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Secondary Towns Integrated Urban Environmental

Improvement Project Project Coordination Office

Babarmahal,
Kathmandu, NEPAL

Ref. No.: 5.3/070-71/240

Date:
2 Jan 2014

✓ Mr. Shailendra Shrestha
The Project Manager
STIUEIP, PIU, Birganj Sub-metropolitan City,
Birganj, Parsa, Nepal

SA DW-Birganj
SBLK
Ysater
gnt
CBK
SBLK
Saula

Sub: STIUEIP (ADB Loan No. 2650 NEP (SF): Birganj SMC – Approval of IEE Report for Sewerage and Drainage Network, WWTP and Road Lane Improvement Sub-Project.

Dear Mr. Shrestha,

It is our pleasure to inform you that GON, Ministry of Urban Development has provided approval on the Initial Environmental Examination (IEE) Report for Sewerage and Drainage Network, WWTP and Road Lane Improvement Sub-project (STIUEIP/W/BRJ/ICB-01), Birganj. Please find the attached approved copy of the report and proceed the implementation of the report for environmental safeguarding as per provision in Environmental Protection Act and Regulation.

Thanking you.

Regards,

(Nava Raj Pyakurel)
Project Deputy Director

Encl.
A Copy of Approved IEE report – 2 set

CC:
The Project Director, STIUEIP/ PCO

Birgunj Sub-Metropolitan City
STIUEIP
Birgunj
Reg. No. 202/060/069
Date: 2060/01/22

Government of Nepal
Ministry of Urban Development
Department of Urban Development and Building
Construction (DUDBC)

Secondary Towns Integrated Urban Environment
Improvement Project (STIUEIP)

INITIAL ENVIRONMENTAL EXAMINATION STUDY
of
**Drainage, Sewerage and Roads Improvement for
Birgunj Municipality**

Proponent

Birgunj Sub-metropolitan City
Project Implementation Unit (PIU)
Secondary Towns Integrated Urban Environment Improvement Project (STIUEIP)
Birgunj, Parsa, Nepal

Prepared by

SMEC International Pty Ltd., Australia in association with Brisbane City Enterprises
Pty Ltd., Australia, CEMAT Consultants (P) Ltd., Nepal and Building Design
Authority, Nepal

August 2013



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Table of Contents

कार्यकारी शारांस	1
वार्डवारी शारांस.....	1
EXECUTIVE SUMMARY	3
1. NAME AND ADDRESS OF THE INSTITUTION PREPARING THE REPORT (PROPONENT) ..	6
1.1. NAME OF THE PROPOSAL	6
1.2. NAME AND ADDRESS OF THE PROPONENT	6
1.3. CONSULTANT PREPARING THE REPORT	6
2. SUMMARY OF THE PROPOSAL AND DETAILED PARTICULARS OF THE AREA WHERE THE PROJECT IS IMPLEMENTED	7
2.1 OBJECTIVE OF THE PROPOSAL.....	7
2.2 IMPACTS ON LAND USE.....	8
2.3 ADVERSE IMPACTS ON ENVIRONMENT, IMPACTS ON HUMAN LIFE AND POPULATION PRESSURE	8
2.4 DAMAGE TO BE SUFFERED BY LOCAL GOODS OR OBJECTS.....	9
2.5 OTHER NECESSARY MATTERS	10
2.5.1 <i>Project Area Delineation</i>	10
2.5.2 <i>IEE Study Methodology</i>	10
2.5.3 <i>Sensitive Objects</i>	12
2.5.4 <i>Baseline Environmental Condition of the Project Area</i>	12
3. TECHNICAL INFORMATION	19
3.1 TYPE OF PROPOSAL AND PROJECT DESCRIPTION (NATURE, LOCATION, SERVICE DELIVERY)	19
3.1.1 <i>Salient Features</i>	20
3.1.2 <i>Service Delivery</i>	24
3.2 TECHNOLOGY AND MATERIALS TO BE USED	24
3.3 EMISSIONS RESULTING FROM THE IMPLEMENTATION OF THE PROPOSAL.....	25
3.4 ENERGY TO BE USED	25
3.5 MANPOWER REQUIREMENTS	26
3.6 RESOURCES REQUIRED FOR THE IMPLEMENTATION OF THE PROPOSAL	26
3.7 TOTAL COST OF THE PROJECT.....	26
3.8 WORK SCHEDULE	26
4. IMPACT OF THE IMPLEMENTATION OF THE PROPOSAL ON THE ENVIRONMENT.....	27
4.1 BENEFICIAL IMPACTS.....	27
4.1.1 <i>Construction Stage</i>	27
4.1.2 <i>Operation and Maintenance Stage</i>	28
4.2 POTENTIAL ENVIRONMENTAL ENHANCEMENT MEASURES	28
4.3 ADVERSE IMPACTS	29
4.3.1 <i>Construction Stage</i>	29
(i) PHYSICAL AND CHEMICAL IMPACTS	29
(ii) BIOLOGICAL IMPACTS.....	31
(iii) SOCIAL, SOCIO-ECONOMIC AND CULTURAL IMPACTS.....	31
4.3.2 <i>Operation and Maintenance Stage</i>	33
(i) PHYSICAL AND CHEMICAL IMPACTS	33
(ii) BIOLOGICAL IMPACTS.....	33
(iii) IMPACTS ON SOCIAL, ECONOMIC, AND CULTURAL DOMAIN.....	33
5. ALTERNATIVE FOR IMPLEMENTATION OF THE PROPOSAL	34
5.1 PROJECT SITE.....	34
5.2 PROJECT DESIGN, TECHNOLOGY SELECTION AND OPERATION	34
5.3 TIME SCHEDULE	35
5.4 NO PROJECT OPTION.....	35
6. MITIGATION MEASURES TO REDUCE OR CONTROL THE IMPACT OF IMPLEMENTATION OF THE PROPOSAL ON THE ENVIRONMENT.....	37
6.1 BENEFIT AUGMENTATION MEASURES	37

6.1.1	Construction Phase	37
6.1.2	Operation and Maintenance Stage	37
6.2	MEASURES TO MITIGATE ADVERSE IMPACTS	38
6.2.1	Construction Phase	38
6.2.2	Operation and Maintenance Phase	45
7.	MATTERS TO BE MONITORED WHILE IMPLEMENTING THE PROPOSAL / MONITORING COST	48
7.1	ENVIRONMENTAL MONITORING / MANAGEMENT ROLES AND RESPONSIBILITY	48
7.2	SITE SUPERVISION, MONITORING AND REPORTING.....	50
7.2.1	Pre-construction Phase	51
7.2.2	Construction Phase	51
7.2.3	Post –Construction Phase	51
7.2.4	Operational and Maintenance Phase	51
7.3	PROJECT ORGANIZATION	52
7.4	MONITORING AND EVALUATION.....	52
7.5	GRIEVANCE RE-DRESS MECHANISM	53
7.6	ACCIDENT RESPONSE MECHANISM DURING CONSTRUCTION.....	54
7.7	ENVIRONMENTAL MANAGEMENT PLAN	55
7.8	PUBLIC RESPONSE	55
7.9	SUMMARY OF MITIGATION COST.....	77
8.	OTHER NECESSARY MATTERS	78
8.1	PERMISSIONS AND CLEARANCES REQUIRED FOR THE PROJECT.....	78
8.2	ENVIRONMENTAL CLEARANCE PROCESS.....	79
8.3	ENHANCEMENT ACTIVITIES	80
8.4	REVIEW OF ACTS, REGULATIONS AND GUIDELINES.....	80
8.4.1	Interim Constitution of Nepal, 2063 (2007)	80
8.4.2	Plans and Policies	80
8.4.3	Acts and Rules	80
8.4.4	Manuals/Guidelines	82
8.4.5	International Conventions and Treaties	82
9.	CONCLUSIONS.....	83

List of Tables

Table 2.1: Environmental Study Categorization.....	7
Table 2.2: PM ₁₀ , TSP, SO ₂ , NO ₂ , CO and Pb Measurements.....	13
Table 3.1: Salient Features.....	20
Table 3.2: Summary of Estimated Quantities of Materials.....	24
Table 3.3: Required Key Plant and Equipments.....	26
Table 7.1: Cost Estimate for Environmental Monitoring During Project Operation.....	53
Table 7.2: Environmental Mitigation Management Plan (EMP).....	56
Table 7.3: Compliance Monitoring Plan.....	67
Table 7.4: Impact Monitoring Plan.....	72
Table 7.5: Summary of Mitigation Cost	77
Table 8.1: Permissions / Clearances Required for the Sub-Project.....	78

List of Figures

Figure 2.1: Project Location Map.....	Annex 7
Figure 2.2: Drainage Layout Map.....	Annex 7
Figure 2.3: Sewerage Layout Map.....	Annex 7
Figure 2.4: Layout Map of Sewerage Treatment Plant.....	Annex 7
Figure 2.5: Direct and Indirect Impact Zone.....	Annex 7
Figure 2.6: Road Network Development Plan.....	Annex 7
Figure 3.1: Typical Road Cross-Section at Core Area.....	Annex 7
Figure 3.2: Typical Road Cross-section for By-pass Road.....	Annex 7
Figure 3.3: Typical Road Cross-section for Canal Road.....	Annex 7
Figure 7.1: Environmental Management Organizational Structure.....	53
Figure 8.1: Procedural Requirement for IEE Clearance.....	79

Annexes

Annex 1	Approved Terms of Reference
Annex 2	Public Notice and Muchulkas (Deed of Inquiries)
Annex 2.1	Public Notice
Annex 2.2	Muchulkas
Annex 3	Recommendation Letters
Annex 4	List of Persons Contacted and Issues Raised
Annex 5	Sample Checklists
Annex 6	Photographs
Annex 7	Figure 2.1: Project Location Map
	Figure 2.2: Drainage Layout Map
	Figure 2.3: Sewerage Layout Map
	Figure 2.4: Layout Map of Sewerage Treatment Plant
	Figure 2.5: Direct and Indirect Impact Zone
	Figure 2.6: Road Network Development Plan
	Figure 3.1: Typical Road Cross-Section at Core Area
	Figure 3.2: Typical Cross-Section for Secondary By-pass Road
	Figure 3.3: Typical Cross-Section for Canal Road
Annex 8	Water Quality Test Results
Annex 9	Rapid Environmental Assessment Checklist

Acronyms

amsl	Above Mean Sea Level
CBOs	Community Based Organizations
CO	Carbon Monoxide
DDC	District Development Committee
DDP	District Development Profile
DSC	Design and Supervision Consultant
DUDBC	Department of Urban Development and Building Construction
EA	Executing Agency
EIA	Environmental Impact Assessment
EMAP	Environment Management Action Plan
EMP	Environmental Monitoring Plan
EPA	Environmental Protection Act
EPR	Environmental Protection Rules
GoN	Government of Nepal
IA	Implementation Agency
IEE	Initial Environmental Examination
km	Kilometre
m	Meter
MoUD	Ministry of Urban Development
NGO	Non Government Organization
NO ₂	Nitrogen Oxide
PAPs	Project Affected Peoples
Pb	Lead
PCO	Project Coordination Office
PD	Project Director
PIU	Project Implementation Unit
PM	Project Manager
PM ₁₀	Particulate Matter of up to 10 microne size
PMSC	Project Management and Support Consultant
PWD	Project Works Directives
SO ₂	Sulfur Dioxide
STIUEIP	Secondary Towns Integrated Urban Environment Improvement Project
STP	Sewerage Treatment Plant
WWTP	Waste Water Treatment Plant
TL	Team Leader
ToR	Terms of Reference
TRP	Tribhuvan Rajpath
TSP	Total Suspended Particle
VDC	Village Development Committee

कार्यकारी शारांस

आयोजनाको पृष्ठभूमि

बीरगञ्ज उप-महानगरपालिका नेपालको मुख्य व्यापारीक केन्द्र हो । यो शहरमा बिभिन्न कारणले वरपरका जिल्ला तथा गा.वि.स. हरू बाट गत एक दशक देखि मानिसहरु स्थानान्तरण भएर आउने क्रम जारी छ । त्यसैको फलस्वरूप यहाँ ढलनिकास, फोहोरमैला, सांगुरा सडकका कारण गाडीको चाप तथा बायु प्रदूषण बढेर बातावरणीय ह्रास भइरहेको छ । उप-महानगरपालिका र यहाँ स्थित अन्य निकायहरुमा सामञ्जस्यको कमिले गर्दा यस्ता समस्याहरु समाधान गर्न कठिनाई भइरहेको छ । धेरैजसो उर्वरा तथा कृषिजन्य जग्गा द्रुत गतिमा बसोबास तथा व्यापारिक क्षेत्रमा परिणत भइरहेको छ । उप-महानगरपालिकाको पूर्वपट्टि स्थित उब्जाउ हुने शिङ्गहा नदी आसपासको उर्वरा जग्गा जनसंख्याको चाप तथा व्यापारीक इलाकामा परिणत भइरहेको छ । वार्ड नम्बर १८ र १९ मा धेरै घरहरु बनिरहेका छन् । यहाँ सडक, ढलनिकास, फोहोरमैला ब्यबस्थापन, आकासे पानीको ब्यबस्थापन, खानेपानी आदीको उचित प्रवन्ध गर्ने बिषय भविष्यकालागी चुनौतिका रुपमा देखिएको छ ।

प्रस्तावित मभौला शहर एकिकृत शहरी बातावरण सुधार आयोजना बीरगञ्ज उप-महानगरपालिकाको ढल तथा ढलनिकास, फोहोरमैला, सडक र सडकमार्ग सुधारका लागि एसियालि विकास बैंकको रिण सहयोगमा पांच बर्षमा कार्यान्वयन सम्पन्न गरिने छ ।

यो आयोजनाको प्रारम्भीक बातावरणीय प्रभाव मुल्याकन बाट आउने प्रतिफल निम्न अनुसार हुने अपेक्षा गरिएको छ: क) सुधारिएको स्यानिटरी ढलको पानी प्रसोधन केन्द्र र ढलनिकास संरचना ख) सुधारिएको शहरी सडक र सडक मार्ग र ग) जनस्वास्थ्य र स्वास्थ्य शिक्षा, फोहोरमैला लाई 3R (reduce, reuse and recycle) को प्रयोगबाट ब्यबस्थापन गर्न प्रचार प्रसार, दक्षता तालिम र साना खालका सामुदायिक सहूलियतहरु आदी समावेस छन् ।

आकासे पानीको बहाव खुला ढलमा प्रयोग गरिदा नराम्रो दुर्गन्ध आउने, जनस्वास्थ्यमा समस्या हुनसक्ने र सम्पूर्ण पानीनै प्रदूषित हुने हुदा यो आयोजनाले आकासे पानीको ढल प्रणालीका साथै स्यानिटरी ढलको पानीलाई राम्रो ब्यवस्थापन गर्नेछ । यो सुधारिएको संरचनामा मानिसको पहुँच नपार्न भूमिगत ढल निकास र भूमिगत ढाकिएको आकासे पानीको निकासको पाइप जडान गर्ने कार्य समावेस हुनेछ ।

प्रस्तावित स्यानिटरी ढलको पानी प्रसोधन केन्द्र बीरगञ्ज उप-महानगरपालिकाको वार्ड नं. २ स्थित छपकैयामा बनाइनेछ । प्रस्तावित बेग्लै ढल निकास र मुख्य तथा सहरको पूर्वी र उत्तरी भागमा आकासे पानीको निकास हालको सडकको विचमा हुनेछ । त्यसैगरी प्रस्तावित सडक तथा सडक मार्ग पहिलेनै रेखाङ्कन भएको सहरको मुख्य भाग र वर्षातको पानीको निकासहुने इलाकामा सिमित हुने छ ।

आयोजनाको सामुदायिक बिकास कार्यक्रम निम्न अनुसारहुनेछ: (क) विद्यालय र समुदायमा जनस्वास्थ्य र स्वास्थ्य शिक्षा, महिला र गरिव सम्मिलित तल्लो बर्गका लागि कार्यक्रम (ख) घरपरीवार र सामुदायिक तहमा 3R (reduce, reuse, recycle) कार्यक्रम (ग) गरिवका लागि दक्षता तालिम (घ) सामुदायिक स्कूल, सामुदायिक पाइखाना र सामुदायिक पानीको पाइप, विरगञ्जका लागि समुहको सहभगिताले तयगरेको प्राथमिकताका आधारमा सुधारिएको स्यानिटरी ढलको पानी निकासको संरचना आदी समावेस छन् ।

जनमानसमा पर्ने फलदायी प्रभाव:

यस आयोजनाबाट जनमानसमा पर्ने फलदायी प्रभावमा स्यानिटरी ढलको पानी तथा ढल निकासको कार्यक्रमका साथै सडक र सडकमार्ग बनेपश्चात बातावरणीय प्रदूषण निम्न अनुसार कम हुनेछ : (क) सडक तथा सडकमार्ग कालोपत्रे गरीने (ख) स्यानिटरी ढलको पानी तथा ढलको पानी जम्मा गर्न र तहलगाउन सुविधा उपलब्ध हुने र (ग) स्यानिटरी ढलको पानी प्रसोधन गरी स्वीकार गर्न सकिनेगरी नदिको पानीमा मिसाउनु आदी समावेस हुनेछ ।

स्यानिटरी ढल निकासको प्रावधानले ढलको पानी प्रसोधन केन्द्रका साथै बीरगञ्ज र वरपरका मानिसको बातावरणीय प्रतिफल तथा समुदाय र कामदारहरुका लागि स्वास्थ्य तथा सुरक्षा सम्बन्धमा टेवा पुग्नेछ । यो आयोजनाले रोजगारीको अवसरबाट आय आर्जनको सुविधाभई त्यहाँका बासिन्दाको आर्थिक अवस्थामा सुधार आउनेछ ।

उक्त ठांड ढाकिएको चौडा सडकबाट सुख्खा समयमा धुलो र बर्षातका समयमा हिलो बाट मुक्त हुनेछ । त्यस्ता संरचनाहरूको बनोटबाट बर्षातको समयमा डुवान हुनबाट पनि बचाउन मद्दत पुग्ने देखिन्छ । पुरा ढाकिएको सडकले दुर्गन्ध लाई कम गर्नुका साथै वरिपरिको बातावरणलाई पनि मनमोहक बनाउने देखिन्छ । सडकको दुवैतिर र स्यानिटरी ढल प्रसोधन केन्द्रको वरिपरी रुखहरू रोपिने हंदा त्यहां हरियाली हुने र जमिनको वनावट पनि राम्रो देखिनुका साथै प्रसोधन केन्द्र तथा बाहनबाट आउने दुर्गन्ध र ध्वनी प्रदूषण पनि कम हुने देखिन्छ ।

जनमानसमा पर्ने प्रतिकूल प्रभाव:

आयोजना निर्माण अवधिमा अस्थायी तवरमा स्थानिय तथा साना किसिमका प्रतिकूल प्रभावहरू पर्छन् जस्ताई कम गर्न सकिन्छ । यस आयोजनाबाट अस्थायी तवरमा हुन सक्ने प्रतिकूल असरहरूमा उपभोग भइरहेका जनताका सुबिधा तथा सेवाहरू केही समयका लागि अवरुद्ध हुन सक्छन् जस्मा विद्युतका पोल तथा लाइनहरू, टेलिफोनका पोल तथा लाइनहरू, अफिल फाइवर, पिउने पानीका पाइपहरू, बस चल्ने सडक, ढल तथा कल्मटहरू पुल तथा नहरका बाटाहरू पर्ने सक्छन् । सडकमा भएका केही रुखहरू ढालिने छन् । राम्रो संग व्यवस्थापन नगरिएका फोहर तथा कामनलाग्ने बस्तुहरूको थुप्रोबाट बायु र पानी प्रदूषणमा बृद्धिहुन सक्छ । सडक बनाउदा ट्राफिकका लागि राम्रो व्यवस्था नभएमा दुर्घटना हुने खतरा बढ्छ । निर्माणकार्यबाट धुलो तथा धुंवा उड्नाले बायु प्रदूषण, पानी प्रदूषण, ढल निकासमा व्यवधान, सडक तथा कामगर्ने ठांडमा हुने दुर्घटना, सामाजिक अस्थिरता तथा स्थानिय जनसमुदायमा पर्ने सक्ने अन्य असरहरूलाई लिन सकिन्छ ।

सडक फराकिलो पार्ने कार्य र ढल बनाउने अवधिभर मानिस ओहोरदोहोर गर्न तथा गाडी आवत जावत गर्न असजिलो हुने देखिन्छ । निर्माण अवधिभर मानिसको ब्यापार तथा अन्य रहनसहनमा समेत बाधा पर्ने देखिन्छ । अस्थायी तवरमा पर्ने अन्य असरमा काम अवधिमा माटो आदी थुपारीए बाट वरपरका घरहरूमा पर्ने असजिलोलाई लिन सकिन्छ । त्यसैगरी कामदारहरू सदा धुलो र अन्य एक्सिडेन्टको सामाना गर्नुपर्ने भएबाट उनीहरूको स्वास्थ्य तथा अरु खतराको बिच काम गर्नुपर्ने हुन्छ ।

न्युनिकरणका उपायहरू:

माथि उल्लेखित असरहरू आयोजना निर्माण अवधिभरमात्र हुने अस्थायी असरहरू भएका र त्यसलाई बिभिन्न न्युनिकरणका उपायहरू अबलम्वन गरिने हुनाले त्यसबाट हुने बातावरणीय प्रभावहरू कम रहेका छन् । धेरै जसो पहिचान गरिएका तथा हुन सक्ने प्रतिकूल प्रभावहरू साना, अस्थायी, छोटो अवधिका र ति सबै नै निर्माण अवधि संग मात्र सम्बद्ध हुने खालका छन् ।

न्युनिकरणका प्रायसबै उपायहरूको लागत डिजाइन र इष्टिमेटमा समावेश गरिएको छ । यसोभएतापनि आयोजनाको डिजाइन र निर्माण कन्ट्र्याक्टमा नदिइएका न्युनिकरणका लागि चाहिने लागतको फेहरिष्ट सिभिल कन्ट्र्याक्टमा समावेश गर्न बेग्लै इष्टिमेट गरिएकोछ । यस्तो रकमको व्यवस्था बृक्षरोपण गर्न, हरियाली बढाउन, भत्काइएका संरचन पुनः स्थापित गर्नुका साथै आयोजनाको निर्माण तथा संचालनका बेला बायु, जल तथा ध्वनी प्रदूषण अनुगमनका लागि छुट्याइएको हो ।

बातावरणीय व्यवस्थापन योजना:

आयोजनाको निर्माण कार्य तथा संचालनबाट उत्पन्न प्रतिकूल असरहरूको न्युनिकरणका उपायहरूको उचित कार्यान्वयनका लागि एक बातावरणीय व्यवस्थापन योजना तर्जुमा गरी लागु गरिने छ । यस आयोजनाले बातावरणीय व्यवस्थापनको नियम तथा जवाफदेहीपन, डिजाइन र विभिन्न कृयाकलापहरूको व्यवस्थापन, साईट निरिक्षण, अनुगमन र रिपोर्टिङ्ग, रेकर्डस र करेक्टिभ मेजर्स, प्रस्तावनाको सुधार र प्रभाव न्युनिकरणका लागि लागतको आंकलनमा ध्यानदिई कार्य गर्नेछ ।

निचोड:

माथि उल्लेख भएका असरहरूलाई बातावरणीय व्यवस्थापन योजनाको अधिनमारही विभिन्न न्युनिकरणका उपाहरू अबलम्वन गर्नेगरी यो आयोजना कार्यान्वयन गरिनेछ, जुन कार्यसम्पादको करारनामामा समावेश हुनेछ ।

EXECUTIVE SUMMARY

Project Background

Birgunj Sub-Metropolitan City is Nepal's principal trade centre. The city has experienced rapid growth especially in the past decade, due to migration to the city from peripheral districts and VDCs for security reasons, or other reasons such as for a better livelihood. There is consequently environmental deterioration resulting from inadequate sanitation and drainage, and mounting traffic congestion mainly in the main road leading to poor air quality in the city. The individual institutional efforts of both the sub-metropolis and sectoral agencies in addressing these issues, has remained uncoordinated and grossly inadequate. Most of the fertile agricultural fields are rapidly converting into residential and commercial areas. The eastern part of the sub-metropolis which lies in the flood-prone area of the Singaha River is also being changed to residential and commercial areas due to pressure of an increase in the population in the sub-metropolitan city. Most buildings are being constructed in Wards 18 and 19. The infrastructural facilities such as roads, sewer and storm-water drains and water supply, need to be developed to match the current rate of other development, which remains a major future concern.

The proposed sub-project (STIUEIP-Birgunj) will be implemented over five year's period supported by Asian Development Bank (ADB) through Project Loans for the improvement of drainage, sewerage and road and lanes of Birgunj Municipality.

The expected outputs of the Subproject under the components considered in the IEE study includes: (i) Improved drainage and sewerage systems; (ii) Improved urban roads and lanes; and (iii) Community development programs undertaken, including health and hygiene education, 3R (reduce, reuse and recycle) of solid waste, promotion, skills training and investment in small-scale community facilities.

The sub-project will improve storm-water drainage systems together with wastewater management systems, as storm water drainage is currently being used as open sewers, causing bad odors, health risks and pollution of the watercourses. The improved system will be underground separate sewer and underground/covered storm water drainage to avoid human intrusion. Urban roads and lanes will be reinstated or upgraded where drainage and sewerage pipe networks work will be undertaken. The proposed waste water treatment plant is located in Chhapkaiya Ward No. 2 of Birgunj Municipality consisting of stabilization ponds (anaerobic, facultative and sludge digestion yard). The proposed separate sewerage and storm water drainage (core area), storm water drainage (east and north of Birgunj town) is located within the existing roads. Similarly the proposed Roads and Lanes are limited to already demarcated road width located within the core areas and storm water diversion areas.

The subprojects subcomponent on Community Development Programs mainly consist of (i) health and hygiene education programs in communities and schools, in particular targeting women and vulnerable groups including the poor, (ii) promotion of household and/or community level 3R (reduce, reuse, recycle) activities (iii) skills training mainly for the poor, and (iv) investment in small-scale facilities such as public schools and community toilets and communal water taps, in accordance with the priorities set by communities, with an aim at achieving social inclusiveness and improved sanitation in Birgunj.

Anticipated Beneficial Impacts

The drainage and sanitation program together with the roads and lanes component will have environmental benefits through reduction in pollution by a) sealing of the roads and lanes b)

providing better access facilities for storm water and sanitary sewer collection and disposal, and c) treatment of waste water to acceptable level prior discharge of effluent to river waterbody. The sanitary sewerage component will bring substantial environmental, community, and workers health and safety benefits to the Birgunj and the surrounding communities by providing appropriate waste water management system, including new waste water treatment plant. The subproject will also generate employment opportunities to the local people and thus will improve local economic and livelihood conditions.

The sealed pavement covering full road width will eliminate dust nuisance during dry and mud hazard during monsoon. The extension, rehabilitation, reinstatement and new construction of drainage and sanitary sewer will minimize inundation problem that frequently occurs during monsoon. The underground/covered drainage and sewerage including covered road side drain will reduce odor nuisance, health hazard and will enhance the looks of the surrounding environment. With designed greenery along the road way and plantation of trees along the buffer area around the treatment plant will also enhance the landscape aesthetics and attenuation of noise and odor created by vehicles and treatment activities respectively.

Anticipated Adverse Impacts

The planned subproject component would only have small scale, localized temporary impacts during construction that can be mitigated. Potential adverse impacts due to the proposed subproject are temporary disruption of public utilities and existing services as: electrical/telephone line, water supply pipelines and drainage / cross-drainage structures. Clearing of roadside vegetation under minimal quantity may take place. There could be risk of health hazard due to overflows and flooding of storm and waste water and nuisance to neighboring areas due to odor and flooding from drain. Water pollution could result due to infiltration from interception chambers and sewer. The drainage, sewerage and road construction will provoke accident risks if the road safety and safe diversion is not managed for smooth flow of traffic.

Nuisance to pedestrian and traffic congestion will occur due to excavation of roads and path from where sewer lines are to be constructed. Public/private utilities will be affected obstructing access to them and loss of livelihood for businesses due to excavation works. Risk will be there for temporary silt runoff due to disposal of excavated soil and erosion on excavated trenchline endangering adjacent buildings over narrow road stretch. Workers will always be prone to health and safety hazard from dust and other accidents.

Increase in noise level, air pollution due to dust particles, pollution of water, poor sanitation, road and work site accidents, land degradation due to excessive quarrying, social conflicts and other pressures on the local communities are the possible impacts during construction. During operation stage, blockage of drains, culverts, nuisance to neighboring areas of WWTP due to odor, insects and rodent, removal and disposal of sludge, pollution of ground/river water due to seepage of waste water are some of the adverse issue that may occur.

Mitigation Measures

The identified impacts are temporary associated with construction phase which can be mitigated. Rehabilitation, extension and construction of adequate drainage / cross-drainage and sewerage structures consisting of concrete hume pipe and well sealed cemented surface is provisioned in the design to avoid seepage and infiltration. The mitigation measures such as vegetative cover all around the demarcated buffer zone area of WWTP and road side plantation has been adopted for attenuation of noise, odor and to enhance landscape aesthetic. Road safety and occupational safety and hazards mitigation has been

included in the detailed design. Mitigation measures for sanitation and health, social and economic impacts are recommended and have been addressed in the detailed design for implementation during project execution.

Most of the cost for mitigation measure is included in the in-built design and estimate. However, some of the mitigation costs not included in the project design and construction contract are estimated separately for inclusion in the Civil Works contract. Such costs include the costs for vegetation and plantation of trees, reinstatement of public utilities/services, spoil disposal etc., and cost for monitoring of water quality during construction and operation phase etc.

Environmental Management Plan

The Environmental Management Plan (EMP) delineates key issues likely to arise from Project implementation, and proposes mitigation measures, including monitoring schedule and responsibility. The EMP also outlines environmental management roles and responsibilities, subproject design and construction management of different activities, site supervision, monitoring and reporting, records, and corrective measures, improvement proposals, and cost estimates for mitigation measures.

Conclusion

The identified impacts are temporary associated with construction phase which can be mitigated and is likely to have minimal detrimental effect on environment. The subproject will be implemented with strict adherence to the mitigation measures as prescribed in the Environmental Mitigation Management Plan which shall form part of the Bidding Document.

CHAPTER 1

1. NAME AND ADDRESS OF THE INSTITUTION PREPARING THE REPORT (PROPONENT)

1.1. Name of the Proposal

Name of the Proposal is "*Initial Environmental Examination for Improvement of Drainage, Sewerage, Road and Lanes for Birgunj Sub-metropolitan City under Secondary Towns Integrated Urban Environment Improvement Project*".

1.2. Name and Address of the Proponent

Project Implementation Agency

Birgunj Sub-Metropolitan City
Project Implementation Unit (PIU)
Secondary Towns Integrated Urban Environment Improvement Project (STIUEIP)
Birgunj, Parsa, Nepal
Telephone: +977 51532186
Facsimile: +977 51521220
E-mail: stiueip.birganj@gmail.com

Project Executing Agency

Ministry of Urban Development (MoUD)

Co-ordination, Monitoring and Implementation

The Project Coordination Office (PCO) in Department of Urban Development and Building Construction (DUDBC) is responsible for overall coordination, monitoring and implementation of STIUEIP assisted by the Project Management Support Consultants (PMSC).

1.3. Consultant Preparing the Report

The IEE study report for Improvement of Drainage, Sewerage, Road and Lanes for Birgunj Sub-metropolitan City under STIUEIP has been prepared by:

SMEC International Pty Ltd., Australia in association with Brisbane City Enterprises Pty Ltd., Australia, CEMAT Consultants (P) Ltd., Nepal and Building Design Authority Nepal
Kamaladi, Kathmandu, Nepal
Tel: 4247706, 4248200
Fax: (977) 1 4223536

Site Office:

Shreepur, Ward No. 14
Birgunj, Nepal
Tel: 051-522768

CHAPTER 2

2. SUMMARY OF THE PROPOSAL AND DETAILED PARTICULARS OF THE AREA WHERE THE PROJECT IS IMPLEMENTED

2.1 Objective of the Proposal

The expected outputs of the Subproject under the components considered in the IEE study are as follows:

- Improved drainage and sewerage systems.
- Improved urban roads and lanes.
- Community development programs undertaken, including health and hygiene education, 3R (reduce, reuse and recycle) of solid waste, promotion, skills training and investment in small-scale community facilities.

Relevancy of the Proposal

The IEE Study of the Proposal is mandatory as per the provision of Governments Environmental Protection Regulation (EPR) as detailed in the table below. The subproject area does not fall in any restricted areas, places of cultural, historical and archeological importance / monuments, conservation areas, wild life national parks, and any other places where the law of the land prohibits any construction activities.

Table 2.1: Environmental Study Catetgorization

Project Component	Study Requirement	EPR Clause No.	EPR Clause Statement
Sewerage Treatment Plant	IEE	Schedule 1, Clause I1, Subclause (c)	<ul style="list-style-type: none"> • Requires IEE study for "selecting, picking, disposing, and recycling waste through chemical, mechanical or biological techniques in an area ranging between 5 – 10 hectares". • The proposed waste stabilization pond covering an area of 6 ha land at paddy field already owned by Municipality at Chhapkaiya (Ward No. 2) will require an IEE study as per the stated provision.
Drainage Sewerage Work	IEE	Schedule 1, Clause I1, Subclause (e)	<ul style="list-style-type: none"> • Requires IEE study for "operation of drainage/sewerage work with investment more than NRs. 5,000,000". • The proposed drainage/sewerage work will have investment of more than NRs. 5,000,000 thus will require an IEE study.
Roads Development	IEE	Schedule 1, Clause D1, Subclause (a & b) Schedule 1, Clause D6	<ul style="list-style-type: none"> • Requires IEE study for the construction of District and Urban roads. • Requires IEE for improvement of the standard, rehabilitation and reconstruction of national highways and feeder roads. • The roads development (blacktop), resurfacing/upgrading and neighbourhood access improvement will require an IEE study as per the stated provision.
Construction	IEE	Schedule1,	<ul style="list-style-type: none"> • Requires IEE study for construction of

Project Component	Study Requirement	EPR Clause No.	EPR Clause Statement
of Toilets		Clause E1	residential, commercial, and their combination buildings with built up area or floor area ranging between 5000 to 10,000 m ² . <ul style="list-style-type: none"> The construction of public toilets (~12 nos.), school toilets (~8 nos.), and tube well drilling and hand pumps for improved toilets (~2000 families) will require an IEE study as per the stated provision as the intervention will not exceed 10,000 m².

Thus with the provisions mentioned above, the proposal requires an IEE study and the approval of the IEE Report by the concerned agency, Ministry of Urban Development.

2.2 Impacts on Land Use

The proposed drainage, Sewerage and roads improvement for Birgunj Sub-metropolitan city covers almost all the wards of Birgunj Municipality. Newly proposed storm water drain mainly covers area along east side of Tribhuvan Rajpath (TRP) stretching north to south with draining off to Singaha river. The improved separate sewerage and drainage system will basically cover core project area west of TRP stretching north (Gandak Canal) to south including area between railway road and TRP. The wastewater from core area will drain to chhapkaiya where treatment process will take place and finally the effluent with 50mg/l BOD will be discharged to Sirsiya River while storm water drain is planned for direct discharge to the Sirsiya River. Since the drainage, sewerage and roads improvement will take place along the available city road width, the impact on land use due to the project activities will be minimal. However, the waste water treatment plant site covering an area of 6 ha land at Chhapkaiya (ward no. 2) already acquired by Municipality will be converted from cultivated land to waste water processing centre consisting various stabilization ponds and pretreatment units. However, creation of buffer zone all around the plant with plantation of trees will minimize alteration in landuse.

2.3 Adverse Impacts on Environment, Impacts on Human Life and Population Pressure

The predicted environmental and social impacts will be both beneficial and adverse.

Beneficial Impacts

As mentioned earlier section, the main subproject components considered under IEE study for Birgunj Municipality are drainage, sewerage, road and lanes improvement. The drainage and sanitation program together with the roads and lanes component will have environmental benefits through reduction in pollution by a) sealing of the roads and lanes b) providing better access facilities for storm water and sanitary sewer collection and disposal, and c) treatment of waste water to acceptable level prior discharge of effluent to river waterbody. The sanitary sewerage component will bring substantial environmental, community, and workers health and safety benefits to the Birgunj and the surrounding communities by providing appropriate waste water management system, including new waste water treatment plant. The subproject will also generate employment opportunities to the local people and thus will improve local economic and livelihood conditions.

The sealed pavement covering full road width will eliminate dust nuisance during dry and mud hazard during monsoon. The extension, rehabilitation, reinstatement and new

construction of drainage and sanitary sewer will minimize inundation problem that frequently occurs during monsoon. The underground/covered drainage and sewerage including covered road side drain will reduce odor nuisance, health hazard and will enhance the looks of the surrounding environment. With designed greenery along the road way and plantation of trees along the buffer area around the treatment plant will also enhance the landscape aesthetics and attenuation of noise and odor created by vehicles and treatment activities respectively.

Adverse Impacts

The planned subproject component would only have small scale, localized temporary impacts during construction that can be mitigated. Potential adverse impacts due to the proposed project are temporary disruption of public utilities and existing services as: electrical/telephone line, water supply pipelines and drainage / cross-drainage structures. Clearing of roadside vegetation under minimal quantity may take place. There could be risk of health hazard due to overflows and flooding of storm and waste water and nuisance to neighboring areas due to odor and flooding from drain. Water pollution could result due to infiltration from interception chambers and sewer. The drainage, sewerage and road construction will provoke accident risks if the road safety and safe diversion is not managed for smooth flow of traffic.

Nuisance to pedestrian and traffic congestion will occur due to excavation of roads and path from where sewer lines are to be constructed. Public/private utilities will be affected obstructing access to them and loss of livelihood for businesses due to excavation works. Risk will be there for temporary silt runoff due to disposal of excavated soil and erosion on excavated trenchline endangering adjacent buildings over narrow road stretch. Workers will always be prone to health and safety hazard from dust and other accidents.

Increase in noise level, air pollution due to dust particles, pollution of water, poor sanitation, road and work site accidents, land degradation due to excessive quarrying, social conflicts and other pressures on the local communities are the possible impacts during construction. During operation stage, blockage of drains, culverts, nuisance to neighboring areas of WWTP due to odor, insects and rodent, removal and disposal of sludge, pollution of ground/river water due to seepage of waste water are some of the adverse issue that may occur.

The identified impacts are temporary associated with construction phase which can be mitigated. Rehabilitation, extension and construction of adequate drainage / cross-drainage and sewerage structures consisting of concrete hume pipe and well sealed cemented surface is provisioned in the design to avoid seepage and infiltration. The mitigation measures such as vegetative cover all around the demarcated buffer zone area of WWTP and road side plantation has been adopted for attenuation of noise, odor and to enhance landscape aesthetic. Road safety and occupational safety and hazards mitigation has been included in the technical detailed design. Mitigation measures for sanitation and health, social and economic impacts are recommended and have been addressed in the detailed technical design for implementation during project execution.

2.4 Damage to be Suffered by Local Goods or Objects

Considerable amount of earth material is to be excavated, placed along road side temporarily and backfilled again upon laying of drainage and sewerage pipes. Construction material as embankmentfill, gravel, aggregates, sand will have to be extracted and transported from suitable quarry sites. It is approximately estimated that around 726,009m³ of earthworks in excavation, around 298,552m³ of backfill, 82,725m³ of subbase/base and around 205,375m³ of suitable material will be required for this purpose. Spoil disposal

amounts around 79,041m³. Similarly, locally available construction materials like aggregate for Bituminous work/concrete work will be required. Uncontrolled riverside quarrying could disrupt natural river flow regime which could trigger unexpected flood disaster to nearby settlements. Likely chances exists in deterioration of existing approach roads leading to quarry sites due to increased mobility of construction vehicle. Further, haphazard storage of construction material could lead to traffic hazard, dust nuisance and siltation on adjacent land due to surface runoff. These will require proper and appropriate handling of construction materials.

2.5 Other Necessary Matters

2.5.1 Project Area Delineation

The Project area impact for the IEE study has been divided into two parts on the basis of proximity and magnitude of the impact. They are "Direct Impact Zone" and "Indirect Impact Zone". These are as delineated below and shown in **Figure 2.5** kept in Annex 7.

Direct Impact Zone: The direct impact zone delineates area occupied by the drainage, sewerage, roads and lanes improvement area within the Birgunj Sub-metropolitan City.

Indirect Impact Zone: The indirect impact zone delineates greater area (i.e. administrative boundary of affected VDC/Municipality) which will directly or indirectly be influenced by the implementation of the project work. These includes administrative boundary of Parsa District and Birgunj Sub-metropolitan City.

The project location map and layout map of drainage, sewerage, sewerage treatment plant and road network development is presented in **Figures 2.1, 2.2, 2.3, 2.4, 2.6** and kept in **Annex 7**.

2.5.2 IEE Study Methodology

The IEE has met the requirements of National Legislation of Nepal. The approach, methodology and procedure followed while preparing the study report is as detailed below.

Desk Study

The desk study includes a review of the EPA, EPR, PWD, relevant project reports, review of IEE reports of similar projects, Reference Manual for Environmental and Social Aspects of Integrated Road Development, relevant Environmental Management Guidelines of DoR for preparation of necessary documents regarding the requirements of IEE. Questionnaire and checklist for public consultation and data collection on physical, biological and socio-economic and cultural baseline environment of the project area was prepared. The Work schedule (ToR) was prepared by reviewing project documents; prioritizing significant environmental impacts/issues through site visit and information from secondary sources; and interaction with stakeholders and the project area people about environmental issues. The draft ToR was prepared and submitted for approval on 6th August 2012. Final ToR was submitted on October 05, 2012 incorporating comments and suggestions received from PCO dated September 30, 2012. The TOR was finally approved by MoUD on December 20, 2012 with the notification from PCO on December 26, 2012. The Approved ToR from MoUD is kept in **Annex 1** of this report.

To plan the subsequent field works and to determine the depth of the study to be conducted, the Acts, Policies, Regulations and Guidelines, as listed in the ToR, has been reviewed carefully.

Public Consultation and Disclosure

Upon approval of the ToR, a 15 days public notice dated January 03, 2013 (2069/09/19) was published in Nepal Samacharpatra (national daily) for consultation and collection of reactions, suggestions and comments from the project area stakeholders/local people for the purpose of IEE preparation. A copy of public notice was displayed in the office notice board of concerned DDC, Wards of Municipality, local schools, hospitals, health posts, public places and other relevant concerned offices. The deed of public enquiry (Muchulka) of that deed was prepared. The Public Notice and Muchulkas are annexed in **Annex 2** of this report. The recommendation letters from the concerned VDCs, and Municipality is kept in **Annex 3** and list of persons contacted issues raised is kept in **Annex 4** of this report. The public consultation was conducted from 2070-1-8 to 2070-1-10 covering all the wards of Birgunj Municipality at their respective ward offices. Besides, interaction discussion was also conducted with locals. The details are presented in **Annex 4**. The following are the summary of major issues raised:

- Almost all the stakeholders raised the same voice expressing their concern regarding drainage problem faced by Birgunj City constituting blockage of drain, flooding, inundation and poor outlets specifically during monsoon. The drainage and sewerage design and implementation should be effective enough to overcome the problem having proper drainage outlets so as to eliminate swampy areas (principal site for mosquito breeding).
- All of them were very happy to learn about the project and hoped that the project will be implemented as soon as possible.

The issue raised during public consultation has been addressed to the extent possible in the detailed design. The IEE report is accessible to interested parties and general public through information center of MoUD, including DUDBC website.

Field Study

The field visit was made to collect baseline information on physical, biological and socio-economic & cultural environment of the project with regards to issues as indicated in the TOR. The collected raw baseline data were verified by citing standard references and evaluated before accessing impacts on them. The sample checklists used for field study and photographs of the project area is kept in **Annex 5** and **Annex 6** respectively.

Primary and Secondary data were collected as follows:

Social and Economic Environment

CBS 2011 and CBS 2001 (for data not available in CBS 2011) were referred to collect information on social and Economic features of the project area

Cultural and Physical Environment

CBS, direct observation, field tests and various literatures were referred to depict data on physical and cultural sites.

Biological Environment

Direct observation and measurement was applied in collection of vegetation to be affected by the project specifically road side plantation that will require clearance.

Chemical Environment

Literatures and water quality analysis were made to depict data on air and water quality of the project vicinity.

Report Preparation

IEE report has been prepared as per GoN requirement in accordance with the contents given in schedule-5 of the EPR'97. Final report to be prepared upon incorporating comments and suggestions on the draft report.

2.5.3 Sensitive Objects

The sub-project as such will not affect any sensitive objects as temples and places of historical significance. Few temporary shops and structures placed illegally within the RoW may need clearance providing prior notice with reasonable timeframe during project implementation. The issue needs to be discussed through public consultation with the Municipality, and relevant local stakeholders for removal and relocation at appropriate place.

2.5.4 Baseline Environmental Condition of the Project Area

This section describes the physical, biological, socio-economic and cultural environment of the project area. The information provided in this section is based on (i) primary field studies conducted by the Consultants' Team, (ii) Public Consultation undertaken and (iii) secondary data on bio-physical, ecological, social and other relevant information. For technical details, coordination was maintained with detail survey and design study team.

2.5.4.1 Physical and Chemical Environment

Geophysical: Location

Birgunj Sub-metropolitan City is situated in the Narayani zone and the district of Parsa in the central development region of Nepal. It is one of the business economic and industrial zone of central region, covering an area of 23.37 km². The city lies at 27°02'30" to 26°57'45" North and 84°55'00" to 84°52' 15" East. The eastern part of the city is bordered by another district – Bara whereas the southern and south western part by Bihar State of India.

