ROAD DEVELOPMENT AUTHORITY
MINISTRY OF PORTS AND HIGHWAYS
THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA

Preparatory Survey on Traffic Improvement Project around New Kelani Bridge

DRAFT FINAL REPORT VOLUME3: Environmental Impact Assessment

JULY 2013

JAPAN INTERNATIONAL COOPERATION AGENCY
ORIENTAL CONSULTANTS CO., LTD.
KATAHIRA & ENGINEERS INTERNATIONAL

Volume I
Main Report

TABLE OF CONTENTS

Volume I – Main Report

EXECUTIVE SUMMARY 1

1 INTRODUCTION 9

1.1 Background of the project 9

1.2 Objective of the proposed project and justification of the project 10

1.3 Project Scope 11

1.4 Objective of the Environmental Impact Assessment (EIA) Report 11

1.5 Methodologies and technologies adopted in EIA report preparation 12

1.5.1 General Methodology 12

1.5.2 Methodology for Hydrological Study 12

1.5.3 Methodology for Ecological Study 12

1.5.4 Methodology of the Social Study 13

1.6 Conformity with Government policies and plans 15

1.7 Preliminary approvals needed for the project and any conditions laid down by state agencies in granting preliminary clearance for the project 15

2 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK 16

2.1 Applicable Environmental Legislation in Sri Lanka 16

2.2 The EIA Process 19

2.3 Environmental Institutional Framework 20

3 DESCRIPTION OF THE PROPOSED PROJECT AND REASONABLE ALTERNATIVES 27

3.1 Evaluation of Alternatives 27

3.1.1 Layout Alternatives 27

3.1.2 Construction Alternatives 33

3.2 Description of the proposed project - Selected Site 34

3.2.1 Project Location, ... 34

3.2.2 Administrative Divisions 35

3.2.3 Bridge Aesthetics 35

3.3 Location map/s of appropriate scale indicating the road trace and surrounding land use..... 37

3.4 The layout plan of the project at appropriate scale. 38

3.5 Design Details of all Bridge Components Including Design Details of the Bridge, length of traces etc. 38

3.5.1 Bridge type: 38

3.6 Methodology of construction..... 41

3.6.1 Whether cofferdam is envisaged, sources and quantities of raw material required and locations and quantities of disposal of waste. 41

3.6.2 Details of Construction Space 42

Construction space will be required along the project road. 10 m or 5 m from the project road edge will be leased during construction. This space is involved in the Resettlement Action Plan (RAP) as a project affected area. In addition, two construction yards will be secured at existing open areas. Demarcation of ROW and Construction Space are presented in Annex 3.3 42

3.6.3 Other facilities and services to be provided..... 42

3.7 Requirement and availability of workforce (during construction) labor camps etc. 42

3.8 Methodology of operation of the project components, any maintenance requirements during the operational phase and methodologies to be used..... 43

3.9 Project construction cost 43

4 DESCRIPTION OF THE EXISTING ENVIRONMENT..... 44

4.1 Physical environment: 44

4.1.1 Topography including existing ground levels with respect to MSL along the trace,..... 44

4.1.2 Geology and soil, ... 44

4.1.3 Climate and meteorology etc. 47

4.1.4 Surface and groundwater hydrology and drainage..... 50

4.2 Water Quality and Water Usage 54

4.2.1 Water quality 54

4.2.2 Water Usage..... 57

4.3 Existing land use 57

4.4 Ambient air quality and noise and Vibration 57

4.4.1 Air Quality 57

4.4.2 Noise 61

4.4.3 Vibration..... 64

4.5 Flood Propagation 67

4.6 Global Warming..... 69

4.6.1 Increased Vulnerability to Floods 70
4.6.2 Rise in Sea Level 70
4.6.3 Drought Exposure 71

4.7 Biological Environment 71
4.7.1 Habitat survey: 71
4.7.2 Flora, Fauna and Biodiversity 73
4.7.3 Rare, endangered and endemic species in the project area and its vicinity 73
4.7.4 Proposed lands for material storage yards and other activities. 73

4.8 Socio-cultural Environment 74
4.8.1 Existing houses, commercial and government buildings within the direct impact areas and the surroundings 75
4.8.2 Socio Economic status of population 78
4.8.3 Principal Economic Activities 85
4.8.4 Planned development activities 86
4.8.5 Availability of infrastructure facilities (roads, railway, water supply, power supply, health care, education etc 86
4.8.6 Culturally, historically and archaeologically important objects/places 87
4.8.8 Existing landscape 89
4.8.9 Traffic congestion 89
4.8.10 Noise sensitive receptors such as hospitals, schools etc. 89
4.8.11 Existing environmental considerations, problems or issues prevailing in the area 90

5 ANTICIPATED ENVIRONMENTAL IMPACTS OF PROPOSED PROJECT 92

5.1 Socioeconomic Impacts 95
5.1.1 Land Acquisition and Resettlement Impacts 95
5.1.2 Impacts on livelihood and economic activities 98
5.1.3 Disruption of existing infrastructure facilities 99
5.1.4 Nuisance to neighborhood 99
5.1.5 Violation of Children's Rights 99
5.1.6 Spreading of HIV/AIDS 100
5.1.7 Health and safety impairment 100