The city borders India, Sirsiya dry port and Bishrampur VDC in the south, the Sirsiya River, Ramgadh VDC in the west, Parwanipur and Bahundangi VDC in the north, Parsauni, Itiyahi VDC and the Singaha River in the east. The city has a total area of 2337 ha, divided into 19 wards with their areas in a range of 4.88 ha (Ward No. 9) to 496.03 ha (Ward No. 19). The city has an elongated shape with a maximum north-south length of 8 km and east-west width of 4 km. The altitude ranges from about 78m in the south near the border area to 87m in the north. The project location map is presented in Figure: 2.1.

Birgunj is quite accessible. It is linked with different places via the Tribhuvan Rajpath and East-West Highway. There are 115 km of black topped road, 83 km gravelled and 82 km earthen roads and a number of trails within the municipality. Overall roads in Birgunj are in a poor condition. Simara Airport is located about 22 km to the north of the city.

Topography and Soil

Birgunj Municipality is located in the Terai plain (northward extension of Indo-Gangetic plain). The topography exhibits a gradual slope of about 1:900 from north to southeast resembling Terai plain (northward extension of Indo-Gangetic plain). The altitude ranges from about 78m in the south near border area to 87m in the north. However there is high micro-topographical variation. Two major rivers are features of Birgunj namely, the Sirsiya

River to the west and the Singaha River to the east. In addition to these two rivers there is Gandak Canal in the north. The land is fertile soil with mix of clay, silt and sand.

Geology

The area consists mainly of quaternary sediments. It is composed of very fertile soil mixed of clay, silt and sand.

Hydrology: Surface and Ground Water

The area is drained by two rivers – the Sirsiya River in the west and the Singaha River in the east. On the north, there is Gandak Canal running along Gandak Road from the northwest to the southeast. This canal prevents surface runoff from the areas to the north of Gandak Road flowing into Birgunj. The Singaha River originates about 4 km upstream from the northern border of the municipality whereas the Sirsiya River originates from far northern area. These rivers are flooded during summer monsoon and river bank cutting particularly at the meander bend during flooding is common. The water in the river during dry period is very low. Groundwater table depth is estimated to be between 9-15 m deep with 1-2 m fluctuation during wet and dry season.

Climate

The climatic condition is sub-tropical monsoon with very hot and wet summer. The mean annual temperature ranges from 23.8°C to 24.5°C. The maximum extreme daily temperature recorded is 41.6°C in May and minimum is 4.5°C in January. The annual rainfall ranges from about 1300mm to 2800mm with an average of 1800mm. More than 82% precipitation occurs in 4 summer months (June to September). Average sunshine duration ranges from 7.26 – 7.50 hr/d and average wind speed ranges from 1.95 – 2.31 km/hr.

Land Use and Land Cover

The dominant land use type is still agriculture. Nearly 73% area is under cultivation followed by residential area (11%), rural residential area (2.1%), business mixed with residential area (4.3%), industrial area (3%), institutional area (4.3%), open land (0.7%), and ponds (0.4%).

Air, Noise and Water Quality

Information on air quality is scanty. The only available data is 8-hour survey conducted in 2000 (Table 2.2). It shows a very high concentration of particulate matters less than 10 microgram and total suspended particulates in the air as compared to the national standard and the standards fixed by WHO. Birgunj had higher carbon monoxide and lead concentration in the air as compared to other part of the country located in middle hills.

Table 2.2: PM₁₀, TSP, SO₂, NO₂, CO, and Pb Measurements

Site	Altitude (masl)	Date	Time	Parameters					
				PM10 (µg/m ³)	TSP (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)	CO (µg/m ³)	Pb (µg/m ³)
Birgunj	091	30/11/2000	10:00 – 18:00	782.90	567.80	63.00	23.00	378.00	0.27
Tolerance				120	230	70	80	100,000 (15 min)	0.50

Source: Nepal Health Research Council and Nepal Environmental and Scientific Services (P) Ltd., Nepal Gazette B.S. 2060/4/19 (August 2003).

Many families in these municipalities are using fuel-wood and dung-cakes for cooking. Indoor pollution is another environmental problems associated with health hazard.

The ground water quality in Birgunj has been found to have a level of arsenic concentration that is unsafe for drinking. Arsenic concentration in the ground water is said to be much higher than the level prescribed by the World Health Organization. Water quality test result is kept in **Annex 8**.

As the area lies in the urban settings affected by industrial emissions, vehicular movement and other infrastructures developments, the air, noise and water quality of the project area is assumed to be disturbed.

Storm Water Drain

According to Municipality Profile (2007), there are approximately 4.7km main storm water drains and 40.5km secondary storm water drains in Birgunj. Open drains have been constructed in all the wards whereas covered drain exists in the areas from Ghantaghar to the hospital and Adarsnagar areas.

The main drains referred as MD1 run in a general direction from the north to the southwest in the core area to the west of Main Road in Birgunj. Most secondary drains in the core area to the west connect MD1. The drainage networks in areas to the east of Main Road in Birgunj have inadequate hydraulic capacity to drain surface runoff effectively during monsoon seasons and they end up swamp areas without drainage outfalls.

Most open drains in Birgunj do not function properly due to the lack of maintenance as well as their misuse by the local people as waste dump sites. These drains are fully filled with debris and wastes all the time and overgrown weeds are covered entire cross sections in most earthen sections.

Material Sources

Availability of materials for construction and their suitability of different use were investigated. During field survey, the alluvium deposits of Rapti and Churiya Rivers between Hetuada and Amlekhgunj (around 45 km north of Birgunj) is noted to have abundant quantity of boulder, cobble, gravel, sand, embankment fill, sub-base, base and pavement materials. The quarrying of materials is being under operation at many locations under permanent basis. Since the extraction of construction material is presently being carried out obtaining permission from the concerned VDC upon payment of local tax, it is envisaged that the materials will also be available to the project. However, the project should conduct controlled quarrying in order to minimize and rectify the already degraded sites.

Sewerage

There are neither public centralized sewerage network systems for sewage collection nor sewage treatment plants for sewage disposal in Birgunj. The open drains have been used for waste water collection and disposal. The on-site sanitation with septic tank and soak pits has been adopted for the sewage disposal from settlements.

Though most of the houses have septic tanks, but very few have soak pits. As such, the septic tank effluents from most houses are directly discharged into the open road-side storm water drains. The municipality does not have facilities for the collection and disposal of septic tank solids. Generally the private operators provide these kinds of services and they have been found to dispose the solids in the road-side drains or on the vacant land.

The town is seriously short of public toilets. There are only seven public toilets in the city. Most of the residents living in settlements belong to slum and squatter areas without toilet facilities have to sort to defecating either in the open fields or in open drains. Most of the existing public toilets have not been maintained after their construction.

2.5.4.2 Biological Environment

The subproject area does not fall in any restricted areas, places of cultural, historical and archeological importance / monuments, conservation areas, wild life national parks, and any other places where the law of the land prohibits any construction activities.

Flora and Fauna

Almost all the area within the municipality is under cultivation and built up area. There is no natural forest area with considerable size except a few patches of orchard and nurseries scattered in different places. The flora species found in Birgunj area are Sisau (*dalbergia sisso*), Siris (*albisia sp*), Kadam (*anthocephalus chinensis*), and groves of Bamboo (*Bombax sp*). Groves of bamboo are common found in the area. Exotic species such as Sapeta is also found in different parts. Kans and Narkat are also found in the flood plain and banks along the river. The proposed waste water treatment plant site covering 6 ha land already acquired by the Municipality constitutes open paddy field.

There is no community forest and other forest type of national significance within the direct impact zone.

The project area forms an urban / semi urban area with non existence of wildlife habitat. Mammals reported from the project area are Nyauri (*Herpestes edwardsi*), Syal (*Canis aureus*) and Musa (*Rattus rattus*). Major bird species reported are Battai , Bhangera *Passer domestica*), Saras (*Grus antigone*), Suga (*Psittacala krameri*), Koili (*Eudynamys scolopacea*), Parewa (*Columba livia*), Dhukur (*Streptopelia orientalis*), Dangre (*Aeridotheres fuscus*) and Kauwa (*Corvus macrorhynchos*).

Ponds, rivers, occational ponds and streams provide aquatic habitats in which small fish, frogs and a range of invertebrates are invariably found. It is likely that surface water flows in the wet season are important for the distribution of aquatic organisms.

2.5.4.3 Socio-economic and Cultural Environment

Population

According to Population Census of 2011, Birgunj Municipality had a total population of 135,904 with annual growth rate of 5.01%. Male comprises about 53.4% and female 46.6%. There are more than 70 caste/ethnic groups. Among them 20 caste/ethnic groups have population more than 1% in the total population. Those are Muslim (17.4%), Kanu (7.3%), Hill Brahamin (7.3%), Kurmi (5.9%), Newar (5.6%), Kalwar (4.5%), Marwadi (4.4%), Sonar (4.1%), Chhetry (3.9%), Baniya (3.3%), Kayastha (3.3%), Yadav (2.7%), Terai Brahamin (2.7%), Teli (2.4%), Tharu (1.8%), Koiri (1.7%), Rajput (1.4%), Badhae (1.4%), Dhanuk (1.3%) and Nuniya (1.2%).

Communities

There are more than 70 caste/ethnic groups. Among them 20 caste/ethnic groups have population more than 1% in the total population. Those are Muslim (17.4%), Kanu (7.3%), Hill Brahamin (7.3%), Kurmi (5.9%), Newar (5.6%), Kalwar (4.5%), Marwadi (4.4%), Sonar

(4.1%), Chhetry (3.9%), Baniya (3.3%), Kayastha (3.3%), Yadav (2.7%), Terai Brahmin (2.7%), Teli (2.4%), Tharu (1.8%), Koiri (1.7%), Rajput (1.4%), Badhae (1.4%), Dhanuk (1.3%) and Nuniya (1.2%).

Occupation

About 52% of the population above 10 years of age is economically active. Majority of the economically active population is engaged in agriculture followed by trade, service and labor. Total literacy rate is 69.5%, comprising of 79.21% among male and 57.72% among female. The town is experiencing high level of in-migration. This has resulted into the emergence of squatter settlement in several areas of the town.

Land Use and Land Cover

The dominant land use type is still agriculture. Nearly 73% area is under cultivation followed by residential area (11%), rural residential area (2.1%), business mixed with residential area (4.3%), industrial area (3%), institutional area (4.3%), open land (0.7%), and ponds (0.4%). (Source: PPTA Report, March 2010)

Health and Sanitation

Birgunj has 8 hospitals, 2 institute of medical Sciences, 2 Nursing Homes and one clinic. Those hospitals are Narayani zonal hospital, A.M.C hospital, Sabottam Maternity home, Kediya eye hospital, Shiva hospital, Shree Ram hospital, national medical hospital, and M.B. Kediya dental hospital. The present sanitation coverage of Itiyahi and Bishrampur is 19.06% while water supply coverage is 88.58%.

The common diseases reported are gastroenteritis and diarrhea. It may be due to poor water quality, lack of proper surface drainage systems and solid waste management.

According to Municipality Profile (2007), there are approximately 4.70 main and 40.54 km secondary drains for storm water discharge. These existing drains are not adequate. So, inundation and flooding during rainy season are common.

There is no centralized sewerage collection and disposal system in Birgunj. The present system of sewage disposal is the on-site sanitation with septic tank and soak pits. The Municipality Law requires each household to construct a toilet and a septic tank. About 51% households do have modern toilet, additional 22% households have ordinary toilet but 25% households do not have toilet (Source PPTA report, March 2010). Though most of the houses do have septic tank, but very few have soak pits for soaking away the effluent of the septic tank. The disposal of the septic tank effluent directly to open road-side drains is causing serious environmental and health hazard. During the dry period, the situation is worst due to absence of diluting storm water. The municipality does not have facilities for the collection and disposal of the septic tank solids. Generally the private operators provide these kinds of services and were found to dispose the solids in the road side drains or in the vacant land. As a result the possibility of infecting from water borne diseases including germination of mosquito in the region is very high.

Solid Waste Management

Solid waste is collected by Birgunj Municipality. It provides waste collection and sweeping services. The containers/bins are placed at different strategic locations which are used by households, institutions and the commercial sector in the town. There is no organized door-to-door collection system in Birgunj. Majority (78%) of the households dispose their waste

still in public places and only 10.5% households use fixed places or containers. Waste is transported using tractors and open trailers. In the absence of a permanent sanitary dumping site, a daily estimated 63.23 tons of garbage is being dumped haphazardly along river banks, ponds, by-pass road and open spaces. Nearby areas of those places are prone to serious health hazard.

Industries

According to district profile (2007), more than 155 different type of industries are located within the municipality. The major types are soap, plastic, textile, garment, metal, leather, distillery, pharmaceutical etc. There are many big and small industries located along Birgunj-Simara Highway in the upstream area. Many industries do not have affluent treatment facilities and it is directly disposed to local streams. As a result, local streams downstream from the site of such streams are polluted. Sirsiya river which is frequently flooded in the western part of the municipality is highly polluted from effluent directly discharged in the river. It has increased the risk of health hazard.

Agriculture Development

Agriculture is still the major source of family income of majority of people living outside the city core. Paddy, wheat, maize, jute, sugarcane, potato are the major crops grown in this area. Lentils and peas are also grown. The fruits commonly grown are mango, leechi, pineapple, banana and lemon. Similarly, vegetables like cauliflower, cabbage, lady finger are also grown.

Infrastructure Facilities

Water Supply: The main source of drinking water in Birgunj is the deep tube well ground water. At present there are four pumping stations operated by Nepal Water Supply Corporation that supply 8 million liters of water to the Sub-metropolitan city. Nearly 6,067 households have piped water supply facility, 1,210 households have drinking water facility from public shallow tube wells and 7,819 households have drinking water facility from shallow tube wells. The water quality from deep tube wells under operation is reported to be safe for drinking water but from shallow tube wells is usually contaminated by surface water and seepage of wastewater. DWSS has already banned those tubewells that contains arsenic that exceeds the limit for drinking purpose.

Communication: Birgunj has good communication system. More than 13,800 telephone line has been distributed. There are three post offices, four FM radios, 6 currier services and quite a few internet facilities within the municipality. More than 199 daily, weekly, monthly and quarterly newspapers are published.

Transportation: Birgunj is quite accessible. It is linked with different places via the Tribhuvan Rajpath and East-West Highway. There are 115 km of black topped road, 83 km graveled and 82 km earthen roads and a number of trails within the municipality. Overall roads in Birgunj are in a poor condition. Simara Airport is located about 22 km to the north of the city. There are more than 5200 Riksa, 313 Tempu and 456 Tanga in Birgunj providing transportation services. 12 traffic congestion particularly in the city centre is observed.

Electricity: Electricity supply operated by NEA is from the national power grid. There are more than 15245 service connections in which 14,100 is for the purpose of domestic use, 860 for industrial, 50 for commercial and 8 for drinking water.

Electricity is mainly used by majorities for lighting purpose whereas wood is still found to be major source of energy for overall domestic purposes i.e. cooking and boiling. Kerosene and

dung patch/cake are also used by large number of people. It shows the higher possibility of infection from the indoor pollutions.

Institutions: Birgunj is also an administrative centre. There are more than 70 regional and district level administrative offices located within this municipality. There are more than 48 primary schools, 7 lower secondary, 40 secondary, 3 higher secondary schools, 10 campuses and 15 technical and computer training institutions within this municipality. Many INGOs and NGOs are working in the Municipality.

Quality of Life Values

The proposed sub-project is not expected to adversely affect any cultural or recreational resources but will increase the existing quality of life values due to the improvement in hygiene and health. Several mitigation measures have been proposed in order to reduce adverse environmental impacts wherever it is necessary.

Religious/Cultural and Ritual Sites

The religious population includes Hindu (82.37%), Buddha (1.98%), Islam (15.40%), Kirat (0.01%), Kaom (0.03%), Christian (0.06%), Sikh (0.01%) and others as (0.18%).

Maisthan, Birta, Alakhiya, Gita, Mahabirsthan temple, Bisma stupa are some of the historically and religiously important places in the municipality. The nearest world heritage site i.e Chitawan National Park is located more than 35km far from this area.

CHAPTER 3

3. TECHNICAL INFORMATION

This chapter contains a detailed technical information and description of the project works that forms the basis for the impact analysis, elaboration of mitigation measures, as well as background information for monitoring and auditing the project's effects on the bio-physical and social environment during and after completion of works.

3.1 Type of Proposal and Project Description (nature, location, service delivery)

Birgunj Sub-Metropolitan City is Nepal's principal trade centre. The city has experienced rapid growth especially in the past decade, due to migration to the city from peripheral districts and VDCs for security reasons, or other reasons such as for a better livelihood. There is consequently environmental deterioration resulting from inadequate sanitation and drainage, and mounting traffic congestion mainly in the main road leading to poor air quality in the city. The individual institutional efforts of both the sub-metropolis and sectoral agencies in addressing these issues, has remained uncoordinated and grossly inadequate. Most of the fertile agricultural fields are rapidly converting into residential and commercial areas. The eastern part of the sub-metropolis which lies in the flood-prone area of the Singaha River is also being changed to residential and commercial areas due to pressure of an increase in the population in the sub-metropolitan city. Most buildings are being constructed in Wards 18 and 19. The infrastructural facilities such as roads, sewer and storm-water drains and water supply, need to be developed to match the current rate of other development, which remains a major future concern. The sub-project (STIUEIP-Birgunj) will be implemented over five year's period supported by Asian Development Bank (ADB) through Project Loans.

The expected outputs of the Subproject under the components considered in the IEE study includes: (i) Improved drainage and sewerage systems; (ii) Improved urban roads and lanes; and (iii) Community development programs undertaken, including health and hygiene education, 3R (reduce, reuse and recycle) of solid waste, promotion, skills training and investment in small-scale community facilities.

The sub-project will improve storm-water drainage systems together with wastewater management systems, as storm water drainage is currently being used as open sewers, causing bad odors, health risks and pollution of the watercourses. The improved system will be underground separate sewer and covered storm water drainage to avoid human intrusion. Urban roads and lanes will be reinstated or upgraded where drainage and sewerage pipe networks work will be undertaken. The proposed waste water treatment plant is located in Chhapkaiya Ward No. 2 of Birgunj Municipality consisting of stabilization ponds (anaerobic, facultative and sludge digestion yard). The proposed separate sewerage and storm water drainage (core area), storm water drainage (east and north of Birgunj town) is located within the existing roads. Similarly the proposed Roads and Lanes are limited to already demarcated road width located within the core areas, storm water diversion areas.

The subprojects subcomponent on Community Development Programs mainly consist of (i) health and hygiene education programs in communities and schools, in particular targeting women and vulnerable groups including the poor, (ii) promotion of household and/or community level 3R (reduce, reuse, recycle) activities (iii) skills training mainly for the poor, and (iv) investment in small-scale facilities such as public schools and community toilets and communal water taps, in accordance with the priorities set by communities, with an aim at achieving social inclusiveness and improved sanitation in Birgunj.

3.1.1 Salient Features

Table 3.1: Salient Features

Sub-project Components	Function / Purpose	Description of the Activities	Quantification of Construction Items / Activities	Location
Separate Sewerage and Storm Water Drainage (core area)	Develop basic infrastructure for the improvement of urban environment and health and hygiene of the people	Construction and rehabilitation of separate Sewerage and Drainage including manholes, culverts, catch drain, diversion channels, Road side drain, outlet structures, tree plantation, turfing and landscaping of new recreational park. The sewerage will be underground RCC hume pipes while storm water drain will be covered with RCC slab.	<ul style="list-style-type: none"> Construction of Sewer line including Main sewer collector (10.359 km); Branch Sewer (10.82 km); and Lateral Sewers (34.40 km). Total 55.579 km Construction of Storm Drain – 1.760 km Construction of 1273 manholes. 	Right of way of the existing roads for core area located west of TRP stretching north (Gandak canal) to south (treatment plant site) including area between TRP and Railway Road at southern part of Birgunj with catchment draining to Sirsiya River.
Storm Water Drainage (east of TRP stretching north to south) including rehabilitation of existing drain in core and outside core area.	Develop basic infrastructure for the improvement of urban environment and health and hygiene of the people	<ul style="list-style-type: none"> Construction of diversion channels, culverts and outlet structures. Upgrading of road and foot path associated with storm water diversions. The storm water drain will be covered with RCC slab including some stretch along secondary bypass road underground with RCC hume pipe. 	<ul style="list-style-type: none"> Construction of main Storm Drain (12, 12A, 13, 13A) – 7.393 km Rehabilitation, improvement and extension of existing drain (in core and outside core area) – 87.023 km <p>Total 94.416 km</p>	Right of way of the existing roads for area covering east of TRP stretching from northern border to southern part of the Municipality with catchment draining to Singaha River and core area catchment draining to Sirsiya River.
Waste Stabilization Treatment Plant	Develop infrastructure for	<ul style="list-style-type: none"> Construction/upgrading of access roads, site clearance and 	<ul style="list-style-type: none"> Construction of waste stabilization pond in 6 ha land that will cater 12 MLD of 	Paddy fields owned by the Municipality

Sub-project Components	Function / Purpose	Description of the Activities	Quantification of Construction Items / Activities	Location
	<p>the treatment of waste water and reduce environmental risk associated with health hazard.</p>	<p>bituminous pavement.</p> <ul style="list-style-type: none"> Lift sewage pump system for raw sewage of RCC works with overflow arrangement. Pretreatment units consisting of inlet chamber, sewage pump, stilling chamber, Screen chambers, grit chambers, parshall flume and distribution chambers consisting of RCC works. Excavation of Ponds-earthen basins (anaerobic pond and facultative pond) with proper embankment and lining system including chlorine dosing facility. Maturation pond was eliminated due to land constraints. Inlet and outlet structures for the ponds. Construction of treated effluent RCC channel. Construction of sludge pond / sludge drying yard for anaerobic sludge treatment. Construction of surface drainage, manholes, collection chambers, boundary wall, administrative and laborator building, generator 	<p>sewage flow for design year of 2035. Peak flow consideration is 30 MLD with peak factor 2.5.</p> <ul style="list-style-type: none"> The treated sewage quality will be of BOD 50mg/l, SS 100mg/l and coliforms 10,000MPN/100ml. (complies with Effluent Standards adopted by then MOE) Effluent Standard of MOE on Industrial Waste is: a) BOD: 30 – 100 mg/l b) SS: 30 – 200 mg/l <p>Since there is no standard for Municipal Waste Effluent, coliforms has been adopted as per international standard.</p>	<p>at chhapkaiya Ward No. 2 of Birgunj Municipality.</p>



Sub-project Components	Function / Purpose	Description of the Activities	Quantification of Construction Items / Activities	Location
Roads and Lanes	Improve environment, health and hygiene of the people reducing the risk of adverse environmental impacts associated with establishment of basic drainage facility and providing improved access.	<p>house, watchmen quarter, workers changing room, parking lots, transformer yard, pump operation and control panel building, overhead tank, hand dug well, water supply facilities etc.</p> <ul style="list-style-type: none"> Tree plantation for creation of buffer zone, turfing and landscaping. <p>Road Resurface/upgrade full width on Drainage Lines and Improved Access.</p> <ul style="list-style-type: none"> Resurface Roads full width (black top over separate sewerage and storm water drain in core area). Road development/resurface (black top) associated with storm water diversion. New Road development (black top). Poor neighborhood access improvement. 	<ul style="list-style-type: none"> Resurface 30% (7m wide) Blacktopped roads – 51.6 km (49.32+2.24 Div4) of for separate sewer and storm drain line in the core area. Resurface 30% (7m wide) Blacktopped roads – 13.95 km along additional drain proposed by DSC & PIU on north and east part at Naguwa village. New Road Construction – 11.4 km for secondary bypass and canal road (proposed diversion drain excluding Div. 4). New Road Construction – 1.16 km for access to Waste Water Treatment Plant site. <p>Total Resurface 65.55 km (30% of 7m width) Total New Road Construction 12.56 km</p>	Public RoWs in core areas (west of TRP and area between railway road and TRP), storm water diversion areas including new road construction (East of TRP).
Sanitation	Develop basic level sanitation and	<ul style="list-style-type: none"> Construction of public toilets with water connection and safe waste 	<ul style="list-style-type: none"> Construction of 12 public toilets. 	Public and private land (sites yet to be

Sub-project Components	Function / Purpose	Description of the Activities	Quantification of Construction Items / Activities	Location
	associated water supply facilities to target groups – urban poor, visitors and students and promote sanitation awareness among local people.	water disposal. <ul style="list-style-type: none"> • Construction of domestic toilets. • Construction of school toilets. • Construction of tube well drilling and hand pumps. • Software promotion (awareness program) 	<ul style="list-style-type: none"> • Construction of 8 school toilets. • Subsidies for 2,000 families to construct private improved toilet. • Construction of hand pumped wells and / or community water schemes in poor areas. 	decided)

The typical road sections at core area, secondary by-pass road and cannal road is presented in **Figure 3.1, 3.2, 3.3** and kept in **Annex 7**.

3.1.2 Service Delivery

The improved sewerage sytem in core area will cover catchment area of 1174 hectare draining to Sirsiya river. The project is anticipated to serve population of 111,217 in base year 2015 to 186,892 population for design year 2035 catering design flow of 12 MLD. Treated sewage effluent quality for river discharge will be: BOD₅ 50mg/l from 300mg/l, suspended solid 100mg/l from 450mg/l, coliform 10,000 MPN/100ml from in the order > 10⁷ MPN/100ml. Similarly the storm water drain will cover catchment area of around 1237 hectare draining to both sirsiya and singaha river. The capacity of the drainage and sewerage will be increased due to inclusion of new drains and rehabilitation of the existing one. The road surface will be smoothen and improved due to full width bituminous pavement.

3.2 Technology and Materials to be Used

Mechanized methods for specialized works will be employed for project works, such as for pipeline excavation, excavation for anerobic and facultative ponds, laying of drainage pipes, excavation of major manholes, back filling works, production of crushed aggregate, sub-base and base course spreading, compacting, and finishing with a bituminous seal. Labour - intensive methods shall be used for other works such as tree plantation that can be done manually, including small earthworks for minor manholes, street inlets and toilet construction, constructing road side drains and retaining structures etc. Local people will be given priority for works according to their skill and qualification. The project works will include following activities:

- Excavation of drainage pipe lines (sewer and storm water) and manholes.
- Excavation of different ponds and treatment units for waste water treatment plant.
- Laying of pipelines (concrete hume/UPVC pipes) and construction of manholes.
- Concreting works for construction of various appurtanances structures.
- Scarification and compaction of existing bituminous pavement.
- Embankment fill for new road construction works.
- Median (road divider) construction where designed.
- Sub-base and base laying.
- Bituminous Pavement for road works.
- Rehabilitation, extension and construction of road side drains, cross-drainages (pipe & slab culverts), retaining walls etc.
- Reinstatement and relocation of existing services i.e. electricity, telecommunication and water supply pipelines located along the RoW.
- Road side avenue tree felling, road side plantation, peripheral plantation around treatment plant for creation of buffer zone including Bio-engineering (seed sowing) on embanked slopes and other places where required.
- Cleaning, maintaining and appropriate operation of sewerage, drainage, road and sewerage treatment plant during operation phase.

The materials to be used in the project works are as detailed below.

Table 3.2: Summary of Estimated Quantities of Materials

Item Description	Unit	Quantity
Earthwork Excavation	cu.m.	726,009
Structural backfill including common backfill	Cu.m.	298,552

Item Description	Unit	Quantity
Formation of Embankment	cu.m.	205,375
Laying of Concrete Hume pipe (sewer and storm water)	RM	60,000
Bricks for soling, brick masonry, and river training walls.	cu.m.	30,376
Concrete class M10/40	cu.m.	500
Concrete class M15/40	cu.m.	1,096
Concrete class M20/20	cu.m.	58,137
Concrete class M25/20	cu.m.	25,413
Gravel as filter material	cu.m.	76,943
Reinforcement steel	MT	15,700
Gravel for sub-base	cu.m.	44,492
Graded Crushed Stone Base Material	cu.m.	38,233
Bitumen for tack coat, prime coat etc.	lit	353,853
Asphalt Concrete, Binder Course 50mm thick	cu.m	11,483
Slopes preparation, seed sowing for bio-engineering	sq.m	60,000
Shoring and Formwork	sq.m	897,527
160mm dia UPVC pipe	RM	25,500
600mm Manhole Cover Frame	Set	7,700
Kerb Stone	RM	35,799
Concrete Tile on Footpath	sq.m	67,650
Spoil Disposal	cu.m	79,041

Source: Preliminary Quantity Estimate

3.3 Emissions Resulting from the Implementation of the Proposal

Solids: Considerable amount of earth material is to be transported from suitable borrow pits for road embankment. It is approximately estimated that 205,375 cu.m. of suitable material will be required for this purpose. Similarly, construction materials like drainage pipes, bricks, temporary drainage line excavated materials, sub-base, base, aggregate concrete / bituminous pavement work will be required that will need appropriate handling and storage.

Noise: During construction, the movement and operation of construction vehicle, plant and equipments will increase noise levels to some extent. However, by applying mitigation measures, the noise level is expected to be controlled within an acceptable level.

Dust: The project work will cause dust emission during construction phase only and during operation phase, dust pollution will be minimized due to full width bituminous sealed pavement that will improve the environment eliminating dust nuisance.

3.4 Energy to be Used

The energy required for the construction works will be basically fossil fuel. The laborers at the camps will need kerosene or gas for cooking purposes. Bitumen will be heated by using kerosene. The use of forest wood for heating and cooking will be strictly prohibited. Construction equipments and Vehicles will use diesel or petrol supplied by the contractor. As the project possesses easy access to all services, pressure on local fuel demand and supply is not anticipated.

3.5 Manpower Requirements

The anticipated work force required for the Project is estimated to be around 54,000 person-days for skilled and 162,000 person-days for unskilled laborers respectively. The unskilled-labor shall primarily be recruited from among the local communities, giving due preference to disadvantaged groups and women to the extent possible.

3.6 Resources Required for the Implementation of the Proposal

The key equipments required for the smooth execution of the project works are as detailed below.

Table 3.3: Required Key Plant and Equipments

S. No.	Equipment Type and Characteristics	Estimated Number Required
1	Excavator (0.75 m ³)	4
2	Loader (1.5 m ³)	2
3	Grader (160 hp)	1
4	Tipper Trucks (8 m ³)	12
5	Vibratory Roller (1,800 km/m)	1
6	Pneumatic Tyre Roller (10-15 Ton)	1
7	Water Bowser	4
8	Bitumen Distributor (5000 litre)	1
9	Bitumen Decanter (5000 litre)	2
10	Chips Spreader	1
11	Asphalt Mixing Plant (50T/hr)	1
12	Asphalt Paver	1
13	Crusher Plant	1
14	DScreen Plant	1
15	Dozer (G7)	1
16	Concrete Mixture (1 bag capacity)	10
17	Hand Operated Compactor	10
18	Water Pump	10
19	Generator	10
20	Compressor	2
21	Concrete Vibrator	10
22	Unique Crane	1

3.7 Total Cost of the Project

The total construction cost needed for the implementation of the sub-project is estimated to be around NRs 3,916,319,991.00 excluding VAT (as per design estimate). The cost breakdown are as follows: Sewerage - 995,752,000; Storm Drain – 2,210,510,000; Road and Lanes – 590,057,991; and Waste Water Treatment Plant – 120,000,000.

3.8 Work Schedule

The drainage, sewerage, road and lanes improvement work under STIUEIP will be implemented over 2 year's period upon work commencement with the provision of single ICB contract package. One year's defects liability period has been allocated for defects remedial works. The earth work activities of the Project shall be avoided during monsoon period. The construction activities will be carried out during day hours only.

CHAPTER 4

4. IMPACT OF THE IMPLEMENTATION OF THE PROPOSAL ON THE ENVIRONMENT

Identification and prediction of environmental impacts have been made for the proposed actions/activities of the Project during the construction and operation stages of the Project. Both beneficial and adverse impacts are analyzed.

Potential environmental impacts on Physical and Chemical, Biological and Socio-economic and cultural aspects are identified and predicted based on the existing environmental condition with respect to the proposed project interventions in terms of **type of impact** (direct/indirect), their **magnitude** (low/moderate/high), **duration** (short term/ medium term/long term), and **extent** (site specific/local/regional/global).

4.1 Beneficial Impacts

As mentioned earlier, the main subproject components for Birgunj Municipality are i) drainage and sanitation improvement; ii) roads and lanes improvement; and iii) community development programs. The drainage and sanitation program together with the roads and lanes component will have environmental benefits through reduction in pollution by newly proposed separate storm drain and sewerage system (underground/covered) including sealing of the roads and lanes.

Beneficial impacts due to the implementation of the Proposal during construction and operation have been assessed and further enhancement measures are suggested. Local potential areas have been identified that can be promoted to enhance the local economy. They are related mainly to improving the livelihoods of the local / poor people. The likely beneficial impacts envisaged during construction and operation stages of the Proposal are:

4.1.1 Construction Stage

The proposed work will be carried out within the Birgunj Municipality. The construction works will provide different opportunities to the local people ranging from laboring to skilled work. There would also be spin-offs leading to improved farm and off-farm activities, which may ultimately benefit the local economy. The beneficial impacts of the subproject during the construction stage are summarized below.

Employment and Income

The first and foremost benefit that local people may expect from the construction works is employment. The construction works offer a wide range of works for unskilled, skilled and semi-skilled laborers. Local people would generate substantial incomes from unskilled and semi-skilled jobs. The amount of money that is injected in the urban economy in the form of wage earnings will directly enhance the initiation of various ancillary economic activities and enterprise development. The impact is thus direct, of high significance, local but short term in nature. If the earned wage income is saved and utilized for micro-enterprises, benefits can be for long term duration.

Enterprise Development and Commercialization

During the construction period, different types of commercial activities will come into operation in order to meet the demand of labor groups, construction crew and Project team. In general, the enterprises will include food and tea shops, groceries, lodges and restaurants

for serving large numbers of people. The demand for local products such as pulses, vegetables, fruits, etc. will rise during the construction period which may provide added impetus for local production and marketing. This will contribute to the local economy and may help reduce urban poverty. Such benefits may contribute to enterprise development which often continues to entrench beyond the construction period. This impact will be direct, of moderate significance, local and long-term in nature.

Skills Enhancement

The underlying policy of the labor intensive approach is to employ locals, specifically poor (unskilled) labour force, to the extent possible, for works that can be carried out manually. This strategy not only provides employment opportunities for the local poor people but also supports the transfer of skills and technical know-how while working in construction work such as masonry, gabion works and roadside plantation. This impact will be direct, of high significance, local and long-term in nature.

4.1.2 Operation and Maintenance Stage

A number of beneficial impacts of the Proposal are anticipated during the operational stage, some of which are indicated below:

Improved Infrastructure and Promotion of Green House Gas Reduction

The improved drainage, sewerage, road and lanes will reduce in pollution, flooding, improve health and hygiene of the people reducing health hazard and will offer easy, comfortable, safe and quick access eliminating existing traffic congestion and reduce roadway accidents. The river water quality will be improved with the construction of waste water treatment plant that will catch entire sewerage flow of core area and treat to acceptable level prior discharge to the river body. The improved road surface will reduce the wear and tear on vehicles parts thus reducing the general costs for spare parts; increase the fuel efficiency and reduce vehicular emissions. This entails in reduction of CO₂ emissions. The improved drainage and sewerage system including proposed plantation of road side avenue trees will also add ground for healthy atmosphere in the surrounding area. Though CO₂ emissions magnitude driven by transportation sector in Nepal is relatively insignificant, the upgraded / widened access covering full road width will somehow be beneficial in fuel efficiency reducing dust emission and associated health hazards. This will be of direct, of high significance, regional and of long-term in nature.

Enhancement of Social Services

Because of the improved aesthetic environment and access, other socio-economic development activities including health, education, communication, market, etc will be increased. This will have indirect, of high significance, regional and long-term impact of the proposed Project.

4.2 Potential Environmental Enhancement Measures

For the proposed subproject, the potential enhancement measures proposed are as follows.

Community Development Program – The subproject under community development program will mainly consist of i) health and hygiene education programs in communities and schools, in particular targeting women and vulnerable groups including the poor, ii) promotion of household and/or community level 3R (reduce, reuse, recycle) activities with a focus on organic waste composting, iii) skills training mainly for the poor, and iv) investment in small-scale facilities such as public, school, and community toilets and communal water

taps, in accordance with the priorities set by communities, with an aim at achieving social inclusiveness and improved sanitation in Birgunj.

Training of Trainers – Training of trainers in construction health, safety and environmental management practices.

Involvement of Key Stakeholders in Different Stages – Planning, design, construction and operation is necessary for successful implementation of proposed activities and improving environment, health and hygiene of the people in sustained way. In order to achieve inclusive, active and meaningful participation, it is also necessary to create/promote public awareness on environmental pollution and sanitation and its linkage with health and hygiene on the one hand and appropriate methods and technologies effective for the improvement of environment and sanitation. For this the Birgunj Municipality will work closely with the community organization and carry out awareness programmes.

The community development, training and awareness program are being rendered under the project through the involvement of separate NGO with the cost being borne by the project.

4.3 Adverse Impacts

The Project activities during construction and operation of the road may create a number of adverse impacts on the local environment. These are discussed briefly in the following sub-sections.

4.3.1 Construction Stage

(i) Physical and Chemical Impacts

Impact Matrix – Construction Stage

Issues	Impacts	Direct/ Indirect	Extent	Duration	Magnitude	Initiation
Earthworks / Slope Stability	<ul style="list-style-type: none"> Soil erosion due to road embankment work. Exposed cut slopes and embanked slopes to rain and wind could cause soil erosion and siltation. Risks of temporary silt runoff due to disposal of excavated soil. 	D	Site	short	L	C
Disruption of Public Utilities	Impacts on public utilities, access to them or damages due to vibration depending on the methods of construction. The public utilities includes electrical line/poles, telephone line/ poles, street lighting, underground piped water supply system, existing cross drainages etc.	D	Local	Medium	H	C
Traffic Hazard and Road Safety	<ul style="list-style-type: none"> Nuisance to pedestrian and traffic congestion during construction due to haphazard stockpiling of construction materials and long exposure of excavated trenches. Roadway accident risks. 	D	Local	Medium	H	C

Issues	Impacts	Direct/ Indirect	Extent	Duration	Magnitude	Initiation
	<ul style="list-style-type: none"> Disruption in smooth flow of traffic. Inadequate provision of road safety measures such as road safety signals, appropriate diversions and lack of enforcement of traffic rules during construction may invite accidents. 					
Noise Pollution	Nuisance to public due to increased noise levels during construction.	D	Local	Medium	M	C
Air Pollution	<ul style="list-style-type: none"> Risk of health and safety hazard to workers and nearby residents from dust and other accidents. Deterioration of air quality and increase in dust/suspended particulate matter. 	D	Local	Short	M	C
Water Pollution	<ul style="list-style-type: none"> Effect on adjoining water bodies from construction activities. Surface water might get contaminated due to the disposal of construction waste generation. 	D	Local	Short	L	C & O
Operation and Closure of Quarries and Borrow pits	<ul style="list-style-type: none"> The project work will require construction materials as sand, aggregates, gravel, suitable material, chippings etc. which are supposed to be brought from approved quarry sites. Extraction activity could disrupt natural land contour, additional land degradation due to excessive quarrying. Disruption of natural land contour, land disputes, soil erosion, loss of potential cropland, loss of vegetation, scouring of river beds etc. Ponding, water logging, and water pollution. 	D & I	Local	Short	M	C
Stockpiling of Construction Materials and Spoil Disposal	<ul style="list-style-type: none"> Construction materials if not stored properly will lead to siltation and pollution. Disturbance to private property. i) Spoil Disposal of 79,041 m³ will need to be managed properly at suitable locations. 	D	Site	Short	L	C
Use of Bitumen / Combustible / and Toxic Materials	<ul style="list-style-type: none"> Use of fuel wood to heat Bitumen. Release of Bitumen into the environment (runoff of bitumen into surface waters) Fire and explosion hazard 	D	Local	Short	L	C

Issues	Impacts	Direct/ Indirect	Extent	Duration	Magnitude	Initiation
	<ul style="list-style-type: none"> Spills and leaks 					
Non compliance of design standards	<ul style="list-style-type: none"> Risks of non adoption of design standards and use of quality materials. 	I	local	long	H	C & O

Note:

D = Direct Impacts

I = Indirect Impacts

L = Low Impacts

M = Moderate Impacts

H = High Impacts

C = Construction Phase

O = Operation (commissioning) Phase

(ii) Biological Impacts

Impact Matrix – Construction Stage

Issues	Impacts	Direct/ Indirect	Extent	Duration	Magnitude	Initiation
Vegetation and Forest Resources	<p>Clearing of vegetation due to construction work located within the right of way.</p> <p>i) Pole class trees (girth >0.30m-0.60m) - 66 nos.</p> <p>ii) Pole class trees (girth > 0.60m – 0.90m) – 17 nos.</p> <p>iii) Timber class trees (girth >0.90m – 1.80m) – 1 nos.</p> <p>iv) Timber class trees (girth >1.80m-2.40m) - non</p> <p>v) Timber class trees (girth >2.40m-3.0m) - non</p> <p>vi) Timber class trees (girth above 3.0m) – 1 nos.</p> <p>vii) Bamboo – 106 nos.</p> <p>The Trees includes: Sisam (<i>dalbergia sisso</i>), Siris (<i>albizia sp</i>), Gular, Sajiwan, Julebi, Bar (<i>ficus benghalensis</i>), Pipal (<i>ficus religiosa</i>), Amba (<i>psidium gujava</i>), Anp (<i>magnifera indica</i>), Katahar (<i>artocarpus heterophyllus</i>), Chatawan, Baajkerai, Dithauri, Supari (<i>areca catechu</i>), Neem (<i>azadirachta indica</i>) etc.</p>	D	Site	Long	M	C & O

Note:

D = Direct Impacts

I = Indirect Impacts

L = Low Impacts

M = Moderate Impacts

H = High Impacts

C = Construction Phase

O = Operation (commissioning) Phase

(iii) Social, Socio-economic and Cultural Impacts

Impact Matrix – Construction Stage

Issues	Impacts	Direct/ Indirect	Extent	Duration	Magnitude	Initiation
Illegal Encrochers	<ul style="list-style-type: none"> No additional land will be required for acquisition as the infrastructures development are within the public right-of-way (RoW) and STP is to constructed 	D	Local	Long	L	C

Issues	Impacts	Direct/ Indirect	Extent	Duration	Magnitude	Initiation
	on the land owned by Municipality. <ul style="list-style-type: none"> Removal of temporary shops and structures of road side vendors within the road right of way if any. 					
Nuisance to Public	<ul style="list-style-type: none"> Nuisance to public due to excavation of roads and path from where sewer/drainage lines are to be constructed. Inconvenience to travelers / vehicle due to road blockage. 	D	Local	Medium	H	C
Occupational Health and Safety	<ul style="list-style-type: none"> Risk of Health and safety hazards to workers from dust and other accidents. Health risks are associated with poor labor camp, unsafe water and unhygienic conditions. Health risks due to influx of outside and migrant laborers. Inadequate living space for laborers. 	D	Local	Medium	H	C
Loss of Livelihood	<ul style="list-style-type: none"> Loss of livelihood for business due to excavation work. 	D	Local	Medium	H	C
Social and Cultural conflicts due to influx of construction workers	<ul style="list-style-type: none"> Spread of alcohol consumption & gambling Potential for STD such as HIV/AIDS 	D	Local	Short	L	C
Non-Cooperation of Local People	<ul style="list-style-type: none"> Risk of non co-operation of local people in construction works such as wastewater treatment plant, toilet, tube wells etc. 	D	Local	Medium	M	C
Labor Camp Location and Management	<ul style="list-style-type: none"> Pollution of surface and ground waters from unsanitary waste disposal practices. Social conflicts. 	I	Local	Medium	M	C

Note:

D = Direct Impacts

I = Indirect Impacts

L = Low Impacts

M = Moderate Impacts

H = High Impacts

C = Construction Phase

O = Operation Phase



4.3.2 Operation and Maintenance Stage

(i) Physical and Chemical Impacts

Pollution of Water Resources due to Poor Construction

Risk of pollution of ground and river water will be eminent due to seepage of waste water if the joints of the drainage and sewerage are not properly sealed. The impacts will be direct, moderate, local and long-term in nature.

Blockage of Drain and Damage to Sewer System due to Poor Maintenance

Blockage of drainage could occur due to throwing of waste by the local people. Nuisance could occur to neighboring areas because of overflow and flooding due to blocking by solid waste. There exists risk of damages to sewer system and danger to worker due to discharge of hazardous waste from the industries and hospitals. The impacts will be indirect, moderate, local and long-term in nature.

Removal and Disposal of sludge

During operation of the treatment plant, desludging will be required when one third volume of anaerobic pond will be full of sludge deposition. Desludging frequency is estimated at least once a year but is recommended at six months interval for satisfactory performance of anaerobic pond (*as recommended in detailed design*). The removal and disposal of sludge could trigger health hazard if not managed properly. The anticipated impacts will be indirect, of moderate in magnitude, local and long-term in nature.

Sanitation

Poor management of public structures such as public toilets and school toilets including unsatisfactory raw water supply could create nuisance to neighboring area and trigger health hazard. The anticipated impacts will be direct, of moderate in magnitude, local and long-term in nature.

(ii) Biological Impacts

Vegetation Destruction

The tree plantation all around the treatment plant for creation of buffer zone and road side tree plantation provisioned in the subproject could be damaged by human as well as domestic animal activities. The anticipated impacts will be direct, of high in magnitude, local and long-term in nature.

(iii) Impacts on Social, Economic, and Cultural Domain

Health and Safety Hazard

There always lies risk of health and safety hazards to workers from hazardous material which may be contained in waste water. The anticipated impacts will be direct, of high in magnitude, local and long-term in nature.