5.2 Impacts from construction and other waste disposal 101

5.3 Change of existing landscape 101

5.4 Hydrological impacts 102
5.4.1 Hindrance to canal and river flow pattern 102
5.4.2 Alteration of drainage pattern of the area 102
5.4.3 Damages to flood protection schemes (Flood bunds/ gates etc.) 102
5.4.4 Hindrance of flood due to loss of retention/ detention area and blockage of drainage pathways. 102

5.4.5 Impacts on bottom sediment 102
5.4.6 Hydrological Impacts "Without Mitigation Scenario" 102
5.5 Water quality (contamination) 103
5.6 Air quality, noise and vibration impacts during construction and operation 103
5.6.1 Air Quality 103
5.6.2 Noise 104
5.6.3 Vibration 104
5.6.4 Overall Impacts on Air Quality Noise and Vibration (with and without the Project) 105
5.7 Global warming 114
5.8 Soil Contamination 114
5.9 Ground Subsidence 114
5.10 Traffic congestion 114
5.11 Impacts on aquatic/ terrestrial habitats 115
5.11.1 Effect on flora and fauna 115
5.11.2 Effect on Flora 115
5.11.3 Details of the affected trees, locations and other details. 116
5.12 Disturbance to Archeological Sites 116
5.13 Damage to existing bridge (New Kelani Bridge) across Kelani River 116
6 PROPOSED MITIGATORY MEASURES 117
6.1 Mitigation Measures for Socioeconomic Impacts 117
6.1.1 Land acquisition and resettlement 117
6.1.2 Mitigation measures for impacts on livelihood and economic activities 122
6.2 Mitigation measures for impact due to disruption of existing infrastructure facilities (Utilities) 122
6.3 Measures to reduce possible nuisance to neighborhood 123
6.4 Mitigation measures for violation of Children's Rights 123
6.5 Mitigation Measures for construction waste and other waste disposal 123
6.6 Mitigation measures for impacts of material extraction and transportation 123
6.7 Mitigation measures to minimize health and safety impairement 124
6.8 Existing landscape 124
6.9 Mitigation Measures for Hydrological Impacts 125
6.9.1 Mitigation measures for river flow and canal flow obstruction 125

6.9.2 Mitigation measures for alteration of drainage pattern of the area 125
6.9.3 Mitigation measures for Impacts on flood protection schemes 125
6.9.4 Mitigation measures for Impacts of flood propagation 125

6.10 Mitigation measures for water quality (contamination) 127

6.11 Mitigation Measures for Air Quality, Noise and Vibration Impacts during Construction and Operation 127

6.11.1 Mitigation measures for impacts on air quality 127
6.11.2 Mitigation measures for noise and vibration impacts 128

6.12 .Mitigation measures for global warming 128

6.13 Mitigation measures for soil contamination 128

6.14 Mitigation measures for ground Subsidence 128

6.14.1 Mitigation measures for impact on bottom sediments 129

6.15 Mitigation Measures to Avoid Traffic Congestion 129

6.16 Mitigation Measures for Impacts on Flora and Fauna Including Aquatic Flora and Fauna 129

6.17 Mitigation Measures for disturbance on Archeological sites or artifacts 129

6.18 Mitigation Measures for any Damages on Existing Bridge 130

7 PUBLIC PARTICIPATION AND INFORMATION DISCLOSURE 134

7.1 Introduction and Background 134

7.2 Overview of Public Consultation and Information Disclosure Process 134

7.3 Information Disclosure 134

7.4 Overview of Stakeholder Meetings (SHM) 134

7.4.1 Meeting Types 134
7.4.2 Social Participatory Rapid Survey 139

7.5 Outcome of the meeting held with Secretary Ministry of Defense and Urban Development Authority 144

8 EXTENDED COST BENEFIT ANALYSIS 145

8.1 General Conditions of Cost Estimation 145

8.2 Construction Cost 145

8.3 Maintenance Cost 146

8.4 Total Cost 146

8.5 Environmental Benefits 147

9 ENVIRONMENTAL MANAGEMENT PLAN INCLUDING MONITORING PROGRAMME.....148

10 CONCLUSION AND RECOMMENDATIONS 151

10.1 General..... 151

10.2 Conclusions..... 152

10.3 Recommendations..... 152

10.3.1 Overall Recommendations..... 152

10.3.2 Special Recommendations to Address Social Concerns..... 153

REFERENCES.....154

Volume II A - Annexes
Volume II B - NBRO Reports

List of Annexes

Annex 1.1 – Terms of Reference
Annex 1.2 – List of Experts
Annex 3.1 – Further Details of Alternatives
Annex 3.2 – Details of Selected Alternative –Final Alignment
Annex 3.3 – Details of Acquisition and Project Structure Boundaries
Annex 4.1 – Details of Flora and Fauna –Ecology
Annex 4.2 – Social Land Use Maps
Annex 4.3 – Socio Economic Data
Annex 4.4 – Clearance letter from Department of Archeology
Annex 5.1 – Details of Air Quality, Noise and Vibration Predictions
Annex 5.2 – Estimate Traffic Volume
Annex 5.3 – Photos of the Landscape of the Project Area
Annex 6.1 – Project Entitlement Matrix
Annex 6.2 – Traffic Diversion Plan
Annex 6.3 – Letter from CEB- for Relocation of Transmission line
Annex 7.1 – Details of Stakeholder Meetings
Annex 9.1 – Environmental Management Plan and Monitoring Plan

LIST OF ABBREVIATIONS

ADT	Average Daily Traffic
AP	Affected Persons
AEA	Atomic Energy Authority
CEA	Central Environmental Authority
CEAA	Consulting Engineers and Architects Associated (PVT) LTD
DS	Divisional Secretary
DSD	Divisional Secretariat Division
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EMC	Environmental Management Committee
EMP	Environmental Management Plan
EMoP	Environmental Monitoring Plan
EPL	Environmental Protection License
ESD	Environmental and Social Division, RDA
FGD	Focused Group Discussion
GoSL	Government of Democratic Socialist Republic of Sri Lanka
GN	*Grama Niladari* (Subordinate of DS)
GND	Grama Niladari Division
GSMB	Geological Survey and Mines Bureau
JICA	Japan International Corporation Agency
LLA	Land Acquisition Act
MOH	Medical Officer of Health
NBRO	National Building Research Organization
NHSP	National Highway Sector Project
NWS&DB	National Water Supply and Drainage Board
NHDA	National Housing Development Authority
MOPH	Ministry of Ports and Highways
PIU	Project Implementation Unit
RDA	Road Development Authority
ROW	Right of Way
SC	Supervision Consultant
SD&CC	State Development and Construction Corporation
SLLRDC	Sri Lanka Land Reclamation and Development Corporation
SLT	Sri Lanka Telecom
SHM	Stake Holder Meeting
SPRA	Social Participatory Rapid Appraisal
UDA	Urban Development Authority
WHO	World Health Organization

LIST OF TABLES

Table 2-1 Other relevant legislation in Sri Lanka for approvals 19
Table 2-2 Permissible Ambient Air Quality Standards 22
Table 2-3 WHO Ambient Air Quality Standards 23
Table 2-4 Proposed Ambient Water Quality Standards for Inland water Sri Lanka 23
Table 2-6 Permissible Noise Levels in accordance with Noise Control Regulations 25
Table 2-7 Noise Level Guidelines- EHS IFC 26
Table 2-8 Maximum Permissible Vibration Values 26
Table 3-1 Comparison of Alternatives 30
Table 3-3 Tentative project construction cost (based on preliminary designs) 43
Table 4-1 River conditions at proposed bridge site 51
Table 4-2 Flood Peak Values for Kelani River 52
Table 4-3 Drainage Capacity Kelani River 54
Table 4-5 Result surface water quality analysis 56
Table 4-6- Result of ground water quality analysis 57
Table 4-8 Measurement Locations 59
Table 4-9 Concentration of each parameter at measurement location 60
Table 4-10 Noise level measurement locations. 63
Table 4-11 Wind speed and direction during the measurement time. 63
Table 4-12 Noise Levels at each measurement location on 5^{th} – 6^{th} April 2013 64
Table 4-14 Vibration levels at each measuring location on 5^{th} April 2013 66
Table 4-15 Trends of air temperature (1961 ~ 1990) 71
Table 4-16 No. of affected households and population 75
Table 4-17 Existing houses, commercial and government buildings within the surrounding area 76
Table 4-18 Existing houses and, commercial buildings within the direct impact area 77
Table 4-19 Summary of Social Status of the Residential Population 78
Table 4-20 Level of education –residential population in direct impact area 79
Table 4-21 Economic parameters Vs. residential population in each GN area 80
Table 4-22 Households headed by women in Direct Impact Area 84
Table 4-23 Culturally and religiously important places 87
Table 4-24 Solid waste collection in Direct Impact Area 90
Table 4-25 Diseases in the direct impact area 91
Table 5-1 Project affected dwellings and small business structures 95
Table 5-2 Nature of impact of government and private and religious institutions 95
Table 5-4 CO_2 emission Factor (Unit : g-CO_2/km) 104
Table 5-8 Estimated result of Air quality of Construction work 105
Table 5-9 Estimated result of Air quality of Construction work 105
Table 5-10 Traffic conditions for estimation 106
Table 5-11 Estimation of NO_2 emitted (ppm) 106
Table 5-12 Estimation of SPM emitted (µg/m3) 107
Table 5-13 Estimation of CO emitted (ppm) 107