Odor, Insects and Rodent

The neighboring areas near to treatment plant site may suffer nuisance due to odor, insects and rodent. The likely impacts may therefore be indirect, of moderate significance, local and long-term in nature.

CHAPTER 5

5. ALTERNATIVE FOR IMPLEMENTATION OF THE PROPOSAL

Within the outlined scope of work, the following alternatives for implementation of the proposal were analyzed pertaining to environmental impacts of the project activities. The alternative analysis mainly focuses on project site; project design, technology selection and operation; and no project options. The proposed sub-project will certainly have a significant impact on the beneficiaries as well as the environment.

5.1 Project Site

The sewer line and storm water drain are aligned within the right of way of the existing roads. No significant adverse environmental impacts are found with the present location of the project activities. The location of sewers and chambers are planned in such a way that it maintains a certain distance from public drinking water supply well or private drinking water supply well. Wherever possible, horizontal separation of at least 10 feet is proposed for sewers from existing or proposed water supply line. Where a sewer crosses water main, it is envisaged that the top of the sewer is at least 18 inches below the bottom of the water main. When it is impossible to obtain stipulated horizontal and vertical separation, both the water main and the sewer is envisaged for pressure-tested to assure water tightness and to avoid infiltration.

The waste stabilization treatment pond is proposed in agricultural fields at Chapkkaiya (ward no. 2) which is located far from the settlement. There are no many alternatives for the selection of site for waste stabilization plant since it has to be located in nearby areas of the natural drainage which is controlled by the orientation of the topographic gradient of the terrain. Though the site constitutes fertile agriculture land possessing high potential for urban growth, it had to be selected considering that it is far from the settlement area and is located along the natural drainage with access road. Birgunj being very close to the international boundary have limited scope for locating such site particularly site located in far downstream areas providing waste water treatment facility to the major part of the municipality. Considering the locational disadvantage (without another alternative site for the treatment of waste water from the core area of the city) of Birgunj the site with high potential for urban growth at Chhapkaiya (draining only from the core area of the city) was selected.

Similarly the proposed new road construction (i.e secondary bypass road and canal road leading to sanitary landfill site) alignment already consists of access demarcation which will be upgraded to bituminous pavement widened to available right of way. For other parts, the upgrading and improvement of roads will follow the sewerage and drainage line within the exiting road right of way.

5.2 Project Design, Technology Selection and Operation

The key design alternatives relates to the choice of drainage and sewerage system; type of treatment plant and pavement type and materials for the road and lanes. Different strategies and approaches have been adopted in designing project activities, selecting the technologies and operational procedures after reviewing best practices, guidelines and standards. While designing the project activities, emphasis was given to urban environment improvement either due consideration on integration among project components and concentration of investment in few localities; inclusiveness and equity in participation with focus to urban poor and disadvantaged groups; public-private partnership; and demand from the proponent i.e. PIU-Birgunj Municipality.

Separate sewerage and separate storm water drainage system has been planned and designed so that smaller size of sewers can be used efficiently for the conveyance. The system is economical and cheaper than the combined system. It will lower the cost of pumping as lesser sewage needs to be pumped for treatment and storm water can be discharged directly in to the river water body. This leads to the requirement of smaller treatment plant and enhances the efficiency of treatment plant with less variance in hydraulic as well as organic loading rates. The under ground sewer lines and underground/covered storm water drainage are proposed so as to reduce odor nuisance and to avoid likely blockage due to human intrusion. The drainage lines are designed with minimum slope requirement (to the extent possible) so as to minimize depth of excavation that will lessen the shoring work and minimize erosion hazard. In order to ensure the capacity of storm water drains and cross-drainages, two years return period for surface drains (road side drain) and five years return period was considered for natural existing nala and proposed cross drainages while calculating design discharge.

For the waste water treatment plant, Waste Stabilization Pond consisting of various pre-treatment units, anaerobic pond, facultative pond, sludge lagoon/sludge drying yard, tree plantation for creation of buffer zone, including associated structures (i.e. roads, administration buildings, guard house, toilets etc) are proposed as land is already purchased and land ownership remains with Municipality. The advantages in selecting Waste Stabilization Pond are: i) high degree of treatment efficiency; ii) high coliform and nutrient (as N) removal efficiency; iii) no electric power requirement for the process; iv) equipment requirement is nil; v) no skilled manpower is required; vi) flexible to hydraulic surge load; and vii) operation is simplest.

The design of asphalt concrete pavement for road and lanes is based on field investigations specifically relating to traffic volume. Covered road side drains are proposed to catch surface run-offs. Adequate cross-drainage structures are inclusive in the design to go along the hydrological assessment to maintain wet season surface water flows.

Priorities have been given to labour intensive technologies and community led basic sanitation for all with gender consideration. The working procedures proposed are participatory one. Awareness creation and skill development activities for the improvement of environment, health and hygiene have also been integrated with the development of basic infrastructures facilities. The project will use local materials as far as possible.

5.3 Time Schedule

The proposed sub-project under STIUEIP will be implemented over 2 years upon work commencement with the provision of one ICB contract package. A one year defects liability period is allocated to carry out defects remedial works. The earth work activities of the Project should be avoided during monsoon period. The construction activities will be carried out during day hours only.

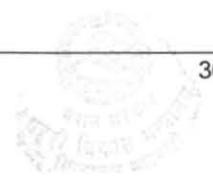
Time Schedule Chart

Description	2012	2013	2014	2015	2016
Detail Design and Procurement	████████████████████				
Construction Management/Supervision		████████████████████			
Defects Liability Period				████████████████████	

5.4 No Project Option

Traffic congestion and atmospheric pollution due to poor road condition, flooding and inundation due to poor drainage and incidence of health hazard (mosquito, flies nuisance and infiltration to ground water) due to lack of proper management of waste water are some of the main environmental problems in Birgunj. Such problems are likely to be intensified in

future. Implementation of the proposed subproject will improve the environmental condition of the city and health and safety of the community by reducing environmental pollution on the one hand and awareness creation on the other. It will also help to improve economic condition and livelihood of the poor communities by providing employment opportunities in the project activities. Ultimately, it will help to improve the quality of life of the people living in the municipality. The implementation of the proposed subproject will have more positive impacts. However, adverse impacts will be minimized through implementation of proposed mitigation and monitoring measures.



CHAPTER 6

6. MITIGATION MEASURES TO REDUCE OR CONTROL THE IMPACT OF IMPLEMENTATION OF THE PROPOSAL ON THE ENVIRONMENT

The proposed mitigation measures will avoid or minimize the adverse environmental impacts of the Project activities. The mitigation measures will be of curative, preventive and compensatory types. Different measures that have been proposed for the augmentation of beneficial impacts and minimization of the adverse impacts of the proposed subproject works are as described below.

6.1 Benefit Augmentation Measures

6.1.1 Construction Phase

Employment Opportunities

The Project will give emphasis in obtaining labor from the project influence area. The Project will employ local poor, vulnerable and socially excluded people (Janajati, Dalit) and women to the extent possible, without gender discrimination. Based on past experience in other Projects, this will divert a good portion of the total Project cost to the local people and will improve their economy.

The project will ensure that disadvantaged persons will be adequately considered in this process and that everyone receives fair and timely remuneration. The Project will ascertain that they will receive adequate training beforehand to carry out the required tasks and to ensure that further livelihood and income generation programs will be jointly undertaken to improve overall economic situation.

It is anticipated that through adequate income generation and livelihood development programs, the earned money will be utilized in such a way that it will generate multiplier effects; for example by investing in cooperative, long-term ventures in farming and off-farming activities, crop diversification, agro-industries, cottage industries based on local resources, etc.

Enhancement of Technical Skills

During the implementation of project works, the local laborers will receive manifold skill training in construction techniques, small engineering structures and bio-engineering works. They also will receive additional knowledge in waste management, material handling and general application of environmental health and social precautionary measures. By augmenting their capacity, local people being involved in the Project will find it easier to find skilled manpower jobs in the future, thus securing their livelihood as an alternative/additional occupation to agriculture. The training program are being rendered under the project through the involvement of separate NGO with the cost being borne by the project.

6.1.2 Operation and Maintenance Stage

Enhancing Quality of Life

New sewer line, storm water drainage, waste water treatment plant and toilets construction including rehabilitation / extension / construction of existing drainage, cross-drainage structures is anticipated to overcome inundation problem noted at various locations within Birgunj Municipality during monsoon. The wastewater will be treated to its acceptable level

prior to discharge to the river body. This will reduce health hazard specifically due to water and vector borne diseases with the elimination of mosquito breeding sites. Further, the proposed full width upgrading / widening of RoW to sealed standard will reduce dust emission and associated health hazards. It is expected that there will be an overall improvement in the quality of life of people from surrounding project area.

Social Support Program

Awareness Program will be conducted during operation / maintenance phase to locals in order to make them well versed with operation and management of newly developed stormwater and wastewater management system. The awareness program are being rendered under the project through the involvement of separate NGO with the cost being borne by the project.

Summary of Enhancement Matrix

S.No.	Enhancement Measures	Estimated Cost in NRs.
Construction Stage		
1.	Employment Opportunities	Provisioned in Construction Contract
2.	Enhancement of Technical Skills: Training in construction skills for local bodies.	Included under Project Cost
Operation and Maintenance Stage		
1.	Enhancing Quality of Life	As a Projects by-product.
2.	Social Support Program: Awareness Program	Included under Project Cost
Total		-

6.2 Measures to Mitigate Adverse Impacts

Most of the cost for mitigation measure is included in the in-built design and estimate. However, some of the mitigation costs not included in the project design and construction contract are estimated separately for inclusion in the Civil Works contract. Such costs include the costs for vegetation and plantation of trees, spoil disposal, monitoring of water quality during construction and operation phase, and reinstatement of public utilities / services etc.

6.2.1 Construction Phase

(i) Physical and Chemical Aspects

Impact/Mitigation Matrix – Construction Phase

Issues	Impacts	Mitigation Measures	Mitigation Cost (NRs)
Earthworks / Slope Stability	<ul style="list-style-type: none"> Soil erosion due to road embankment work. Exposed cut slopes and embanked slopes to rain and wind could cause soil erosion and siltation. Risks of temporary silt runoff due to disposal of excavated soil. 	<ul style="list-style-type: none"> Proper and adequate shoring work to avoid slide. Minimize exposure of trench excavation work. Turfing for embanked slopes. Development and approval of a sediment and erosion control plan prior to land disturbance. Removal of spoils as soon as it is excavated. Disposal of spoils in municipal – approved sites. 	<ul style="list-style-type: none"> Estimated cost for turfing: NRs. 600,000.00 [20,000 m² x 30] For other mitigation measures, cost included in construction contract.
Disruption of Public Utilities	Impacts on public utilities, access to them or	<ul style="list-style-type: none"> Full inventory of public utilities existing in construction sites. 	Estimated cost: NRs. 25,000,000.00

	<p>damages due to vibration depending on the methods of construction. The public utilities includes electrical line/poles, telephone line/poles, street lighting, underground piped water supply system, existing cross drainages etc.</p>	<ul style="list-style-type: none"> • If required, preparation of relocation plans with service providers to any damages to utilities during construction. • Provision of satisfactory access to buildings, dwellings, or other activity areas if construction works and new facilities disrupt existing access. • Replacement of (or compensation payments to) public and private physical structures damaged due to construction or vibration. • Keep the site free from all unnecessary obstructions and storing or disposing of any contractor's equipment or surplus material. Clear away and remove from site any wreckage rubbish and temporary works which are no longer required. • Reinstate roads and lanes where sewerage pipe and storm water drainage networks works will be undertaken. 	
Traffic Hazard and Road Safety	<ul style="list-style-type: none"> • Nuisance to pedestrian and traffic congestion during construction due to haphazard stockpiling of construction materials and long exposure of excavated trenches. • Roadway accident risks. • Disruption in smooth flow of traffic. • Inadequate provision of road safety measures such as road safety signals, appropriate diversions and lack of enforcement of traffic rules during construction may invite accidents. 	<ul style="list-style-type: none"> • Plan transportation routes so that heavy vehicles do not enter the urban area. • Scheduling transport of spoils to avoid peak traffic periods and other important times. • Do not block public roads. • Do not deposit excavated soils/mud on public roads. • Coordinate with Municipal Traffic Office for temporary road diversions. • Provision of sign boards for pedestrians to inform nature and duration of construction works. • Provision of adequate road safety measures such as road safety signals, appropriate diversions, barricades and speed control measures. • Contractor shall prepare traffic management plan and get its approval from the supervising engineer. • Minimization of period of construction by increase of workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools. 	Cost included in the project design for implementation.
Noise Pollution	Nuisance to public due to increased noise levels during construction.	<ul style="list-style-type: none"> • Avoid noise generating activities at night. Restrict work to day hours. • Noise barriers to be placed in sensitive locations i.e. schools, 	The anticipated cost and specific conditions for noise pollution control are

		<p>hospitals etc.</p> <ul style="list-style-type: none"> • Consult with the local community to inform them of the nature, duration and likely effects of the construction work, and to identify any local concerns so that these can be addressed. • Minimizaiton of period of construction. 	<p>included in the construction contract.</p>
Air Pollution	<ul style="list-style-type: none"> • Risk of health and safety hazard to workers and nearby residents from dust and other accidents. • Deterioration of air quality and increase in dust/suspended particulate matter. • Gaseous pollution. 	<ul style="list-style-type: none"> • Reduce dust by spraying water on stockpiled soil, excavated materials, and spoils. • Construction area shall be maintained damp by periodical spray of water. • Cover stockpiled construction materials with tarpaulin. • Ensure delivery vehicles be covered. • Provide temporary hoardings where required to minimize dust impact on locations of temples and other cultural sites. • Enforce construction contractor to produce and implement a site Health and Safety (H&S) Plan that includes: (a) excluding the public from the site, (b) ensure that all workers are provided with and use appropriate personal protective equipment, (c) H&S training for all site personnel, (d) documented procedures jto be followed for all site activities, and (e) documentation of work-related accidents. • The Contractor will implement safety measures against accident risks. • All construction vehicles should comply with Motor Vehicles and Transportation Management Act as amended. • Ensure use of vehicles complying with NVMES 2069 BS. 	<p>The anticipated cost and specific conditions for air pollution control are included in the construction contract.</p>
Water Pollution	<ul style="list-style-type: none"> • Effect on adjoining water bodies from construction activities. • Surface water might get contaminated due to the disposal of construction waste generation. • Possibility for reduction in Recharge of ground water due to proposed drainage/sewerage and sealed roads. 	<ul style="list-style-type: none"> • Surface and ground water reserves must be protected from any source of contamination such as construction and oily waste that will degrade its potable quality. • Solid wastes shall be disposed off in designated sites. • Ensure that the construction debris do not find their way into the drainage or irrigation canals which may get clogged. • Prohibit washing of machinery and vehicles in surface waters, provide sealed washing basins and collect 	<p>The anticipated cost and specific conditions for water pollution control are included in the construction contract.</p> <p>Estimated cost for Water Quality Monitoring: NRs. 480,000.00 [3 sites x 8 times x 20000] (This activity is also</p>

		<p>wastewater in sedimentation/retention pond.</p> <ul style="list-style-type: none"> • Contractor needs to arrange for sufficient water supplies and proper sanitation facilities for its labor force. • Regular water quality monitoring (physic-chemical and microbiological tests) according to determined sampling schedule. • The road and drainage design will have a provision of open space for vegetative cover at appropriate locations to the extent possible. However, it is assumed that the Recharge of ground water will take place at upstream area where adequate open surface exists. 	<p>indicated in compliance and Impact Monitoring Plan)</p>
<p>Operation and Closure of Quarries and Borrow pits</p>	<ul style="list-style-type: none"> • The project work will require construction materials as sand, aggregates, gravel, suitable material, chippings etc. which are supposed to be brought from approved quarry sites. Extraction activity could disrupt natural land colour, additional land degradation due to excessive quarrying. • Disruption of natural land contour, land disputes, soil erosion, loss of potential cropland, loss of vegetation, scouring of river beds etc. • Ponding, water logging, and water pollution. 	<ul style="list-style-type: none"> • Locate and peg quarries and seek approval from the supervising consultant. • Obtain permission/license for extraction of materials from stakeholders, Municipality, DDC or VDC as appropriate. • Locate extraction sites restricted to small areas, preferably on existing quarry sites and sites without any tree cover, away from dwellings, archeological, religious or cultural sites, sites which will not alter river flow regime and possess water logging problem in future, and sites where effects will be temporary. • Prevent ponding of water through adequate drainage. • The depth of the pits should be regulated so that the sides of the excavation will have a slope not steeper than 1:4. • Stripped materials shall be stored so as not to disrupt natural drainage and shall be protected so as not to be eroded into surface waters. • Restore the site maintaining natural contours and vegetation. 	<p>The contractual conditions for opening, operating and closing quarries / borrow pits and the costs associated with these operations are included in the construction contract.</p>
<p>Stockpiling of Construction Materials and Spoil Disposal</p>	<ul style="list-style-type: none"> • Construction materials if not stored properly will lead to siltation and pollution. • Disturbance to private property. • Haphazard spoil disposal could cause smothering of vegetative cover triggering erosion, siltation, pollution, 	<ul style="list-style-type: none"> • Locate, peg and seek approval from the supervising consultant for the use of stockpile sites. • Stockpile should not be located on water courses; should not be within 50m of DSchools, hospitals or public standpipes; and should not affect locals and their properties. • Obtain written permission from landowners and local bodies for stockpiling on their land. • Stockpiles should be covered with 	<p>The specific conditions for stockpiling of construction materials are included in the construction contract.</p> <p>Spoil Disposal of 79,041 m³ will need to be managed</p>

	distruction of private property, crops, land irrigation systems.	<p>tarpaulins. For large stockpiles, it should be enclosed with side barriers and also covered when not in use.</p> <ul style="list-style-type: none"> • Provide intervening vegetated buffer to control any un-expected run-off. • Clean area properly after completion. • Locate disposal sites on stable ground without excessive slope; that avoids water courses and wetlands; that will not promote instability and result in destruction of property, vegetation and local services. Preferably permissible sites are abandoned quarry or borrow pit in order to restore original contour. • Restrict disposal at approved locations with correct placement of fill. 	<p>properly at suitable locations. Estimated cost for spoil disposal is: NRs. 7,900,000.00 [79,041m³ x 100]</p>
Use of Bitumen / Combustible / and Toxic Materials	<ul style="list-style-type: none"> • Fuel wood burning to heat Bitumen. • Release of Bitumen into the environment (runoff of bitumen into surface waters) • Fire and explosion hazard • Spills and leaks 	<ul style="list-style-type: none"> • Fuel wood shall not be used for heating bitumen. Bitumen shall be melted in heaters using kerosene, diesel or gas fuel. • Bitumen drums should be stored in dedicated areas, not scattered along the road and any small accidental spills should be cleared up immediately. • No bituminous material shall be discharged into side drains. • Bitumen shall not be applied in strong wind or rainy conditions. 	The anticipated cost and specific conditions for management and use of Bitumen / combustible / toxic materials are included in the construction contract.
Non compliance of design standards	<ul style="list-style-type: none"> • Risks of non adoption of design standards and use of quality materials. 	<ul style="list-style-type: none"> • Supervision and immediate action accordingly. 	Cost included in the construction contract.

(ii) Biological Aspects

Impact/Mitigation Matrix – Construction Phase

Issues	Impacts	Mitigation Measures	Mitigation Cost (NRs)
Vegetation and Forest Resources	<p>Clearing of vegetation due to construction work located within the right of way.</p> <p>i) Pole class trees (girth >0.30m-0.60m) - 66 nos.</p> <p>ii) Pole class trees (girth > 0.60m – 0.90m) – 17 nos.</p> <p>iii) Timber class trees (girth >0.90m – 1.80m) – 1 nos.</p> <p>iv) Timber class trees (girth >1.80m-2.40m) - non</p> <p>v) Timber class trees (girth >2.40m-3.0m) - non</p>	<ul style="list-style-type: none"> • The project will coordinate with the concerned authority (Municipality, DDC, District Forest Office) for proper tagging, felling, stacking and transporting logs at designated location. • Fuel wood shall be banned for construction work. • Identify and seek approval from supervising consultant for felling of trees within the RoW including stacking and handover to concerned authority. (around 85 nos.) 	<p>Estimated cost for felling of tree: NRs. 60,000.00</p> <p>Estimated cost for plantation of suitable road side trees: NRs. 650,000.00 [1300x500]</p> <p>Estimated cost for plantation of suitable trees around wastewater treatment</p>

	vi) Timber class trees (girth above 3.0m) - 1 nos. vii) Bamboo – 106 nos. Total Trees to be felled – 85 nos.	<ul style="list-style-type: none"> Plantation (including protection and management for 5years) of suitable road side trees. (around 1300 nos.) Plantation (including protection and management for 5years) of suitable trees around the wastewater treatment plant site for creation of buffer zone. (around 3500 nos.) The compensatory plantation is more than 1:25 ratio.	plant site: NRs. 1,050,000.00 [3500x300] Total: 1,760,000.00
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(iii) Social, Socio-economic and Cultural Aspects

Impact/Mitigation Matrix – Construction Phase

Issues	Impacts	Mitigation Measures	Mitigation Cost (NRs)
Illegal Encrochers	<ul style="list-style-type: none"> No additional land will be required for acquisition as the infrastructures development are within the public right-of-way (RoW) and STP is to constructed on the land owned by Municipality. Removal of temporary shops and structures of road side vendors within the road right of way if any. 	<ul style="list-style-type: none"> Initiate all removal / demolition procedure for temporary shops and structures of road side vendors within the road right of way by issuing notice with reasonable timeframe to the concerned for their controlled demolition. 	Cost included in the project design for implementation.
Nuisance to Public	<ul style="list-style-type: none"> Nuisance to public due to excavation of roads and path from where sewer/drainage lines are to be constructed. Inconvenience to travelers / vehicle due to road blockage. 	<ul style="list-style-type: none"> Reinstate road and footpath immediately after construction of sewer/drainage line. Provision of signboards for pedestrians to inform nature and duration of construction work. Increase workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools for minimization of period of construction. Plan transportation routes so that heavy vehicles do not enter the urban area. Scheduling transport of spoils to avoid peak traffic periods and other important times. Do not block public roads. Coordinate with Municipal Traffic Office for temporary road diversion. 	Cost included in the construction contract.
Occupational Health and Safety	<ul style="list-style-type: none"> Risk of Health and safety hazards to workers from dust and other accidents. Health risks are 	<ul style="list-style-type: none"> Reduce dust by spraying stockpiled soil, excavated materials, and spoils. Adequate lighting and safety signal devices be installed for 	Cost included in the construction contract.

	<p>associated with poor labor camp, unsafe water and unhygienic conditions.</p> <ul style="list-style-type: none"> • Health risks due to influx of outside and migrant laborers. • Inadequate living space for laborers. 	<p>work safety.</p> <ul style="list-style-type: none"> • Adequate warning signs and safety barriers will be provided for work safety. • Protective clothing including helmets, masks, boots, gloves, ear plugs and goggles should be provided for workers safety. • At workplace, first aid unit including an adequate supply of dressing materials, technician and a standby vehicle will be provisioned for Accident Response Mechanism. Pertaining to seriousness of the nature of injury, immediate transportation to nearby hospital will also be maintained in the work site. • Provide and maintain adequate space, proper drinking water, sewerage and waste disposal facilities at the camps. • Maintain health care system at construction camps including regular visit by trained medical staff for routine checkup of workers and avoidance of communicable disease. • Strict rules and regulation be maintained in the labor and work camp to avoid alcoholic and other bad habits. • Impart construction safety education to all villagers, schools, clubs and drivers of construction vehicles. 	
Loss of Livelihood	<ul style="list-style-type: none"> • Loss of livelihood for business due to excavation work. 	<ul style="list-style-type: none"> • Leave spaces for access between mounds of soil. • Provision of walkways and metal sheets where required to maintain access across trenches for people and vehicles. • Increase workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools. • Consult businesses and institutions regarding operating hours and factoring this in work schedules. • Provision of signboards for pedestrians to inform nature and duration of construction works. 	Cost included in the construction contract.
Social and Cultural	<ul style="list-style-type: none"> • Spread of alcohol consumption & gambling 	<ul style="list-style-type: none"> • Strict rules and regulation shall be maintained in the labor and 	Cost included in the construction contract.

conflicts due to influx of construction workers	<ul style="list-style-type: none"> • Potential for STD such as HIV/AIDS 	work camp so that any engagement in alcoholic and other bad habits are restricted.	
Non-Cooperation of Local People	<ul style="list-style-type: none"> • Risk of non co-operation of local people in construction works such as wastewater treatment plant, toilet, tube wells etc. 	<ul style="list-style-type: none"> • Good rapporting and involvement of local people / user groups. 	Cost included in the construction contract.
Labor Camp Location and Management	<ul style="list-style-type: none"> • Pollution of surface and ground waters from unsanitary waste disposal practices. • Social conflicts. 	<ul style="list-style-type: none"> • Locate, peg and seek approval from SC for labor camp sites. • Camps shall not be located near settlements; near water supply intakes; or sites that affects locals access to drinking water. • Camp shall not be in the vicinity of landslide and flood plains. • Provide and maintain proper drinking water, sewerage and waste disposal facilities at the camps. • The solid waste generated will be separated. Non-degradable waste as plastic, steel, grasses etc. will be recycled while bio-degradable waste will be collected and dumped at proper location approved by DSC/Municipality with consent of relevant stakeholders. Open burning of solid waste will be strictly banned during construction. • Ensure no wood is burnt by any worker on or off site. Camps shall be provided free of cost, with electricity and regulator & adequate fuel supplies of LPG or Kerosene. • Prohibit workforce from poaching wildlife and cutting trees. • After use, sites shall be cleared and restored to near natural or stable conditions with vegetative cover. • Restrict working hours from 7:00 to 18:00. • The Contractor shall not employ child or under aged person as per Labour Act, BS 2048. 	Cost included in the construction contract.

6.2.2 Operation and Maintenance Phase

(i) Physical and Chemical Aspects

Impact/Mitigation Matrix- Operation and Maintenance Phase

Issues	Impacts	Mitigation Measures	Mitigation Cost (NRs)
Pollution of Water	<ul style="list-style-type: none"> • Risk of pollution of ground and river water 	<ul style="list-style-type: none"> • Quality of effluent and river water needs to be regularly monitored. 	Estimated cost for water quality

Resources	due to seepage of waste water.	<ul style="list-style-type: none"> The design and construction of sewerage system itself should be made robust and seepage proof. 	monitoring: NRs. 120,000.00 [3 sites x 2 times x 20000] For other direct observations: NRs. 200,000.00 [2 times x 100,000] Total: NRs. 320,000.00 [These activities are also indicated in Compliance & Impact Monitoring Plan]
Blockage of Drain and Damage to Sewer System due to Poor Maintainance	<ul style="list-style-type: none"> Blockage of drainage could occur due to throwing of waste by the local people. Nuisance could occur to neighbring areas because of overflow and flooding due to blocking by solid waste. Risk of damages to sewer system and danger to worker due to discharge of hazardous waste from the industries and hospitals. 	<ul style="list-style-type: none"> Building of Public Awareness. Timely supervision and monitoring. Regular cleaning of drain Promotion of public awareness and practices about solid waste management and sanitation issues. Control industrial and medical waste discharge into drain without treatment enforcing existing legal provisions. 	Included under operation and maintenance cost.
Removal and Disposal of Sludge	<ul style="list-style-type: none"> Removal and disposal of sludge could trigger health hazard if not managed properly. 	<ul style="list-style-type: none"> Sludge will need to be cleared on a regular basis and should be disposed of by the Municipality or reputable contractor within their designated sludge handling facility. Possible use as fertilizer after laboratory testing. 	Included under operation and maintenance cost.
Sanitation	<ul style="list-style-type: none"> Poor management of public structures such as public toilets and DSchool toilets including unsatisfactory raw water supply could create nuisance to neiboring area and trigger health hazard. 	<ul style="list-style-type: none"> Monitoring and immediate action accordingly. Involve local community / users to regularly monitor and take action accordingly. 	Included under operation and maintenance cost.

(ii) Biological Aspects

Impact and Mitigation Matrix – Operation and Maintenance Phase

Issues	Impacts	Mitigation Measures	Mitigation Cost (NRs)
Vegetation Destruction	<ul style="list-style-type: none"> Planted tree could be damaged by human as well as domestic animal activities. 	<ul style="list-style-type: none"> The concerned agency should carry out regular maintenance of planted trees and its protection from human and domestic animals. 	Included under operation and maintenance cost.

(iii) Social, Economic and Cultural Aspects

Impact/Mitigation Matrix – Operation and Maintenance Phase

Issues	Impacts	Mitigation Measures	Mitigation Cost (NRs)
Health and Safety Hazard	<ul style="list-style-type: none"> Risk of health and safety hazards to workers from hazardous material which may be contained in waste water. 	<ul style="list-style-type: none"> Preparation and implementation of a site health and safety plan ensuring the workers use protective equipments. Training for all employees so that they understand the system and know what action to take in particular circumstances such as during times of peak flow or accidental release of untreated effluent. 	Included under operation and maintenance cost.
Odor, Insects and Rodent	<ul style="list-style-type: none"> Neighboring areas specifically near to treatment plant site and public toilets may suffer nuisance due to odor, insects and rodent. 	<ul style="list-style-type: none"> Regular operation and maintenance (lime spreading where required) 	Included under operation and maintenance cost.

Summary of Mitigation Matrix

S.No.	Mitigation Measures	Estimated Cost in NRs.
Construction Phase		
1	Turfing on embanked slope for earthworks / slope stabilization.	600,000.00
2	Reinstatement of public utilities / services i.e. electrical poles, transformers, telephone poles, underground piped water supply system with supply mains/lines, and street lighting etc.	25,000,000.00
3	Road safety: planning transportation routes, temporary diversions, provision of sign boards and adequate road safety measures.	Included in design/construction contract
4	Proper operation and closure of quarries and borrow pits.	Provisioned in construction contract
5	Proper stockpiling of construction materials and debris disposal.	Provisioned in construction contract for stockpiling of construction materials. Cost for Disposal of Spoil at designated location: 7,900,000.00
6	Minimization of Air Pollution: Water spray, vehicle maintenance and proper transportation of construction material.	Provisioned in construction contract
7	Minimization of Noise Pollution: Day hours working, ear plugs for labors, vibration effect monitoring etc.	Provisioned in construction contract
8	Minimization of Water Pollution: Proper waste disposal, hygienic labor/work camps etc.	Provisioned in construction contract for minimization of water pollution. Water quality monitoring cost: 480,000.00
9	Proper handling of Bitumen / Combustible / Toxic Materials	Provisioned in construction contract
10	Vegetation and Forest Resource: Felling of trees, stacking, transportation, and compensatory plantation including five year management etc.	1,760,000.00
11	Removal of temporary shops and structures	Provisioned in the project design for implementation.
12	Measures for Occupational Health and Safety	Provisioned in construction contract
13	Loss of livelihood for business due to excavation work.	Provisioned in construction contract
14	Measures for minimizing cultural conflicts due to influx of Construction Workers.	Provisioned in construction contract
Operation Phase		
1	Pollution of water resources	Water quality monitoring cost: 120,000.00 Other direct observations: 200,000.00
2	Regular cleaning of drain and awareness raising	Provisioned under operation and maintenance cost.
3	Removal and disposal of sludge	Provisioned under operation and maintenance cost.
4	Regular maintenance of planted trees.	Provisioned under operation and maintenance cost.
5	Health and safety to workers & regular operation and maintenance to avoid odor, insects and rodent.	Provisioned under operation and maintenance cost.
Total		36,060,000.00

CHAPTER 7

7. MATTERS TO BE MONITORED WHILE IMPLEMENTING THE PROPOSAL / MONITORING COST

The main objective of environmental monitoring is to detect impact in the early phase of sub-project activity in order to provide adequate corrective action before it is too late. Other objectives of monitoring are to provide feedback on the accuracy of impact prediction, effectiveness of mitigation measures and provide guidance for readjustments during sub-project implementation and operation. Environmental monitoring thus helps to ensure the effectiveness of environmental mitigation measures, compliance with environmental standards and to facilitate on changes required in sub-project design and operation.

The National EIA Guidelines (1993) and EPR, 1997 require monitoring plans and indicators, schedules and responsibility be identified in the IEE report. The following sub-sections deal with the various components of the environmental monitoring and management plan in order to promote the full integration of monitoring activities in sub-project works and their implementation.

7.1 Environmental Monitoring / Management Roles and Responsibility

Responsibility for environmental management associated with implementation of Secondary Towns Integrated Urban Environment Improvement Project for Birgunj Municipality involves number of parties, each with specific responsibilities for particular activities.

(a) The five main parties responsible for the design and implementation of mitigation measures prior to, during and following sub-project implementation are:

- MoUD
- DUDBC, PCO / PIU, STIUEIP Birgunj
- Asian Development Bank (ADB)
- Design and Supervision Consultant
- Construction Contractor

Within the urban sector, the Ministry of Urban Development (MoUD) has overall responsibility for environmental safeguarding.

The DUDBC, PCO, as co-ordination, monitoring and implementation agency is responsible for overall coordination, monitoring and implementation of STIUEIP and environmental monitoring/management works assisted by PMSC. Implementation of the Project will be the responsibility of Project Manager, PIU, STIUEIP-Birgunj with technical assistance from DUDBC, PCO that will undertake environmental assessment functions, as well as monitoring of sub-projects and provision of advice relating to design of environmental mitigation and enhancement measures, and the setting of environmental quality standards.

The Asian Development Bank is responsible for overseeing of DUDBC project management in accordance with loan conditions, the detailed road design and EMP, including periodic site visits to ensure compliance.

The design and supervision Consultant will prepare final detailed designs and conduct necessary environmental studies including EMP design recommendations. It will supervise the day to day activities of the construction contractor on behalf of PIU and conduct technical

supervision of sub-project layout, overseeing contract implementation and certifying works for payment. The design and supervision consultant will ensure effective implementation and compliance of all aspects of work as specified in Environmental Monitoring/Management Plan (EMP) by the Contractor, with reporting direct to the Project Manager, PIU, STIUEIP-Birgunj.

The construction Contractor will be responsible for undertaking all duties and works assigned to him/her in the sub-project construction contract, including all specified conditions in this EMP. The Contractor will work closely with the design and supervision Consultant to ensure that the works are constructed to specified standards.

The specific responsibility of PIU, STIUEIP-Birgunj; Design and Supervision Consultant (PIU's representative); and construction Contractor are as follows:

PIU, STIUEIP-Birgunj

- Acquisition of all necessary structures & temporary shops within RoW, if any.
- Review and approval of detailed project construction designs.
- Obtaining necessary permits from GoN for project construction activities including liaising with various Government Institutions (i.e. District Forest Office, District Agriculture Office, District Irrigation Office, Office of Nepal Electricity Authority, District Telecommunication Office, District Water Supply and Sewerage Office, Traffic Police Office, District Administration Office, District Survey Office etc.) and Local Bodies (i.e. Municipality, DDC, VDC etc.) including NGO/CBO.
- Review and approval of survey, marking and subproject works.
- Review and approval of proposed ancillary work sites (including workforce camps, quarries, borrow pits and storage areas).
- Project maintenance and environmental monitoring and management following handover by the Contractor.
- The operators of Birgunj Municipality will be responsible for operation and maintainance of the newly developed system.

Design and Supervision Consultant (PIU's representative)

- Preparation of final project construction design, conduct required environmental studies and EMP design recommendations.
- Survey and pegging of project construction design works.
- Supervision of the Contractor to ensure work to be undertaken as per sub-project construction contract.
- Inspection and reporting of Contractor's activities to ensure effective implementation of the EMP.
- Auditing Contractor's works and activities against the conditions set out in EMP.
- Issuing corrective action requests and conducting follow up inspections and evaluation of corrective actions.
- Reporting all non-conformances to the Project Manager, PIU, STIUEIP, Birgunj.
- Certifying correctly constructed sub-project works for payment.

Construction Contractor

- Construction of detailed project design works and implementation of EMP.
- Participation in site inspections and audits undertaken by the Design and Supervision Consultant.
- Implementation of corrective actions in response to requests made by the Design and Supervision Consultant regarding specific environmental safeguards.

- (b) Similarly roles and responsibilities of other local, district and central level institutions and those affected by the project construction will also be equally important and the project proponent will maintain interaction and coordination with all of them accordingly. The roles and responsibilities are as briefed below.

Ministry of Urban Development

- Review and comment on IEE for final approval.
- Licensing and give permission for Project Implementation.
- Review project design & contract documents against approved IEE measures and national environmental standards and give comments for corrective actions.
- Review of monitoring reports of project construction and operation and give comments for corrective actions.

District Forest Office

- Give approval and permission for tree clearance.
- Assist proponent in pegging, measuring and evaluation of the affected tree.
- Review of monitoring reports of project construction and operation and give comments for corrective actions related to vegetation.
- Assist the proponent in identification of compensatory afforestation areas as per the plans of the district and reserve areas so that Landscape Approach to Biodiversity Conservation.
- Advise and assist the proponent in the forestry awareness programs.

Municipality / DDC

- Provide recommendation to the proponent with comments and suggestions and assist proponent in the project implementation.
- Assist in public consultation awareness building organized by the proponent.
- Assist and provide suggestions to the proponent in the matters related to community mobilization.
- Assist MoUD in the proposal audit.
- Review of monitoring reports of project construction and operation and give comments for corrective actions.
- Ensure that transparency in the project activities are maintained by all the concerned stakeholders as per IEE report and commitments.
- The operators of Birgunj Municipality will be responsible for operation and maintainance of the newly developed system.

7.2 Site Supervision, Monitoring and Reporting

Strict supervision of sub-project construction activities is required prior to, during and following construction to ensure that works are constructed in accordance with the approved designs and that environmental impact are fully mitigated in accordance with the EMP. A standard system of site inspections, reporting and approval shall be undertaken during the life of sub-project, as described below.

7.2.1 Pre-construction Phase

Pre-construction inspections of each section of the project component and all ancillary sites shall be undertaken by the Design and Supervision Consultant and Contractor. It will serve to:

- Identify site specific sub-project construction or environmental problems.
- Identify existing services and public utilities that are required to be reinstated, extended, and re-located.
- Identify construction waste disposal sites.
- Identify quarries and borrow pits site for extraction of construction materials.
- Identify labor and work force camp sites.
- Plan of phasing of construction along the drainage, sewerage and road alignment.

Design and Supervision Consultant and Contractor shall discuss and agree upon the factors listed above and document accordingly. The Design and Supervision Consultant shall review the sites pegged by the Contractor and approve them for construction where appropriate, or request the Contractor to re-peg sites. The cost for inspection is included in the sub-project implementation cost.

7.2.2 Construction Phase

The Contractor is wholly responsible for complying with all aspects in the construction contract pertaining to environmental protection provisions and must at all times during the contract term provide clear evidence that contract requirements are being met.

The Design and Supervision Consultant shall undertake appropriate supervisions of sub-project works during construction, and inspections of ancillary sites during their period of use. For non-compliance activities as per EMP contract conditions, notice shall be issued for rectification accordingly and if required, pay items shall be withheld.

The Design and Supervision Consultant shall undertake appropriate inspection of all ancillary sites in use over preceding months, as well as any ancillary site activities currently in progress, at the end of each month in conjunction with the Contractor. If any activities are not being undertaken in accordance with the contract or EMP conditions, the Design and Supervision Consultant shall document these and specify corrective measures in the Monthly Report. The Design and Supervision Consultant shall provide a copy of the Monthly Report to the Contractor of the inspection for action. The cost for supervision is included in the sub-project implementation cost.

7.2.3 Post –Construction Phase

The Design and Supervision Consultant shall undertake a post-construction certification inspection of each completed section of sub-project component and each rehabilitated ancillary sites. Certification shall be based upon the contract conditions and EMP conditions. The cost for post-construction certification inspection is included in the project implementation cost.

7.2.4 Operational and Maintenance Phase

The environmental monitoring of project during the sub-project operation and maintenance phase shall concentrate on the major identified potential impacts of the project.

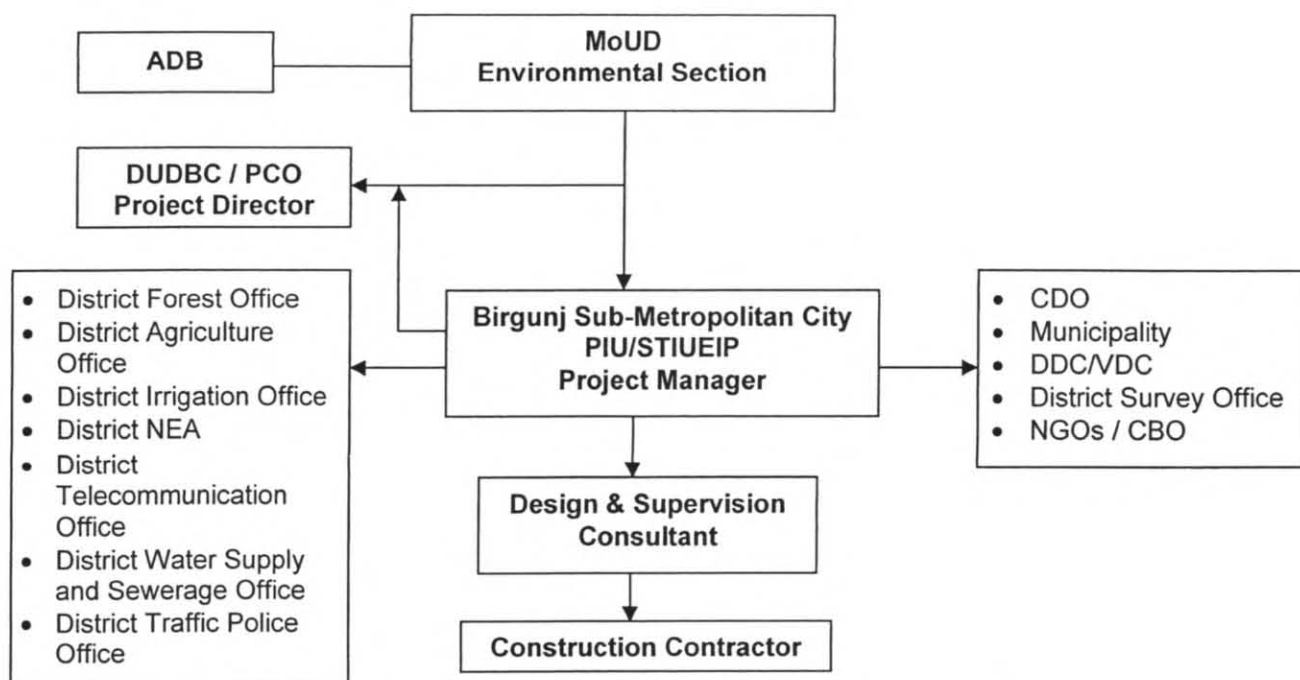


Figure 7.1: Environmental Management Organizational Structure

The environmental monitoring of project during project operation phase shall concentrate on the major identified potential impacts of the project, including pollution of ground water, blockage of drains, nuisance to neighboring areas due to odor, insects and rodent, removal and disposal of sludge, slope stability, vegetative cover, drainage and sedimentation. The PIU, STIUEIP-Birgunj shall undertake a 6-monthly inspection of the project component (including drainage, sewerage and road and lanes etc) and related features over the initial year following the completion of project construction. Standard report covering environmental features shall be completed by PIU, STIUEIP-Birgunj following each inspection. The estimated cost for environmental monitoring and evaluation during project operation is estimated as follows:

Table 7.1: Cost Estimate for Environmental Monitoring During Project Operation

S.No.	Particular	Quantity and Unit Rate	Amount (NRs)
1	Water Quality Monitoring	3 sites x 2 times x 20000	120,000.00
2	Other Direct Observation	2 times x 100,000	200,000.00
		Total	320,000.00

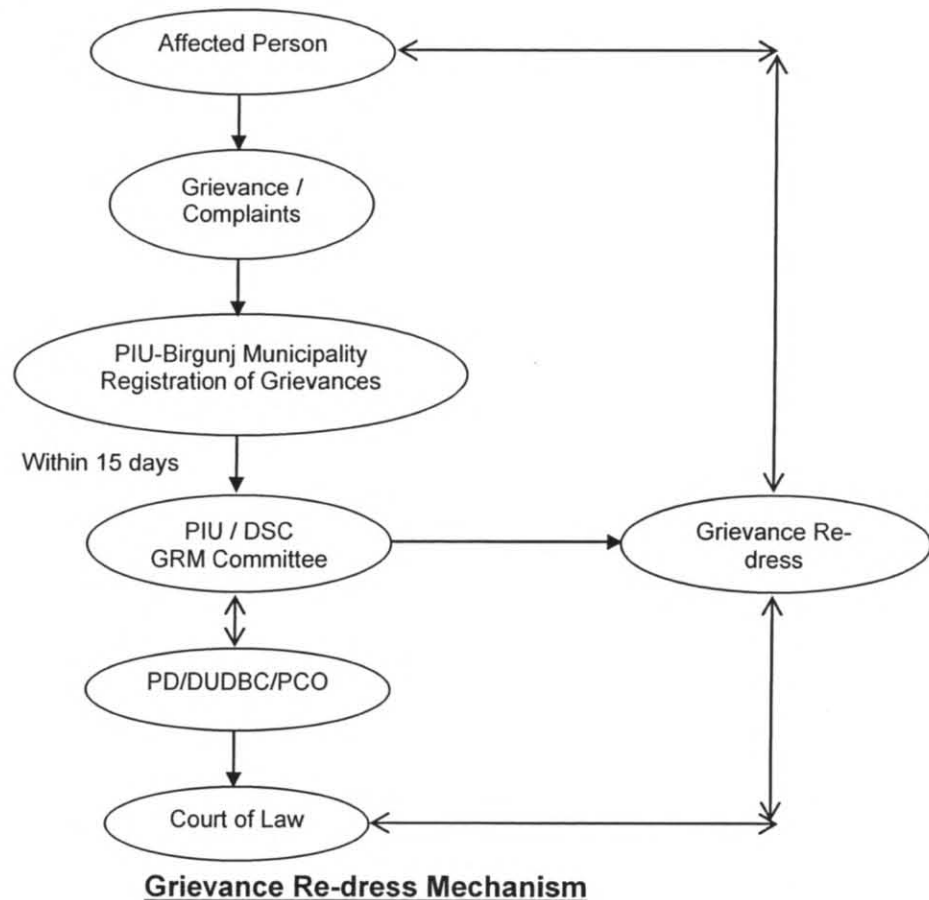
The monitoring for compliance of recommended mitigation measures during construction and post-construction certification inspection of each completed section of sub-project and each rehabilitated ancillary sites shall be undertaken by the Design and Supervision Consultant. The cost for monitoring during construction and post-construction certification inspection is included in the project implementation cost.