Table 5-14 Estimation of SO_2 emitted (ppm) 107
Table 5-15 Result Analysis of Noise Level (Peliyagoda-Kelanitissa) 108
Table 5-16 Result Analysis of Noise Level (Kelanitessa-Orugidawatta) 108
Table 5-17 Result Analysis of Noise Level (Kelanitessa-Ingurukade junction) 108
Table 5-18 Result Analysis of Noise Level (Kelanitessa-Ingurukade junction) 109
Table 5-19 Estimated Noise level in the Future (Kelanitissa-Orugodawatta) 110
Table 5-21 Result Analysis of Vibration Level (Peliyagoda-Kelanitissa) 112
Table 5-22 Result Analysis of Vibration Level (Kelanitessa-Orugidawatta) 112
Table 5-23 Result Analysis of Vibration Level (Kelanitessa-Ingurukade junction) 113
Table 5-22- Result of Traffic Vibration Forecast 113
Table 5-26 Trees identified in the direct impact area of the project 116
Table 6-1 Number of affected structures in each route option 117
Table 7-1 Details of Stakeholder Meetings 136
Table 7-2 Brief Overviews of the "1st Stakeholders' meeting" 138
Table 7-3 Number of participants of the 1st stakeholder meeting 138
Table 7-4 Brief Overviews of the "2nd Stakeholders' meeting" 139
Table 7-5 Number of participants of the 2nd stakeholder meeting 139
Table 7-6 Views on resettlement 140
Table 7-7 Summary of Discussion in the 1st and 2nd Stakeholder Meetings 141
Table 8-1 Table Maintenance Cost 146
Table 8-2 Cost of paint 146
Table 8-3 Summary of Total Cost 147
Table 10-1 Summary of Affected Persons, Structures and Method of Compensation 151

LIST OF FIGURES

Figure 1-1 Objective of the project 10
Figure 3-1 Alternative A: Adjacent to the existing railway 27
Figure 3-2 Alternative B: Adjacent to New Kalani Bridge 28
Figure 3-3 Alternative C: Above the existing canal trace 28
Figure 3-4 Alternative D: Above the existing road 29
Figure 3-5 Alternative D: Route Alternatives in Social Perspective 32
Figure 3-6 Project Location Map 35
Figure 3-7 Portrait of the proposed bridge- closer view 36
Figure 3-8 Portrait of the proposed bridge- distant view Along with the existing bridge 36
Figure 3-9 Facets of National Heritage and Symbols Used in the Aesthetic Design of the Bridge 36
Figure 3-10 Land Use Map of the Project Area with Project Location 37
Figure 3-11 Layout Plan for the Project Area 38
Figure 3-12 Bridge sections of proposed project 39
Figure 3-13 Main bridge across Kelani River (Extra dosed type bridge) 39
Figure 3-14 Images of Precast Box Girder bridges 40
Figure 3-15 Tentative project implementation schedule 42

Figure 4-1 Geology Map of the Project Area (Source: Geology of Sri Lanka, P.G. Coorey) 45
Figure 4-2 Soil Map of the Project Area (*Source: Panabokke C- Soils of Sri Lanka)* 46
Figure 4-3 Average Rainfall Data Colombo 47
Figure 4-4 Average High and Low Temperature 48
Figure 4-5 Day and Night Relative Humidity in Colombo 48
Figure 4-6 Mean Evaporation - Colombo 49
Figure 4-7 Wind roses for Colombo (2012) 49
Figure 4-8 Drainage Pattern of the Project Area 50
Figure 4-9 River cross section at existing Kelani bridge 51
Figure 4-10 Flood Hydrograph for Nagalagam Street for 2005 Extreme Flood 52
Figure 4-11 Flood Levels of Kelani River 53
Figure 4-12 Location of Nagalagam Street and Kelanimulla flood level measuring stations 53
Figure 4-13 Water Quality Measurement Locations 55
Figure 4-14 Locations for Air quality Monitoring 58
Figure 4-15 Locations for Noise Measurement 62
Figure 4-16 Locations for Noise Measurement 63
Figure 4-17 Locations for Vibration Measurement 65
Figure 4-18 Flood Levels at Nagalagam Street 67
Figure 4-19 Flood Propagation Map 68
Figure 4-20 Tsunami Propagation Map 69
4-21 Transport sector vulnerability to sea level rise exposure 70
Figure 4-23- Location of oil pipelines 87
Figure 5-1 Affected Religious and Social Infrastructure 97
Figure 5-2 CO_2 Emission Factor 104
Figure 5-3 Estimated Noise level in the Future (Peliyagoda-Kelanitissa) 109
Figure 5-4 Estimated Noise level in the Future (Peliyagoda-Kelanitissa) 109
Figure 5-5 Estimated Noise level in the Future (Kelanitissa-Orugodawatta) 110
Figure 5-8 Estimated Noise level in the Future (Kelanitissa-Ingurukade junction, Port access road) ... 111
Figure 5-9 Decay by the distance of Vibration level 112
Figure 6-1 Locations of the resettlement sites 121
Figure 6-2 Drainage Management Plan 126
Figure 9-1 Procedure and relationship of Environmental Management Plan 149
Figure 9-2 Organization of proposed Project Management Unit (PMU) 150

EXECUTIVE SUMMARY



With the operation of Colombo – Katunayake Expressway (CKE) it is anticipated that the traffic flow into the Colombo city through the New Kelani bridge will be increased. The present traffic arrangement in and around the New Kelani bridge will not be able to cater to this traffic and in turn it may also affect the life span of the existing bridge. Therefore Road Development Authority (RDA) of the Ministry of Ports and Highways (MoPH) initiated a study with the assistance from the Government of Japan to improve the traffic condition around the New Kelani Bridge.

Hence as the proposed project, a six lane bridge across the Kelani River adjacent to the existing New Kelani Bridge, and associated ramps structures, will be constructed.

The objective of the project is to increase the transport efficiency in the environs of New Kelani Bridge and to establish the nexus between CKE and the city transport network. The project is named as **The Second New Kelani Bridge Project –A Project for Traffic Improvement around Existing Kelani Bridge**.

The project is located in Colombo and Gampaha districts covering the District Secretaries' (DS) administrative areas of Colombo, Kolonnawa and Kelaniya. Respective GN divisions are Navagampura, Bloemandhal and Grandpass North in Clombo, Wadullawatte Orugodawatte and Sedawatte in Kolonnawa and Peliyagoda and Gangabada East in Kelaniya. Local Government bodies which cover the project area are Colombo Municipal Council, Kolonnawa Urban Council and Peliyagoda Pradeshiya Sabha.

The study is based on desk studies, field studies, stakeholder meetings and household surveys to obtain relevant latest field data and to assess project impacts on the Physical, Physio-chemical, biological and Social environments. The report conforms to the ToR issued by CEA.

.

Various project alternatives were considered. "No Project Alternative" was compared against possible project alternative. If no auxiliary bridge is constructed across the Kelani River close to the "New Kelani Bridge" as proposed, the existing bridge will not be able to cater to the increased traffic flow in and out of Colombo city, increasing the traffic congestion within the project area. The additional traffic load onto the existing New Kelani Bridge will reduce its life span as a result.

Four layout alternatives have been considered during the feasibility studies. In these alternative layouts location alternative for the placing of the main bridge was also considered and it was

concluded that it is best to construct a new bridge parallel to the existing bridge. Various bridge types, ramp arrangements, interchange arrangements have also been selected as construction alternatives. These alternatives have been evaluated under various aspects. The result of such comparison shows that Alternative-B is determined to be optimal in terms of cost, environmental impact, traffic congestion, construction ease, water quality impacts etc.

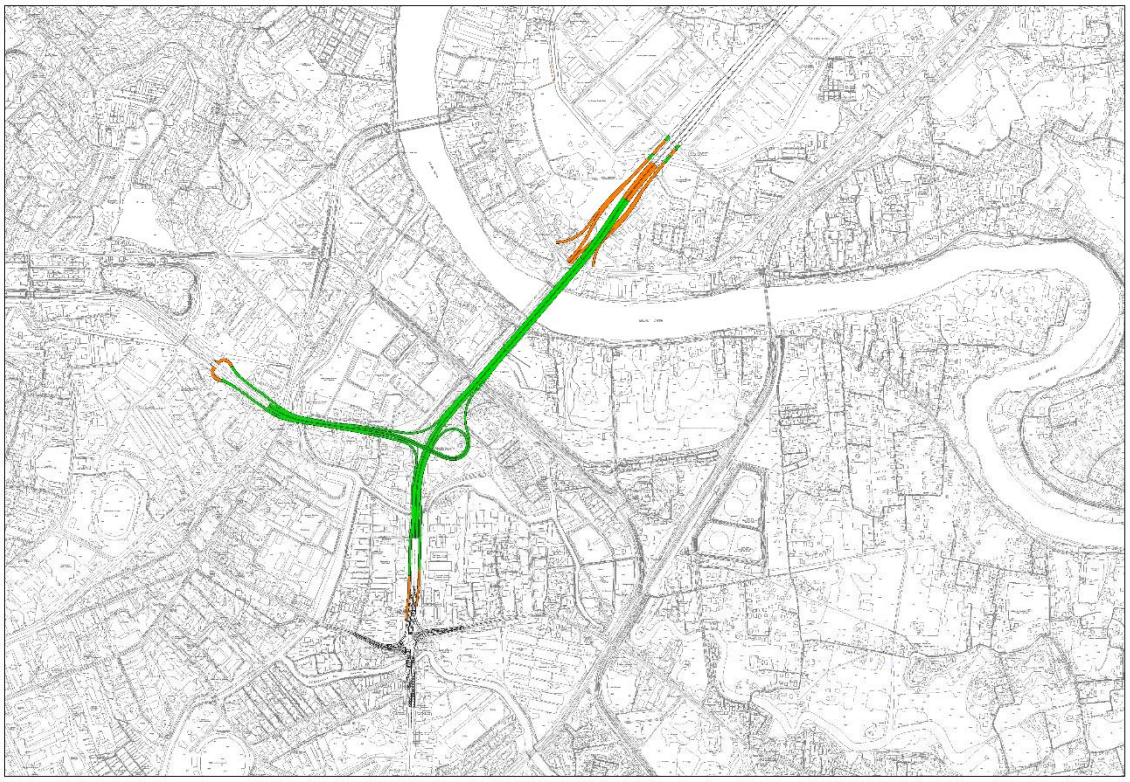


Figure 1-Layout Plan -Route Alternative B

Standard construction techniques in road and bridge construction will be employed in construction and most of the construction work will be machine based. There will also be some manual construction work such as form work, assembling reinforcements, welding, providing finishes, lane marking etc. There will not be any piers for the proposed six lane main bridge across the Kelani River in the waterway.