7.5 Grievance Re-dress Mechanism

Public dissent, especially amongst local stakeholders is obvious and common to surface upon the sub-project stretch where its activity is undertaken and continued without suggested environmental safeguards being correctly respected, most notably during material extraction, drainage line excavation and storage of spoil material, locating cross outfall drainage, and draining out hazardous spills over the private land without consent of the landowner, and finally, creating inconvenience to the locals (littering along road side and arable land, dust hazard, noise pollution etc.) because of inappropriate construction practice.

The concern/grievances from local/affected people may come up related to inappropriate implementation of various components of EMP. These issues can be easily addressed through acknowledgement, evaluation and corrective action and response approach. To resolve grievance from public or stakeholders concerning the sub-project will be directed to the Project Manager, PIU, STIUEIP-Birgunj. For local stakeholders' convenience, this mechanism will be affected by establishing mandatory "grievance register book" at the Office of Project Manager, PIU, STIUEIP-Birgunj. The register book will delineate i) date of grievance registered ii) name / address of grievance lodger (stakeholder) iii) nature of grievance being lodged and iv) location / site of fault works requiring corrections.

Firstly, it will be assessed if the grievances are genuine or suggestion is acceptable. Accordingly, response will be given within 15-30 days by the PIU, STIUEIP-Birgunj in consultation with the Design and Supervision Consultant. In case the Project Manager, PIU, STIUEIP-Birgunj through Design and Supervision Consultant is unable to resolve the issue, the matter will be forwarded to the PD, DUDBC/PCO. The corrective action will be carried out as per the response or action plan indicated to the stakeholder. Lastly if PD, DUDBC/PCO is unable resolve the matter, the matter will be resolved by the court of law. The outcome shall also form part of quarterly progress report. Grievance re-dress mechanism shall be translated in Nepali language and posted to the respective DDC/Municipality office by PIU, STIUEIP-Birgunj at least 30 days prior to commencement of construction works.



7.6 Accident Response Mechanism during Construction

In order to adopt prompt accident response mechanism, at every work place, a readily available first aid unit including an adequate supply of dressing materials, technician and a standby vehicle will be provisioned for Accident Response Mechanism. Pertaining to

seriousness of the nature of injury, immediate transportation to nearby hospital will also be maintained in the work site.

7.7 Environmental Management Plan

This Environmental Mitigation Management Plan (EMP) delineates key issues likely to arise from Project implementation, and proposes mitigation measures, including monitoring schedule and responsibility. The EMP also outlines environmental management roles and responsibilities, sub-project design and construction management of different activities, site supervision, monitoring and reporting, records, and corrective measures, improvement proposals, and cost estimates for mitigation measures. The EMP is detailed in **Table 7.2** and shall form a part of Bidding Document. Environmental Compliance Monitoring Plan and Environmental Impact Monitoring Plan is presented in **Table 7.3** and **Table 7.4** respectively delineating monitoring indicators, period, and frequency during various stages of Project implementation and operation.

7.8 Public Response

The public consultation was conducted from 2070-1-8 to 2070-1-10 covering all the wards of Birgunj Municipality at their respective ward offices. Besides, interaction discussion was also conducted with locals. The public responses received during public consultation are given in detail in **Annex 4** and is summarized as follows.

- Almost all the stakeholders raised the same voice expressing their concern regarding drainage problem faced by Birgunj City constituting blockage of drain, flooding, inundation and poor outlets specifically during monsoon. The drainage and sewerage design and implementation should be effective enough to overcome the problem having proper drainage outlets so as to eliminate swampy areas (principal site for mosquito breeding).
- All of them were very happy to learn about the project and hoped that the project will be implemented as soon as possible.

Table 7.2: Environmental Mitigation Management Plan (EMP)

Environmental Issues / Component	Mitigation Measures / Actions	Approximate Location	Time Frame	Mitigation Cost (NRs.)	Institutional Responsibility	
					Implementation	Supervision
[A] Environmental Enhancements						
1. Employment Opportunity	<ul style="list-style-type: none"> Project emphasizes in obtaining labor from the project influence area. The project will employ local poor, vulnerable and socially excluded people and women to the extent possible pertaining to their skill and capacity. 	Throughout project area	Construction	Construction Contract	Contractor	DSC, PIU / Municipality
2. Skill Training	<ul style="list-style-type: none"> Enhancement of technical skill by providing training for local laborers in construction techniques, small engineering structures and bio-engineering works. 	Throughout project area	Construction and Maintenance	Project Cost	Project nominated NGO	DSC, PIU / Municipality
3. Social Support Program	<ul style="list-style-type: none"> Awareness program to locals for operation and management of newly developed infrastructure management system. 	Throughout project area	Construction and Maintenance	Project Cost	Project nominated NGO	DSC, PIU / Municipality
4. Enhancing Quality of Life	<ul style="list-style-type: none"> New sewer line, storm water drainage, waste water treatment plant, toilets construction and upgrading / widening of RoW to sealed standard will overcome inundation problem, reduce dust emission and associated health hazard. This will improve the quality of life of people. 	Project area	Operation and Maintenance	Construction Contract	Contractor	DSC, PIU / Municipality
[B] Pre-Construction Stage						
1. Illegal Encroachers / Land and Building Acquisition	<ul style="list-style-type: none"> No additional land will be required for acquisition as the infrastructures development are within the public right-of-way (RoW) and STP is to constructed on the land owned by Municipality. Removal of temporary shops and structures of road side vendors within the road right of way (if any) issuing notice with reasonable time frame to the concerned for their controlled demolition. 	Throughout project area	Design/Pre - Construction	Project Cost	PIU / Municipality, DSC	PIU / Municipality
2. Permits	<ul style="list-style-type: none"> Obtain necessary permits for commencement of project work and provide a copy to the Contractor. Obtain written permission from landholders, Municipality, DDC, VDC under the Local Self-Governance Act, 1998 prior to commencement of various activities related to 	Throughout project area	Pre - Construction	Project Preparation Cost Construction	PIU / Municipality, DSC Contractor	PIU / Municipality DSC, PIU /

IEE Study Report
Drainage, Sewerage and Roads Improvement for Birgunj Municipality

Environmental Issues / Component	Mitigation Measures / Actions	Approximate Location	Time Frame	Mitigation Cost (NRs.)	Institutional Responsibility	
					Implementation	Supervision
	<ul style="list-style-type: none"> construction work and provide copies to the Supervising Consultant. 			Contract		Municipality
3. Worksite survey, Pegging and approval	<ul style="list-style-type: none"> Conduct layout survey of the proposed project works. Locate, peg out and seek approval from the Supervising Consultant for each ancillary site prior to the commencement of related activities. Inspect and approve, if correct all ancillary sites. 	Throughout project area	Pre - Construction	Construction Contract	Contractor	DSC, PIU / Municipality
[C] Construction Stage						
C1. Physical and Chemical						
1. Earthworks / Slope Stabilization	<ul style="list-style-type: none"> Proper and adequate shoring work to avoid slide. Minimize exposure of trench excavation work. Turfing for embanked slopes. Development and approval of a sediment and erosion control plan prior to land disturbance. Removal of spoils as soon as it is excavated. Disposal of spoils in municipal – approved sites. 	Throughout project area.	Design & Construction	Estimated cost for turfing: NRs. 600,000.00 [20,000 m ² x 30] For others, provisioned in Construction Contract	Contractor	DSC, PIU / Municipality
2. Disruption of Public Utilities	<ul style="list-style-type: none"> Full inventory of public utilities existing in construction sites. If required, preparation of relocation plans with service providers to any damages to utilities during construction. Provision of satisfactory access to buildings, dwellings, or other activity areas if construction works and new facilities disrupt existing access. Replacement of (or compensation payments to) public and private physical structures damaged due to construction or vibration. Keep the site free from all unnecessary obstructions and storing or disposing of any contractor's equipment or surplus material. Clear away and remove from site any wreckage rubbish and temporary works which are no longer required. Reinstate roads and lanes where sewerage pipe and storm 	Throughout project area.	Construction	Estimated cost: Lump Sum NRs. 25,000,000.00	Contractor	DSC, PIU / Municipality

Environmental Issues / Component	Mitigation Measures / Actions	Approximate Location	Time Frame	Mitigation Cost (NRs.)	Institutional Responsibility	
					Implementation	Supervision
3. Traffic Hazard and Road Safety	<p>water drainage networks works will be undertaken.</p> <ul style="list-style-type: none"> Plan transportation routes so that heavy vehicles do not enter the urban area. Scheduling transport of spoils to avoid peak traffic periods and other important times. Do not block public roads. Do not deposit excavated soils/mud on public roads. Coordinate with Municipal Traffic Office for temporary road diversions. Provision of sign boards for pedestrians to inform nature and duration of construction works. Provision of adequate road safety measures such as road safety signals, appropriate diversions, barricades and speed control measures. Contractor shall prepare traffic management plan and get its approval from the supervising engineer. Minimization of period of construction by increase of workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools. 	Throughout project area.	Construction	Construction Contract	Contractor	DSC, PIU / Municipality
4. Noise Pollution	<ul style="list-style-type: none"> Avoid noise generating activities at night. Restrict work to day hours. Noise barriers to be placed in sensitive locations i.e. schools, hospitals etc. Consult with the local community to inform them of the nature, duration and likely effects of the construction work, and to identify any local concerns so that these can be addressed. Minimization of period of construction. Reduce dust by spraying water on stockpiled soil, excavated materials, and spoils. Construction area shall be maintained damp by periodical spray of water. 	Throughout project area	Construction	Construction Contract	Contractor	DSC, PIU / Municipality
5. Air Pollution	<ul style="list-style-type: none"> Reduce dust by spraying water on stockpiled soil, excavated materials, and spoils. Construction area shall be maintained damp by periodical spray of water. 	Throughout project area.	Construction	Construction Contract	Contractor	DSC, PIU / Municipality

Environmental Issues / Component	Mitigation Measures / Actions	Approximate Location	Time Frame	Mitigation Cost (NRs.)	Institutional Responsibility	
					Implementation	Supervision
6. Water Pollution	<ul style="list-style-type: none"> • Cover stockpiled construction materials with tarpaulin. • Ensure delivery vehicles be covered. • Provide temporary hoardings where required to minimize dust impact on locations of temples and other cultural sites. • Enforce construction contractor to produce and implement a site Health and Safety (H&S) Plan that includes: (a) excluding the public from the site, (b) ensure that all workers are provided with and use appropriate personal protective equipment, (c) H&S training for all site personnel, (d) documented procedures to be followed for all site activities, and (e) documentation of work-related accidents. • The Contractor will implement safety measures against accident risks. • All construction vehicles should comply with Motor Vehicles and Transportation Management Act as amended. • Ensure use of vehicles complying with NVMS 2069 BS. • Surface and ground water reserves must be protected from any source of contamination such as construction and oily waste that will degrade its potable quality. • Solid wastes shall be disposed off in designated sites. • Ensure that the construction debris do not find their way into the drainage or irrigation canals which may get clogged. • Prohibit washing of machinery and vehicles in surface waters, provide sealed washing basins and collect wastewater in sedimentation/retention pond. • Contractor needs to arrange for sufficient water supplies and proper sanitation facilities for its labor force. • Regular water quality monitoring (physico-chemical and microbiological tests) according to determined sampling schedule. 	Throughout project area.	Construction	Construction Contract	Contractor	DSC, PIU / Municipality
		3 sensitive locations as directed by DSC	Every 3 months	Estimated cost for Water Quality Monitoring: NRs. 480,000.00 [3 sites x 8 times x 20000] (This activity is also indicated in compliance and Impact Monitoring)	Through approved monitoring agency.	DSC, PIU / Municipality

Environmental Issues / Component	Mitigation Measures / Actions	Approximate Location	Time Frame	Mitigation Cost (NRs.)	Institutional Responsibility	
					Implementation	Supervision
7. Operation and Closure of Quarries and Borrow pits	<ul style="list-style-type: none"> Locate and peg quarries and seek approval from the supervising consultant. Obtain permission/license for extraction of materials from stakeholders, Municipality, DDC or VDC as appropriate. Locate extraction sites restricted to small areas, preferably on existing quarry sites and sites without any tree cover, away from dwellings, archeological, religious or cultural sites, sites which will not alter river flow regime and possess water logging problem in future, and sites where effects will be temporary. Prevent ponding of water through adequate drainage. The depth of the pits should be regulated so that the sides of the excavation will have a slope not steeper than 1:4. Stripped materials shall be stored so as not to disrupt natural drainage and shall be protected so as not to be eroded into surface waters. Restore the site maintaining natural contours and vegetation. 	Location of selected quarries and borrow pits proposed during construction	Construction	Plan) Construction Contract	Contractor	DSC, PIU / Municipality
8. Stockpiling of Construction Materials and Spoil Disposal	<ul style="list-style-type: none"> Locate, peg and seek approval from the supervising consultant for the use of stockpile sites. Stockpile should not be located on water courses; should not be within 50m of Schools, hospitals or public standpipes; and should not affect locals and their properties. Obtain written permission from landowners and local bodies for stockpiling on their land. Stockpiles should be covered with tarpaulins. For large stockpiles, it should be enclosed with side barriers and also covered when not in use. Provide intervening vegetated buffer to control any unexpected run-off. Clean area properly after completion. Locate disposal sites on stable ground without excessive slope; that avoids water courses and wetlands; that will not 	Throughout project area.	Construction	Construction Contract. Estimated cost for spoil disposal is: NRs. 7,900,000.00 [79,041m ³ x 100] Cost of seed sowing on embanked slope is mentioned above.	Contractor	DSC, PIU / Municipality

Environmental Issues / Component	Mitigation Measures / Actions	Approximate Location	Time Frame	Mitigation Cost (NRs.)	Institutional Responsibility	
					Implementation	Supervision
	<p>promote instability and result in destruction of property, vegetation and local services. Preferably permissible sites are abandoned quarry or borrow pit in order to restore original contour.</p> <ul style="list-style-type: none"> Restrict disposal at approved locations with correct placement of fill. 					
9. Use of Bitumen / Combustible / and Toxic Materials	<ul style="list-style-type: none"> Fuel wood shall not be used for heating bitumen. Bitumen shall be melted in heaters using kerosene, diesel or gas fuel. Bitumen drums should be stored in dedicated areas, not scattered along the road and any small accidental spills should be cleared up immediately. No bituminous material shall be discharged into side drains. Bitumen shall not be applied in strong wind or rainy conditions. Supervision and immediate action accordingly. 	Throughout project area	Construction	Construction Contract	Contractor	DSC, PIU / Municipality
10. Non compliance of design standards	<ul style="list-style-type: none"> Supervision and immediate action accordingly. 	Throughout project area.	Construction	Construction Contract	Contractor	DSC, PIU / Municipality
C2. Biological						
1. Vegetation and Forest Resources	<ul style="list-style-type: none"> The project will coordinate with the concerned authority (Municipality, DDC, District Forest Office) for proper tagging, felling, stacking and transporting logs at designated location. Fuel wood shall be banned for construction work. Identify and seek approval from supervising consultant for felling of trees within the RoW including stacking and handover to concerned authority. <p>Tree:</p> <ul style="list-style-type: none"> >girth 0.30 – 0.60m = 66 nos. >girth 0.60m – 0.90m = 17 nos. >girth 0.90 – 1.80m = 1 no. >girth 3.0m = 1 no. <p>Bamboo 106 nos.</p> <ul style="list-style-type: none"> Plantation (including protection and management for 	Project area including road and lanes, waste water treatment plant.	Construction	Estimated cost for felling of tree: NRs. 60,000.00 [66x245 = 16,170] [17x933 = 15,861] [1x2598 = 2,598] [1x20977 = 20,977] [106x20 = 2,120] Estimated cost for plantation of suitable road side trees: NRs. 650,000.00	Contractor	DSC, PIU / Municipality

Environmental Issues / Component	Mitigation Measures / Actions	Approximate Location	Time Frame	Mitigation Cost (NRs.)	Institutional Responsibility	
					Implementation	Supervision
	<ul style="list-style-type: none"> 5years) of suitable road side trees. (around 1300 nos.) Plantation (including protection and management for 5years) of suitable trees around the wastewater treatment plant site for creation of buffer zone. (around 3500 nos.) 			[1300x500] Estimated cost for plantation of suitable trees around wastewater treatment plant site: NRs. 1,050,000.00 [3500x300] Total: 1,760,000.00		
C3 Socio-economic and Cultural						
1. Illegal Encroachers	<ul style="list-style-type: none"> Initiate all removal / demolition procedure for temporary shops and structures of road side vendors if any within the road right of way by issuing notice with reasonable timeframe to the concerned for their controlled demolition. results of public consultation. 	Throughout project area.	Pre-construction and Construction	Included in project cost.	PIU / Municipality, DSC, Contractor	DSC, PIU / Municipality
2. Nuisance to Public	<ul style="list-style-type: none"> Reinstate road and footpath immediately after construction of sewer/drainage line. Provision of signboards for pedestrians to inform nature and duration of construction work. Increase workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and Schools for minimization of period of construction. Plan transportation routes so that heavy vehicles do not enter the urban area. Scheduling transport of spoils to avoid peak traffic periods and other important times. Do not block public roads. Coordinate with Municipal Traffic Office for temporary road diversion. 	Throughout project area.	Construction	Construction Contract	Contractor	DSC, PIU / Municipality

Environmental Issues / Component	Mitigation Measures / Actions	Approximate Location	Time Frame	Mitigation Cost (NRs.)	Institutional Responsibility	
					Implementation	Supervision
3. Occupational Health and Safety	<ul style="list-style-type: none"> Reduce dust by spraying stockpiled soil, excavated materials, and spoils. Adequate lighting and safety signal devices be installed for work safety. Adequate warning signs and safety barriers will be provided for work safety. Protective clothing including helmets, masks, boots, gloves, ear plugs and goggles should be provided for workers safety. At workplace, first aid unit including an adequate supply of dressing materials, technician and a standby vehicle will be provisioned for Accident Response Mechanism. Pertaining to seriousness of the nature of injury, immediate transportation to nearby hospital will also be maintained in the work site. Provide and maintain adequate space, proper drinking water, sewerage and waste disposal facilities at the camps. Maintain health care system at construction camps including regular visit by trained medical staff for routine checkup of workers and avoidance of communicable disease. Strict rules and regulation be maintained in the labor and work camp to avoid alcoholic and other bad habits. Impart construction safety education to all villagers, Schools, clubs and drivers of construction vehicles. 	Throughout project area, locations selected for labor/work camps.	Construction	Construction Contract	Contractor	DSC, PIU / Municipality
4. Loss of Livelihood	<ul style="list-style-type: none"> Leave spaces for access between mounds of soil. Provision of walkways and metal sheets where required to maintain access across trenches for people and vehicles. Increase workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and Schools. Consult businesses and institutions regarding operating hours and factoring this in work Schedules. 	Throughout project area	Construction	Construction Contract	Contractor	DSC, PIU / Municipality

Environmental Issues / Component	Mitigation Measures / Actions	Approximate Location	Time Frame	Mitigation Cost (NRs.)	Institutional Responsibility	
					Implementation	Supervision
5. Social and Cultural conflicts due to influx of construction workers	<ul style="list-style-type: none"> Provision of signboards for pedestrians to inform nature and duration of construction works. Strict rules and regulation shall be maintained in the labor and work camp so that any engagement in alcoholic and other bad habits are restricted. 	Throughout project area and location of labor and work camp.	Construction	Construction Contract	Contractor	DSC, PIU / Municipality
6. Non-Cooperation of Local People	<ul style="list-style-type: none"> Good rapporting and involvement of local people / user groups. 	Throughout project area.	Construction	Construction Contract	Contractor	DSC, PIU / Municipality
7. Labor Camp Location and Management	<ul style="list-style-type: none"> Locate, peg and seek approval from SC for labor camp sites. Camps shall not be located near settlements; near water supply intakes; or sites that affects locals access to drinking water. Camp shall not be in the vicinity of landslide and flood plains. Provide and maintain proper drinking water, sewerage and waste disposal facilities at the camps. The solid waste generated will be separated. Non-degradable waste as plastic, steel, grasses etc. will be recycled while bio-degradable waste will be collected and dumped at proper location approved by DSC/Municipality with consent of relevant stakeholders. Open burning of solid waste will be strictly banned during construction. Management of solid waste will be undertaken as per SWMA 2068 BS. Ensure no wood is burnt by any worker on or off site. Camps shall be provided free of cost, with electricity and regulator & adequate fuel supplies of LPG or Kerosene. Prohibit workforce from poaching wildlife and cutting trees. After use, sites shall be cleared and restored to near natural or stable conditions with vegetative cover. Restrict working hours from 7:00 to 18:00. The Contractor shall not employ child or under aged person 	Throughout Labor Camp Area	Construction	Construction Contract	Contractor	DSC, PIU / Municipality

Environmental Issues / Component	Mitigation Measures / Actions	Approximate Location	Time Frame	Mitigation Cost (NRs.)	Institutional Responsibility	
					Implementation	Supervision
[D] Operation and Maintenance Stage						
1. Pollution of Water Resources	as per Labour Act, BS 2048. <ul style="list-style-type: none"> Quality of effluent and river water needs to be regularly monitored (physic-chemical and microbiological test). The design and construction of sewerage system itself should be made robust and seepage proof. 	3 sensitive locations	Operation Every 6 month	Estimated cost for water quality monitoring: NRs. 120,000.00 [3 sites x 2 times x 20000] For other direct observations: NRs. 200,000.00 [2 times x 100,000] Total: NRs. 320,000.00 [These activities are also indicated in Compliance & Impact Monitoring Plan]	Through approved monitoring agency	PIU/Municipality, DUDBC
2. Blockage of Drain and Damage to Sewer System due to Poor Maintenance	<ul style="list-style-type: none"> Building of Public Awareness. Timely supervision and monitoring. Regular cleaning of drain Promotion of public awareness and practices about solid waste management and sanitation issues. Control industrial and medical waste discharge into drain without treatment enforcing existing legal provisions. 	Throughout project area	Operation	Maintenance cost	PIU / Municipality	DUDBC
3. Removal and Disposal of Sludge	<ul style="list-style-type: none"> Sludge will be cleared at the frequency of every 6 months by the Municipality and will be placed on allocated sludge drying bed provisioned in the design layout. The digested sludge will be looked upon for possible use as fertilizer after laboratory testing. 	Waste water treatment plant site	Operation	Maintenance cost	PIU / Municipality	DUDBC

Note: DDC = District Development Committee. DSC = Design and Supervising Consultant. DUDBC = Department of Urban Development and Building Construction. PIU/Municipality = Project Implementation Unit / Birgunj Municipality. RoW = Right of Way. VDC = Village Development Committee.



Table 7.3: Compliance Monitoring Plan

Predicted Impact	Mitigation Measures	Indicator for Monitoring	Method	Period and Frequency	Approx. Location	Institutional Responsibility	
						Implementation	Supervision
1. Physical and Chemical Environment							
Earthworks / Slope Stability	Turfing on embanked slopes. minimize exposure of trench excavation. removal of spoils as soon as possible and disposal of spoils in municipal approved site.	adequacy and quality of turfing. survival rate of vegetative cover. scouring and siltation	direct observation	Regular during construction phase and every six months during operation	Throughout project area.	Contractor	DSC, PIU / Municipality, DUDBC
Disruption of Public Utilities	Removal, reinstatement and relocation (where required) for existing services.	Correct placement of public utilities.	direct observation	regular during construction	Throughout project area	Contractor	DSC, PIU / Municipality
Traffic Hazard and Road Safety	adequate road safety signals, barriers, junctions improvement etc. appropriate diversion and proper barricades for construction site demarcation	smooth flow of traffic. Incidence of accidents.	direct observation. data collection from traffic post.	regular during construction phase and every six month during operation phase	Throughout project area	Contractor	DSC, PIU / Municipality, DUDBC
Noise Pollution	ensure plant & equipment conforms to best practices. Workers provided with appropriate ear muffs / plugs. Provision of noise barriers placed in sensitive areas. Works to be restricted to day hours only.	no complaints from local residence. cracks caused by vibration due to construction activities monitored closely.	direct observation	regular during construction and every six monthly during operation.	Throughout project area	Contractor	DSC, PIU / Municipality, DUDBC
Air Pollution	Construction plants located at appropriate locations. Construction site	No excess dust deposition on crops and vegetation.	direct observation	regular during construction and every six month during	Throughout project area.	Contractor	DSC, PIU / Municipality, DUDBC

IEE Study Report
Drainage, Sewerage and Roads Improvement for Birgunj Municipality

Predicted Impact	Mitigation Measures	Indicator for Monitoring	Method	Period and Frequency	Approx. Location	Institutional Responsibility	
						Implementation	Supervision
	maintained damp by periodical spray of water. all construction vehicles to comply GoN pollution regulation. ensure vehicles plying during operation complies with GoN regulation.	No complaints from local residence. Monitoring of evidence issued by concerned agency.		operation phase.			
Water Pollution	Restrict debris disposal near water bodies. Provision of toilets, good drainage, proper water supply and solid waste management within work and labour camp. The design and construction of sewerage system itself should be made robust and seepage proof.	No siltation. Monitoring of provisions. Physico-chemical and Microbiological tests to WHO standards	direct observation measurement and analysis	Regularly during construction and every six month during operation phase. water quality monitoring, every three months during construction and every six months for one year during operation.	Project area Three sensitive locations as directed by DSC	Contractor Through approved monitoring agency	DSC, PIU / Municipality, DUDBC DSC, PIU / Municipality, DUDBC
Operation and Closure of Quarries and Borrow Pits	finalize quarries and borrow pits sites. ensure located away from population centers, drinking water intakes. Sides of excavation will have a slope not steeper than 1:4.	no evidence of water ponding. no increased visual turbidity of surface waters. natural contour restored.	direct observation	regular during construction phase	Location of selected quarries and borrow pits proposed during construction	Contractor	DSC, PIU / Municipality, DUDBC



Predicted Impact	Mitigation Measures	Indicator for Monitoring	Method	Period and Frequency	Approx. Location	Institutional Responsibility	
						Implementation	Supervision
Stockpiling of Construction Materials and Spoil Disposal	Adequate drainage to prevent ponding. avoid haphazard debris disposal. identify suitable sites for stockpiling and debris disposal with written permission from relevant stakeholders. proper coverage of stockpiles with control on surface runoffs. correct placement of fill. restriction on use of fuel wood. storage at designated areas. accidental spills shall be cleared immediately. provisions for collection and retaining leaks and spills.	Sufficient protection measures provided against washouts. no increased visual turbidity of surface waters. stability of spoil area. complaints from local residence	Direct observation	Regular during construction phase	Location of identified stockpiling and debris disposal sites	Contractor	DSC, PIU / Municipality
Use of Bitumen / Combustible / Toxic Materials	restriction on use of fuel wood. storage at designated areas. accidental spills shall be cleared immediately. provisions for collection and retaining leaks and spills.	hazardous materials management procedures implemented. no visible puddles of oil or oil contaminated soil.	direct observation and analysis	regular during construction and every six months during operation phase.	Project area	Contractor	DSC, PIU / Municipality, DUDBC
Non compliance of design standards	supervision and immediate action accordingly	Work conforming to design, drawing and specification	Direct observation and analysis	regular during construction	Project area	Contractor	DSC, PIU / Municipality
2. Biological Environment							
vegetation and forest resources	coordinate with concerned authority for proper felling, stacking and transportation of logs at designated locations. plantation of 1300 nos. of	ensure appropriate felling and stacking of trees. ensure appropriate plantation with protective measures.	direct observation	regular during construction and every six month during Operation.	Throughout new road construction and wastewater treatment plant site	Contractor	DSC, PIU / Municipality, DUDBC

Predicted Impact	Mitigation Measures	Indicator for Monitoring	Method	Period and Frequency	Approx. Location	Institutional Responsibility	
						Implementation	Supervision
	trees within RoW and 3500 nos. at wastewater treatment plant site with appropriate tree species.	survival rate of trees.					
3. Social, Socio-economic and Cultural Environment							
Illegal Encroachers	Prior notice to be given for demolition and removal of illegally built structures and temporary hut/shops within RoW if any.	no complaints from local stakeholders.	direct observation	before construction	Throughout project area	DSC, PIU / Municipality	PIU / Municipality
Nuisance to Public	Reinstate site immediately after construction. Proper signboards for pedestrian and plan transportation routes and avoid blocking of roads.	No complaints from local stakeholders	direct observation	during construction	Throughout project area	Contractor	DSC, PIU / Municipality
Occupational Health and Safety	compliance with safety rules and regulations. good sanitary condition at labor and work camp. maintain discipline at labor, work camp and construction site. placement of signboards and prohibition to outsiders at risk prone sites	no complaints from labor, workers and local residence. workers health condition assessment. number of cases of disease and roadway accidents.	direct observation	regular during construction and every six month during operation phase.	Project area, work and labour camp locations	Contractor	DSC, PIU / Municipality, DUDBC
Loss of Livelihood	Provision of walkways and metal sheets where required to maintain access across trenches for people and vehicles.	No complaints from local stakeholders	direct observation	during construction	Throughout project area	Contractor	DSC, PIU / Municipality
Social and Cultural	Strict rules and regulation shall be maintained in the	No complaints from local stakeholders	direct observation	during construction	Throughout project area	Contractor	DSC, PIU / Municipality

IEE Study Report
Drainage, Sewerage and Roads Improvement for Birgunj Municipality

Predicted Impact	Mitigation Measures	Indicator for Monitoring	Method	Period and Frequency	Approx. Location	Institutional Responsibility	
						Implementation	Supervision
conflicts due to influx of construction workers	labor and work camp so that any engagement in alcoholic and other bad habits are restricted.						
Non-Cooperatoin of Local People	Good rapporting and involvement of local people / user groups.	No complaints from local stakeholders	direct observation	during construction	Throughout project area	Contractor	DSC, PIU / Municipality
Labor Camp Location and Management	Good Sanitary condition at labor camp. Maintain discipline at labor, work camp and construction site.	No complaints from local stakeholders. Workers health condition assessment. Number of cases of disease at labor camp.	Direct observation	Regular during construction	Labor camp area	Contractor	DSC, PIU / Municipality

Note: DDC = District Development Committee. DSC = Design and Supervising Consultant. DUDBC = Department of Urban Development and Building Construction. PIU/Municipality = Project Implementation Unit / Birgunj Municipality. RoW = Right of Way. VDC = Village Development Committee.



Table 7.4: Impact Monitoring Plan

Predicted Impact	Mitigation Measures	Indicator for Monitoring	Method	Period and Frequency	Approx. Location	Institutional Responsibility	
						Implementation	Supervision
1. Physical and Chemical Environment							
Earthworks / Slope Stability	Turfing on embanked slopes. minimize exposure of trench excavation. removal of spoils as soon as possible and disposal of spoils in municipal approved site.	Status of vegetative cover. Evidence of scouring and siltation	direct observation	Regular during construction phase and every six months during operation	Throughout project area	Contractor	DSC, PIU / Municipality, DUDBC
Disruption of Public Utilities	Removal, reinstatement and relocation (where required) for existing services.	Complaints from locals	direct observation	regular during construction	Throughout project area	Contractor	DSC, PIU / Municipality
Traffic Hazard and Road Safety	adequate road safety signals, barriers, junctions improvement etc. appropriate diversion and proper barricades for construction site demarcation	Smooth flow of traffic. Incidence of accidents.	direct observation. data collection from traffic post.	regular during construction phase and every six month during operation phase	Throughout project area	Contractor	DSC, PIU / Municipality, DUDBC
Noise Pollution	ensure plant & equipment conforms to best practices. Workers provided with appropriate ear muffs / plugs. Provision of noise barriers placed in sensitive areas. Works to be restricted to day hours only.	Complaints from local residence.	direct observation	regular during construction and every six monthly during operation.	Project area	Contractor	DSC, PIU / Municipality, DUDBC
Air Pollution	Construction plants located at appropriate locations. Construction site	No complaints from local residence.	direct observation	regular during construction and every six month during	Project area	Contractor	DSC, PIU / Municipality, DUDBC

IEE Study Report
Drainage, Sewerage and Roads Improvement for Birgunj Municipality

Predicted Impact	Mitigation Measures	Indicator for Monitoring	Method	Period and Frequency	Approx. Location	Institutional Responsibility	
						Implementation	Supervision
	<p>maintained damp by periodical spray of water.</p> <p>all construction vehicles to comply GoN pollution regulation.</p> <p>ensure vehicles plying during operation complies with GoN regulation.</p>			operation phase.			
Water Pollution	<p>Restrict debris disposal near water bodies.</p> <p>Provision of toilets, good drainage, proper water supply and solid waste management within work and labour camp.</p> <p>The design and construction of sewerage system itself should be made robust and seepage proof.</p>	No siltation.	direct observation	Regularly during construction and every six month during operation phase.	Project area	Contractor	DSC, PIU / Municipality, DUDBC
		Physico-chemical and Microbiological tests to WHO standards	measurement and analysis	water quality monitoring, every three months during construction and every six months for one year during operation.	Three sensitive locations as directed by DSC	Through approved monitoring agency	DSC, PIU / Municipality, DUDBC
Operation and Closure of Quarries and Borrow Pits	<p>finalize quarries and borrow pits sites.</p> <p>ensure located away from population centers, drinking water intakes.</p> <p>Sides of excavation will have a slope not steeper than 1:4.</p>	<p>Evidence of water ponding distraction of natural water course.</p> <p>Restoration of natural contour.</p>	direct observation	regular during construction phase	Location of selected quarries and borrow pits proposed during construction	Contractor	DSC, PIU / Municipality

Predicted Impact	Mitigation Measures	Indicator for Monitoring	Method	Period and Frequency	Approx. Location	Institutional Responsibility	
						Implementation	Supervision
Stockpiling of Construction Materials and Spoil Disposal	Adequate drainage to prevent ponding. avoid haphazard debris disposal. identify suitable sites for stockpiling and debris disposal with written permission from relevant stakeholders. proper coverage of stockpiles with control on surface runoffs. correct placement of fill.	Visual turbidity of surface waters. stability of spoil area. complaints from local residence	Direct observation	Regular during construction phase	Location of identified stockpiling and debris disposal sites	Contractor	DSC, PIU / Municipality
Use of Bitumen / Combustible / Toxic Materials	restriction on use of fuel wood. storage at designated areas. accidental spills shall be cleared immediately. provisions for collection and retaining leaks and spills.	no visible puddles of oil or oil contaminated soil.	direct observation and analysis	regular during construction and every six months during operation phase.	Project area	Contractor	DSC, PIU / Municipality, DUDBC
Non compliance of design standards	Supervision and immediate action accordingly	Work conforming to design, drawing and specification	Direct observation and analysis	regular during construction	Project area	Contractor	DSC, PIU / Municipality
2. Biological Environment							
vegetation and forest resources	coordinate with concerned authority for proper felling, stacking and transportation of logs at designated locations. plantation of 1300 nos. of	Status of tree survival and growth.	direct observation	regular during construction and every six month during Operation.	Throughout project area and wastewater treatment plant site	Contractor	DSC, PIU / Municipality, DUDBC

Predicted Impact	Mitigation Measures	Indicator for Monitoring	Method	Period and Frequency	Approx. Location	Institutional Responsibility	
						Implementation	Supervision
	trees within RoW and 3500 nos. at wastewater treatment plant site with appropriate tree species.						
3. Social, Socio-economic and Cultural Environment							
Illegal Encroachers	Prior notice to be given for demolition and removal of illegally built structures and temporary hut/shops within RoW if any.	Complaints from local stakeholders.	direct observation	before construction	Throughout road corridor	DSC, PIU / Municipality	PIU / Municipality
Nuisance to Public	Reinstate site immediately after construction. Proper signboards for pedestrian and plan transportation routes and avoid blocking of roads.	Complaints from local stakeholders	direct observation	during construction	Project area	Contractor	DSC, PIU / Municipality
Occupational Health and Safety	compliance with safety rules and regulations. good sanitary condition at labor and work camp. maintain discipline at labor, work camp and construction site. placement of signboards and prohibition to outsiders at risk prone sites	number of cases of disease and roadway accidents.	direct observation	regular during construction and every six month during operation phase.	Project area, work and labour camp locations	Contractor	DSC, PIU / Municipality, DUDBC
Loss of Livelihood	Provision of walkways and metal sheets where required to maintain access across trenches for people and vehicles.	Complaints from local stakeholders	direct observation	during construction	Project area	Contractor	DSC, PIU / Municipality
Social and Cultural	Strict rules and regulation shall be maintained in the	Complaints from local stakeholders	direct observation	during construction	Project area	Contractor	DSC, PIU / Municipality

IEE Study Report
Drainage, Sewerage and Roads Improvement for Birgunj Municipality

Predicted Impact	Mitigation Measures	Indicator for Monitoring	Method	Period and Frequency	Approx. Location	Institutional Responsibility	
						Implementation	Supervision
conflicts due to influx of construction workers	labor and work camp so that any engagement in alcoholic and other bad habits are restricted.						
Non-Cooperatoin of Local People	Good rapping and involvement of local people / user groups.	No complaints from local stakeholders	direct observation	during construction	Throughout project area	Contractor	DSC, PIU / Municipality
Labor Camp Location and Management	Good sanitary condition at labor camp. Maintain discipline at labor camp.	Number of cases of disease at labor camp.	Direct observation	Regular during construction	Labor camp area	Contractor	DSC, PIU / Municipality

Note: DDC = District Development Committee. DSC = Design and Supervising Consultant. DUDBC = Department of Urban Development and Building Construction. PIU/Municipality = Project Implementation Unit / Birgunj Municipality. RoW = Right of Way. VDC = Village Development Committee.



7.9 Summary of Mitigation Cost

Cost estimates of Environmental Mitigation, Monitoring, Environmental Enhancement and Social Support Program are as detailed below.

Table 7.5: Summary of Mitigation Cost

S.No.	Particulars	Estimated Cost in NRs
1	Cost for Environmental Mitigation	
	• Construction Phase	35,260,000.00
	• Operation Phase	-
2	Cost for Environmental Monitoring	
	• Construction Phase – water quality monitoring every 3 months at 3 sensitive locations. For other compliance monitoring and supervision, it is included in total Project Cost. Monitoring to be carried out by DSC for higher authority as PIU-Birgunj. Frequency at every 3 months is reasonable.	480,000.00
	• Operation Phase – water quality monitoring every six months up to one year and for other direct observations. Monitoring to be carried out by DSC for higher authority as PIU-Birgunj. Frequency at every 6 months is reasonable.	320,000.00
3	Cost for Enhancement Measures – Training in construction skills for local bodies.	Project Cost
4	Cost for other Social Support Program – Traffic Management and Awareness Program	Project Cost
	Total Environmental Cost	36,060,000.00
	Total Project Cost	3,916,319,991.00
	Percentage of Environmental Cost to the Project Cost	0.92 %

CHAPTER 8

8. OTHER NECESSARY MATTERS

8.1 Permissions and Clearances Required for the Project

The legal framework of the country consists of several acts, notifications, rules, and regulations to protect environment and wildlife. List of required clearances / permissions related to environment has been summarized in Table 8.1.

Table 8.1: Permissions / Clearances Required for the Sub-Project

S.No.	Clearances	Acts/Rules/Notifications/Guidelines	Concerned Agency	Responsibility
A. Pre-construction Stage				
1	Environmental Clearance	Environmental Protection Act 1997 and Environmental Protection Rules, 1997 (First Amendment, 1999).	Ministry of Urban Development (MoUD)	Department of Urban Development and Building Construction (DUDBC) / PM, PIU, STIUEIP, Birgunj Sub-Metropolitan City
2	Felling of Trees	Forest Act, 1992 (Amended in 1998) and Local Self-Governance Act, 199	Ministry of Forest	DUDBC / PM, PIU, STIUEIP, Birgunj Sub-Metropolitan City
B. Implementation Stage				
3	Permission for construction material quarrying (stone, cobble, sand, gravel, soil etc)	Local Self-Governance Act, 1999 and Soil, Watershed Conservation Act, 1982 and Watershed Conservation Rule, 1985.	Concerned Project and Concerned VDC, DDC and Municipality	Contractor
4	Consent to operate Asphalt Plant, Crushers, Batching Plant	Local Self-Governance Act, 1999	Concerned Project and Concerned VDC, DDC and Municipality	Contractor
6	Consent for disposal of sewage from labor camps	Water Resource Act, 1992	Concerned Project	Contractor
7	Pollution Under Control Certificate	Motor Vehicle and Transportation Management Act, 1993	Department of Transport	Contractor
8	Relocation and repair of irrigation canal	-	Concerned Project, DDC, VDC, Municipality and District Irrigation Office	Contractor
9	Relocation and	-	Concerned Project,	Contractor

	repair of Water Supply Lines		DDC, VDC, Municipality and District Water Supply Office	
10.	Relocation and repair of electrical poles / lines / street lighting.	-	Concerned Project, DDC, VDC, Municipality and District NEA Office.	Contractor
11.	Relocation and repair of telephone poles, lines, optical fibre	-	Concerned Project, DDC, VDC, Municipality and District Telecommunication Office.	Contractor

8.2 Environmental Clearance Process

The procedure for obtaining environmental clearance for IEE has been depicted in **Figure 8.1**.

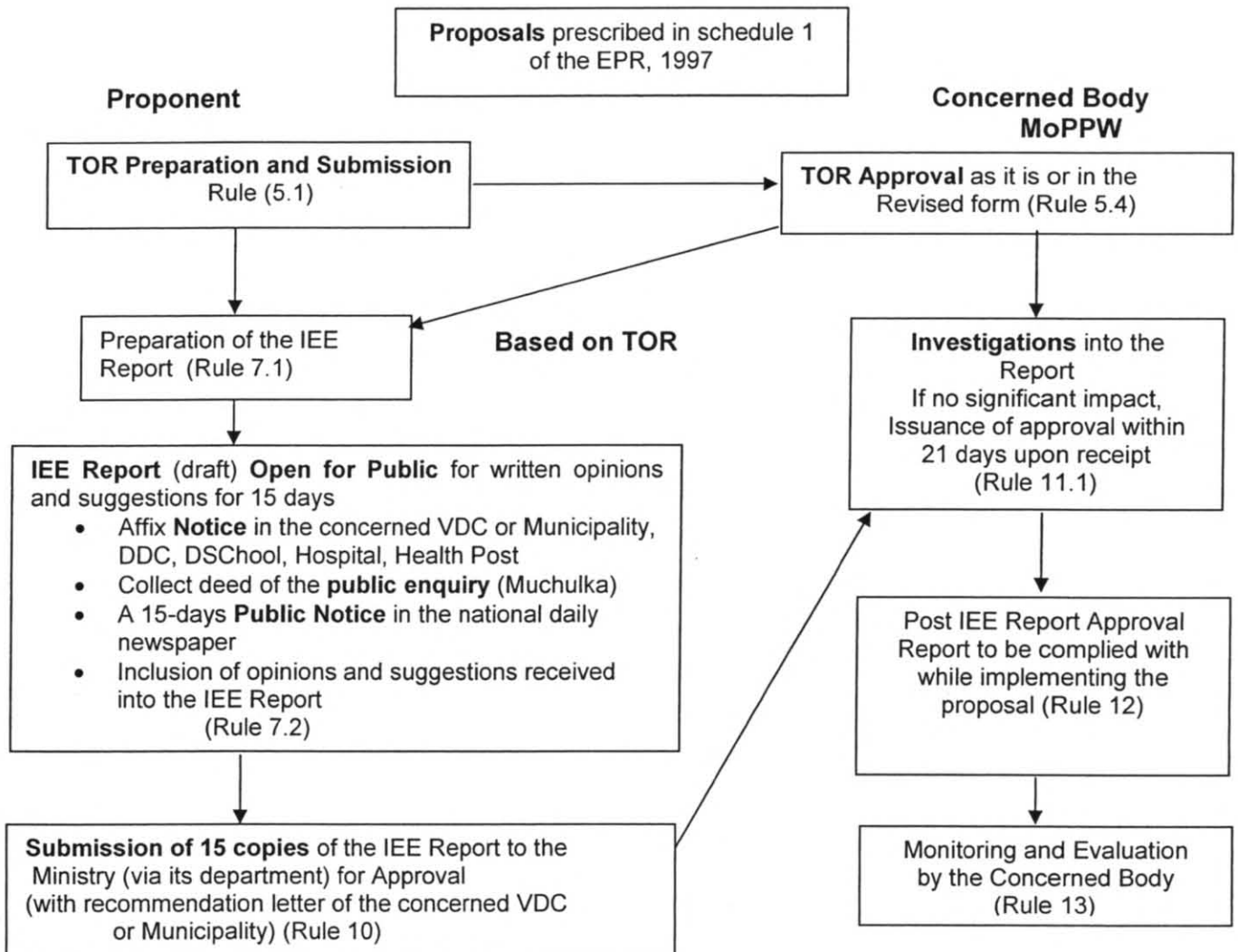


Fig. 8.1: Procedural Requirement for IEE Clearance



8.3 Enhancement Activities

During the project implementation works, the Project will ensure that local laborers receive manifold skill training in construction techniques and small engineering structures. They also will receive additional knowledge in waste management, material handling and general application of environmental health and social precautionary measures. By augmenting their capacity, local people being involved in the Project will find it easier to find skilled manpower jobs in the future, thus securing their livelihood as an alternative/additional occupation to agriculture.