The project is still in the feasibility level and construction work will go on for a period of 36 months commencing 2017.The total construction cost including land acquisition, taxes and administration costs will be approximately Rs.60.9 billion. Funding will be provided by the Government of Japan under JICA funding.

Topography of the area consists of relatively flat terrain which consists of flood plain areas and slightly elevated areas of high urban character. Main land use types are water bodies, marshy land, parks and urban built up areas.

Average annual rainfall in the project area is 2200 mm. The average temperature in Colombo is 28 ºC and the maximum temperature is 31 ºC.

Water quality parameters of the project area were measured by National Building Research Organization (NBRO), BOD values ranged from 1 to 2.6 mg/l at $20C^0$, total coliform from 680 to 300 count/1000 ml, dissolved oxygen (DO) from 5.6 to 7.8mg/l etc. There is no major water usage of the project area in the form of either groundwater or surface water because of water quality issues. Baseline air quality noise and vibration in the project area was measured by NBRO. Air quality-CO_2 concentrations from 600-1120ppm, CO values from 2 to 6.7, SO_2 values from 12 to 274 $\mu g/m^3$, NO_2 values from 16 to 33 $\mu g/m^3$, SPM from 49 to 168$\mu g/m^3$ and PM_{10} from 30 to 68 $\mu g/m^3$.

High noise levels were recorded in the project area. Movement of vehicles is the main source of noise. Based on the noise levels the Project Area could be classified as a high noise area. The noise level was 70-80dB in the most measured locations. Vibration frequency range is between 0.28Hz to 1.63Hz

Only floods are recorded as natural disasters within the project area (especially within Kelani River and flood bund).According to existing literature, the phenomenon of global warming in the project area and surroundings has been reported; 1-.Increased vulnerability to Floods, 2-Sea level rise, 3-Increase in temperature are such parameters.

Biological environment of the area was assessed through a terrestrial and aquatic habitat survey. The floral species observed in residential and commercial area of the project site predominantly include fruits, vegetables, shading and ornamental plant species. The polluted canals are unused by residents and water in these canals is green in color because of blue green algae and other microorganisms.

The social environment consists of households mostly occupied by squatters, business premises and Government buildings. Total population in the affected area is 1915 . Two percent (2%) of the households spend less than Rs.10,000 per month which is an indication of high level of poverty.

The most significant impact from the project is the displacement of people from houses and business premises. Thus 395 of houses, 54 business premises have to be relocated. Total number of affected residential and business infrastructure is 449. Most of the people who live in the affected settlement area work as laborers or porters at Pettah and Colombo Fort area. During the census survey carried out in the project area it was observed that some households are involved in house level business activities such as manufacturing incense sticks and doormats.

Using detours to find access could be considered as a nuisance to the neighborhood during project construction period. According to the results of Socio Economic surveys for Resettlement Action Plan study, approximately 90% of the affected householders stated their willingness to be relocated.

Construction activities such as soil excavation, piling, backfilling and embankment work will require operation of heavy machinery. Movement of dump trucks and trucks loaded with material will also take place. There is a risk of injury to people and workers.