It is anticipated that through adequate income generation and livelihood development programs, the earned money will be utilized in such a way that it will generate multiplier effects; for example by investing in cooperative, long-term ventures in farming and off-farming activities, crop diversification, agro-industries, cottage industries based on local resources, etc.

8.4 Review of Acts, Regulations and Guidelines

In Nepal, various instruments are in place to ease the integration of environmental aspects in development proposals. The study team has reviewed relevant acts, regulations and guidelines, but not limited to the following legislative provisions and guidelines of Nepal.

8.4.1 Interim Constitution of Nepal, 2063 (2007)

Realizing the need of environmental protection and right to live in clean environment at the national level, the interim constitution of Nepal has categorically included the article relating to environment. The article 16 of interim constitution has granted 'every person shall have the right to live in clean environment' as a fundamental right for the people. The article 35 (5) of the constitution has made it obligatory that the State requires to give priority to the protection of environment and prevention of further damage of the environment on the account of physical development activities and to take special measures for protection of wild life, vegetation and forests. Therefore, it is necessary to carry out the study of environmental resources in all development projects and also to assess their impacts, so that appropriate measures could be taken up to prevent any adverse and harmful effects on environment.

8.4.2 Plans and Policies

- Three Years Interim Development Plan, 2008
- Environmental Policy and Plan

8.4.3 Acts and Rules

- Environmental Protection Act, 1996

The Environmental Protection Act, 1996 and Environmental Protection Regulation, 1997 (first amendment, 1999) contain several provisions to institutionalize the integration of environmental aspects in development Subprojects including urban development sector (drainage, sewerage, solid waste and road) and empowers Ministry of Environment to approve EIA report. Similarly, in case of IEE level study, line Ministry, which is Ministry of Urban Development is authorized to approve the Final IEE Report. The following are the highlights of the EPA, 1996;

The Act recognizes the interdependence between development and the environment and shows the concerns for minimizing the impacts of environmental degradation on people, animal, and plant species and their physical surroundings. The Act obliges the proponent to

undertake IEE and EIA of proposal, plans or Subprojects which may cause changes in existing environmental condition and authorizes Ministry of Environment to clear all EIA and line Ministry for IEE study,

Empowers Ministry of Environment to prohibit the use of any matter, fuel, equipment or plant, which has adverse effects on the environment. The Act has provisions for polluters to compensate affected persons from polluting activities. Empowers government to provide additional incentives to any industry, occupation, technology or process, which has positive impacts on environmental conservation. It provisions to establish an Environmental Protection Fund to be used for environmental protection, pollution control and heritage conservation, and it gives the government authority to declare specific area as environmentally protected areas.

- Environmental Protection Rules, 1997 (First Amendment, 1999)

In the process of implementing EPA (1996) effectively the Environmental Protection Rule (EPR) came into force in 1997 and was amended in 1999. The EPR contains elaborate provisions for the process to be followed during the preparation and approval of Subprojects requiring EIAs and IEEs including scoping documents, terms of reference, public consultations and hearings, and environmental monitoring and auditing. The environmental legislation empowers the concerned Ministry to monitor the environmental activities including mitigation measures and Ministry of Environment for environmental auditing. For IEE, the concerned Ministry, which is the Ministry of Urban Development in case of the urban environment improvement projects, is authorized to approve the Final IEE Report. The EPR also lists the types of development activities requiring IEE or EIA level Study. It also gives an outline of content of the terms of reference document, IEE and EIA report.

- Water Resources Act, 2049(1992) and Water Resources Regulations, 2050(1993)
- Public Roads Act, 1974
- Road Board Act, 2002
- Labour Act, 1991 and Labour Rules (1993)
- Forest Act, 1993 and its Rules, 1995

In addition, the Act has empowered GoN to permit the use of any part of government managed forest, community forest, leasehold forest, if no other alternative is left except to use forest area for implementing development projects of national priority without significantly affecting the environment.

The forest rule of 1995 in its article 65 stipulates that if the project execution in the forest area causes any kind of loss or harm to local individual or community, the project shall have to bear the amount of compensation. Also, the project shall have to bear all expenses incurred on felling and transporting the trees and such other forest products of forest area. It is mandatory to plant 25 saplings for every tree cut and maintain them for 5 years.

- Land Acquisition Act, 1997

The Land Acquisition Act (1977, as amended 1993) guides the compulsory acquisition of land. GoN can acquire land at any place and in any quantity by giving compensation pursuant to the Act for the land acquired for any public purpose(s) or for operation of any development project initiated by GoN institutions

- Local Self-Governance Act, 1998 and its Rules, 2000
- Vehicle and Transport Management Act, 1992 and Rules, 1997
- Town Development Act (1992)
- Pesticides Act (1991) and Rules (1993)



- Village Development Committee Act (1991)
- District Development Committee Act (1991)
- Municipality Act (1992)
- Electricity Act (1992)
- Industrial Enterprises Act (1992)
- Tourism Act (1978)
- Mines and Minerals Act (1985)
- Nepal Water Supply Corporation Act (1989)

8.4.4 Manuals/Guidelines

- Public Works Directives (Vol.I and II), HMGN, 2002
- Guide to Road Sector Slope Protection Works, DoR, 2003
- Nepal Road Statistics, 2002
- National EIA Guidelines, 1993
- National EIA Guidelines for Industry Sector (1995)
- Urban Environment Management Guidelines (2009)
- Design Manual for Urban Roads
- Forest Produce Collection, Sale and Distribution Guidelines, 1998
- Environmental Management Guidelines, GEU/DoR, 1997
- Environmental Management Guidelines for Roads and Bridges, GEU/DoR, July 1999
- Environmental and Social Management Framework 2007, DoR
- National Noise Emission Standards, 2069 BS
- Standards for Emissions from In-use and Imported Diesel Generators, 2069 BS
- Generic Standards for CWTP Effluents to be Discharged into Inland Surface Waters, 2060 BS
- Vehicle Emission Standards for Green Sticker, 2057 BS
- NVMES, 2069 BS

8.4.5 International Conventions and Treaties

Nepal is a signatory to many international agreements, conventions etc. related to environmental conservation such as: Convention on Wetlands of International Importance especially as Waterfowl Habitat, (1971); Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES-1973); The Convention on Biological Diversity (1992). Internalization of these Conventions and Treaties into domestic laws and policies is in progress.



CHAPTER 9

9. CONCLUSIONS

The environmental impacts of the proposed Project for drainage, sewerage and road and lanes improvement are likely to have minimal detrimental effects on environment. Most of the adverse impacts identified and predicted are of minimal, temporary, short term and reversible in nature associated with construction phase. Rehabilitation, extension and construction of adequate drainage / cross-drainage and sewerage structures consisting of concrete hume pipe and well sealed cemented surface is provisioned in the design to avoid seepage and infiltration. Road safety and occupational safety and hazards mitigation has been included in the technical detailed design. Mitigation measures for sanitation and health, social and economic impacts are recommended and have been addressed in the detailed design for implementation during project execution.

The drainage and sanitation program together with the roads and lanes component will have environmental benefits through reduction in pollution by a) sealing of the roads and lanes b) providing better access facilities for storm water and sanitary sewer collection and disposal, and c) treatment of waste water to acceptable level prior discharge of effluent to river waterbody. The sanitary sewerage component will bring substantial environmental, community, and workers health and safety benefits to the Birgunj and the surrounding communities by providing appropriate waste water management system, including new waste water treatment plant. The subproject will also generate employment opportunities to the local people and thus will improve local economic and livelihood conditions.

The sealed pavement covering full road width will eliminate dust nuisance during dry and mud hazard during monsoon. The extension, rehabilitation, reinstatement and new construction of drainage and sanitary sewer will minimize inundation problem that frequently occurs during monsoon. The underground/covered drainage and sewerage including covered road side drain will reduce odor nuisance, health hazard and will enhance the looks of the surrounding environment. With designed greenery along the road way and plantation of trees along the buffer area around the treatment plant will also enhance the landscape aesthetics and attenuation of noise and odor created by vehicles and treatment activities respectively.

The identified impacts are temporary associated with construction phase which can be mitigated and is likely to have minimal detrimental effect on environment. The subproject will be implemented with strict adherence to the mitigation measures as prescribed in the Environmental Mitigation Management Plan which shall form part of the Bidding Document.

References

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2. ADB, 2003, Environmental Assessment Guidelines.
3. Department of Roads, (2003). Reference Manual for Environmental and Social Aspects of Integrated Road Development. MoPPW, GON, Kathmandu.
4. Environmental Management Guidelines, 1999. Ministry of Works and Transport, Department of Roads, Geo-environment Unit.
5. District Development Profile of Nepal, 2004.
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7. HMGN, 2002.Public Works Directives.
8. HMGN, 2002. Forest and Vegetation Types of Nepal. Ministry of Forests and Soil Conservation, Nepal.
9. HMGN, 2002. Nepal Biodiversity Strategy. Ministry of Forests and Soil Conservation, Nepal.
10. ISRC, 2007/08. District Profile of Nepal. Intensive Study and Research Centre Kathmandu.
11. Department of Road, Planning and Design Branch, Geo-Environmental and Social Unit, 2007. Environmental and Social Management Framework. Kathmandu, Nepal.

ANNEX 1
Approved Terms of Reference



BIRGANJ SUB-METROPOLITAN CITY
SECONDARY TOWNS INTEGRATED URBAN
ENVIRONMENTAL IMPROVEMENT PROJECT (STIUEIP)
PROJECT IMPLEMENTATION UNIT (PIU)
BIRGANJ, PARSA, NEPAL



Ref.no. : 200 / 069 / 070

Date: 26 Dec 2012

To,

Mr. Mohiuddin Mahmud
Regional Manager – South Asia 2
M/s SMEC International Pty.Ltd.,Australia[Consultants]
Brisbane City Enterprizes , Australia
Building Design Authority(BDA),Nepal and
CEMAT Consultants ,Nepal

Attn:

Mr. Nagendra Jha
Team leader

Sub:- Go ahead to submit the IEE report

This is to notify you that the IEE for Drianage/Sewerage/Road improvement works in Birganj Sub-metropolitan City has been approved on 20 Dec from Ministry of Urban Development as letter fax received on dated 26 Dec 2012 from PCO.You are, henceforth, request to submit the IEE report as per approved TOR

Ccto:

Mr. Sudip Poudel
Smec and Associates Coordinator

With regards

Shailendra Shrestha
Project Manager
Project Manager

Government of Nepal
Ministry of Urban Development
Department of Urban Development and Building
Construction (DUDBC)

(Draft)

TERMS OF REFERENCE
FOR
INITIAL ENVIRONMENTAL EXAMINATION STUDY
of
**Drainage, Sewerage and Roads Improvement for
Birgunj Municipality**
Parsa District

Proponent

Birgunj Sub-metropolitan City
Project Implementation Unit (PIU)
Secondary Towns Integrated Urban Environment Improvement Project (STIUEIP)
Birgunj, Parsa, Nepal

Prepared by

SMEC International Pty Ltd., Australia in association with Brisbane City Enterprises
Pty Ltd, Australia, CEMAT Consultants (P) Ltd., Nepal and Building Design Authority
Nepal

August 2012



Table of Contents

1.	NAME AND ADDRESS OF THE INDIVIDUAL OR INSTITUTION PREPARING THE REPORT (PROPONENT)	1
1.1	Name of Proposal	1
2.	PROPOSAL INTRODUCTION	2
2.1	Background	2
2.2	Project Objectives	2
2.3	Brief Description of the Project Area	2
2.4	Salient Feature	5
2.5	Objectives of IEE	5
2.6	Rationale for Conducting IEE	9
2.7	Impact Area Delineation	10
3.	PROCEDURES TO BE ADOPTED WHILE PREPARING THE IEE REPORT	11
3.1	Desk Study	11
3.2	Public Consultation	11
3.3	Field Study	11
3.4	Data Processing	12
3.5	Identification, Prediction and Evaluation of the Impacts	12
3.6	Report Preparation	12
4	REVIEW OF ACTS, POLICIES, RULES, REGULATIONS AND GUIDELINES	13
5	REQUIRED TIME, BUDGET AND STUDY TEAM FOR PREPARING THE REPORT	15
5.1	Time Schedule	15
5.2	Estimated Budget	15
5.3	IEE Team Composition	15
6	SPECIFIC IMPACTS/ISSUES OF THE PROPOSAL IMPLEMENTATION ON THE ENVIRONMENT	16
6.1	Adverse Impact / Issues	16
6.1.1	Social and Economic Impact/Issues	16
	Construction Stage	16
	Operation and Maintenance Stage	16
6.1.2	Physical, Chemical and Cultural Impact/Issues	16
	Construction Stage	16
	Operation and Maintenance Stage	17
6.1.3	Biological Impact/Issues	17
6.2	Beneficial / Enhancement Activities	17
6.2.2	Beneficial impact/activities	17
6.2.3	Enhancement Activities	17
6.3	Management Issues	17
7	ALTERNATIVE ANALYSIS	18
7.1	Design	18
7.2	Project Site	18
7.3	Technology, Procedure of Operation, Time Schedule, Raw Materials to be Used	18
7.4	No Project Option	18
8	MATTERS CONCERNING THE PREVENTION OF THE IMPACT OF THE IMPLEMENTATION OF THE PROPOSAL ON THE ENVIRONMENT (MITIGATION MEASURES).....	19
9	MATTERS TO BE MONITORED WHILE IMPLEMENTING THE PROPOSAL (ENVIRONMENTAL MONITORING PLAN).....	19

10	OTHER NECESSARY MATTERS.....	19
11	DELIVERABLES	19
	References.....	22

List of Table

Table 2.1	Salient Feature of Proposed Sub-Project Components.....	7
Table 2.2	Environmental Study Categorization.....	11
Table 5.1	Time Schedule.....	17

ANNEXES

Annex 1 Figure 2.1: Location Map of Project Area
Figure 2.2: Preliminary Layout Plan of Waste Water Treatment Plant

Annex 2 Site Photos



Acronyms

amsl	Above Mean Sea Level
CBOs	Community Based Organizations
DDC	District Development Committee
DDP	District Development Profile
DUDBC	Department of Urban Development and Building Construction
EA	Executing Agency
EIA	Environment Improvement Project
EMAP	Environmental Impact Assessment
EMP	Environmental Monitoring Plan
EPA	Environmental Protection Act
EPR	Environmental Protection Rules
GoN	Government of Nepal
IA	Implementation Agency
IEE	Initial Environmental Examination
Km	Kilometre
m	Meter
MoUD	Ministry of Urban Development
NGO	Non Government Organization
PAPs	Project Affected Peoples
PCO	Project Coordination Office
PIU	Project Implementation Unit
PMSC	Project Management and Support Consultant
PWD	Public Works Directives
PAPs	Project Affected Peoples
STIUEIP	Secondary Towns Integrated Urban Environment Improvement Project
WWTP	Waste Water Treatment Plant
ToR	Terms of Reference
VDC	Village Development Committee



TERMS OF REFERENCE

1. NAME AND ADDRESS OF THE INDIVIDUAL OR INSTITUTION PREPARING THE REPORT (PROPONENT)

Proponent

Project Implementation Agency

Birgunj Sub-Metropolitan City
Project Implementation Unit (PIU)
Secondary Towns Integrated Urban Environment Improvement Project (STIUEIP)
Birgunj, Parsa, Nepal
Telephone: +977 51532186
Facsimile: +977 51521220
E-mail: stiueip.birganj@gmail.com

Project Execution Agency

Ministry of Urban Development (MoUD)

Co-ordination, Monitoring and Implementation

The Project Coordination Office (PCO) in Department of Urban Development and Building Construction (DUDBC) is responsible for overall coordination, monitoring and implementation of STIUEIP assisted by the Project Management Support Consultants (PMSC).

1.1 Name of Proposal

Improvement of Drainage, Sewerage, Road and Lanes for Birgunj Sub-metropolitan City under Secondary Towns Integrated Urban Environment Improvement Project.



2. PROPOSAL INTRODUCTION

2.1 Background

Birgunj Sub-Metropolitan City is Nepal's principal trade centre. The city has experienced rapid growth especially in the past decade, due to migration to the city from peripheral districts and VDCs for security reasons, or other reasons such as for a better livelihood. There is consequently environmental deterioration resulting from inadequate sanitation and drainage, and mounting traffic congestion mainly in the main road leading to poor air quality in the city. The individual institutional efforts of both the sub-metropolis and sectoral agencies in addressing these issues, has remained uncoordinated and grossly inadequate. Most of the fertile agricultural fields are rapidly converting into residential and commercial areas. The eastern part of the sub-metropolis which lies in the flood-prone area of the Singaha River is also being changed to residential and commercial areas due to pressure of an increase in the population in the sub-metropolitan city. Most buildings are being constructed in Wards 18 and 19. The infrastructural facilities such as roads, sewer and storm-water drains and water supply, need to be developed to match the current rate of other development, which remains a major future concern.

Birgunj Sub-metropolitan City, PIU, STIUEIP has engaged the Design and Supervision Consultant to undertake Detailed Engineering Survey, Design and Construction Supervision for improvement/development of infrastructural facilities such as sewer, storm-water drains, road and lanes for Birgunj City including Initial Environmental Examination, preparation of contract document for execution of the construction work.. The STIUEIP will be implemented over five years period supported by Asian Development Bank (ADB) through Project Loans.

This Terms of Reference for the IEE study for Improvement/Development of Drainage, Sewerage, Roads and Lanes for Birgunj Sub-metropolitan City under Secondary Towns Integrated Urban Environment Project has been prepared by SMEC International Pty Ltd., Australia in association with Brisbane City Enterprises Pty Ltd, Australia, CEMAT Consultants (P) Ltd., Nepal and Building Design Authority Nepal. The Ministry of Urban Development (MoUD) is the concerned authority for the approval of the IEE study report.

2.2 Project Objectives

The expected outputs of the Subproject under the components considered in the IEE study are as follows:

- Improved drainage and sewerage systems.
- Improved urban roads and lanes.
- Community development programs undertaken, including health and hygiene education, 3R (reduce, reuse and recycle) of solid waste, promotion, skills training and investment in small-scale community facilities.

2.3 Brief Description of the Project Area

Birgunj Sub-metropolitan City is situated in the Narayani zone and the district of Parsa in the central development region of Nepal. It is one of the business economic and industrial zone of central region, covering an area of 23.37 km². The city lies at 27°02'30" to 26°57'45" North and 84°55'00" to 84°52' 15" East. The eastern part of the city is bordered by another district – Bara whereas the southern and south western part by Bihar State of India.

The Pathlaiya to Birgunj corridor is one of the most important manufacturing centres in Nepal constituting many industries including among others steel, plywood, rice mills, sugar mill, agricultural equipment, tanning etc. Birgunj is one of the major gateway towns to India and more than 50% of total foreign trade is carried out via this town.

The city borders India, Sirsiya dry port and Bishrampur VDC in the south, the Sirsiya River, Ramgadh VDC in the west, Parwanipur and Bahundangi VDC in the north, Parsauni, Itiyahi VDC and the Singaha River in the east. The city has a total area of 2337 ha, divided into 19 wards with their areas in a range of 4.88 ha (Ward No. 9) to 496.03 ha (Ward No. 19). The city has an elongated shape with a maximum north-south length of 8 km and east-west width of 4 km. The altitude ranges from about 78m in the south near the border area to 87m in the north. The location map of the project area is presented in **Annex 1: Figure 2.1**.

The city's population according to the Integrated Town Profile for Birgunj sub metropolitan area 2007 was 145,478 [78,835 males (54.19%) and 66,643 females (45.81)] in 25,748 households, with an annual population growth rate of 5.01%. The average family size is 5.65 and population density is 4813 per square km.

Surface and Ground Water

The area is drained by two rivers – the Sirsiya River in the west and the Singaha River in the east. On the north, there is Gandak Canal running along Gandak Road from the northwest to the southeast. This canal prevents surface runoff from the areas to the north of Gandak Road flowing into Birgunj. The Singaha River originates about 4 km upstream from the northern border of the municipality whereas the Sirsiya River originates from far northern area. These rivers are flooded during summer monsoon and river bank cutting particularly at the meander bend during flooding is common. The water in the river during dry period is very low. Groundwater table depth is estimated to be between 9-15 m deep with 1-2 m fluctuation during wet and dry season.

Topography

The topography exhibits a gradual slope of about 1:900 from north to southeast resembling Terai plain (northward extension of Indo-Gangetic plain). The altitude ranges from about 78m in the south near border area to 87m in the north. However there is high micro-topographical variation. Two major rivers are features of Birgunj namely, the Sirsiya River to the west and the Singaha River to the east. In addition to these two rivers there is Gandak Canal in the north. The land is fertile soil with mix of clay, silt and sand.

Geology

The area consists mainly of quaternary sediments. It is composed of very fertile soil mixed of clay, silt and sand.

Transportation

Birgunj is quite accessible. It is linked with different places via the Tribhuvan Rajpath and East-West Highway. There are 115 km of black topped road, 83 km gravelled and 82 km earthen roads and a number of trails within the municipality. Overall roads in Birgunj are in a poor condition. Simara Airport is located about 22 km to the north of the city.

Water Supply

The main source of drinking water in Birgunj is the deep tube well ground water. At present there are four pumping stations operated by Nepal Water Supply Corporation that supply 8 million liters of water to the sub-metropolitan city. Nearly 6,067 households have piped water supply facility, 1,210 households have drinking water facility from public shallow tube wells and 7,819 households have drinking water facility from shallow tube wells. The water quality from deep tube wells is reported to be safe for drinking water but from shallow tube wells is usually contaminated by surface water and seepage of wastewater.

Storm Water Drain

According to Municipality Profile (2007), there are approximately 4.7km main storm water drains and 40.5km secondary storm water drains in Birgunj. Open drains have been constructed in all the wards except in the areas from Ghantaghar to the hospital and Adarsnagar areas where drains are covered.

The main drains referred as MD1 run in a general direction from the north to the southwest in the core area to the west of Main Road in Birgunj. Most secondary drains in the core area to the west connect MD1. The drainage networks in areas to the east of Main Road in Birgunj have inadequate hydraulic capacity to drain surface runoff effectively during monsoon seasons and they end up swamp areas without drainage outfalls.

Most open drains in Birgunj do not function properly due to the lack of maintenance as well as their misuse by the local people as waste dump sites. These drains are fully filled with debris and wastes all the time and overgrown weeds are covered entire cross sections in most earthen sections.

Sewerage

There are neither public centralized sewerage network systems for sewage collection nor sewage treatment plants for sewage disposal in Birgunj. The open drains have been used for waste water collection and disposal. The on-site sanitation with septic tank and soak pits has been adopted for the sewage disposal from settlements.

Though most of the houses have septic tanks, but very few have soak pits. As such, the septic tank effluents from most houses are directly discharged into the open road-side storm water drains. The municipality does not have facilities for the collection and disposal of septic tank solids. Generally the private operators provide these kinds of services and they have been found to dispose the solids in the road-side drains or on the vacant land.

The town is seriously short of public toilets. There are only seven public toilets in the city. Most of the residents living in settlements belong to slum and squatter areas without toilet facilities have to sort to defecating either in the open fields or in open drains. Most of the existing public toilets have not been maintained after their construction.

Solid Waste Management

Solid waste is collected by Birgunj Municipality. It provides waste collection and sweeping services. The containers/bins are placed at different strategic locations which are used by households, institutions and the commercial sector in the town. There is no organized door-to-door collection system in Birgunj. Majority (78%) of the households dispose their wastes to public places and only 10.5% households use fixed places or containers. Wastes are transported using tractors and open trailers. In the absence of a permanent sanitary dumping site, about 45 tons of garbage a day are being dumped haphazardly along river

banks, ponds, by-pass road and open spaces. Nearby areas of those places are prone to serious health hazard.

2.4 Salient Feature

The sub-project will improve storm-water drainage systems together with wastewater management systems, as storm water drainage is currently being used as open sewers, causing bad odors, health risks and pollution of the watercourses. Wastewater treatment plants will also be constructed. Urban roads and lanes will be reinstated or upgraded where drainage and sewerage pipe networks work will be undertaken. The proposed waste water treatment plant is located in Chhapkaiya Ward No. 2 of Birgunj Municipality and the preliminary layout plan of the proposed treatment plant consisting of stabilization ponds (anaerobic, facultative and maturation) is presented in **Annex 1: Figure 2.2**. The proposed combined sewerage and storm water drainage (core area), storm water drainage (east and north of Birgunj town) is located within the right of way of existing roads. Similarly the proposed Roads and Lanes is located within the RoWs in core areas, storm water diversion areas and east west highways. The salient feature of the subproject components under this IEE study consideration are detailed in **Table 2.1**.

The subprojects subcomponent on Community Development Programs mainly consist of (i) health and hygiene education programs in communities and schools, in particular targeting women and vulnerable groups including the poor, (ii) promotion of household and/or community level 3R (reduce, reuse, recycle) activities (iii) skills training mainly for the poor, and (iv) investment in small-scale facilities such as public schools and community toilets and communal water taps, in accordance with the priorities set by communities, with an aim at achieving social inclusiveness and improved sanitation in Birgunj.

2.5 Objectives of IEE

The primary objective of the IEE is to assess and inform decision makers about the potential environmental impacts of the proposed project and to suggest appropriate and pragmatic mitigation measures to mitigate and / or minimize the adverse impacts so that the Project can be implemented in an environmentally friendly manner.

The specific objective of the IEE are:

- collect baseline data on physical, biological, socio-economic and cultural resources/ conditions of the project area;
- to identify, predict and assess the adverse and beneficial environmental impacts of the project in terms of magnitude, extent and duration during the project construction and operation phases;
- to suggest mitigation measures for the adverse impacts and enhancement activities for site specific at project;
- to familiarize various stakeholders with IEE outcomes through public consultation and participation programs and to incorporate their relevant concerns and issues in IEE report;
- to prepare environmental management, monitoring and auditing plans; and to provide sufficient information to decision makers about likely consequences of the project due to its implementation to make the final decision for the approval of the project.



Table 2.1: Salient Feature of Proposed Sub-Project Components

Sub-project Components	Function / Purpose	Description of the Activities	Quantification of Construction Items / Activities	Location
Combined Sewerage and Storm Water Drainage (core area)	Develop basic infrastructure for the improvement of urban environment and health and hygiene of the people	Construction and rehabilitation of drainage including manholes, culverts, catch drain, diversion channels, culvert slab covers and tree plantation, turfing and landscaping of new recreational park.	<ul style="list-style-type: none"> Construction and rehabilitation of 49.32 km (44.61+4.71MD1) primary and secondary sewer line including storm drain in the core area. Construction of 630 manholes. Total 49.32 km	Right of way of the existing roads.
Storm Water Drainage (east and north of the town)	Develop basic infrastructure for the improvement of urban environment and health and hygiene of the people	<ul style="list-style-type: none"> Construction of diversion channels, culverts and outlet structures. Upgrading of road and foot path associated with storm water diversions. 	<ul style="list-style-type: none"> Construction of 13.69 km new storm drain(north & east part) that includes Diversions 4, 12, 12A, 13 & 13A. Construction of 13.95 km new storm drains (north and east part at Naguwa village) additionally proposed by PIU and DSC. Total 27.64 km	Right of way of the existing roads.
Waste Stabilization Treatment Plant	Develop infrastructure for the treatment of waste water and reduce environmental risk associated with health hazard.	<ul style="list-style-type: none"> Construction/upgrading of access roads, site clearance and surface dressing. Lift sewage pump system for raw sewage of RCC works with overflow arrangement. Pretreatment units consisting of screen chambers, grit chambers, parshall flume, distribution chambers and equalization / neutralization tank of RCC works Excavation of Ponds-earthen basins with proper embankment 	<ul style="list-style-type: none"> Construction of waste stabilization pond in 6 ha land. 	Privately owned paddy fields acquired by the Municipality at chhapkaiya Ward No. 2 of Birgunj Municipality.



Sub-project Components	Function / Purpose	Description of the Activities	Quantification of Construction Items / Activities	Location
		<p>with lining system.</p> <ul style="list-style-type: none"> • Construction of treated effluent RCC channel. • Construction of sludge pond. • Construction of surface drainage, manholes, collection chambers, boundary wall, administrative and laborator building, generator house, watchmen quarter, workers changing room, parking lots, transformer room, pump operation and control panel building, overhead tank, hand dug well, water supply facilities etc. • Tree plantation, turfing and landscaping. 		
<p>Roads and Lanes</p>	<p>Improve environment, health and hygiene of the people reducing the risk of adverse environmental impacts associated with establishment of basic drainage facility and providing improved access.</p>	<p>Road Resurface/upgrade full width on Drainage Lines and Improved Access.</p> <ul style="list-style-type: none"> • Resurface Roads full width (combined sewerage in core area). • Road development (black top) associated with storm water diversion. • Road development (black top) of connection roads (west-East) • Poor neighborhood access 	<ul style="list-style-type: none"> • Resurface 30% (7m wide) Blacktopped roads – 51.6 km (49.32 +2.24Div4) of combined sewer line including storm drain in the core area. • Resurface 30% (7m wide) Blacktopped roads – 13.95 km along additional drain proposed by DSC & PIU on north and east part at Naguwa village. • New Road Construction – 11.4 km for secondary bypass and canal road (proposed diversion drain excluding Div. 4). • New Road Construction – 1.16 km for 	<p>Public RoWs in core areas, storm water diversion areas.</p>



ToR for IEE Study of Drainage, Sewerage and Roads Improvement for Birgunj Municipality

Sub-project Components	Function / Purpose	Description of the Activities	Quantification of Construction Items / Activities	Location
Sanitation	Develop basic level sanitation and associated water supply facilities to target groups – urban poor, visitors and students and promote sanitation awareness among local people.	<p>improvement.</p> <ul style="list-style-type: none"> • Construction of public toilets with water connection and safe waste water disposal. • Construction of domestic toilets. • Construction of school toilets. • Construction of tube well drilling and hand pumps. • Software promotion (awareness program) 	<p>access to Waste Water Treatment Plant site.</p> <p>Total Resurface 65.55 km (30% of 7m width) Total New Road Construction 12.56 km</p> <ul style="list-style-type: none"> • Construction of 12 public toilets. • Construction of 8 school toilets. • Subsidies for 2,000 families to construct private improved toilet. • Construction of hand pumped wells and / or community water schemes in poor areas. 	Public and private land (sites yet to be decided)



2.6 Rationale for Conducting IEE

The IEE Study of the Proposal is mandatory as per the provision of Government's Environmental Protection Regulation (EPR) as detailed in the table below. The subproject area does not fall in any restricted areas, places of cultural, historical and archeological importance / monuments, conservation areas, wild life national parks, and any other places where the law of the land prohibits any construction activities.

Table 2.2: Environmental Study Categorization

Project Component	Study Requirement	EPR Clause No.	EPR Clause Statement
Sewerage Treatment Plant	IEE	Schedule 1, I1 (c)	<ul style="list-style-type: none"> Requires IEE study for "selecting, picking, disposing, and recycling waste through chemical, mechanical or biological techniques in an area ranging between 5 – 10 hectares". The proposed waste stabilization pond covering an area of 6 ha land at privately owned paddy field already acquired by Municipality at Chhapkaiya will require an IEE study as per the stated provision.
Drainage Sewerage Work	IEE	Schedule 1, I1 (e)	<ul style="list-style-type: none"> Requires IEE study for "operation of drainage/sewerage work with investment more than NRs. 5,000,000". The proposed drainage/sewerage work will have investment of more than NRs. 5,000,000 thus will require an IEE study.
Roads Development	IEE	Schedule 1, D1 (a & b) Schedule 1, D6	<ul style="list-style-type: none"> Requires IEE study for the construction of District and Urban roads. Requires IEE for improvement of the standard, rehabilitation and reconstruction of national highways and feeder roads. The roads development (blacktop), resurfacing/upgrading and neighbourhood access improvement will require an IEE study as per the stated provision.
Construction of Toilets	IEE	Schedule 1, E1	<ul style="list-style-type: none"> Requires IEE study for construction of residential, commercial, and their combination buildings with built up area or floor area ranging between 5000 to 10,000 m². The construction of public toilets (~12 nos.), school toilets (~8 nos.), and tube well drilling and hand pumps for improved toilets (~2000 families) will require an IEE study as per the stated provision as the intervention will not exceed 10,000 m².

Thus with the provisions mentioned above, the proposal requires an IEE study and the approval of the IEE Report by the concerned agency, Ministry of Urban Development.

2.7 Impact Area Delineation

The Project area impact for the IEE study has been divided into two parts on the basis of proximity and magnitude of the impact. They are "Direct Impact Zone" and "Indirect Impact Zone". These are as delineated below.

Direct Impact Zone: The direct impact zone delineates area occupied by the drainage, sewerage, roads and lanes improvement area within the Birgunj Sub-metropolitan City.

Indirect Impact Zone: The indirect impact zone delineates greater area (i.e. administrative boundary of affected VDC/Municipality) which will directly or indirectly be influenced by the implementation of the project work. These includes administrative boundary of Parsa district and Birgunj Sub-metropolitan City.



3. PROCEDURES TO BE ADOPTED WHILE PREPARING THE IEE REPORT

The approach, methodology and procedure shall be as prescribed below while preparing one comprehensive and coherent IEE report. The report shall be as per the EPA, 1997 and EPR, 1997.

3.1 Desk Study

The desk study includes a review of the EPA, EPR, PPTA reports, project reports as inception, design criteria, project concept plan, maps etc and review of IEE reports of similar projects, ADB Guidelines and other relevant documents regarding the requirements of IEE. Questionnaire and checklist for data collection on physical, biological and socio-economic and cultural baseline environment of the project area shall be prepared. The Work Schedule (ToR) shall be prepared by reviewing the documents, project information from secondary sources, interaction with stakeholders and the district people about environmental issues as required by law. The Work Schedule (ToR) shall be submitted for approval by MoUD through PIU, STIUEIP. Reference to Reports for similar projects and other pertinent literature shall be made to determine a reference framework.

To plan the subsequent field works and to determine the depth of the study to be conducted, the Acts, Policies, Regulations and Guidelines, as listed in this ToR, shall be reviewed carefully.

3.2 Public Consultation

Upon approval of the ToR, the proponent shall publish a 15 days notice in a national level daily news paper for consultation with local people in the project area for collection of reactions, suggestions and comments from the project area stakeholders for the purpose of IEE preparation. A copy of public notice shall be displayed in the office notice board of concerned offices and prepare a deed of public enquiry (Muchulka) of that deed.

3.3 Field Study

The field visit will be conducted to collect baseline information on socio-economic, cultural & physical, and biological environment of the project pertaining to issues as indicated in the ToR. The baseline data shall be included, but not limited to the following:

Social and Economic Environment:

Information on social and Economic features of the project area including population, ethnicity, employment facilities, educational status, and health and sanitation conditions shall be presented.

Report of settlement pattern, migration, religion, and religious land holdings and crop production.

Existing infrastructure and development activities in the project area and documentation of the existing infrastructure likely to be directly affected by the project shall be given. An estimation of the approximate area disturbed/acquired for the project will be made.

Cultural and Physical

Description of cultural sites and issues. Meteorological (climate,

Environment: temperature) data of the nearest weather station, precipitation, land use and utilization pattern data of the project area shall be studied. Air, noise and water quality (surface as well as ground water) data and other information concerning physical resources of the project area shall be collected. Similarly, geological, land stability, information on flooding intensities and damage, water sources shall be collected.

Biological Environment: Vegetation type in the project area particularly road side plantation that will require clearance shall be noted. The study shall calculate and document plant species likely to be felled.

Chemical Environment Information on air and water quality (both surface and ground water) of the project vicinity shall be collected and presented.

The collected raw baseline data shall be verified by citing standard references and evaluated before accessing impacts on them.

3.4 Data Processing

The collected raw baseline data shall be verified by citing standard references and evaluated before accessing impacts on them. The data and information gathered from the field work will be compiled and analyzed to establish the relations between the environmental impacts and their mitigation measures. On the basis of data analysis, conclusions will be drawn on the resolution of environmental issues and enhancement of the environment of the project area. All the data shall be compiled into a computerized database system.

3.5 Identification, Prediction and Evaluation of the Impacts

Potential environmental impacts on Physical, Biological and Socio-economic and cultural aspects shall be identified, predicted and evaluated based on the existing environmental condition with respect to the proposed project interventions in terms of **type of impact** (direct/indirect), their **magnitude** (low/moderate/high), **duration** (short term/ medium term/long term), and **extent** (site specific/local/regional/global).

3.6 Report Preparation

An IEE report including EMP as per GoN format shall be prepared in accordance with the contents given in Schedule-5 of the EPR'97. Final report shall be prepared after incorporating the comments on the draft report.



4 REVIEW OF ACTS, POLICIES, RULES, REGULATIONS AND GUIDELINES

The IEE report shall comply with the following legislative provisions and guidelines:

Constitution

- Interim Constitution of Nepal, 2063 (2007)

Policies and Plans

- Three Years Interim Development Plan, 2008
- Environmental Policy and Plan

Acts and Rules

- Environmental Protection Act, 1997
- Environmental Protection Rule, 1997 (Amendment, 1999)
- Soil and Watershed Conservation Act (1982)
- Solid Waste Management and Resource Mobilization Act, (1987) and Rules (1989)
- Water Resources Act, 1992 and its Rules, 1993
- Public Road Act, 1974
- Road Board Act, 2002
- Labour Act, 1991 and Labour Rules (1993)
- Forest Act, 1993 and its Rules, 1995
- Land Acquisition Act, 1977
- Local Self-Governance Act, 1998 and its Rules, 2000
- Vehicle and Transport Management Act, 1992 and Rules, 1997
- Town Development Act (1992)
- Pesticides Act (1991) and Rules (1993)
- Village Development Committee Act (1991)
- District Development Committee Act (1991)
- Municipality Act (1991)
- Electricity Act (1992)
- Industrial Enterprises Act (1992)
- Tourism Act (1978)
- Mines and Mineral Act (1985)
- National Parks and Wildlife Conservation Act (1987)
- Nepal Water Supply Corporation Act (1989)

Manuals/Guidelines

- Public Works Directives (Vol.I and II), HMGN, 2002
- Guide to Road Slope Protection Works, DoR, 2003
- Nepal Road Statistics, 2002
- National EIA Guidelines, 1993
- National EIA Guidelines for Industry Sector (1995)
- Urban Environment Management Guidelines (2009)
- Design Manual for Urban Roads
- Forest Produce Collection, Sale and Distribution Guidelines, 1998
- Environmental management Guidelines, GEU/ DoR, 1997



- Environmental Management Guidelines for Roads and Bridges, GEU/ DoR, July, 1999
- Environmental & Social Management Frame Work 2007, DoR

Conventions:

Any conventions if applicable.



5 REQUIRED TIME, BUDGET AND STUDY TEAM FOR PREPARING THE REPORT

This includes time schedule, estimated budget and appropriate manpower (experts) for conducting IEE study.

5.1 Time Schedule

The study shall be completed within 63 days upon approval of the ToR. The work schedule is presented in the following table:

Table 5.1: Time Schedule

Activities	Month 1				Month 2				Month 3				Month 4			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1 Desk Study	■	■														
2 Initial Site Visit		■	■													
3 ToR Preparation and Submission			■	■												
4 Comment and Approval of ToR by MoUD				■	■	■	■	■								
5 Affix 15 days Public Notification								▲								
6 Preliminary Design Information Compilation to prepare Project Information								■	■	■	■	■				
7 Fieldwork: Baseline Documentation on Physical, Biological and Socio-Economic and Cultural Environments								■	■	■	■	■				
8 Public Consultation and Collection of Recommendation Letters from VDCs								■	■	■	■	■				
10 Analysis and Interpretation											■	■	■	■	■	■
11 Preparation and Submission of Draft IEE Report													■	■	■	■
12 Comments from MoUD																■
14 Final Report Preparation																■
15 Submission of the Final Report																▲

5.2 Estimated Budget

As IEE/EIA is part of DSC ToR, the budget for the study team is included in DSC Contract.

5.3 IEE Team Composition

The following experts / specialist will be involved in IEE study.

- Environmental Specialist
- Drainage and Sewerage Specialist
- Sewage Treatment Specialist
- Roads Specialist
- Hydrologist and Hydro-geologist
- Geologist / Geotechnical Engineer
- Sociologist and Ecologist / Botanist



6 SPECIFIC IMPACTS/ISSUES OF THE PROPOSAL IMPLEMENTATION ON THE ENVIRONMENT

The proponent shall assess and evaluate the possible impacts of the proposed Sub-project on socio-economic, cultural, physical, chemical and biological aspects for construction, operation and maintenance periods in the following areas:

6.1 Adverse Impact / Issues

6.1.1 Social and Economic Impact/Issues

The issues and concerns related to socio-economic environment includes, but not necessarily limited to the following:

Construction Stage

- Land and Building acquisition and compensation (where required and applicable);
- Demolition of permanent and temporary structures as a part of site clearance;
- Nuisance to pedestrian and traffic congestion;
- Impacts on public/private utilities and access to them;
- Nuisance from construction camps;
- Alternative fuel for cooking and bitumen heating;
- Risk of health and safety hazards to workers from dust and other accidents;
- Loss of livelihood for businesses due to excavation works;
- Occupational health and safety;
- Inflow of labour and cash may disrupt social setting and affect law and Order situation;

Operation and Maintenance Stage

- Risk of health and safety hazards to workers from hazardous materials which may be contained in waste water;
- Blockage of drainage and nuisance to neighboring areas due to overflow and flooding;
- Nuisance to neighboring areas due to odor, insects and rodent
- Risk of poor management of public structures such as public toilets, school toilets etc;

6.1.2 Physical, Chemical and Cultural Impact/Issues

The issues and concerns related to the cultural, physical and chemical environment includes, but not necessarily limited to:

Construction Stage

- Possible impact on cultural, religious and historical sites;
- Impact on public and important places;
- Temporary Disruption of Public Utilities. Reinstatement and Re-location of existing Services as: electrical poles and cables, water supply pipelines, telephone line, irrigation canal crossings etc;
- Landscape disturbance and change in land use;

- Land stability, soil erosion and downstream sedimentation due to excavation and stockpiling of construction materials;
- Risk of pollution of ground and river water due to seepage of waste water;
- Deterioration of air quality and increase in dust/suspended particulate matter;
- Rise in Noise level and vibration due to construction work;
- Risk of Industrial waste directly discharged to sewer and drain;
- Leakage of oil, grease and other materials;
- Solid wastes disposal generated by the construction workers;
- Water pollution due to haphazard spoil disposal;
- Impact due to Operation of Quarries and borrow pits;

Operation and Maintenance Stage

- Pollution of ground and river water due to seepage of waste water;
- Removal and disposal of sludge;
- Nuisance to neighboring areas due to odor, insects and rodent;

6.1.3 Biological Impact/Issues

The issues and concerns related to biological environment includes, but not necessarily limited to the following:

Construction Stage

- Clearing of vegetation specifically road side plantation;

Operation and Maintenance Stage

- Birds hazard
- Aquatic life – water pollution

6.2 Beneficial / Enhancement Activities

6.2.2 Beneficial impact/activities

- Availability of local construction workers and employment opportunities
- Developed infrastructure for the treatment of waste water will reduce environmental risk associated with health hazard.
- Improved environment, health and hygiene of the people reducing the risk of adverse environmental impacts associated with establishment of basic drainage facility and providing improved access.

6.2.3 Enhancement Activities

Any enhancement issues raised/found during the study will be included in final IEE study.

6.3 Management Issues

After detail analysis of likely impacts of the project activities on the local environment, a mechanism should be included in the IEE report to augment the beneficial impacts and minimize the adverse ones. The environmental management plan (EMP) should account for the mitigation measures for each impact identified, monitoring of impacts and environmental auditing components, including environmental management responsibilities. Furthermore, the IEE study should take into account project execution issues, as appropriate, strict management of contractor's work and use of appropriate technologies for road construction.

7 ALTERNATIVE ANALYSIS

Alternative analysis shall be made as per EPR, 1997. The Proponent shall analyze the likely environmental impacts of project activities in all possible alternative with due consideration of alternatives. The analysis of the proposal shall focus on the following issues:

7.1 Design

Assess and analyze alternative design options including design configuration, waste water treatment options, sewerage collection chambers, traps, road surfacing etc will be evaluated and least affecting one will be recommended including other appropriate design components.

7.2 Project Site

Assess alternative routes that may avoid significant environmental impacts like minimizing tree clearance. The sewage treatment unit and allied structures, overflow unit and other associated facilities including the conveying routes may be diverted to save the natural environmental setting if warranted.

7.3 Technology, Procedure of Operation, Time Schedule, Raw Materials to be Used

The proponent will consider the alternatives for technology, implementation procedure, and raw materials requirements in close coordination with the design team. In general, choices shall be considered in the context of cost effectiveness, labour intensive and with low risks of environmental hazards.

7.4 No Project Option

No project option is always open.

The likely impacts of each alternative shall be assessed and compared in terms of adverse environmental impacts and benefits, and the environmentally sound alternative shall be recommended.



8 MATTERS CONCERNING THE PREVENTION OF THE IMPACT OF THE IMPLEMENTATION OF THE PROPOSAL ON THE ENVIRONMENT (MITIGATION MEASURES)

Two types of mitigation measures will be included in the IEE Report. They are benefit augmentation measures and adverse impacts mitigation measures. The mitigation measures will be included for both construction and operational stages with estimated cost for mitigation. The Environmental Management Action Plan (EMAP) shall be an integral part of the IEE Report. Mitigation measures can also be presented in matrix format. Suggested mitigation measures shall be pragmatic and proven in the past.

9 MATTERS TO BE MONITORED WHILE IMPLEMENTING THE PROPOSAL (ENVIRONMENTAL MONITORING PLAN)

The monitoring plan shall categorize the type of monitoring such as compliance and impact monitoring parameters and/or indicators will be identified not only for construction and operational stages but shall also be sub categorized in terms of social-economic and cultural environment, physical and chemical environment and biological environment. They will be well documented in the IEE Report. It will also include schedule of monitoring, methods, location and responsible agency for monitoring. The plan shall include required manpower for the purpose of the monitoring. Responsibility of monitoring including estimated cost for environmental monitoring shall be included in the IEE Report.

10 OTHER NECESSARY MATTERS

The proponent shall comply with all the requirements as mentioned in the EPA and EPR 1997 before submitting the IEE report for necessary approval. The IEE report shall adequately cover the aspects included in this TOR and mentioned in Schedule 5 of EPR 1997. The Report will clearly recommend whether an Environmental Impact Assessment is required or whether an Initial Environmental Examination is sufficient for the proposed subproject.

The conclusions of the IEE shall be drawn up and presented in a separate chapter. The recommendation of the study shall be clearly presented in the report.

The report shall include proof of publication of public notice, deed of inquiry (muchulka) of pasting public notice, and recommendations of the concerned Municipality. It shall include relevant information, references, annexes, maps, photos, tables, charts, graphs and questionnaires, as applicable. A map showing the project layout shall also be included in the report. A clear linkage on baseline information, impacts, environmental protection measures, monitoring and auditing plans shall be maintained in the IEE report. The proponent will also annex the approved Terms of Reference in the report.

11 DELIVERABLES

The Proponent will submit fifteen copies of the final report of the project prepared under Rule 7 to the concerned agency, Ministry of Urban Development in accordance with Section 5 of the EPA'97 and Rule 10 of EPR'97.



References

1. Environmental Protection Act, 1997 and Environment Protection Rules, 1997. Ministry of Law, Justice and Parliament Affairs, Nepal.
2. Village Development Committee Profile of Nepal, 2008
3. Environmental Assessment Guidelines, ADB, 2003



ANNEX 1

FIGURE 2.1: LOCATION MAP OF PROJECT AREA

**FIGURE 2.2: PRELIMINARY LAYOUT PLAN OF WASTE
WATER TREATMENT PLANT**



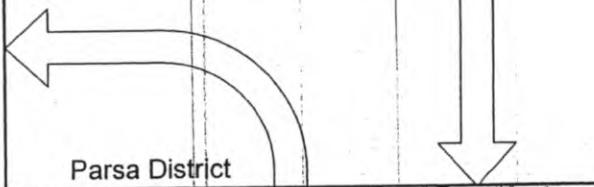
Figure 2.1 Location Map of Project Area

Birgunj Sub-Metropolitan City, Map

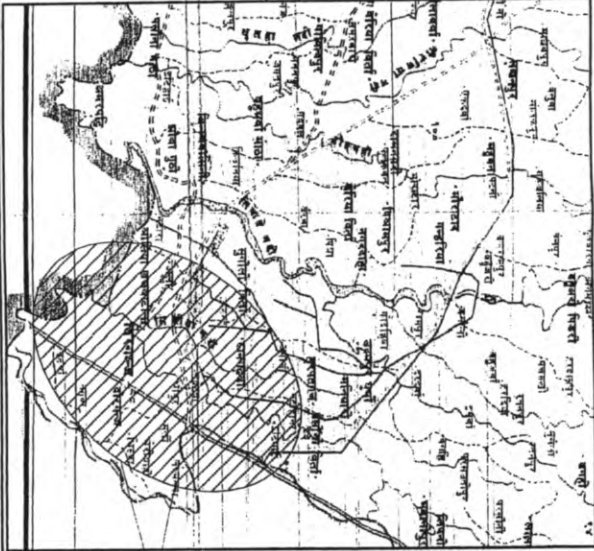


LEGEND

- Ward Boundary
- Trunk Sewer
- Branch Drain
- Sub Branch Drain
- Surface Drain
- SIP Site
- Sanitary Landfill Site
- Highway/ Bridge
- Metalled Road/ Bridge
- Crawled Road/ Bridge
- Earthen Road/ Bridge
- River/ Stream
- Canal
- Contour
- Spot Height

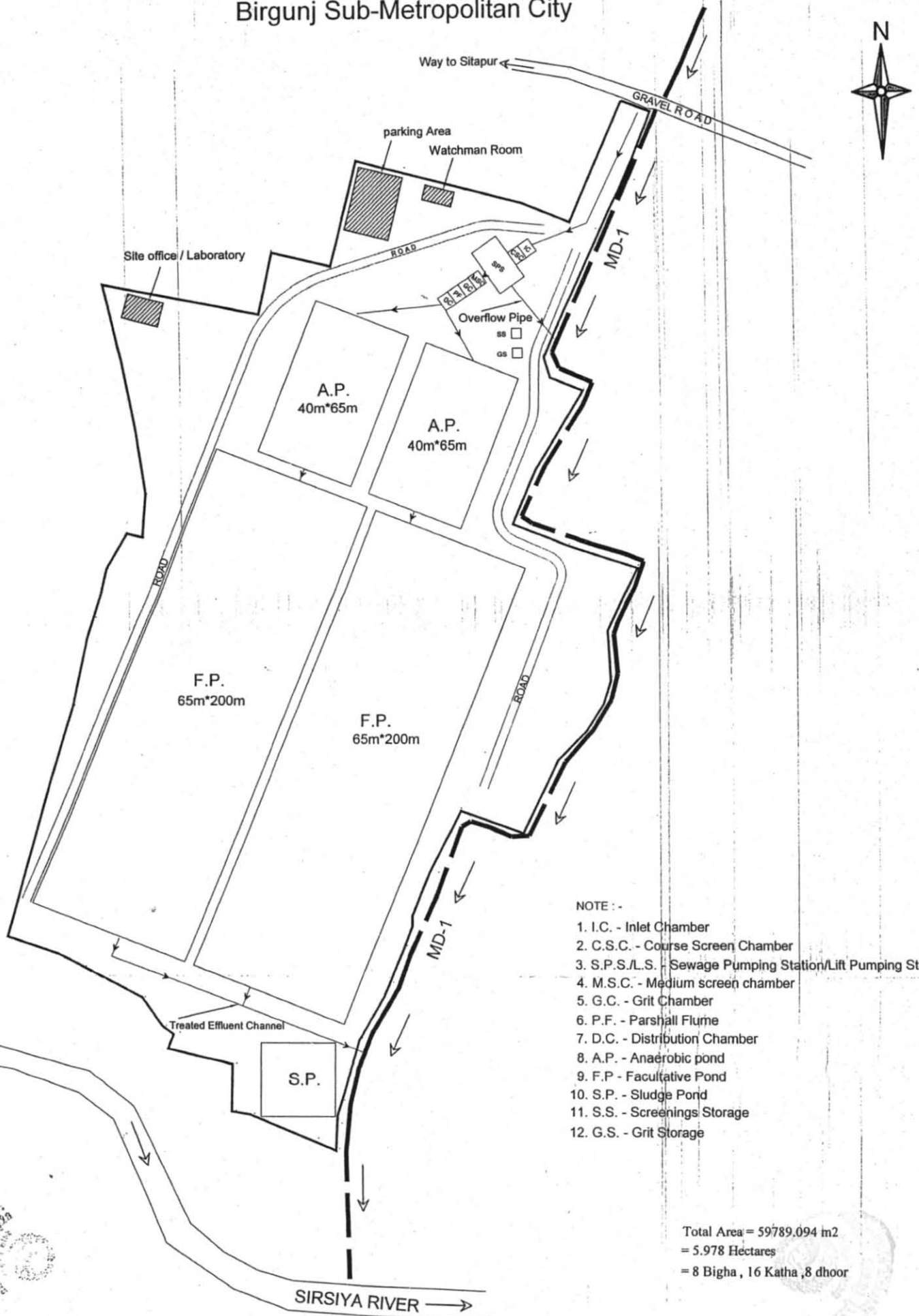


Parsa District



Birgunj Sub-Metropolitan City

Figure 2.2 Preliminary Layout Plan of Waste Water Treatment Plant Chhapakaiya , Ward No. -2 Birgunj Sub-Metropolitan City



NOTE :-

1. I.C. - Inlet Chamber
2. C.S.C. - Course Screen Chamber
3. S.P.S./L.S. - Sewage Pumping Station/Lift Pumping Station
4. M.S.C. - Medium screen chamber
5. G.C. - Grit Chamber
6. P.F. - Parshall Flume
7. D.C. - Distribution Chamber
8. A.P. - Anaerobic pond
9. F.P. - Facultative Pond
10. S.P. - Sludge Pond
11. S.S. - Screenings Storage
12. G.S. - Grit Storage

Total Area = 59789.094 m2
= 5.978 Hectares
= 8 Bigha , 16 Katha , 8 dhoor

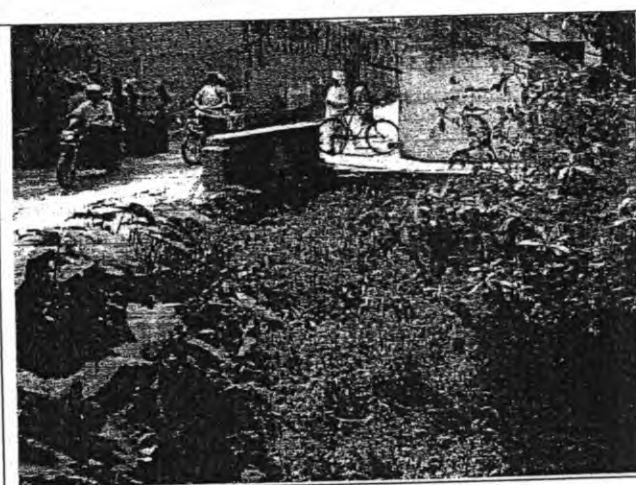


ANNEX 2

SITE PHOTOS

2012 AUG 20 10:11 AM
BIRGUNJ MUNICIPALITY

Site Photos



MD1 to be covered



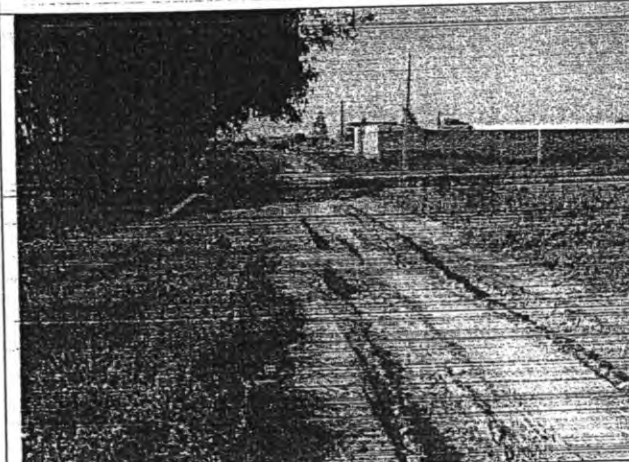
A new park to be built here



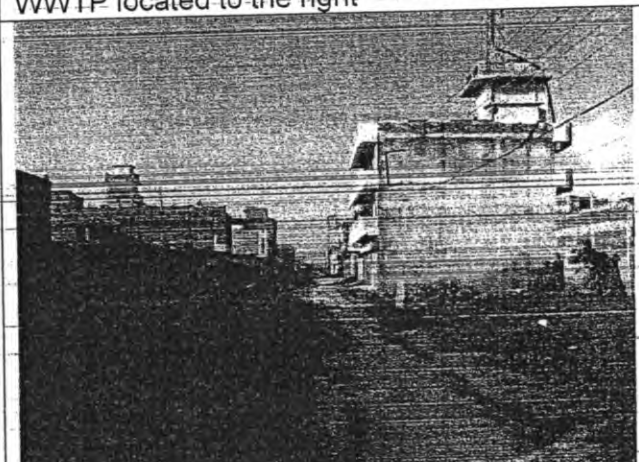
MD1 to be covered



Flows in MD1 will be lifted to the proposed
WWTP located to the right



Site of the proposed Canal Road, looking
towards the north



Site of the proposed 2nd Bypass Road, looking
towards the north



ANNEX 2
Public Notice and Muchulkas

ANNEX 2.1

Public Notice





नेपाल

NEPAL SAMACHAR PATRA

राजधानीमा त्रिभुवन चौराहाको राष्ट्रिय दैनिक

समाचारपत्र

संघीय लोकतान्त्रिक गणतन्त्र नेपाल

बिहीबार, पुस १९ गते २०१९

Thursday, January 3, 2019

www.newsofnepal.com

काठमाडौं, नेपाल

वर्ष ९९

अंक ३२२

मभौला शहर एकिकृत वातावरण सुधार आयोजना
आयोजना कार्यान्वयन इकाई
बीरगंज उप-महानगरपालिका

बर्षादे पानीको ढल, स्थानीय टोल तथा सडक सुधार कार्यको प्रारम्भिक वातावरणीय परीक्षण (IEE) सम्बन्धि

सार्वजनिक सूचना

प्रथम पटक प्रकाशित मिति : २०१९/०९/१९

एशियाली विकास बैंकको ऋण सहयोगमा (Loan No. 2650-NEP) नेपाल सरकार, शहरी विकास मन्त्रालय, मभौला शहर एकिकृत शहरी वातावरण सुधार आयोजना, आयोजना कार्यान्वयन इकाई, बीरगंज उप-महानगरपालिका द्वारा बीरगंज उप-महानगरपालिकाको आंशिक रूपमा समेट्ने गरी निर्धारण गरिएको क्षेत्रमा बर्षादे पानीको ढल, स्थानीय टोल तथा सडक सुधार गर्ने कार्यको प्रारम्भिक वातावरणीय परीक्षण (IEE) गर्नुपर्ने भएकोले वातावरण संरक्षण ऐन २०५३ तथा वातावरण संरक्षण नियमावली २०५४ (पहिलो संशोधन २०५५) को नियम ५२ अनुसार यो सार्वजनिक सूचना प्रकाशित गरिएको छ।

प्रस्तावको नाम : आयोजना कार्यान्वयन इकाई, बीरगंज उप-महानगरपालिका, मभौला शहर एकिकृत शहरी वातावरण सुधार आयोजना

प्रस्तावको विवरण : बर्षादे पानीको ढल, स्थानीय टोल (बेस्टबाट टिटमेन्ट प्लान्टसहित) तथा सडक सुधार र निर्माण गर्ने कार्य प्रस्तावले प्रत्यक्ष प्रभाव पार्ने क्षेत्र: बीरगंज उप-महानगरपालिका, पर्सा जिल्ला

उक्त प्रस्तावको कार्यान्वयनबाट वातावरणमा पर्ने सक्ने प्रभावको सम्बन्धमा सम्बन्धित उप-महानगरपालिका तथा वडा कार्यालयहरु समेत, जिल्ला विकास समिति, बिद्यालय, अस्पताल, स्वास्थ्य चौकी तथा अन्य सरोकारवाला व्यक्ति वा संस्थाले यो सूचना प्रकाशित भएको मितिले पन्ध्र (१५) दिन भित्र निम्न लिखित विषयमा आ-आफ्नो राय सुभाष पठाई सहयोग गरिदिनुहुन अनुरोध गरिन्छ। प्राप्त सुभाषहरु प्रारम्भिक वातावरणीय परीक्षण प्रतिवेदनमा समावेश गरिनेछ।

प्रभाव मुल्यांकन वातावरणीय क्षेत्रहरु: भौतिक, जैविक, आर्थिक र सामाजिक एवं सांस्कृतिक।

राय सुभाषका लागि सम्पर्क तथा पत्राचार गर्ने ठेगानाहरु

Birgunj Sub-metropolitan City
Secondary Towns Integrated Urban Environment
Improvement Project (STIUEIP)
Project Implementation Unit (PIU)
Birgunj, Parsa, Nepal
Phone: 051-521220 Fax: 051-525185
E-mail: stieip.birgunj@gmail.com

Consultants: SMEC International
Pty. Ltd., Australia in association with
Brisbane City Enterprises Pty Ltd,
Australia, CEMAT Consultants (P) Ltd.
Nepal and Building Design Authority, Nepal
Site Office: Vishwa, Birgunj, Parsa



ANNEX 2.2

Muchulkas

मुचुल्का

मभौला शहर एकिकृत शहरी वातावरण सुधार आयोजना

'एशियाली विकास बैंकको ऋण सहयोगमा नेपाल सरकार, शहरी विकास मन्त्रालय, मभौला शहर एकिकृत शहरी वातावरण सुधार आयोजना, आयोजना कार्यान्वयन इकाई, बीरगंज उप-महानगरपालीबाट ~~नेपाल सरकार~~ प्रज्ञा..... दैनिकमा प्रथम पटक मिति २०६९/०९/१९... मा प्रकाशित भएको बीरगंज उप-महानगरपालीकाको आंशिक रुपमा समेटने गरी निर्धारण गरिएको योजना क्षेत्रमा बषादि ढल, स्यानीटरी ढल तथा सडक सुधार निर्माण गर्ने कार्यको प्रारम्भिक वातावरणीय परीक्षण (IEE) को लागि सार्वजनिक सूचनाको प्रतिलिपी तल उल्लेखित कार्यालय/सार्वजनिक स्थलमा उल्लेखित मितिका दिन हामीहरुको रोहवरमा टाँस गरी यो मुचुल्कामा सहिछाप गरी दियौं।

कार्यालय भएमा

क्र.सं.	कार्यालयको नाम	प्रमाणित गर्ने कर्मचारीको नाम	प्रमाणित गरेको मिति	प्रमाणित गर्ने कर्मचारीको सहि	कार्यालयको छाप
१.	वडा समिती वडा नं. १७	लेलन...	२०६९/९/१९		
२.	वडा समिति नं. १५	शुद्धार युद्धर	०९/९/२५		
३.	विरगंज पालिका कल्लेप	जैमचन्द्र प्र. ३०	२०६९/९/२५		
४.	विरगंज कर्मचारी संघ	शैल रत्न	२०६९/९/२५		

सार्वजनिक स्थल भएमा

स्थलको नाम	उपस्थित व्यक्तिहरु	लिङ्ग	उमेर	ठेगाना	सहिछाप
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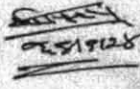





मुचुल्का

मझौला शहर एकिकृत शहरी वातावरण सुधार आयोजना

एशियाली विकास बैंकको ऋण सहयोगमा नेपाल सरकार, शहरी विकास मन्त्रालय, मझौला शहर एकिकृत शहरी वातावरण सुधार आयोजना, आयोजना कार्यान्वयन इकाई, वीरगंज उप-महानगरपालीवाट दैनिकमा प्रथम पटक मिति २०६९/०९/१६ मा प्रकाशित भएको वीरगंज उप-महानगरपालीकाको आंशिक रूपमा समेट्ने गरी निर्धारण गरिएको योजना क्षेत्रमा बषादे ढल, स्यानीटरी ढल तथा सडक सुधार निर्माण गर्ने कार्यको प्रारम्भिक वातावरणीय परीक्षण (IEE) को लागि सार्वजनिक सूचनाको प्रतिलिपी तल उल्लेखित कार्यालय/सार्वजनिक स्थलमा उल्लेखित मितिका दिन हामीहरुको रोहवरमा टाँस गरी यो मुचुल्कामा सहिछाप गरी दियो ।

कार्यालय भएमा

क्र.सं.	कार्यालयको नाम	प्रमाणित गर्ने कर्मचारीको नाम	प्रमाणित गरेको मिति	प्रमाणित गर्ने कर्मचारीको सहि	कार्यालयको छाप
१.	वडा समिति वडा नं १११	सुनार उपरुप	२०६९/११/२४	Gm	
२.	वडा नं ८ वडा समिति कार्यालय	सुनीन्द्र	२०६९/११/२४		
३.	वडा समिति का.म.म.प.९९१	वडा समिति का.म.म.प.९९१	१२/१०/६९	१२/१०/६९	
४.	डि.ड.क.र.प.	वीरगंज		१२/१०/६९	

सार्वजनिक स्थल भएमा

स्थलको नाम	उपस्थित व्यक्तिहरु	लिङ्ग	उमेर	ठेगाना	सहिछाप
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मुचुल्का

मझौला शहर एकिकृत शहरी वातावरण सुधार आयोजना

एशियाली विकास बैंकको ऋण सहयोगमा नेपाल सरकार, शहरी विकास मन्त्रालय, मझौला शहर एकिकृत शहरी वातावरण सुधार आयोजना, आयोजना कार्यान्वयन इकाई, वीरगंज उप-महानगरपालीबाट दैनिकमा प्रथम पटक मिति २०६९/०९/११ मा प्रकाशित भएको वीरगंज उप-महानगरपालीकाको आंशिक रुपमा समेट्ने गरी निर्धारण गरिएको योजना क्षेत्रमा बषादि ढल, स्यानीटरी ढल तथा सडक सुधार निर्माण गर्ने कार्यको प्रारम्भिक वातावरणीय परीक्षण (IEE) को लागि सार्वजनिक सूचनाको प्रतिलिपी तल उल्लेखित कार्यालय/सार्वजनिक स्थलमा उल्लेखित मितिका दिन हामीहरुको रोहवरमा टाँस गरी यो मुचुल्कामा सहिछाप गरी दियो।

कार्यालय भएमा

क्र.सं.	कार्यालयको नाम	प्रमाणित गर्ने कर्मचारीको नाम	प्रमाणित गरेको मिति	प्रमाणित गर्ने कर्मचारीको सहि	कार्यालयको छाप
१.	वीरगंज उप-महानगरपालीका	श्री प्रेम मण्डल	०६/११/२४	[सहि]	[छाप]
२.	वडा समितिको कार्यालय	राजेश्वर मण्डल	०६/११/२४	[सहि]	[छाप]
३.	वडा समितिको कार्यालय	श्री मण्डल	०६/११/२४	[सहि]	[छाप]
४.	वडा समितिको कार्यालय	श्री मण्डल	०६/११/२४	[सहि]	[छाप]

सार्वजनिक स्थल भएमा

स्थलको नाम	उपस्थित व्यक्तिहरु	लिङ्ग	उमेर	ठेगाना	सहिछाप
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मुचुल्का

मभौला शहर एकिकृत शहरी वातावरण सुधार आयोजना

एशियाली विकास बैंकको ऋण सहयोगमा नेपाल सरकार, शहरी विकास मन्त्रालय, मभौला शहर एकिकृत शहरी वातावरण सुधार आयोजना, आयोजना कार्यान्वयन इकाई, वीरगंज उप-महानगरपालीबाट ...को.पा.ला.न.स.का.स.रा.र.प.न.न. दैनिकमा प्रथम पटक मिति २०६९/०९/०६ मा प्रकाशित भएको वीरगंज उप-महानगरपालीकाको आंशिक रुपमा समेट्ने गरी निर्धारण गरिएको योजना क्षेत्रमा वर्षादे ढल, स्यानीटरी ढल तथा सडक सुधार निर्माण गर्ने कार्यको प्रारम्भिक वातावरणीय परीक्षण (IEE) को लागि सार्वजनिक सूचनाको प्रतिलिपी तल उल्लेखित कार्यालय/सार्वजनिक स्थलमा उल्लेखित मितिका दिन हामीहरुको रोहवरमा टाँस गरी यो मुचुल्कामा सहिछाप गरी दियो ।

कार्यालय भएमा

क्र.सं.	कार्यालयको नाम	प्रमाणित गर्ने कर्मचारीको नाम	प्रमाणित गरेको मिति	प्रमाणित गर्ने कर्मचारीको सहि	कार्यालयको छाप
१.	विद्युत उप कार्यालय				
२.					
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सार्वजनिक स्थल भएमा

स्थलको नाम	उपस्थित ब्यक्तिहरु	लिङ्ग	उमेर	ठेगाना	सहिछाप
	१.				
	२.				
	३.				
	४.				
	५.				
	६.				



मुचुल्का

मभौला शहर एकिकृत शहरी वातावरण सुधार योजना

एशियाली विकास बैंकको ऋण सहयोगमा नेपाल सरकार, शहरी विकास मन्त्रालय, मभौला शहर एकिकृत शहरी वातावरण सुधार योजना, आयोजना कार्यान्वयन इकाई, वीरगंज उप-महानगरपालीबाट २०६९/०९/१९ मा प्रकाशित भएको वीरगंज उप-महानगरपालीकाको आंशिक रुपमा समेटने गरी निर्धारण गरिएको योजना क्षेत्रमा बर्षादे ढल, स्यानीटरी ढल तथा सडक सुधार निर्माण गर्ने कार्यको प्रारम्भिक वातावरणीय परीक्षण (IEE) को लागि सार्वजनिक सूचनाको प्रतिलिपी तल उल्लेखित कार्यालय/सार्वजनिक स्थलमा उल्लेखित मितिका दिन हामीहरुको रोहवरमा टाँस गरी यो मुचुल्कामा सहिछाप गरी दियो।

कार्यालय भएमा

क्र.सं.	कार्यालयको नाम	प्रमाणित गर्ने कर्मचारीको नाम	प्रमाणित गरेको मिति	प्रमाणित गर्ने कर्मचारीको सहि	कार्यालयको छाप
१.	शहरी विकास कार्यालय	डा. वि. वि. वि.	२०७१/१२/२४	डा. वि. वि. वि.	
२.	कार्यालय	रामेश्वर	२०७१/१२/२४		
३.	वडा समिति वाडो नं. १०	रामेश्वर	२०७१/१२/२४	रामेश्वर	
४.	वडा समिति वाडो नं. ६	विष्णु कुँवर	२०७१/१२/२४	विष्णु कुँवर	

सार्वजनिक स्थल भएमा

स्थलको नाम	उपस्थित ब्यक्तिहरु	लिङ्ग	उमेर	ठेगाना	सहिछाप
१.					
२.					
३.					
४.					
५.					
६.					



मुचुल्का

मभौला शहर एकिकृत शहरी वातावरण सुधार आयोजना

एशियाली विकास बैंकको ऋण सहयोगमा नेपाल सरकार, शहरी विकास मन्त्रालय, मभौला शहर एकिकृत शहरी वातावरण सुधार आयोजना, आयोजना कार्यान्वयन इकाई, वीरगंज उप-महानगरपालीबाट नेपाल समाचार पत्र दैनिकमा प्रथम पटक मिति २०६९/०९/१५ मा प्रकाशित भएको वीरगंज उप-महानगरपालीकाको आंशिक रुपमा समेटने गरी निर्धारण गरिएको योजना क्षेत्रमा वर्षादे ढल, स्यानीटरी ढल तथा सडक सुधार निर्माण गर्ने कार्यको प्रारम्भिक वातावरणीय परीक्षण (IEE) को लागि सार्वजनिक सूचनाको प्रतिलिपी तल उल्लेखित कार्यालय/सार्वजनिक स्थलमा उल्लेखित मितिका दिन हामीहरुको रोहवरमा टाँस गरी यो मुचुल्कामा सहिछाप गरी दियौं ।

कार्यालय भएमा

क्र.सं.	कार्यालयको नाम	प्रमाणित गर्ने कर्मचारीको नाम	प्रमाणित गरेको मिति	प्रमाणित गर्ने कर्मचारीको सहि	कार्यालयको छाप
१.	वडा समिती नं-३	सुनुका	०६/१५/२४		
२.	वडा समिती नं-५	सुनुका	०६/१५/२४		
३.	ताडा समिती वडा नं-१२	सुनुका	०६/१५/२४		
४.	जिल्ला प्रमुख कार्यालय परी	सुनुका	०६/१५/२४		

सार्वजनिक स्थल भएमा

स्थलको नाम	उपस्थित ब्यक्तिहरु	लिङ्ग	उमेर	ठेगाना	सहिछाप
	१.				
	२.				
	३.				
	४.				
	५.				
	६.				



मुचुल्का

मझौला शहर एकिकृत शहरी वातावरण सुधार आयोजना

एशियाली विकास बैंकको ऋण सहयोगमा नेपाल सरकार, शहरी विकास मन्त्रालय, मझौला शहर एकिकृत शहरी वातावरण सुधार आयोजना, आयोजना कार्यान्वयन इकाई, वीरगंज उप-महानगरपालीबाट २०६९/०९/२६.. मा प्रकाशित भएको वीरगंज उप-महानगरपालीकाको आशिक रुपमा समेट्ने गरी निर्धारण गरिएको योजना क्षेत्रमा वर्षादे ढल, स्यानीटरी ढल तथा सडक सुधार निर्माण गर्ने कार्यको प्रारम्भिक वातावरणीय परीक्षण (IEE) को लागि सार्वजनिक सूचनाको प्रतिलिपी तल उल्लेखित कार्यालय/सार्वजनिक स्थलमा उल्लेखित मितिका दिन हामीहरुको रोहवरमा टाँस गरी यो मुचुल्कामा सहिछाप गरी दियो ।

कार्यालय भएमा

क्र.सं.	कार्यालयको नाम	प्रमाणित गर्ने कर्मचारीको नाम	प्रमाणित गरेको मिति	प्रमाणित गर्ने कर्मचारीको सहि	कार्यालयको छाप
१.	वि.सं.स.स.स.स.स. गो.सं.स.स.स.स. सिमरी-२०५०.४	सुशीला शर्मा	२०६९/१२/२३		
२.	रुग्घर प्रोडिक्टर हस्पिटल एब्स एच.सि. ई.सि., वीरगंज	सन्तोष कुमार पुडा	२०६९/१२/२३		
३.	प.स.स.स.स.स. १५, सिमरी	वि.सं.स.स.स.स.	२१/१२		
४.	१५, सि.स.	सुशीला	१२/२३		

सार्वजनिक स्थल भएमा

स्थलको नाम	उपस्थित व्यक्तिहरु	लिङ्ग	उमेर	ठेगाना	सहिछाप
	१.				
	२.				
	३.				
	४.				
	५.				
	६.				



ANNEX 3
Recommendation Letters



वीरगंज उप-महानगरपालिका
BIRGANJ SUB-METROPOLITAN CITY



पत्र संख्या :- ०६९/०६०
 चलानी नं. :- ५१

मिति: ०६/०९/१२

विषय- सिविलीत वीर।

श्रीमान्ना महा (एचिठ्ठ शहरी वातावरण पुनार आयोजना)
 आयोजना कम्पि-वपन इकाई
 वीरगंज उप महानगरपालिका
 वीरगंज

प्रस्तुत विषयमा मिति २०६९-९-१९ गतेको नेपाल (सामाजिक) कृषि पत्रे कामो उकासित एबिग्रिनट पुनार। महा कम्पिलपन। तस गोरुको लक्ष्य अवात तपा तल बडा ने वमा डो। श्राविक वषडे दल (मा-गीती) तमा लछि पुनार निगणि गती कारिमा कम्पि-वपन अवाश्रमा वातावरणीय पक्ष एक मौतिक गैरि क श्राविक (सामाजिक एवं सांस्कृतिक पक्ष)मा पुन उभावनादि -य निचला गती कारि लमासभ गोरुको जानकारी गती। पुन तस आयोजनाले (समाज) वीरगंज उप महानगरपालिका कम्पिलपन वलासा पुनार आउने महाने आयोजना काम-वपन प्रकृमा तस आगडी बहाल तने भुक्तमना साथ सिविलीत उड्ड।

५
 ११/०९/१२
 ०६०-१-१२
 वीरगंज उप-महानगरपालिका
 वीरगंज

"स्वस्थ सुन्दर विकासको शहर वीरगंज नगर"

पशुपति आदर्शनगर, वीरगंज (नेपाल) फोन : ०५१-५२२०१०, ५२२८०२, ५२०९४४, ५२०९६६, ५३०८४५, ५२२८०३ फ्याक्स : ०५१-५२२०१४
 Pashupati Adarsh Nagar, Birganj (Nepal), Ph 0977-51-522010, 522802, 520944, 520966, 530845, 522803 Fax: 051-522014, Email: bjsubme@atcnet.com.np





वीरगंज उप-महानगरपालिका
BIRGANJ SUB-METROPOLITAN CITY



पत्र संख्या :- ०६५/०६०
 चलानी नं. :- ६२



मिति: ०६०/१/१०

विषय: विचारिए पत्र।

श्री कर्णाल डायर लिमिटेड अगरी कानूनरदा सुधा आर्चन
 आर्चन आर्चन ३३३
 कैलाश डए कानूनरदा फिलिड
 विचारिए

प्रस्तुत विषय का स्थिति ०६५/०५/१५ गते श्री नेपाल समाजमा एक
 डायरि कम्पनी का प्रकाशित सम्बन्धित सुचना पत्र अनुसार एउटा
 डायरि कम्पनी का प्रकाशित सुचना पत्र। यस काई नं. ३ मा प्रकाशित
 पत्रमा उक्त कम्पनीको उक्त एका सदस्य सुधा विचारिए अर्थात् काई नं.
 आर्चन ३३३ का कानूनरदा पत्रमा उक्त विचारिए, विचारिए आर्चन
 अर्थात् काई नं. ३३३ अर्थात् उक्त एका सदस्य सुधा विचारिए अर्थात् काई नं.
 उक्त कम्पनी अर्थात् आर्चन ३३३ अर्थात् काई नं. ३३३ अर्थात् काई नं.
 अर्थात् काई नं. ३३३ अर्थात् काई नं. ३३३ अर्थात् काई नं. ३३३ अर्थात् काई नं.
 अर्थात् काई नं. ३३३ अर्थात् काई नं. ३३३ अर्थात् काई नं. ३३३ अर्थात् काई नं.
 अर्थात् काई नं. ३३३ अर्थात् काई नं. ३३३ अर्थात् काई नं. ३३३ अर्थात् काई नं.

[Handwritten Signature]
 ०६०/१/१०
 व.स. ली.वा.
 पत्र संख्या तथा नं.

“स्वस्थ सुन्दर विकासको शहर वीरगंज नगर”

पशुपति आदर्शनगर, वीरगंज (नेपाल) फोन : ०५१-५२२०१०, ५२२००२, ५२०९५५, ५२०९६६, ५३०८५५, ५२२८०३ फ्याक्स : ०५१-५२२०१५
 Pashupati Adarsh Nagar, Birganj (Nepal), Ph 0977-51-522010, 522802, 520944, 520966, 530845, 522803 Fax: 051-522014, Email: brjsubme@atcnet.com.np





वीरगंज उप-महानगरपालिका
BIRGANJ SUB-METROPOLITAN CITY



पत्र संख्या :- ६९
 चलानी नं. - ०६६१०६०

मिति: २०७०/११/१०

विषय - सिफारिस पत्र

श्री ममोला शहर एकिकृत शहरी बालबरण सुधार आयोजना
 उनायोजना कार्यान्वयन इकाई ।
 वीरगंज - उप महानगरपालिका
 वीरगंज ।

प्रस्तुत विषयमा मिति २०७०/११/१० गतेको नेपाल समाचार पत्र दैनिक पत्रिकामा प्रकाशित सार्वजनिक सूचना अस् कार्यालयमा टाँस गरीएको अन्तर्गत अवगत भयो । अस् कहान्: दुमा प्रस्तावित बर्षादे टल, टला मीटरी टल तथा सडक सुधार निर्माण गर्ने कार्यको कार्यान्वयन गर्नुमा बालाबराणीय पक्षको प्रातिकर्षक अर्बिकु आर्थिक र सामाजिक श्रव-सौर-कृतिक पर्ने प्रभावलाई न्यूनीकरण गर्ने कार्य हा माकेस गरीएको जानकारी भयो । साथै अस् आयोजनाले प्रमगमा वीरगंज उप महानगर पालिकाले बालाबरणमा सुधार आउने अर्बिकले आयोजना कार्यान्वयन सुरुमा भएगडो बढेस अन्ने शुभ कामनाका साथ सिफारिस गर्दछु ।

(Signature)
 मिति: २०७०/११/१०
 महा सचिव

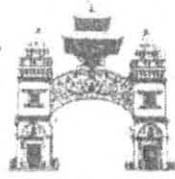
"स्वस्थ सुन्दर विकासको शहर वीरगंज नगर"

पशुपति आदर्शनगर, वीरगंज (नेपाल) फोन : ०५१-५२२०१०, ५२२८०२, ५२०९४४, ५२०९६६, ५३०८४५, ५२२८०३ फ्याक्स : ०५१-५२२०१४
 Pashupati Adarsh Nagar, Birganj (Nepal). Ph 0977-51-522010, 522802, 520944, 520966, 530845, 522803 Fax: 051-522014, Email: brjsubme@atohet.com.np





वीरगंज उपमहानगरपालिका
BIRGANJ SUB-METROPOLITAN CITY



१३१ स्थानीय-कार्यालय १६मि.४

पत्र संख्या :-

मिति २०७०/११/१०

चलानी नं. :- २४१०६९१०६०

विषय :- सिफारिस सम्बन्धमा

श्री ब्रह्मदेव शर्मा रजिष्टर शहर बालबच्चा सुधार आयोगका
 आयोगका कार्यालय इकाई
 वि. ३.मं.नं.प्री. बिरगंज

उपरोक्त सम्बन्धमा मिति २०६९/१३/१६ गतेको नेपाल सामाजिक
 प्रगतिशील पत्रिका मा प्रकाशित सार्वजनिक सुचना बर्स-
 कार्यालय १६मि.४ मा टास गरी को बालबच्चा सुधार आयोगको
 बर्स १६मि.४ मा प्रकाशित- ७७- ७७- ७७- ७७- ७७- ७७- ७७- ७७-
 ७७- ७७- ७७- ७७- ७७- ७७- ७७- ७७- ७७- ७७- ७७- ७७- ७७- ७७-
 या बालबच्चा सुधार आयोगको कार्यको कार्ययोजना अध्याय
 २०७० लाई सम्बन्धित गर्ने प्रभावलाई सुनिश्चिता गर्ने कार्य
 सामाजिक बर्षको जानकारी तथा सार्थक आयोगका
 को सामाजिक वि. ३.मं.नं.प्री. को बालबच्चा सुधार आयोगको
 गरीको आयोगका कार्ययोजना प्रष्ट्या अगाडी बढाउने
 गर्ने सुझावको साथ सिफारिस गर्दछु।

(Signature)
 १/१०

"स्वस्थ सुन्दर विकासको शहर वीरगंज नगर"

पशुपति आदर्शनगर, बीरगंज (नेपाल) फोन : ०५१-५२२०१०, ५२२००२, ५२०९४४, ५२०९६६, ५३०८४५, ५२२८०३ फ्याक्स : ०५१-५२२०१४
 Pashupati Adarsh Nagar, Birganj (Nepal), Ph 0977-51-522010, 522802, 520944, 520966, 530845, 522803 Fax: 051-522014, Email: brijsubme@alcnet.com.np





वीरगंज उप-महानगरपालिका
BIRGANJ SUB-METROPOLITAN CITY



पत्र संख्या :- २४/०६६-०६०

मिति: २०६०/१/१०

चलानी नं. :- वि.प.नं. सि.मि.सि.गो.सि.का.का.६

श्री अमिता शहर एडिटेड न शहर वातावरण सुधा आयाजना
 आयोजना काया नवयन हेतु
 वीरगंज उप-महानगरपालिका
 गीरगंज

त्यस्तु विपना, किल २०६९/१९९९ गते का नेपाल समाचार
 पत्र दैनिके पत्रिका, लडाखित सापेजावड सुचना माल क्रमिक्रमका
 योत जगिएका उपलार, भवगत भमा/भसयु न पडाका, जततादि
 कषाक डल, (भानिरी) डल तथा लडक सुधार निमीतागेन
 कायका इमानवयन अकविक, वातावरणीय पका डरग मोतिउ
 जेदिउ, आधिउ २ सामाजिउ एवं सांस्कृतिउ पकाइवका पम
 पकाव लाउ न्युनि डरप, गेन काय सकोवका जगिएका जाकका
 भमा । साथै यत आयोजनाले समग्रका वीरगंज उप-महानगर
 पालिकाका वातावरण सुधा आडिन महामाल आयोजना -
 कायानवयनलेका, याडा अगाडी वडास मल्ल सुकडाभन
 साथ सि.मि.सि.गो.सि.का.६ ।

११/१/२०६०
 [Signature]
 [Stamp]

"स्वस्थ सुन्दर विकासको शहर वीरगंज नगर"
 पशुपति आदर्शनगर, वीरगंज (नेपाल) फोन : ०५१-५२२०१०, ५२२८०२, ५२०९४४, ५२०९६६, ५३०८४५, ५२२८०३ फ्याक्स : ०५१-५२२०१४
 Pashupati Adarsh Nagar, Birganj (Nepal), Ph 0977-51-522010, 522802, 520944, 520966, 530845, 522803 Fax: 051-522014, Email: brjsubme@icncl.com.np





वीरगंज उप-महानगरपालिका
BIRGANJ SUB-METROPOLITAN CITY



पत्र संख्या :- १०६/०२९/०६०
 चलानी नं. :-

मिति: २०६०/०९/१०



विषय: सिफारिस पत्र

रानी मन्थौली २।६९ एकीकृत वानावरण सुधार आयोगमा
 आयोगमा कार्य गर्न इच्छा

बी. डी. म. नं. पा. ५।

उपरोक्त लक्ष्यमा २०६९/०९/१० गतेको मेमोले लामा चारपनको निशुपानमा
 मा प्रशासन सार्वजनिक सुचनामा कार्यलयमा रोजगारीको अवसर
 उपरोक्तमा मल वडामा प्रशासनिक कार्य, कल, र-मा-र-र, कल, रमा-
 र-र सुधार निर्माण गर्न कार्यको आयोगमा आयोगमा वानावरण
 यदी-र-र मालिकको कार्य, कार्य, आयोग र लामाको उल्लेखनीय पद-र-र
 मा पने प्रभावलाई न्यूनीकरण गर्ने कार्य समावेश गरिएको जानकारी
 मन्थौली रानी मल आयोगमा लेख्यमा विलोपन उप महासचिवको
 वानावरण सुधार आयोगको मलकोले आयोगमा कार्यलयमा
 -पौडी उगाडी/ वनोपचारको सुभामना लामो सिफारिस लाम-
 अनुशील-र-र

लेखक/सचिव
वडा सचिव
 बी. डी. म. न. पा. वडा नं.-६

"स्वस्थ सुन्दर विकासको शहर वीरगंज नगर"
 पशुपति आदर्शनगर, वीरगंज (नेपाल) फोन : ०५१-५२२०१०, ५२२८०२, ५२०९४४, ५२०९६६, ५३०८४५, ५२२८०३ फ्याक्स : ०५१-५२२०१४
 Pashupati Adarsh Nagar, Birganj (Nepal), Ph 0977-51-522010, 522802, 520944, 520966, 530845, 522803 Fax: 051-522014, Email: brjsubme@atcnet.com np





वीरगंज उप-महानगरपालिका
BIRGANJ SUB-METROPOLITAN CITY



पत्र संख्या :-

चलानी नं. :-

७६६/०६९/६०१/०६५

विषय: सिमाना रोड

मिति: ०६०/१/०९

श्री प्रमोद शर्मा सहित शहरी वातावरण सुधार कार्यक्रम
 कार्यक्रम कार्यन्वयन इकाई
 वीरगंज उप-महानगरपालिका
 वीरगंज

अरोक्त सम्वन्धमा मिति २०६९/०१/०९ गतेको नेपाल
 समाचार पत्र हेर्ने क्रममा प्रकाशित स्तम्भिक समाचारमा कार्य
 लाग्ने रोड शहरीको बन्दोबस्त गर्न गयो। यस १९९/०६ का
 प्रस्तावित वर्षादे बल, स्थानीय बल तथा सडक सुधार निर्माण गर्ने कार्य
 को कार्यन्वयन अर्थात् वातावरणीय पक्षमा भौतिक, जैविक सम्बन्ध
 र सामाजिक एवं सांस्कृतिक पक्षमा पनि प्रभावलाई गुरुत्वको साथै कार्य
 लाग्नेवा गरीएको जानकारी गयो। त्यसै भए आयोगको सम्वन्धमा
 वीरगंज उप महानगरपालिकाको वातावरण सुधार कार्य गरीएको
 कार्यक्रम कार्यन्वयन प्रकृषा नई आगोडी ०६०९ नम्बर श्रम-नागरिक
 को सम्वन्धमा मिति ०६०९)

[Signature]
 वडा सचिव
 वि. व. न. न. वा. ०६०९ मिति बका न.