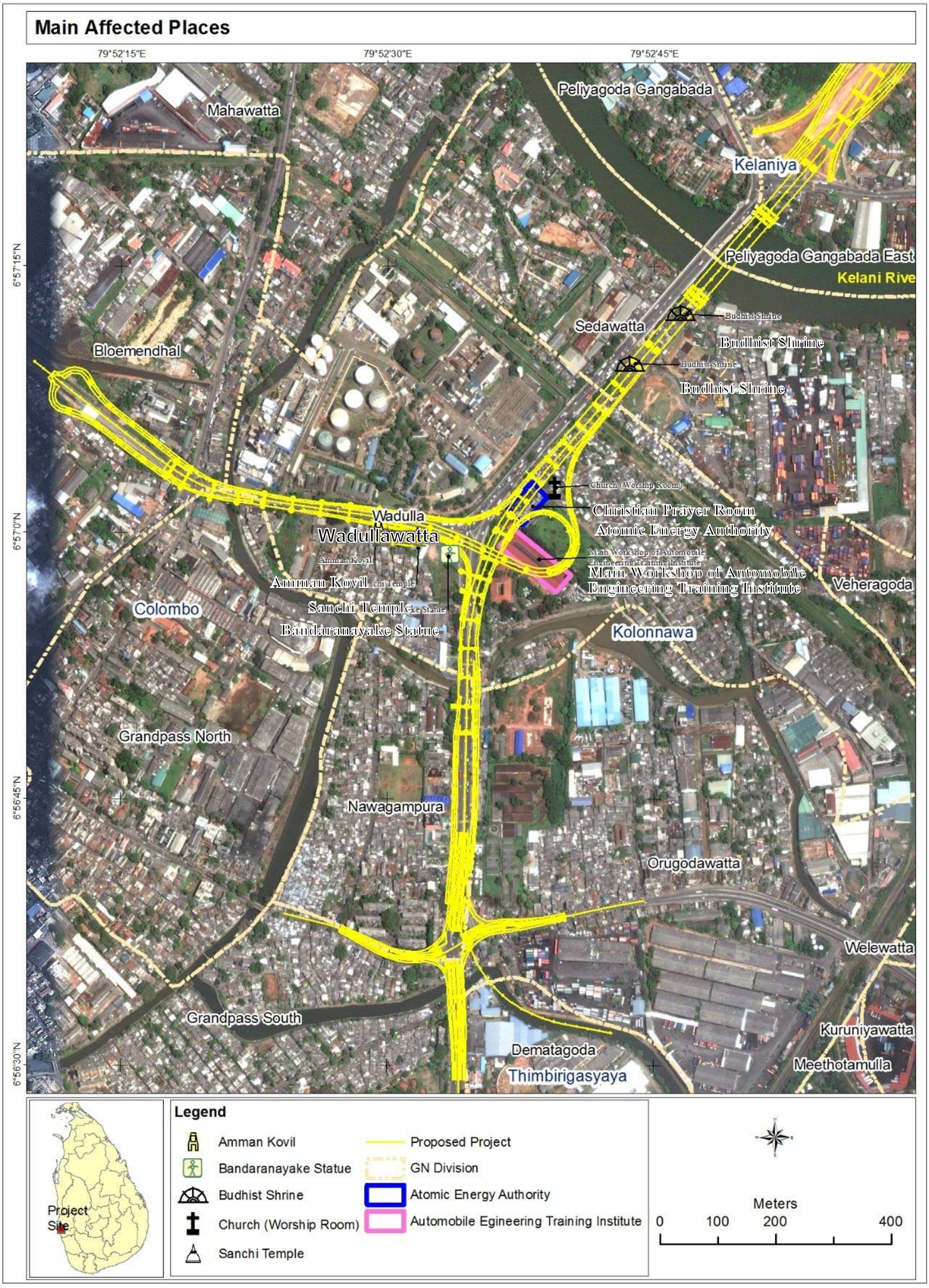


Figure 2 Main Affected Places

Government buildings and a few religiously important buildings such as Buddhist temples, Buddha statues and Hindu Kovils are located within the project affected area and include:

1. Atomic Energy Authority- Fully affected
2. Workshop of the Automobile Engineering Training Institute, Sanchi Temple and Amman Kovil (Located adjacent to the New Kelani bridge road) will be partially affected
3. Statue of Mr. SWRD Bandaranayake, a former Prime Minister, two roadside Buddha statues and a small Christian prayer room will be also affected and could be relocated in suitable places

Refer Figure 2 for the locations of the affected places.

The existing high-tension (132kV) power line to Kelanithissa power plant will need to be changed to an underground system which may result in temporary power outages. Other than these major impacts, the construction work will also need to remove electricity power lines, telecommunication lines, and water supply lines located within the project area. Several petroleum pipe lines transporting oil from the harbour cross the project and structures will be designed to avoid them.

The new bridge and the road network are designed to be built at a much higher elevation than the existing road and bridge structure. Such constructions and removal of structures will change the landscape of the project area.

Offsite construction waste disposal will disturb the low land and its drainage pattern if not carried out systematically. Soil also could get contaminated from the substances used for road pavements, spill of paints and such chemicals. As there is no heavy earthwork involved the impact of ground subsidence is not anticipated.

The risk of fire and electrocution should also be considered during a project of this magnitude. Also stagnant water bodies that could be created if precautions are not taken during construction and may lead to breeding of mosquitoes.

There will not be any significant permanent impact on the drainage pattern of the area as the provided bridge and appurtenant structures are elevated. There will not be any significant impact on flood bunds of Kelani River. The proposed road design does not block any drainage pathways as in most instances the system is elevated

Some impacts on water quality will occur during construction such as the increase of water turbidity, contamination by construction related substances and chemicals. Based on a numerical analysis it was inferred that there is no significant impact of NO_2. SPM due to construction work. The value of the estimated results is close to the measured values. The estimated concentration of NO_2 at the Project site along the road, when the Project is implemented, is decreased compared to when the project is not implemented. Construction, noise will be generated by construction machinery and vehicles. However, significant impacts will not be continuously present even during construction

stage as noise generating construction work is intermittent. A reduction of noise levels could be anticipated once the new bridge and new roads are opened for traffic as there will be a distance based noise decay owing to high vehicular speed. It was predicted that vibration associated with road construction work will impact nearby residents. A reduction of the vibration level was predicted due to implementing the project. Although construction machines and vehicles generate greenhouse gases, quantities of generating gases do not give serious impact. By the implementation of the project, the amount of CO_2 emission will be decreased.

A considerable amount of the project area is covered with man-made habitats. Since the project activities are restricted to the existing ROW and surrounding lands, the project would not lead to loss of habitats.

During the survey of the project affected area any endemic or threatened flora and fauna species were not observed. It will be necessary to cut down trees which interfere with the proposed constructions. Some of the trees including 44 large trees (diameter at breast height more than 30 cm) and 125 medium trees (diameter above breast height between 15cm to 30 cm) may be affected.