“स्वस्थ सुन्दर विकासको शहर वीरगंज नगर”

पशुपति आदर्शनगर, वीरगंज (नेपाल) फोन : ०५१-५२२०१०, ५२२००९, ५२०९५४, ५२०९६६, ५३०६४५, ५२२००३ फ्याक्स : ०५१-५२२०१५
 Pashupati Adarsh Nagar, Birganj (Nepal), Ph 0977-51-522010, 522802, 520944, 520966, 530845, 522803 Fax: 051-522014, Email: birsubme@afcn.net.com.np





वीरगंज उप-महानगरपालिका
BIRGANJ SUB-METROPOLITAN CITY



मिति: २०६०/११/१२

पत्र संख्या :-

चलानी नं. :- २८/०६९१०६०

बिषय :- सिफारीस सम्बन्धमा

श्री प्रहोला शहर स्थित कुत बाहरी वातावरण सुधार अभियान
 अभियान कार्यान्वयन इकाई
 वीरगंज उप महा नगरपालिका वडा नं. ८
 वीरगंज

प्रकृत बिषयमा मिति २०६८/०९/१८ गतेको भेला
 ले सम्मान्य पत्र दैनिक पत्रिकाको प्रकाशित आवेगको
 क बुझना प्राप्त कार्यालयमा राख्न गरी स्वीकृत भएको
 गत भयो । प्रसन्न वडा मा प्रस्तावित वर्षादि ढल, रुखानी
 यरी ढल तथा स्डक सुधार निर्माण गर्ने कार्यका लागि
 यो भूविज्ञान वातावरणीय पत्र हाल भौतिक जैविक,
 भूविज्ञान र सामाजिक स्व स्वास्थ्यीक पत्रहरूमा पर्ने
 प्रभाव लक्ष्मी भूनिर्माण गर्ने कार्य सम्बन्ध गरी स्वीकृत
 जायकारी भयो । खान्ने प्रसन्न भाषाजनाले समग्रमा
 वीरगंज उप महा नगरपालिकाको वातावरणमा सुधार
 ल्याउने भन्ने उद्देश्यले अभियानमा कार्यान्वयन प्रकृमा
 यहाँ अन्तरी वेदोस गर्ने शुभ काम नै साथ सिफारीस
 गर्दछु ।

(Signature)
 २०६०/११/१२

"स्वस्थ सुन्दर विकासको शहर वीरगंज नगर"
 पशुपति आदर्शनगर, वीरगंज (नेपाल) फोन : ०५१-५२२०१०, ५२२००२, ५२०९४४, ५२०९६६, ५२०८४४, ५२०८४४, ५२०८४४, ५२०८४४
 Pashupati Adarsh Nagar, Birganj (Nepal), Ph 0977-51-522010, 522802, 520944, 520966, 530845, 522803 Fax: 051-522014 Email: bjsubme@nccn.com.np
वडा सचिव
वडा नं. ८





वीरगंज उप-महानगरपालिका
BIRGANJ SUB-METROPOLITAN CITY



पत्र संख्या :- ०६६१०६०

मिति: २०७०.११.१०

चलानी नं. :-

पा.स.नं. नं. ६५०६६१०६०

विषय: सिपानीया पत्र

वीरगंज उप-महानगरपालिकाको कार्यालयबाट
सिपानीया पत्रको सम्बन्धमा जानकारी गराइएको छ।
सिपानीया पत्रको सम्बन्धमा जानकारी गराइएको छ।

सिपानीया पत्रको सम्बन्धमा जानकारी गराइएको छ।
सिपानीया पत्रको सम्बन्धमा जानकारी गराइएको छ।
सिपानीया पत्रको सम्बन्धमा जानकारी गराइएको छ।
सिपानीया पत्रको सम्बन्धमा जानकारी गराइएको छ।
सिपानीया पत्रको सम्बन्धमा जानकारी गराइएको छ।
सिपानीया पत्रको सम्बन्धमा जानकारी गराइएको छ।
सिपानीया पत्रको सम्बन्धमा जानकारी गराइएको छ।
सिपानीया पत्रको सम्बन्धमा जानकारी गराइएको छ।
सिपानीया पत्रको सम्बन्धमा जानकारी गराइएको छ।
सिपानीया पत्रको सम्बन्धमा जानकारी गराइएको छ।

"स्वस्थ सुन्दर विकासको शहर, वीरगंज नगर"

पशुपति आदर्शनगर, वीरगंज (नेपाल) फोन : ०५१-५२२०१०, ५२२००२, ५२०९२२, ५२०९६६, ५३०८४४, ५२२८०३ फ्याक्स : ०५१-५२२०१४
Pashupati Adarsh Nagar, Birganj (Nepal), Ph 0977-51-522010, 522602, 520944, 520966, 530845, 522803 Fax: 051-522014, Email: brjsubme@atcnet.com.np





वीरगंज उप-महानगरपालिका

BIRGANJ SUB-METROPOLITAN CITY



पत्र संख्या :- ०६६/०६०

चलानी नं. :- ०१.५.५.०३५



मिति: ०६०/१/१०

विषय: स्थानीय गरीब, गरिबी-
 श्री मन्मोला शहर (वि.सं. २१८७) कल्याणकारी योजना
 आयोजना
 आयोजना कार्यलयन इकाई
 नैराश्रम उपविभाग सि ५८ ३१०
 नीरञ्ज

उपरोक्त कार्य-समाप्ति मिति २०१९/०५/१५ गते नेपाल सरकार
 पत्राचार प्रक्रिया प्रदर्शन शक्यता अनुसार कार्यलयन इकाईको
 कार्यालय अन्तर्गत गरीब। यसका साथै कल्याणकारी योजनाको
 हला तथा सडक सुधार निर्माण गर्न कार्य-समाप्ति आयोजना नालाको
 परामर्श गरी, जेठो, इलाका र समाजिक सेवा सहायता परामर्शमा उपर
 प्रभावकारी बलिकाता गर्न कार्य-समाप्ति गरी, आयोजना गरी। साथ
 यस आयोजनाको सम्पन्न गरी, उप-महानगरपालिका र नालाको सुधार
 आइने कालमा आयोजना कार्यलयन प्रक्रिया माई अगाडी बढेसु कता उपर
 कामनाडा साथ स्थानीय गरिब / =

(Signature)
 ०६०/१/१०
 पत्र सचिव

"स्वस्थ सुन्दर विकासको शहर वीरगंज नगर"

पशुपति आदर्शनगर, वीरगंज (नेपाल) फोन : ०५१-५२२०१०, ५२२००२, ५२०९४४, ५२०९६६, ५३०८४५, ५२२८०३ फ्याक्स : ०५१-५२२०१४
 Pashupati Adarsh Nagar, Birganj (Nepal), Ph 0977-51-522010, 522802, 520944, 520966, 530845, 522803 Fax: 051-522014, Email: brjsubme@atcnr.com.np





वीरगंज उप-महानगरपालिका
BIRGANJ SUB-METROPOLITAN CITY



पत्र संख्या :- ०५२/०६०

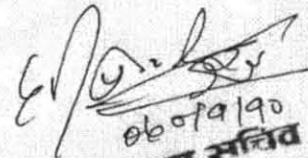
मिति: ०६०७/१/१०

चलानी नं. :- ६१

विषय: शिफारिस

श्री मन्मोहन शहर एकिकृत शहरी वातावरण सुधार आयोगना
आयोजना कार्यलयत इकाई
वीरगंज उप-महानगरपालिका
वीरगंज

प्रस्तुत शिफारिस मिति ०६०७/०६/१० गतेको नेपाल स्पान्चार् पत्र दैनिक प्रतिकमा प्रकाशित सार्वजनिक सूचना यस कार्यालयमा यस गरिएको व्यक्तित्व अफगत भयो। यसका २.१२ मा प्रस्तावित वर्कड कूल, स्थानीयको कूल तथा सडक सुधार निर्माण गर्ने कार्यको कार्यालयत अवधिमा पलापरौय पदाहक शैक्षिक, शैक्षिक, आर्थिक र सामाजिक एवं सांस्कृतिक पदाहकसु पर्ने पत्रापलसि व्युत्पिकरण गर्ने काम समाप्ति गरीएको जानकारी भयो। साथै यस आयोजनाले समग्रमा वीरगंज उप-महानगरपालिकाको पलापरौयमा सुधार आउने भएकोले आयोजना कार्यालयत प्रकृत चैडि अगाडी बेहोस भन्ने अनुमाननाका साथ शिफारिस गर्दैछु।


०६०७/१/१०
वडा सचिव
वीरगंज-१२

“स्वस्थ सुन्दर विकासको शहर वीरगंज नगर”

पशुपति आदर्शनगर, वीरगंज (नेपाल) फोन : ०५१-५२२०१०, ५२२८०२, ५२०९५५, ५२०९६६, ५२०६५५, ५२२८०३ फ्याक्स : ०५१-५२२०१५
Pashupati Adarsh Nagar, Birganj (Nepal), Ph 0977-51-522010, 522802, 520944, 520966, 530845, 522803 Fax: 051-522014, Email: brjsubme@atcnet.com.np





वीरगंज उप-महानगरपालिका
BIRGANJ SUB-METROPOLITAN CITY



पत्र संख्या :- १४९/०६९/०७०

मिति: ०७.०१.१९९१

चलानी नं. :- विषय - विपरीत व्यवस्था - !

मी प्रयोग शहर एकिकृत शहर वातावरण सुधार आयोग
 आयोग कार्यविधान हुकाई
 की ७० मदा न पर विरुद्ध
 प्रस्तावित विषय (मिति: ०६.१२.१९९०) गरीको गैर
 व्यवस्था पर दैनिक यजिकायत प्रकृति आर्थिक
 सुचना प्रकाशकमा टाउ गरीको उपरी अपगत
 मारी, पर वडा पर पुस्ताविषय बर्षले ठल उपरीदर्श ठल
 तथा खडक सुधार निर्माण, गर्ने कार्यको, कार्यविधान
 अवधिमा, वातावरण पर वडा आर्थिक वैपिक आर्थिक
 र उपरीदर्श एक सांस्कृतिक पर वडा, गर्ने प्रपत्रलाई
 मुनिकरना गर्ने कार्य उपरीदर्श गरीको, जानकारी मारी,
 साथै प्रकाश आयोगले उपरीदर्श गर्ने ठल मदा, न० पर
 को वातावरण सुधार आयोग मदीकोले आयोग का-
 र्यविधान प्रकृति माई अगदी वडीस गर्ने सुपकारना-
 कर साथै विपरीत गरीको

०४/०१/९१
 प्रकाश
 ०७/०१/९१
 का नं. १९

"स्वस्थ सुन्दर विकासको शहर वीरगंज नगर"
 पशुपति आदर्शनगर, वीरगंज (नेपाल) फोन : ०५१-५२२०१०, ५२२००२, ५२०९५४, ५२०९६६, ५३००५५, ५२२००३ फ्याक्स : ०५१-५२२०१४
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वीरगंज उप-महानगरपालिका
BIRGANJ SUB-METROPOLITAN CITY



पत्र संख्या :- ०६९१०६०

चलानी नं. :- १६२

मिति: २०७०-११-९

विषय: सिफारिस पत्र

श्रीममौलाशिएर एकिकरन बाही बागवण सुहाइ साधौजना,
 साधौजना कार्यालयन सुहाइ
 वीरगंज उप-महानगरपालिका
 वीरगंज

उपरोक्त पत्रमा मिति: २०७०/११/१९ गतेको नेपाल समाचार पत्र दैनिक पत्रिकामा प्रकाशित सार्वजनिक सुचना यस कार्यालयमा राम्रै गरी एको व्यहोरा खण्ड भयो, यस वकान: वरमा प्रचारित भएकै रक, रचना-वीथी रक तथा मसक सुहाइ निर्माण गरी कार्यालय कार्यलय सुहाइमा बागवणीय पदार्थ मौनिक, जैविक, सांख्यिक र सामाजिक एवं सांस्कृतिक पदार्थमा पत्र प्रभावलाई न्यूनिकरण गरी कार्य समाप्ति गरी एको जानकारी भयो, साथै यससम्बन्धमा समग्रमा वीरगंज उप-महानगरपालिकाको बागवणमा सुहाइ सडने भएकोले साधौजना कार्यालयमा प्रकृत्या सड सगाडी व्यहोरा म-ने हाथि र सुभकाम-ना का साथ सिफारिस साथ हाउरोहो गर्नुहुन्छ।

(Signature)
 वडा सचिव
 वीरगंज उप-महानगरपालिका
 वडा नं. ०१
 २०७०



वीरगंज उपमहानगरपालिका
BIRGANJ SUB-METROPOLITAN CITY



पत्र संख्या :- ०६९/०६०
चलानी नं. :- ११०

पत्रा समिति
पत्रा नं. १५

मिति: २०६०/११/९

श्री मर्माला बाह्य संकेकृत सटरीवालाकरण सुधार आयोगना
आयोगना कार्यान्वयन इकाई
वी.उप.म.न.पा.
वीरगंज

विषय :- सिफारिस पत्र

उपरोक्त पत्राध्यायमा मिति २०६०/०९/१९ गतेको नैपाल समाचार पत्र दैनिक पात्रिकामा प्रकाशित सार्वजनिक सुचना यस कार्यालय मा प्राप्त गरिएको व्यहोरा अफगत भयो। यस पत्रा नं. १५ मा प्रस्तावित कक्षा टोल, स्थानीय टोल तथा सडक सुधार निर्माण गर्ने कार्यको कार्यान्वयन अवधिमा वातावरणीय पत्र हरू भौतिक औतिक, आर्थिक र समाजिक एक सांस्कृतिक पत्रहरूमा पर्ने प्रभाव लाई ध्यानिकरण गर्ने कार्य समावेश गरिएको मानकारि भयो। साथै यस आयोगनाले समग्रमा वी.उप.म.न.पा. का को वातावरण मा सुधार आउने भएकाले आयोगना कार्यान्वयन प्रकृया चाँडै अगाडी कटौस भन्ने शुभकामनाका साथ सिफारिस गर्दछु।


बडा त्तचित

"स्वस्थ सुन्दर विकासको शहर वीरगंज नगर"

पशुपति आदर्शनगर, वीरगंज (नेपाल) फोन : ०५१-५२२०१०, ५२२८०२, ५२०९५५, ५२०९६६, ५३०८५५, ५२२८०३ फ्याक्स : ०५१-५२२०१५
Pashupati Adarsh Nagar, Birganj (Nepal), Ph 0977-51-522010, 522802, 520944, 520966, 530845, 522803 Fax: 051-522014, Email: brjsubme@alcatel.com.np





वीरगंज उप-महानगरपालिका
BIRGANJ SUB-METROPOLITAN CITY



पत्र संख्या :-
 चलानी नं. :- ०९-८१
 १५३१७०



मिति: २०७०-१-९

विषय: सिजासि पत्र।

श्री मन्मोहा शाह र शिक्षक शहरी वातावरण सुजा (अभियोजन)
 अभियोजन कार्यन्वयन इकाई
 वीरगंज उप-महानगरपालिका
 वीरगंज

प्रस्तुत सिजासि मिति २०६९/०९/१९ जेठको आनेपाल -
 विमाया पत्र येनिक पत्रिकाका सञ्चालित सार्वजनिक -
 सुन्दा अस कामान्वयन शास जासको कम्प्लेक्स अकार -
 मी मास १६ नं पत्रका प्रस्तुत पत्रमा केवल सिजासि
 छलमा सडक सुजा सिजासि गर्ने कामको कामान्वयन -
 यकिकता कातासुजासि प्रस्तुत भेटिक, जे सिके जासिकि -
 र सामाजिक एवं नासिकिक प्रस्तुत पत्रमा सुजासि -
 मास कामान्वयन गर्ने काम समापका जासिके जासिके
 सिजे मास कामान्वयन सुजासि वीरगंज उप-महानगर -
 पालिकाको वातावरण सुजासि जासिके जासिके जासिके
 कामान्वयन सुजासि जासिके जासिके जासिके
 सुजासि सुजासि जासिके जासिके जासिके

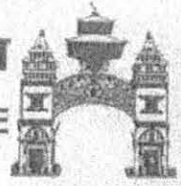
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 वडा सचिव

"स्वस्थ सुन्दर विकासको शहर वीरगंज नगर"
 पशुपति आदर्शनगर, वीरगंज (नेपाल) फोन : ०५१-५२२०१०, ५२२००२, ५२०९५५, ५२०९६६, ५३०८५५, ५२२८०३ फ्याक्स : ०५१-५२२०१५
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वीरगंज उप-महानगरपालिका कार्यालय
BIRGANJ SUB-METROPOLITAN CITY OFFICE



पत्र संख्या १३३/०३६१०६०
 चलानी नं. :-

मिति: २०६०/०९

तिरुवां:- सिफारिस पत्र
 श्री मङ्गला शहर रक्षित शहरी कार्यसुधार आयोग
 आयोगका कार्यसूचक ईकाई
 वीरगंज उप-महानगरपालिका
 वीरगंज

प्रस्तुत विषयमा मिति २०६०/०९/१९ गते नेपाल
 समन्वय पत्र देखिकै पत्राचारमा काम गर्नु शुरुवातिको हुने
 नो भन्ने कार्यालयमा यसै गरी कार्यको व्यवस्था उपगत भयो
 । यसै गरी न.०८ मा प्रस्तावित कार्यको लागि सम्बन्धी कार्यको
 सडक सुधार निर्माण गर्ने कार्यको कार्यालयको उपस्थितिमा
 वातावरणीय प्रसङ्ग, जलिक, जैविक, आर्थिक र सामाजिक
 एवं सांस्कृतिक पक्षहरूमा पर्ने प्रभावलाई ध्यानमा राखेर
 कार्य सम्पन्न गरी ल्याउने जावकारी भयो । साथै यसै आयोग
 जनाले समग्रमा वीरगंज उप-महानगरपालिकाको वातावरण
 राम्रो बनाउन आयोगले गरेको आयोगका कार्यसूचक
 प्रकाशनाद आयोगको वहाँसु मन्त्रे शुभकामना साथ
 सिफारिस गर्दछु ।

(Signature)
 ०६०११८
सचिव

"स्वस्थ सुन्दर विकासको शहर वीरगंज नगर"
 पशुपति आदर्शनगर, वीरगंज (नेपाल) फोन : ०५१-५२२०१०, ५२२८०२, ५२०९४४, ५२०९६६, ५३०८४५, ५२२८०३ फ्याक्स : ०५१-५२२०१४
 Pashupati Adarsh Nagar, Birganj (Nepal), Ph 0977-51-522010, 522802, 520944, 520966, 530845, 522803 Fax: 051-522014, Email: brjsubme@icn.net.np



ANNEX 4
List of Persons Contacted
and
Issues Raised

DRAINAGE, SEWERAGE AND ROADS IMPROVEMENT FOR BIRGUNJ MUNICIPALITY

Annex 4: List of Persons Contacted

S.No.	Name	Address	Occupation
1	Rajesh Kumar Prasad	ward No. 10	ward secretary
2	Mohan Prasad Karki	Birgunj - 16	ward secretary
3	Lalendra Prasad Karki	Birgunj - 17	ward secretary
4	Satendra Prasad	.. 92	ward secretary
5	Manish Miya	Birgunj - 15	ward secretary
6	मदन लाल शर्मा	वडा नं. 6	वडा सचिव
7	मो.पी. चन्द साह	वडा नं. 09	वडा सचिव
8	HARI SHRESTHA	.. 12	..
9	Rajesh Kumar Sharma	ward No: 10	ward secretary
10	Rajendra Hari Sharma	ward No - 11	ward secretary
91	मि. रमेश चन्द्र शर्मा	वडा नं. 2	वडा सचिव
92	म. सुन्दर शर्मा	वडा नं. 2	वडा सचिव
93	मि. रमेश चन्द्र शर्मा	.. - 2	वडा सचिव
94	मि. रमेश चन्द्र शर्मा	वडा नं. 8	वडा सचिव
95	मि. रमेश चन्द्र शर्मा	वडा नं. 9	वडा सचिव
96	मि. रमेश चन्द्र शर्मा	वडा सचिव - 9	वडा सचिव
97	मि. रमेश चन्द्र शर्मा	वडा सचिव - 8	वडा सचिव
98	मि. रमेश चन्द्र शर्मा	वडा सचिव - 9	वडा सचिव



DRAINAGE, SEWERAGE AND ROADS IMPROVEMENT FOR BIRGUNJ MUNICIPALITY

Annex 4: Issues Raised by Local Stakeholders

S.No.	Person/Institution & Address	Issues Raised/Concern Expressed
•	सुरेश मिश्र, जिला कमिश्नरिय, जेपीसी जनअधिकार फोरम, वडा नं १बीरगंज	• रानी सती मन्दिर को मुनि दूला नाला छ। मन्दिर को अपि पछि टाकीमा दूला पानी ले रोड मा २-४ फीट पानी जम्मा हुन्छ र जुरे रोड पानीले बल्क हुन्छ पानी निकास को proper व्यवस्था हुनु पर्ने।
•	मनोज कुमार कलवाट श्री पू वडा अध्यक्ष वडा नं-१२ बीरगंज	• स्टीडीओ आफिस को अगाडी पानी ४ फीट सम्म बाधे मा जम्मा हुने गर्दछ। Main Drain निर्माण नभएको कारण सबै पानी रोडमै जम्मा हुन्छ। Main channel Cabin नजीक जाग बगर Drain सफा गर्न व्यवस्था नभएको। Bhojpur School को पछाडि Main drain सम्मि हलधर गरिदिने पानी पास हुने व्यवस्था नभएको सोको व्यवस्था हुनु पर्ने।
•	सन्तार अन्धारी, बडासचिव वडा नं १८	• वडा नं १८ मा हाल पानी को निकास हुँदैन। पानी निकास को proper व्यवस्था हुनु पर्ने।
•	राजेश शर्मा, वडा सचिव वडा नं १०,	• Army barrack को पूर्व र उत्तरतिर को बायो लिंक रोड पानी Dump हुने गर्दछ। • Dr. Pingla Amitya को Clinic Area समेत नाला किलिमि Area देखि लिएर पियमाथी college सम्म को Area पानी लेनडम्प हुने गर्दछ। त्यसैको proper उपनस्थापन हुनु पर्ने।
•	मनिफ मिश्र वडा सचिव वडा नं १२	• मुरली गाउँ बाट पानी निस्कने निकास हुँदैन बर्खाफ मा जुरे बाधे पानी ले बारिद सोको उपनस्थापन हुनु पर्ने।
•	गोपी चन्द साह वडा सचिव वडा नं ५	• अनुमान मन्दिर को पूर्व पश्चिम तिर बाधे अडाला गर्नु पर्ने। पानी को निकास गर्ने उपनस्थापन हुनु पर्ने।
•	रावडी देवी महरा, (कैत्रीप सदस्य, फोस गणतन्त्रिक गापत्री नगा वडा - नं १)	• नाला र हल निकास को उपनस्था हुनु पर्ने।
•	मुन्नी क्षीबास्वत (कैत्रीप महिला कमिश्नरिय) संकीप सदभावना पार्टी काठमा - १५	• बाधे बनाउनु पर्ने। • मस्जिद गेल देखि पूर्वपरी नाला सफा निर्माण गर्नुपर्ने। • मिथिला नगल येल, दक्षिण वस्ती मा खानेपानी र चर्पी को उपनस्था हुनु पर्ने। • Earthen Road तार्डे पिप जागे उपनस्थापन गर्नुपर्ने। • Nagma Pool देखि दक्षिण काठमाथि सम्म 1km by Road रोड खण्ड हुने तिर Drainage हुला नाला पनहुनुपर्ने।
•	सुरज पटेल (Board Advisor), मुवा सरोका सभाज नेपाल, कुहास येल वडा नं- ६	• जेल को Sewage Pipe नाला पालिका र्थो धर्मि मा direct connect गरे को हुने। नाला जाग दरहा को लफाई को उपनस्था हुनु पर्ने।
•	राजुभा प्रसाद सहकारी वडा सचिव वडा नं २	• जेल को पूर्वपरी पदाडि कुहास येलमा बाधे कश्पारी बाधे।
•	रमेश्वर हरि शर्मा, वडा सचिव वडा नं ११	• गाडे मन्दिर देखि पश्चिम सम्म दल को बाधो उपनस्था नभएको हुनाले फुट बाधे गरिने गरेको। वर्षाफाट मा जुरे वडा को बाधे हल नाला उपनस्था हुनु पर्ने।



ANNEX 5
Sample Checklists

DRAINAGE, SEWERAGE AND ROADS IMPROVEMENT FOR BIRGUNJ MUNICIPALITY
Annex-5: Checklist for Environmental Baseline / Issues

S.No.	Environmental Baseline	Physical / Biological / Socio-economic and Cultural	Location	Ward No.	Remarks



ANNEX 6
Photographs

Site Photos



MD1 needing to be covered



A new park to be developed here



MD1 needing to be covered



Flows in MD1 to be lifted to the proposed WWTP located to the right



Site of the proposed Canal Road, looking towards the north



Site of the proposed 2nd Bypass Road, looking towards the north

ANNEX 7

Figure 2.1: Project Location Map

Figure 2.2: Drainage Layout Map

Figure 2.3: Sewerage Layout Map

Figure 2.4: Layout Map of Sewerage Treatment Plant

Figure 2.5: Direct and Indirect Impact Zone

Figure 2.6: Road Network Development Plan

Figure 3.1: Typical Road Cross-Section at Core Area

Figure 3.2: Typical Cross-Section for Secondary By-pass Road

Figure 3.3: Typical Cross-Section for Canal Road



Figure 2.1 Location Map of Project Area

Birgunj Sub-Metropolitan City, Map

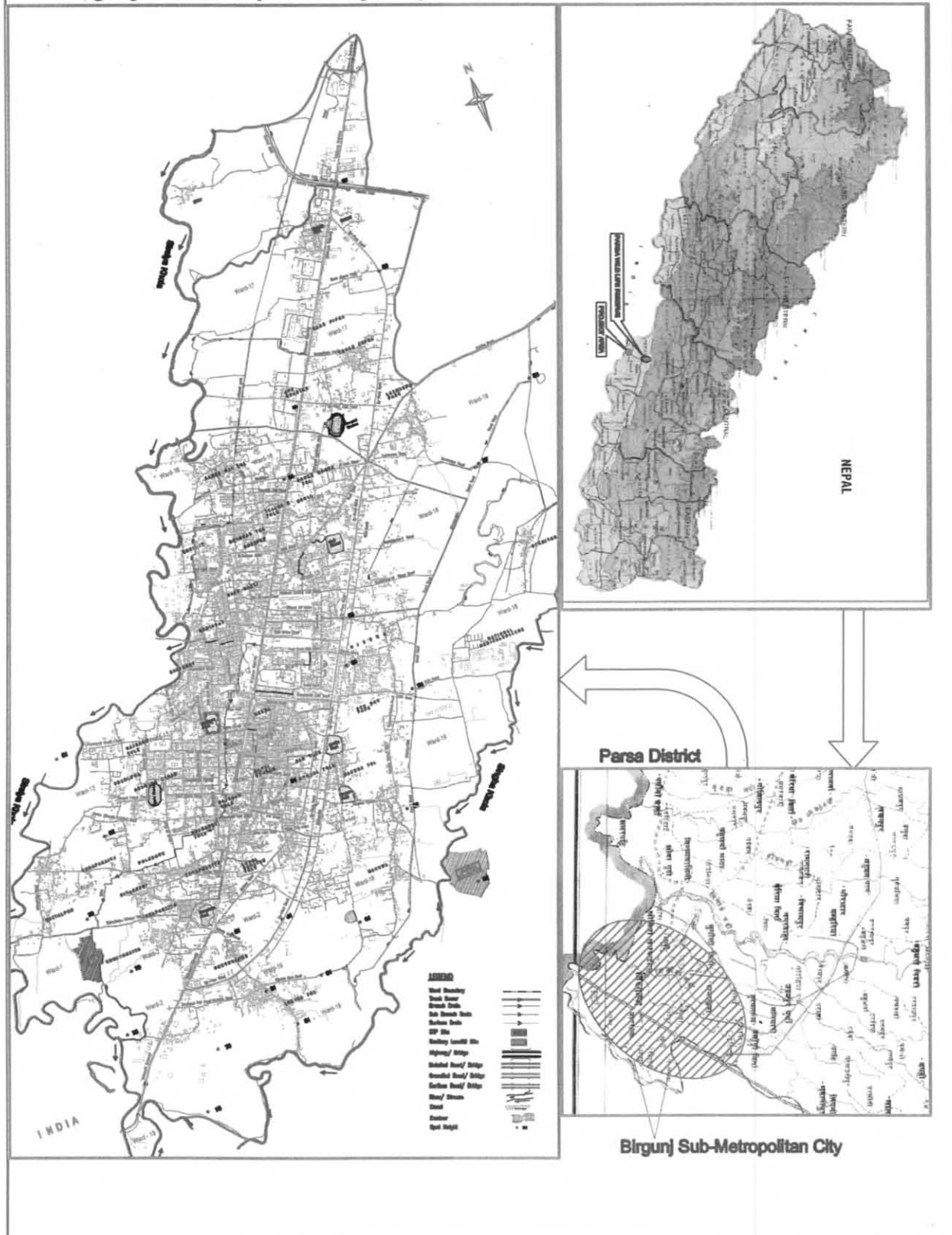


Figure 2.3 Sewerage Layout Map

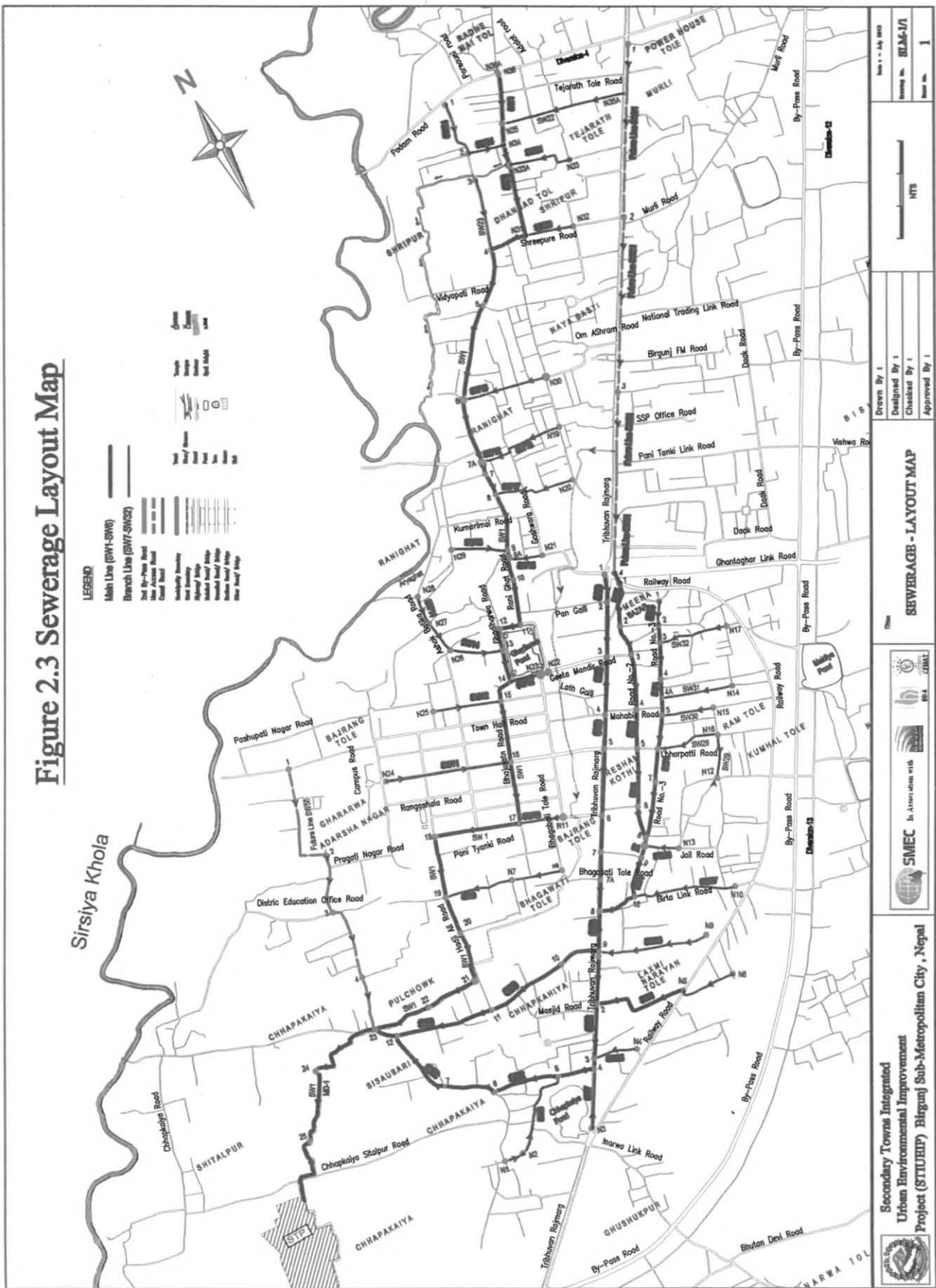


Figure 2.4 Layout Map of Sewerage Treatment Plant

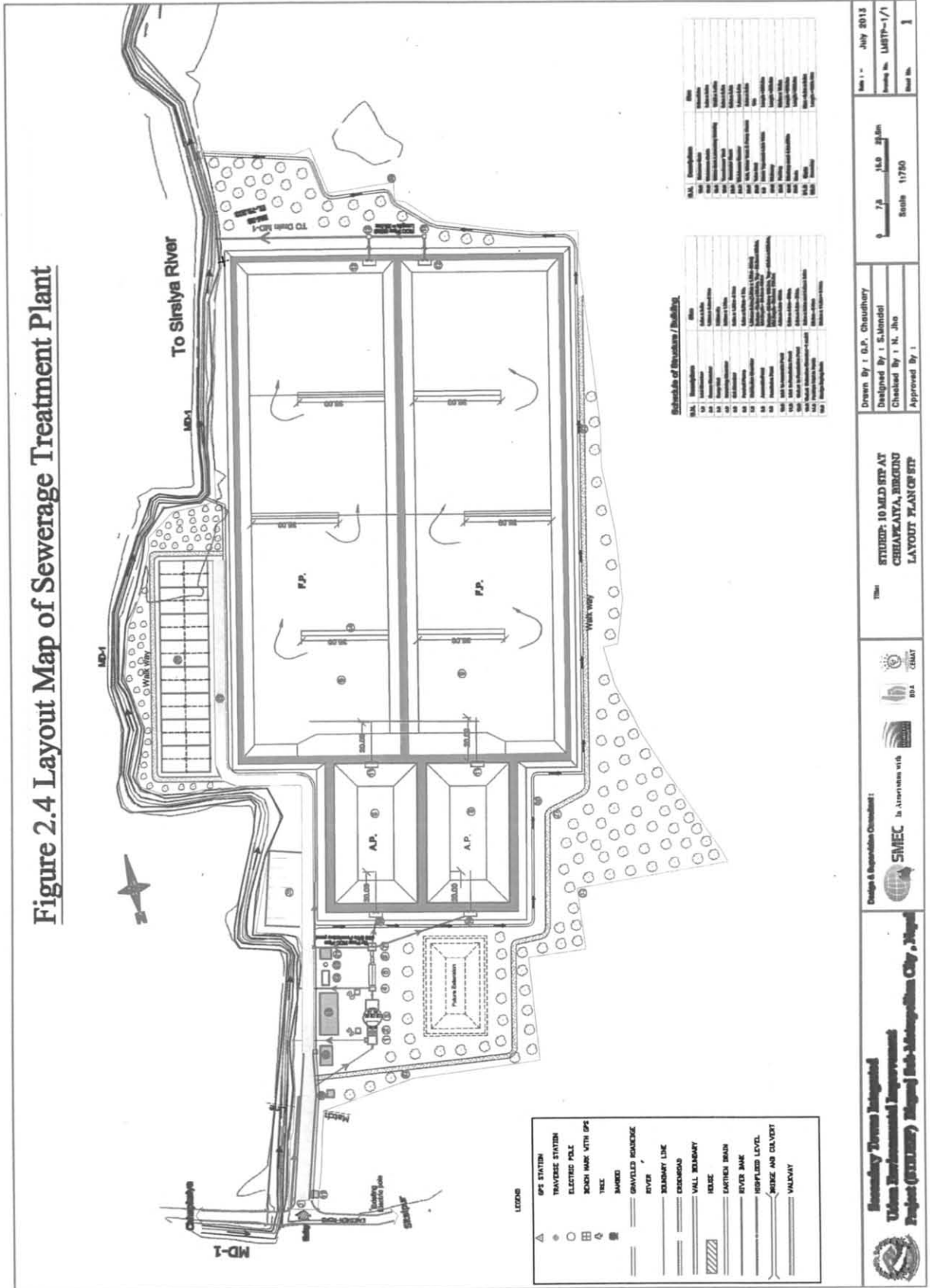


Figure 2.5 : Direct & Indirect Impact Zone

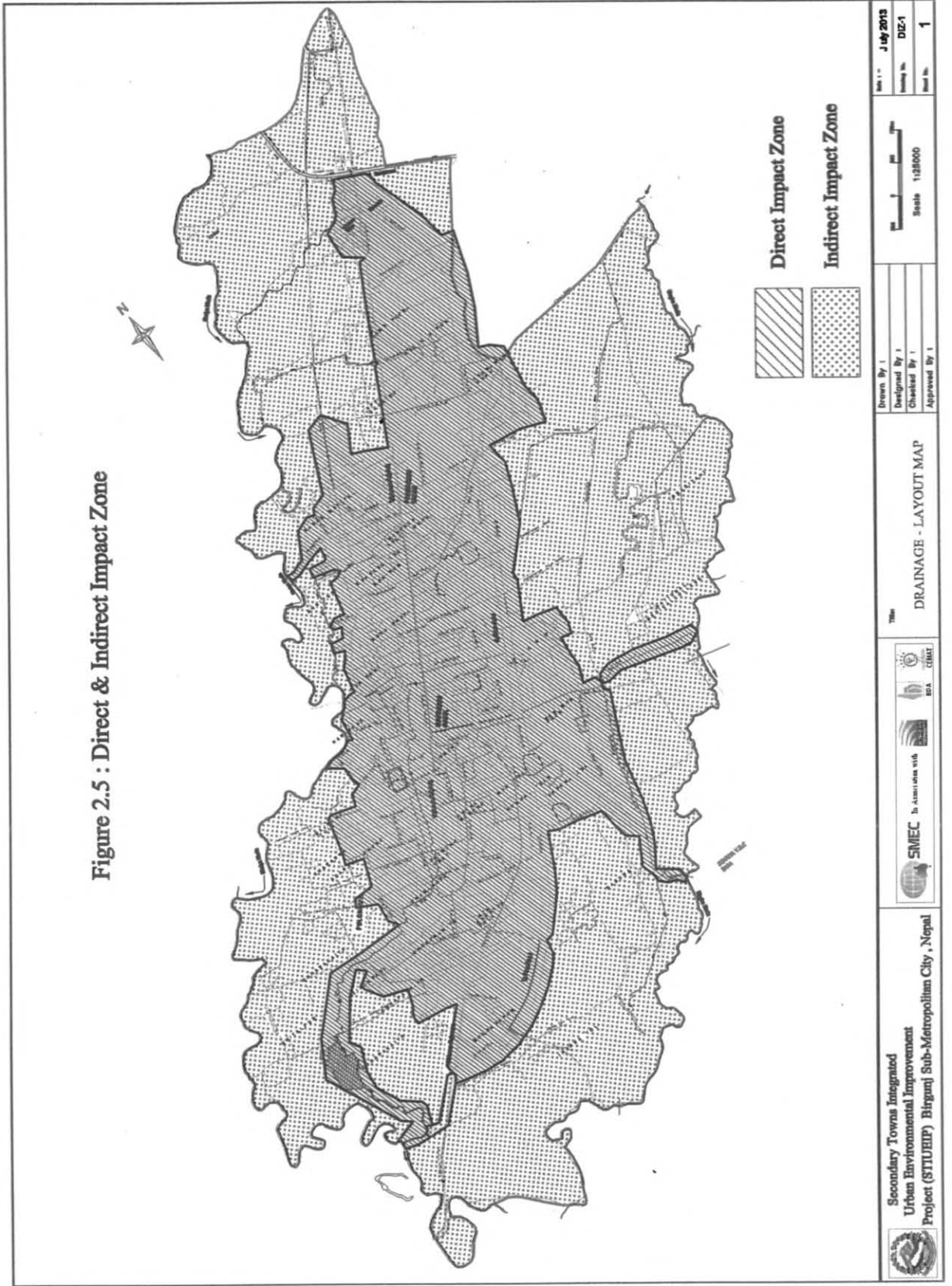
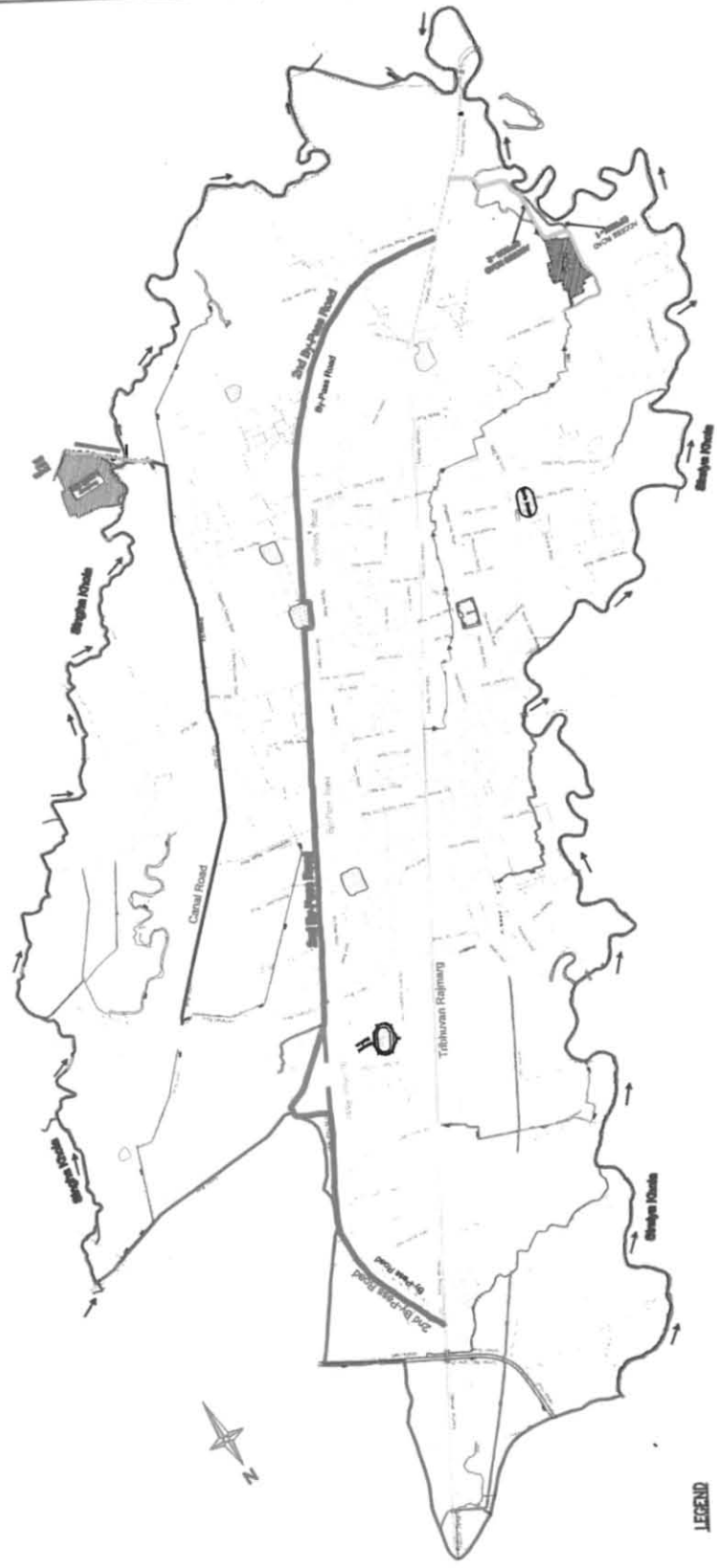




Figure 2.6: Road Network Development Plan



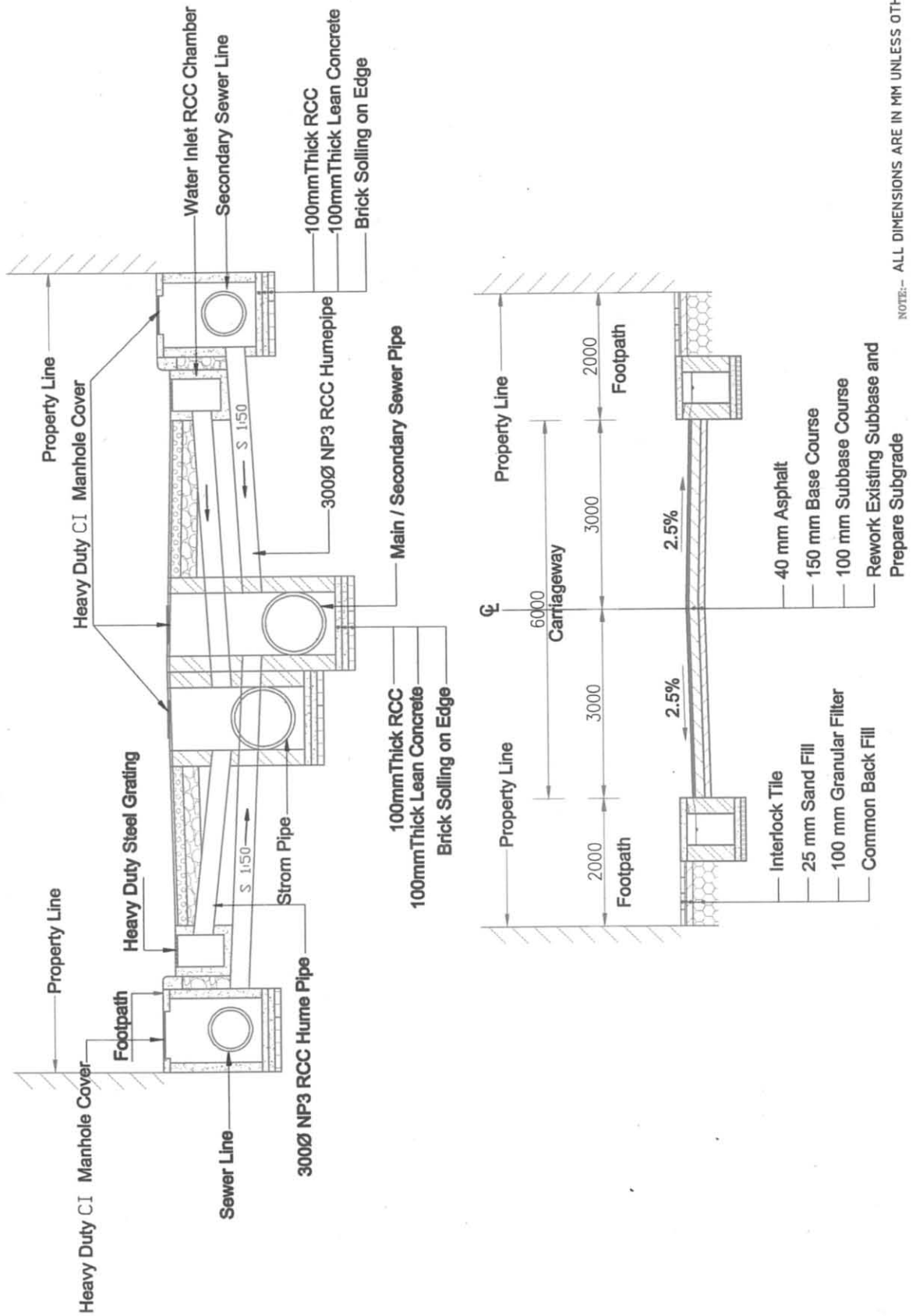
LEGEND

- 2nd By-Pass Road
- 1st Avenue Road
- Canal Road
- Secondary Roads
- Footpath
- Footpath with drainage
- Footpath with drainage and sewer
- Footpath with drainage and sewer and water supply
- Other Foot Path

 SMEC is associated with    	Design & Supervision Consultant: SMEC in Association with    	ROAD NETWORK DEVELOPMENT PLAN BIKUNI, NEPAL	Drawn By : G.P. Chaudhary Designed By : C.M. Ghimire Checked By : N. Sh. Joshi ACServed By : 1	Scale 1:25000 	Date : July 2018 Drawing No. MD/001/18-1 Sheet No. 1
--	---	---	---	--	---

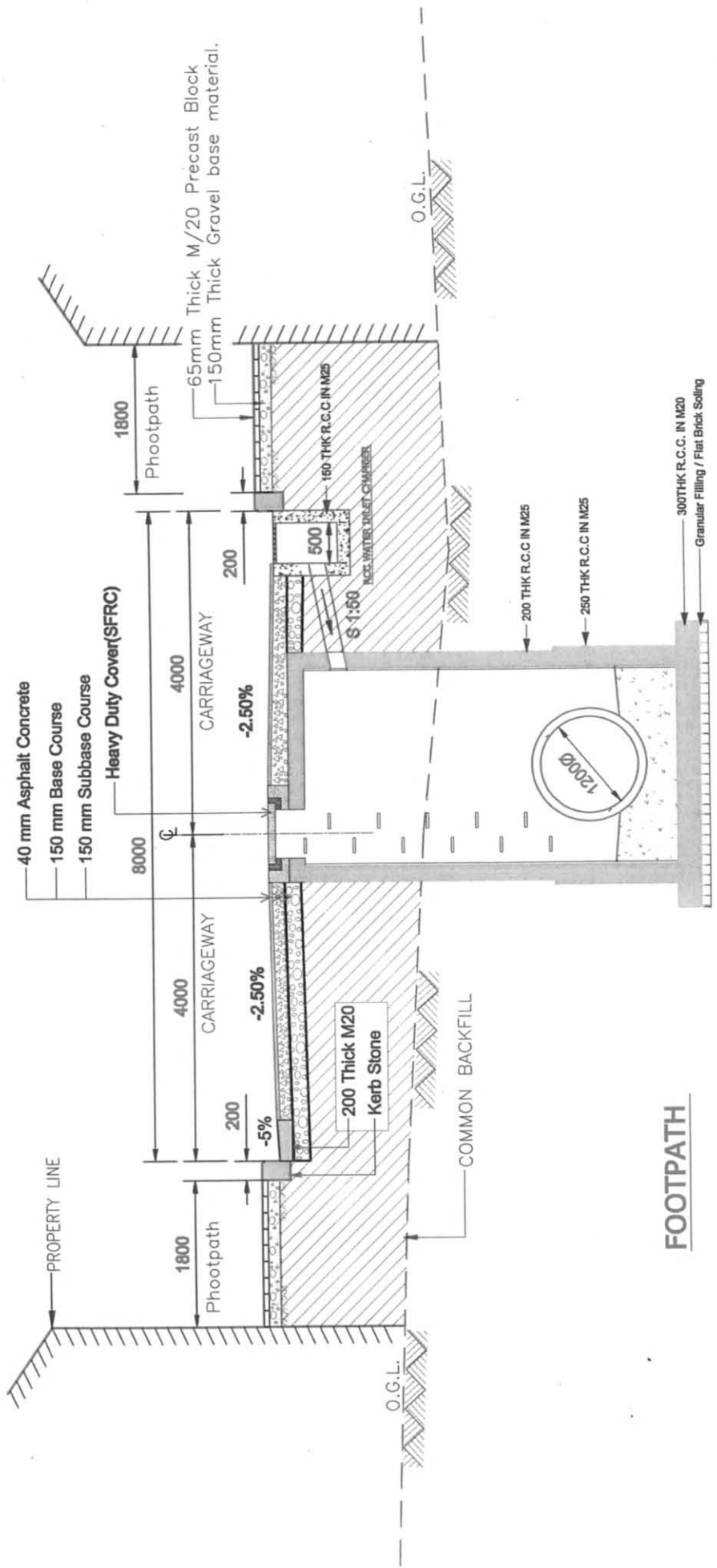
Secondary Thruway Integrated
 Urban Morphological Improvement
 Project (1000000) Nepal Inter-Departmental City, Nepal

Figure 3.1 Typical Road Section at Core Area

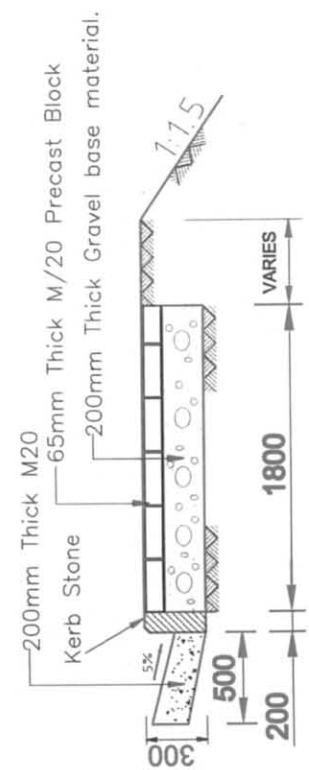


NOTE:- ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED.

Figure 3.2 Typical Road Section of 2nd By-Pass Road



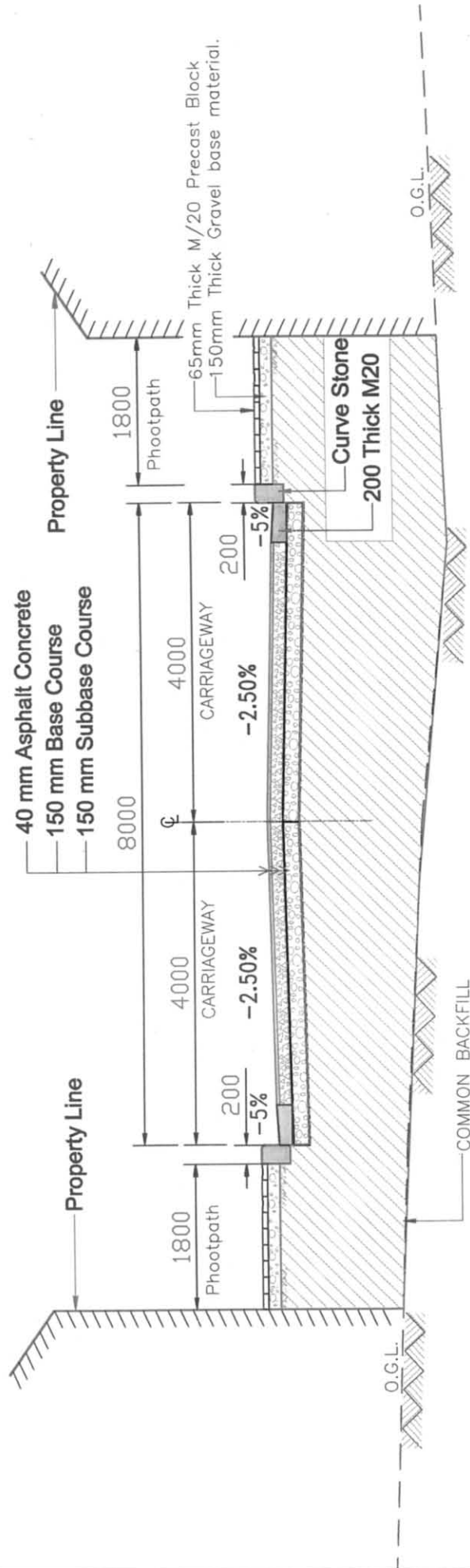
FOOTPATH



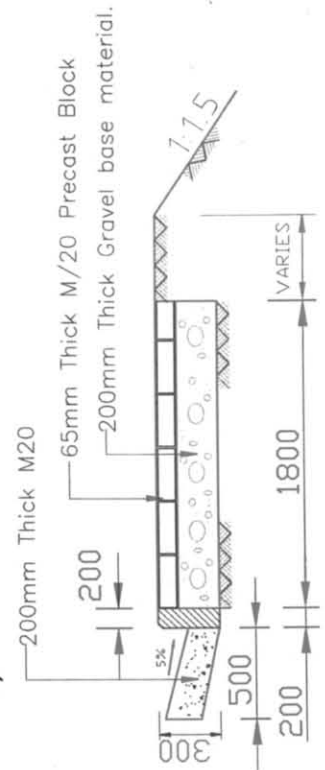
NOTE:- ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED.



Figure 3.3 Typical Road Section of Canal Road



TYPICAL ROAD SECTION



NOTE:- ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED.

ANNEX 8
Water Quality Test Results





CEMAT WATER LAB P. LTD.

(Water Analysis, Treatment Consultancy & Environment Research)

Tel. No. 4416289, 4436667
 Fax: 977 -1- 4417690, P.O.Box : 3953
 E-mail : cematlab@wlink.com.np
 info@cematwaterlab.com.np
 Web : www.cematwaterlab.com.np
 Pawanmarg-33, Mafidevi
 Kathmandu, Nepal

WASTEWATER ANALYSIS REPORT

Sender > CEMAT Consultancy P. Ltd	Sample No. > 1	Lab No. > 519 A/12
Collector > CEMAT Water Lab. P. Ltd	Location > Parsauni-8, Birgunj	District >
Source > Siraiya Khola S.01 Upstream	Collection Date >	Time > 4: 15 pm
Receipt Date > 13 Dec, 2012	Analysis Date > 13 Dec, 2012	

Parameters	Unit	Result	Method
PHYSICAL			
pH	-	7.2	Electrometric
Total Suspended Solids	mg/L	886	Filtration
Lab. Temperature	°C	14.5	Thermometer
CHEMICAL			
Ammonia	mg/L as NH ₃	6.7	Spectrophotometric (Nessler's)
C.O.D.	mg/L	90	K ₂ Cr ₂ O ₇ , Digestion
B.O.D.	mg/L	35	5 days incubation
Total Nitrogen	mg/L as N	15	Kjeldahl Method
Oil & Grease	mg/L	< 1	Partition Gravimetric method.
BACTERIOLOGICAL			
Total Coliform	MPN Index/100ml	4.6×10 ⁵	Multiple Tube Test
Faecal Coliform	MPN Index/100ml	2.4×10 ⁵	Multiple Tube Test

Analyzed by: Ramesh
 Date: 31 Dec, '12

Checked by: [Signature]
 Date: [Signature]

Authorized sign: [Signature]
 Date: 2 Jan, '13

CEMAT WATER LAB (P.) LTD.



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 E-mail : cematlab@wlnk.com.np
info@cematwaterlab.com.np
 Web : www.cematwaterlab.com.np
 Pawanmarg-33, Maitidevi
 Kathmandu, Nepal

WASTEWATER ANALYSIS REPORT

Sender :- CEMAT Consultancy P. Ltd	Sample No. :- 2	Lab No. :- 519 B/12
Collector :- CEMAT Water Lab. P. Ltd	Location :- Chapkay-1	District :-
Source :- Sirsiya Khola S.09 Downstream	Collection Date :-	Time : 2:50 pm
Receipt Date :- 13 Dec, 2012	Analysis Date :- 13 Dec, 2012	

Parameters	Unit	Result	Method
PHYSICAL			
pH	-	7.3	Electrometric
Total Suspended Solids	mg/L	828.5	Filtration
Lab. Temperature	^o C	14.5	Thermometer
CHEMICAL			
Ammonia	mg/L as NH ₃	8.3	Spectrophotometric (Nessler's)
C.O.D.	mg/L	70	K ₂ Cr ₂ O ₇ , Digestion
B.O.D.	mg/L	21	5 days incubation
Total Nitrogen	mg/L as N	15	Kjeldahl Method
Oil & Grease	mg/L	< 1	Partition Gravimetric method
BACTERIOLOGICAL			
Total Coliform	MPN Index/100ml	32.6×10 ³	Multiple Tube Test
Faecal Coliform	MPN Index/100ml	7.0×10 ³	Multiple Tube Test

Analyzed by: *Sonu*
 Date: 31 Dec, '12

Checked by: *K. Prasad*
 Date:

Authorized sign: *K. Prasad*
 Date: 2 Jan, '13

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 info@cematwaterlab.com.np
 Web. : www.cematwaterlab.com.np
 Pawanmarg-33, Mallidivi
 Kathimandu, Nepal

WASTEWATER ANALYSIS REPORT

Sender :- CEMAT Consultancy P. Ltd	Sample No. :- 4	Lab No. :- 519 D/12
Collector :- CEMAT Water Lab. P. Ltd	Location :- Chapkaya-1	District :-
Source :- MD1 Downstream S.07	Collection Date :-	Time :- 3:15 pm
Receipt Date :- 13 Dec , 2012	Analysis Date :- 13 Dec, 2012	

Parameters	Unit	Result	Method
PHYSICAL			
pH	-	7.4	Electrometric
Total Suspended Solids	mg/L	9864	Filtration
Lab. Temperature	^o C	14.5	Thermometer
CHEMICAL			
Ammonia	mg/L as NH ₃	38.7	Spectrophotometric (Nessler's)
C.O.D.	mg/L	612	K ₂ Cr ₂ O ₇ , Digestion
B.O.D.	mg/L	294	5 days incubation
Total Nitrogen	mg/L as N	48	Kjeldahl Method
Oil & Grease	mg/L	< 1	Partition Gravimetric method
BACTERIOLOGICAL			
Total Coliform	MPN Index/100ml	11×10 ⁵	Multiple Tube Test
Faecal Coliform	MPN Index/100ml	46×10 ⁵	Multiple Tube Test

Analyzed by: *Sonu*
 Date: 31 Dec, '12

Checked by: *Kajandara*
 Date:

Authorized sign: *K.B.*
 Date: 2 Jan, '13

CEMAT WATER LAB (P) LTD.



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ANNEX 9
Rapid Environmental Assessment
Checklist

Environmental Screening Checklist and the Environmental Classification

Rapid Environmental Assessment (REA) Checklist

Country/Project Title: Nepal / STIUEIP, Birgunj

Sector Division: Drainage, Sewerage and Road and Lanes Improvement

SCREENING QUESTIONS	Yes	No	REMARKS
A. PROJECT SITING			
IS THE PROJECT AREA ADJACENT TO OR WITHIN ANY OF THE FOLLOWING ENVIRONMENTALLY SENSITIVE AREAS?			
▪ CULTURAL HERITAGE SITE		X	
▪ PROTECTED AREA	<input type="checkbox"/>	X	
▪ WETLAND	<input type="checkbox"/>	X	
▪ MANGROVE	<input type="checkbox"/>	X	
▪ ESTUARINE	<input type="checkbox"/>	X	
▪ BUFFER ZONE OF PROTECTED AREA	<input type="checkbox"/>	X	
▪ SPECIAL AREA FOR PROTECTING BIODIVERSITY	<input type="checkbox"/>	X	
B. POTENTIAL ENVIRONMENTAL IMPACTS			
WILL THE PROJECT CAUSE...			
▪ encroachment on historical/cultural areas; disfiguration of landscape by road embankments, cuts, fills, and quarries?		X	
▪ encroachment on precious ecology (e.g. sensitive or protected areas)?		X	
▪ alteration of surface water hydrology of waterways resulting in increased sediment in streams affected by increased soil erosion at construction site?		X	No alteration of surface water hydrology of waterways will be made in this subproject. Rather, the drainage and sewerage system will be improved to cater surface runoffs, waste water generation including treatment prior disposal of effluent to the water body.

SCREENING QUESTIONS	Yes	No	REMARKS
<ul style="list-style-type: none"> ▪ deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction? 	√		<ul style="list-style-type: none"> • Risk is temporary associated with construction phase. Materials will be handled properly, extension and construction of interceptor drains, proper sanitation in camps equipped with septic tanks.
<ul style="list-style-type: none"> ▪ increased local air pollution due to rock crushing, cutting and filling works, and chemicals from asphalt processing? 	√		<ul style="list-style-type: none"> • Risk is temporary associated with construction phase. • Stone crushing plant / Hotmix plant / Batching plant shall be appropriately located at least 500m from settlement & habitation fitted with dust suppression equipment. • Construction area shall be maintained damp by periodical spray of water. • Delivery vehicles will be covered. Mixing equipment will be well sealed and equipped as per existing standards.
<ul style="list-style-type: none"> ▪ noise and vibration due to blasting and other civil works? 	√		<ul style="list-style-type: none"> • Ensure plant and equipment conforms to best practices. • Vehicles and equipment be fitted with silencer and maintained to keep noise at minimum levels. • Workers provided with appropriate ear muffs/plugs. • Noise barriers be placed in urban and sensitive locations. • Work be restricted to day hours
<ul style="list-style-type: none"> ▪ dislocation or involuntary resettlement of people 		x	The right of way where the construction work will take place is clear.
<ul style="list-style-type: none"> ▪ other social concerns relating to inconveniences in living conditions in the project areas that may trigger cases of upper respiratory problems and stress? 	√		<ul style="list-style-type: none"> • Dust could cause respiratory problems. Construction area shall be maintained damp by periodical spray of water.
<ul style="list-style-type: none"> ▪ hazardous driving conditions where construction interferes with pre-existing roads? 	√		<ul style="list-style-type: none"> • Traffic management plan implementation and monitoring.
<ul style="list-style-type: none"> ▪ poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases from workers to local populations? 	√		<ul style="list-style-type: none"> • Risk is temporary associated with construction phase. • Camps shall not be located near settlements; near water supply intakes; or sites that affects locals access to drinking water. • Ensure proper drinking water, sewerage and waste disposal facilities at the camps.
<ul style="list-style-type: none"> ▪ creation of temporary breeding habitats for mosquito vectors of disease? 	√		Proper water management to ensure no water impounding at borrow pits, drainage ditch etc.

SCREENING QUESTIONS	Yes	No	REMARKS
<ul style="list-style-type: none"> ▪ dislocation and compulsory resettlement of people living in right-of-way? 		x	COI is clear.
<ul style="list-style-type: none"> ▪ accident risks associated with increased vehicular traffic, leading to accidental spills of toxic materials and loss of life? 	√		<ul style="list-style-type: none"> • Adequate warning signs, safety barriers, traffic calming measures will reduce probability of accidents. • Traffic management plan implementation and monitoring.
<ul style="list-style-type: none"> ▪ increased noise and air pollution resulting from traffic volume? 	√		Traffic will increase but attenuation of noise through road side plantation. Municipality to avoid built up areas along critical sections for noise.
<ul style="list-style-type: none"> ▪ increased risk of water pollution from oil, grease and fuel spills, and other materials from vehicles using the road? 	√		<ul style="list-style-type: none"> • Ensure vehicles using the road comply with GoN Motor Vehicles and Transportation Management Act. • Ensure standard vehicle servicing centers are established along the highway at appropriate locations.

Proposed Project Classification: Should be categorized as a 'B' Project.

Prepared by

Name: Sarad Raj Shrestha

Designation: Environmental Expert

Date: July 2012

Design & Supervision Consultant for Secondary Towns Integrated
Urban Environmental Improvement Project (STIUEIP)
Birgunj Sub-metropolitan City, Nepal



SMC

In Association with



BDA



CEMAT

Ref. No. – STI-135

Dates: 04 August 2013

TO,

Mr. Shailendra Shrestha.
The Project Manager, STIUEIP
Project Implementation Unit,
Birgunj Sub-Metropolitan City, Birgunj

**Sub: - Final IEE Report
Drainage, Sewerage and Road Improvement for Birgunj Municipality
STIUEIP, Birgunj**

Dear Sir,

With reference to your letter dated July 31, 2013, please find enclosed 3 copies of revised final IEE Report for Drainage, Sewerage and Road Improvement for Birgunj Municipality incorporating comments and suggestions received from MOUD during presentation held before review committee on 28 July 2013.

The clarification notes on received comments has been prepared in tabulated form which is also enclosed along with for your reference.

We will be very thankful for your kind cooperation.

Sincerely yours,

Nagendra Jha
Team Leader, DSC
STIUEIP, Birgunj

**SMC in association with
BCE/BDA/CEMAT**

Incorporation of Comments and Suggestions on Draft IEE- STIUEIP, Birgunj
(Drainage, Sewerage, Road and Lanes Improvement)

Comment No.	Comments from MoUD Dated 2070/4/13	Response from the Proponent (through DSC)
	Comments Summary from MoUD	
1	कार्यकारी सारांश खण्डमा sealed road surface को नेपाली रूपान्तर कालोपत्रे हुनुपर्ने तथा अन्य स्थानहरूमा समेत प्राविधिक शब्दहरूमा भएको अशुद्धिकरणहरू जस्तै: intersect, branch line, main line जस्ता शब्दहरू राखी सच्याउनु पर्ने ।	<ul style="list-style-type: none"> Executive summary in Nepali Para 7 second line "कालो पत्रे गरिने" added instead of "ढाकिने". Technical words as "main storm water drain", secondary storm water drain" "branch drainage line" have been inserted where appropriate in the report.
2	The relevancy of closed conduit instead of open system should be mentioned.	Chapter 5, Section 5.2, Second Para, 5 th line elaborates relevancy of closed conduit instead of open system.
3	The operators who will maintain the system in future should be mentioned clearly.	Chapter 7, Section 7.1 (a) under heading "PIU, STIUEIP-Birgunj" and Section 7.1(b) under heading "Municipality/DDC", following has been added at the end. "The operators of Birgunj Municipality will be responsible for operation and maintenance of the newly developed system."
4	Project Monitoring को विषयमा concerned agency हरूको रोल तथा कस कसले कुन कुन समयमा के के गतिविधिको monitoring गर्ने स्पष्ट उल्लेख हुनु पर्ने ।	<ul style="list-style-type: none"> Table 7.2 "Environmental Mitigation Management Plan", Table 7.3 "Compliance Monitoring plan" and Table 7.4 "Impact Monitoring Plan" delineates roles and responsibility of concerned agency. Further Chapter 7, Section 7.1 also delineates roles and responsibility of concerned agency.
5	The legend map should indicated sewerage and road both. Also indicate work camp locations, designated spoil disposal sited, construction materials, storage depots, approved quarry sited, sedimentation/retention ponds, designated sites for solid waste disposal and sludge treatment/handling facility on one of the project layout maps.	<ul style="list-style-type: none"> Road Network Plan is given in Figure 2.6. Figure 2.4 "Layout Map of Sewerage Treatment Plant" delineates sludge lagoon/sludge drying bed and retention ponds etc. Work Camp Location and Management, designated spoil disposal sites, construction materials stockpiling, quarry sites management and operation is delineated in Table 7.2 "Environmental Mitigation Management Plan". The tentative location of quarry sites is indicated in Section 2.5.4.1 under heading "Material Sources". <p>The detailed location of above sites are sensitive issue and is</p>

Incorporation of Comments and Suggestions on Draft IEE- STIUEIP, Birgunj
(Drainage, Sewerage, Road and Lanes Improvement)

Comment No.	Comments from MoUD Dated 2070/4/13	Response from the Proponent (through DSC)
6	उल्लेख भएको HH survey मा कतिवटा घरधुराहरु सम्बन्धमा गरिएको हो सो क्विटांन हुनुपर्ने ।	not possible at this stage as it requires identification as per EMP and get it approved with due consent from local body and local stakeholders. As IEE forms part of bidding document, contractually it is not possible at this stage and will be carried out during construction stage upon obtaining necessary approval of selected sites as per EMP.
7	The effluent standard should be clearly mentioned and the water quality monitoring at the disposal site should be done frequently.	Since the project will not affect any household, no household survey was carried out. The information on population, communities and occupation has been drawn from CBS 2011 and where data are not available, CBS 2001 has been used. <ul style="list-style-type: none"> • Effluent standard mentioned in Chapter 3, Section 3.1.1, Table 3.1 for "Waste Stabilization Treatment Plant" under column "Quantification of Construction Items/Activities". • Water quality monitoring frequency is indicated in Chapter 7, table 7.2 [C] under heading "Water Pollution" during construction stage and table 7.2 [D] under heading "Pollution of Water Resources" during operation and maintenance stage.
8	Management of solid wastes generated from labor camps and construction activities will have to be undertaken as per SWMA, 2068 BS.	Management of Solid Waste generated from labor camps is detailed in Chapter 7, Table 7.2 C3, no. 7 under heading "Labor Camp Location and Management".
9	Ensuring the use of vehicles complying with NVMES, 2069 BS during project construction could be one effective mitigation measure related to avoiding/minimizing impact on air quality.	"Ensure use of vehicles complying with NVMES 2069 BS." is added at the end in Chapter 7, Table 7.2, C1, no. 4 under heading "Air Pollution".
10	Zone of Influence should be clear and concise.	Zone of influence is clearly delineated in Chapter 2, Section 2.5.1 and is indicative in Figure 2.5 kept in Annex 7.
11	Methodology अन्तर्गत Primary data collections सम्बन्धि field study and the tools used for impact analysis should be mentioned.	<ul style="list-style-type: none"> • Chapter 2, Section 2.5.2 under heading "Field Study" delineates data collection method. • Chapter 4, Section 4, Second Para mentions impact analysis method in terms of type of impact (direct / indirect), their





Incorporation of Comments and Suggestions on Draft IEE- STIUEIP, Birgunj
(Drainage, Sewerage, Road and Lanes Improvement)

Comment No.	Comments from MoUD Dated 2070/4/13	Response from the Proponent (through DSC)
12	Child labor issue should be addressed. Data regarding to arsenic should be included. If possible the option for treatment should be mentioned. Technical word should be used such as lateral, intersect, main line e.t.c.	<p>magnitude (low/moderate/high), duration (short term / medium term / long term), and extent (site specific / local / regional / global).</p> <ul style="list-style-type: none"> Chapter 7, Table 7.2, C3, no. 7 under heading "Labor Camp Location and Management", the following has been added at the end "The Contractor shall not employ child or under aged person as per Labour Act, BS 2048." The information regarding arsenic in ground water has been referred from PPTA report, March 2010 which is also based in assumption referring to relevant literature. Ground water investigation has not been done, thus data regarding arsenic is not available. Chapter 5, Section 5.2, Para 3 clearly denotes option for choosing type of treatment plant. Technical words as "main storm water drain", secondary storm water drain" "branch drainage line" have been inserted where appropriate in the report.
13	CFMIP cost should be included along with social assessment.	The mitigation cost provided in the EMP is based on estimated cost. The cost in the contract has been kept as provisional sum which will be used as per its necessity.
1	Comment from MoSTE Representative.	
2	Cover page मा Draft आवश्यक नरहेको । आयोजन आफैमा Environment protection हेतु प्रस्ताव गरिएको र सकारात्मक सवालहरू रहने ।	"Draft" in cover page has been deleted. Thank you. The statement is true.
3	Rationality of IEE study सम्बन्धि legal provisions लाई स्पष्ट अनुसूची - खण्ड उप-खण्ड उल्लेख गरी प्रस्तुत गर्ने Protected Area सम्बन्धि विवरण सान्दर्भिक नदेखाएको ।	<ul style="list-style-type: none"> Chapter 2, Section 2.1 under heading "Relevancy of the Proposal" Table 2.1 "Environmental Study Categorization" already mentions legal provision as per EPR, the Schedule, clause and sub-clause justifying requirement of IEE. The project area not lying in protected area was mentioned to further justify the non requirement of EIA.

Incorporation of Comments and Suggestions on Draft IEE-STUIEIP, Birgunj
(Drainage, Sewerage, Road and Lanes Improvement)

Comment No.	Comments from MoUD Dated 2070/4/13	Response from the Proponent (through DSC)
4	Spoil/debris disposal sites कहाँ पहिचान भएका छन् । उल्लेख गर्ने ।	Spoil disposal sites requirement is delineated in Table 7.2 "Environmental Mitigation Management Plan". The detailed location of sites are sensitive issue and is not possible at this stage as it requires identification as per EMP and get it approved with due consent from local body and local stakeholders. As IEE forms part of bidding document, contractually it is not possible at this stage and will be carried out during construction stage upon obtaining necessary approval of selected sites as per EMP.
5	नेपाली सारांस लगायत whole report को language thoroughly correction/edit गर्नुपर्ने देखिन्छ ।	The language has been thoroughly edited and corrected where necessary in the whole report.
6	Methodology अन्तर्गत primary data collections सम्बन्धि field study अन्तर्गतका methods/tools के के प्रयोग गरियो social, physical तथा biological methods/tools प्रस्ट उल्लेख गर्ने ।	Chapter 2, Section 2.5.2 under heading "Field Study" delineates data collection method.
7	Sub Chapter 2.5.4 लाई छुट्टै chapter मा Existing Environmental baseline प्रस्तुत गर्दा अपयुक्त हुने ।	The EPR, Schedule 5 regarding matters to be mentioned while preparing reports relating to IEE does not have provision for separate chapter for baseline environmental condition. Thus, as per EPR guidance, it is kept in chapter 2 under the heading "Other Necessary Matters".
8	P. 12 मा बाई नं. ९ को क्षेत्रफल ५ हेक्टर र १९ को करिव ५०० हे. उल्लेख भएको के हो re-visit गर्ने साथै नं.पा. को Administrative map सफल गर्दा बेस ।	The ward area has been depicted from the GIS map prepared by Birgunj Sub-metropolitan office. The ward boundary has been verified by DSC with consultation of Municipal technicians.
9	Water test of sample collection sites उल्लेख गर्ने साथै Sirsiya र Singaha rivers को DS water test गर्नु पर्ने । साथै सो नदिहरुको Biological Life forms बारे Baseline मा उल्लेख हुनुपर्ने ।	<ul style="list-style-type: none"> The sample collection site for water test is given in the test result. One was taken in Sirsiya river upstream of effluent discharge site, another downstream of effluent discharge site and another for waste water just ahead of proposed treatment site. Since waste water is to be disposed in sirsiya river, only sirsiya river water test was conducted as per project requirement. The biological baseline is provided in Chapter 2, section 2.5.4.2



Incorporation of Comments and Suggestions on Draft IEE- STIUEIP, Birgunj
(Drainage, Sewerage, Road and Lanes Improvement)

Comment No.	Comments from MoUD Dated 2070/4/13	Response from the Proponent (through DSC)
10	तथ्याङ्क/information को sources बुलाउने (P-13), Land categories criteria पुनर्विचार गर्ने ।	under heading "Flora and Fauna" in Para 4. Data / information source has been mentioned including for land categorization.
11	P-13 मा Arsenic Polluted GW भनिएको तर P.16 मा not mentioned like that, is controversy, correct.	<ul style="list-style-type: none"> The information regarding arsenic in ground water has been referred from PPTA report, March 2010 which is also based in assumption referring to relevant literature. Ground water investigation has not been done, thus data regarding arsenic is not available. However, DWSS has already banned those tube-wells that contains arsenic that exceeds the limit for drinking purpose. Section 2.5.4.3 under heading "Infrastructure Facilities" 1st para has been modified.
12	धेरै ठाउँमा Disposal भनिएकोमा Discharge गर्दा उपयुक्त हुने ।	"Disposal" has been replaced by "Discharge" where appropriate in the report.
13	P.14 मा उल्लेखित flora/fauna को latine name उल्लेख गर्ने ।	Chapter 2, Section 2.5.4.2 – latine name of flora and fauna given.
14	Alignment लगायत construction sites मा के कति सध्यामा कुनै प्रजातिका रूखहरु कटान गरिनुपर्ने उल्लेख गर्ने साथै compensation/mitigation प्रस्ताव गर्ने ।	<ul style="list-style-type: none"> Chapter 4, Section 4.3.1, (ii) under "Biological Impacts", the details of trees that needs to be cleared is already given. Chapter 6, Section 6.2.1 (ii) under "Biological Aspects", compensatory plantation is already proposed and is also reflected in table 7.2, C2 "EMP".
15	P.15 लगायत Baseline मा विभिन्न sub-heading सँगै राखिएकोमा छुट्टा छुट्टै राखी स्पष्ट उल्लेख गर्ने ।	Chapter 2, Section 2.5.4.3 - The text under heading "Population, Communities and Occupation" has been presented under different heading as "Population", "Communities" and "Occupation".
16	कतै secondary र कतै Tributary drain र sewerage भनिएको constant नभएको correction गर्ने ।	Chapter 2, Section 2.5.4.3, under heading "Health and Sanitation" Para 3, the "Tributary drain" has been replaced by "Secondary drain".
17	P.15 मा Toilet use सम्बन्धी Data Complete नरहेको स्रोत बुलाउने ।	Chapter 2, Section 2.5.4.3, under heading "Health and Sanitation" Para 4, the source of information regarding toilets has been quoted.
18	Sludge व्यवस्थापन elaborate गर्ने ।	Table 7.2 under EMP, D3, the mitigation measures for "Removal

Incorporation of Comments and Suggestions on Draft IEE- STIUEIP, Birgunj
(Drainage, Sewerage, Road and Lanes Improvement)

Comment No.	Comments from MoUD Dated 2070/4/13	Response from the Proponent (through DSC)
19	Project Activities के के हल । salient feature मा भएको लाई project description अन्तर्गत प्रष्ट उल्लेख गर्ने ।	and Disposal of Sludge" is modified as" <ul style="list-style-type: none"> • "Sludge will be cleared at the frequency of every 6 months by the Municipality and will be placed on allocated sludge drying bed provisioned in the design layout. • The digested sludge will be looked upon for possible use as fertilizer after laboratory testing."
20	Relocation गरिनु पर्ने । Dismantle गरिनुपर्ने भौतिक संरचना/वस्तुहरु के । कति हुत् उल्लेख गर्ने ।	The Project Activities are given separately under Chapter 3 "Technical Information", Section 3.2 under heading "Technology and materials to be used" in 2 nd para as per EPR. There is no structures to be demolished. However, underground water supply pipe lines, electrical and telephone line, poles may need reinstatement and relocation for which the lumpsum estimated cost is provisioned as provisional sum in the contract. The proposal has been delineated under table 7.2, C1 for component "Disruption of Public Utilities".
21	Workers campsites उल्लेख गर्ने, waste management generated at camps, fuel source for workers उल्लेख गर्ने ।	Table 7.2 "Environmental Mitigation Management Plan", C3, no.7 outlines "Labor Camp Location and Management".
22	Skilled & unskilled manpower उल्लेख गर्ने ।	Chapter 3, Section 3.5 outlines requirement of estimated skilled and unskilled manpower.
23	मूस्लीमको संख्या बढि देखाएको तर Religious/cultural baseline मा सो समुदायसंग सम्बन्धित events/feasts/festivals/spots उल्लेख नभएको ।	Chapter 2, Section 2.5.4.3 under heading "Religious/Cultural and Ritual Sites" the following has been added as para 1 "The religious population includes Hindu (82.37%), Buddha (1.98%), Islam (15.40%), Kirat (0.01%), Kaom (0.03%), Christian (0.06%), Sikh (0.01%) and others as (0.18%)."
24	Solid waste management सम्बन्धी Landfill site को कार्य भई रहेको P.18 मा उल्लेखित 3R को Activities यस अध्ययनको Scope भित्र पर्छ पढैन प्रष्ट पार्ने ।	Chapter 3, Section 3.1 2 nd and 4 th para. The development of Landfill site for the solid waste management does not fall under this IEE scope of study. The project will however generate awareness regarding 3R activity.
25	Urban-road upgrade, By-pass, canal सम्बन्धि सव्याई/चौडाई सहित उल्लेख गर्ने । Highway को By-pass भए EIA अध्ययन गरिनु	<ul style="list-style-type: none"> • The details of road is given in Table 3.1 under Section 3.1.1 and is reflected in Figure 3.1, 3.2,3.3 in Annex 7.

Incorporation of Comments and Suggestions on Draft IEE- STIUEIP, Birgunj
(Drainage, Sewerage, Road and Lanes Improvement)

Comment No.	Comments from MoUD Dated 2070/4/13	Response from the Proponent (through DSC)
26	<p>पनि देखिन्छ ।</p> <p>Salient feature को प्रस्तुती फरक परेको । project components उल्लेख भए अन्य Reference लिई प्रतुत गर्ने । Access road सम्बन्धि विवरण दिने ।</p>	<ul style="list-style-type: none"> It is not the Highway By-Pass road but the name of the road is termed as Secondary By-Pass road. <p>There is no discrepancy in the Salient Features. The details of the access road is given in Table 3.1 under Section 3.1.1 and is reflected in Figure 3.1, 3.2, 3.3 in Annex 7.</p>
1	<p>Monitoring Section</p> <p>कार्यकारी सारांश खण्डमा:</p> <ul style="list-style-type: none"> Sealed road surface को नेपाली रूपान्तर 'कालोपत्रे' उपयुक्त होला । ढाकिएको सडक भन्दा अर्कै अर्थ लाग्छ । सानातिना र अस्थायि किसिमका स्थानिय असरहरूबारे उल्लेख गरिएका छन् । Built up area र storm Drainage System ले गर्दा Ground Water Recharge मा हुने हासको सम्बन्धमा र त्यसका Mitigation Measures बारे उल्लेख देखिएन । 	<ul style="list-style-type: none"> Executive summary in Nepali Para 7 second line "कालो पत्रे गरिने" added instead of "ढाकिएको". Section 6.2.1 (i) under "Water Pollution", the issue of Recharge is outlined.
2	<p>Summary of the Proposed & Detailed Particulars खण्डमा:</p> <p>Storm water drain लाई covered वा closed conduit मै किन प्रसाल्न गर्नु परेको, पुष्ट्यई देखिएन, solid waste dumping को समस्या त closed / covered system मा पनि देखिएकै छ, त्यो culture को कुरा हो ।</p>	<p>Chapter 5, Section 5.2, Second Para, 5th line elaborates relevancy of closed conduit instead of open system.</p>
3	<p>Who operates the WWTP in future? NWSC or Municipality</p>	<p>Chapter 7, Section 7.1 (a) under heading "PIU, STIUEIP-Birgunj" and Section 7.1(b) under heading "Municipality/DDC", following has been added at the end.</p> <p>"The operators of Birgunj Municipality will be responsible for operation and maintenance of the newly developed system."</p>
4	<p>हाल प्रस्तावित WWTP site हालको capacity का लागि मात्र ठिक देखिन्छ future capacity expansion को लागि site को व्यवस्था के छ ?</p>	<p>The WWTP is designed to cater waste water load for design year upto 2035. It is 20 years from the expected commencement of its operation in year 2015. Thereafter, Municipality will have to search for another suitable site.</p>
5	<p>Bypass road को Man Hole को size अत्यधिक ठूलो किन ? बुझिएन</p>	<p>The manhole size depends upon the size of the drainage pipe.</p>

Incorporation of Comments and Suggestions on Draft IEE- STIUEIP, Birgunj
(Drainage, Sewerage, Road and Lanes Improvement)

Comment No.	Comments from MoUD Dated 2070/4/13	Response from the Proponent (through DSC)
		<p>Since the drainage pipe dia. along second by-pass road is bigger, the size of the manhole seems bigger. The Figure presented is drawn as schematic diagram not to scale.</p>
	<p>Comment from Environmental Engineer.</p>	
1	<p>The Executive Summary should summarize all chapters of the report.</p>	<p>The Executive Summary summarizes all major contents of the study report.</p>
2	<p>Maps presented are excellent in terms of clarity. However, a map showing the road network to be improved is missing and in the sewerage layout map (Figure 2.3) legends are not complete (for example STP) while in the drainage layout map (Fig. 2.2) also legend is completely missing.</p>	<ul style="list-style-type: none"> • Road Network Development Plan is inserted as Figure 2.6 in Annex 7. • Legends has been added accordingly.
3	<p>Also indicate work camp locations, designated spoil disposal sites, construction materials (including bitumen drums) storage depots, approved quarry sites, sedimentation/retention ponds, designated sites for solid waste disposal and sludge treatment/handling facility on one of the project layout maps.</p>	<ul style="list-style-type: none"> • Figure 2.4 "Layout Map of Sewerage Treatment Plant" delineates sludge lagoon/sludge drying bed and retention ponds etc. • Work Camp Location and Management, designated spoil disposal sites, construction materials stockpiling, quarry sites management and operation is delineated in Table 7.2 "Environmental Mitigation Management Plan". The tentative location of quarry sites is indicated in Section 2.5.4.1 under heading "Material Sources". <p>The detailed location of above sites are sensitive issue and is not possible at this stage as it requires identification as per EMP and get it approved with due consent from local body and local stakeholders. As IEE forms part of bidding document, contractually it is not possible at this stage and will be carried out during construction stage upon obtaining necessary approval of selected sites as per EMP.</p>
4	<p>It should be categorically mentioned that open burning of any solid waste as an easy method of</p>	<p>Table 7.2 "Environmental Mitigation Management Plan", C3, no.7 outlines "Labor Camp Location and Management".</p>

Incorporation of Comments and Suggestions on Draft IEE-STUIEIP, Birgunj
(Drainage, Sewerage, Road and Lanes Improvement)

Comment No.	Comments from MoUD Dated 2070/4/13	Response from the Proponent (through DSC)
5	<p>solid waste disposal will be strictly banned during construction period.</p> <p>A comprehensive plan/strategy of safe disposal of all wastes generated from labor camps along with construction debris needs to be included as one of the mitigation measures.</p>	<ul style="list-style-type: none"> • Table 7.2 "Environmental Mitigation Management Plan", C3, no.7 outlines "Labor Camp Location and Management". • Table 7.2 "Environmental Mitigation Management Plan", C1, no.8 outlines Spoil disposal management plan.
6	<p>Provision of sludge treatment/handling facility needs to be further elaborated.</p>	<p>Table 7.2 under EMP, D3, the mitigation measures for "Removal and Disposal of Sludge" is modified as:</p> <ul style="list-style-type: none"> • "Sludge will be cleared at the frequency of every 6 months by the Municipality and will be placed on allocated sludge drying bed provisioned in the design layout. • The digested sludge will be looked upon for possible use as fertilizer after laboratory testing."
7	<p>With regard to the impact related to the risk of groundwater and river water pollution due to seepage of wastewater (before it reaches the STP), monitoring of effluent and river water quality does not make much sense as a mitigation measure. Instead, the design of the sewerage system itself should be made robust and seepage proof.</p>	<p>Table 7.2 under EMP, D, no.1 under heading "Pollution of Water Resources", the following has been added as mitigation measures "The design and construction of sewerage system itself should be made robust and seepage proof."</p>
8	<p>All the construction and operational activities to be carried out in the course of project implementation need to be categorically mentioned under project description.</p>	<p>Chapter 3 "Technical Information" under Section 3.2 delineates activities to be carried out by the project as per EPR.</p>
9	<p>Avoidance of any relocation of/damage to public utilities should be the matter of consideration during pre-construction phase rather than construction phase.</p>	<p>The project will not affect any structures as the construction is limited within the RoW. However, underground utilities at this stage cannot be verified which will come up with the excavation work. Provision of cost for reinstatement and relocation of such utilities is estimated and kept in BoQ as provisional sum to be undertaken during construction.</p>

Incorporation of Comments and Suggestions on Draft IEE- STIUEIP, Birgunj
(Drainage, Sewerage, Road and Lanes Improvement)

Comment No.	Comments from MoUD Dated 2070/4/13	Response from the Proponent (through DSC)
10	<p>The chapter on review of policy/legislation should also include (i) National Noise Emission Standards, 2069 BS (ii) Standards for Emissions from In-use and Imported Diesel Generators, 2069 BS(iii) Generic Standards for CWTP Effluents to be Discharged into Inland Surface Water, 2060 BS (iv) Vehicle Emission Standards for Green Sticker, 2057 BS (v) NVMES, 2069 Bs.</p>	<p>Chapter 8, Section 8.4.4, the following has been added.</p> <ul style="list-style-type: none"> • National Noise Emission Standards, 2069 BS • Standards for Emissions from In-use and Imported Diesel Generators, 2069 BS • Generic Standards for CWTP Effluents to be Discharged into Inland Surface Waters, 2060 BS • Vehicle Emission Standards for Green Sticker, 2057 BS • NVMES, 2069 BS.
11	<p>Management of solid wastes generated from labor camps and construction activities will have to be undertaken as per SWMA, 2068 BS.</p>	<p>Table 7.2 "Environmental Mitigation Management Plan", C3, no.7 outlines "Labor Camp Location and Management".</p>
12	<p>Ensuring the use of vehicles complying with NVMES, 2069 BS during project construction could be one effective mitigation measure related to avoiding/minimizing impact on air quality.</p>	<p>Table 7.2 "Environmental Mitigation Management Plan", C1, no.5 under heading Air Pollution outlines the quoted remark.</p>