The traffic congestion will be reduced once the new bridge and all access roads of the project are operational. This will also help the county's economy as the precious man hours spent on the road will be reduced. However there could be temporary traffic congestion during construction time.

According to recent studies carried out by Department of Archeology on the request of RDA, there are no any archeological sites in the area.

The following main mitigation measures are suggested to mitigate social impacts. Further details are provided in the Resettlement Action Plan (RAP). Compensation payments for land and structures lost (hoses or business premises) and providing interim payments for the loss of livelihood, business or employment. Arrangements are being made to resettle affected householders in a housing scheme constructed by UDA in the State Timber Corporation Land at Orugodawatte. Tentatively estimated resettlement cost stands around Five billion Sri Lanka Rupees.

The statues including the Bandaranayake Statue will be relocated to suitable locations based on the desires of the stakeholders while the small Christian prayer room also can be relocated at a suitable location in consultation with its users.

Sanchi temple is only marginally affected and no major rehabilitation is necessary. Amman Kovil will lose 40% of its land area it will be rehabilitated within the current premises.

The Atomic Energy Authority is planned to be shifted to Mahenawatte , Homagama. The Automobile Training Institute is planned to be reconstructed at the Vocational Training Institute premises also in Orugodawatte.

Impacts emerging from noise, vibration, ground subsidence, traffic congestion, water quality, air quality, soil contamination and blocking of drainages/silting will be controlled by compelling the Contractor to adhere to Contract conditions, specifications and the Environmental management Plan supervised by RDA and periodically monitored by CEA.

Adverse effects on Workers' and residents' health and safety, will be mitigated through the Environment management Plan and FIDIC Conditions of Contract under JICA guidelines where Contractor is required to put in place a Safety Plan and appoint a dedicated Safety Officers and provide medical facilities.

Any adverse impacts due to waste disposal of construction camps as well as construction waste will be mitigated by getting the Contractors to adhere to proper waste disposal methods and use of approved sites for disposal. All hazardous chemicals will be required to be handled according to the relevant regulations

Only trees that interfere with construction work will be felled. Trees will not be cut during breeding seasons of birds if they use them as breeding places and if they are forage trees fruiting seasons will be avoided. New trees will be planted in suitable locations in the project area to enhance the bio diversity of the area, especially along the river banks

All mitigation measures will be closely monitored by the project proponent, Road Development Authority, especially through its Environmental and Social Division and the Project Management unit while the activities will also be monitored by relevant statutory institutions such as SLLRDC, Local Authorities, Irrigation Department, Labour Department and Public health Inspectors. Central Environmental Authority will carry out periodic monitoring as well as attending to public complaints, if any.

There will be environmental effects during construction of the project and these can be mitigated through Environmental Management and Monitoring Programmes. Since the project once completed will reduce the traffic congestion, it will result in substantial environmental benefits including reduction of pollution, dust, smoke and reduction of greenhouse gasses. The effects on global warming will be positive through reduced greenhouse gases.

Stakeholders indicate no objection to the proposed project and in fact there is wide spread support for this nationally important project. Majority of households and business owners who will be relocated have no objection for relocation if adequate compensation and alternative accommodation is provided at a close location with better facilities. All government and religious institutions are willing to be relocated or rehabilitated if they are assisted to reestablish and continue their services.

The Project will add a pleasing landscape to this important entry point to the city of Colombo with the unique design of the Extra-dozed bridge architecture inspired by national symbols of Sri Lanka

The alternative B layout is recommended to be proceed to the detailed design and construction stages with mitigation measures identified in this EIA. Implementation of the EMP and EMoP and

resettlement of affected parties before commencement of construction is recommended according to the Resettlement Action Plan (RAP).

1 INTRODUCTION

1.1 Background of the project

Main land based transport system of Sri Lanka is the road network. It occupies 98% of goods and 92% of commuter transport. Development of transport infrastructure is a major Government Policy. The existing New Kelani Bridge situated at the Colombo North is a strategic point in the Colombo City transport network. Colombo Katunayaka Expressway (CKE) Project is near completion, which will increase the traffic flow towards Colombo creating additional burden to the economy. Especially it is anticipated that the traffic flow into the Colombo city through CKE will be increased. The present traffic arrangement in and around the New Kelani bridge will not be able to cater to this traffic and in turn it may affect the life span of the existing bridge. Therefore, construction of a new bridge is determined urgent.

Road Development Authority (RDA) of Ministry of Ports and Highways (MOPH) is the premier highway authority in the country and is responsible for the maintenance and development of the National Highway Network, comprising the Trunk (A Class) and Main (B Class) roads and the planning, design and construction of new highways, bridges and expressways to augment the existing network.

Therefore, Road Development Authority (RDA) had initiated a study to improve the traffic around the New Kelani bridge area. A basic level prefeasibility study has been completed by RDA where four route options had been studied. With all the options it was revealed that a new bridge should be constructed across the Kelani River adjacent to the existing New Kelani Bridge (upstream). The project is now officially termed as “Traffic Improvement Project around New Kelani Bridge in the Democratic Socialist Republic of Sri Lanka” (here after referred as to “the project”). The project is intended to augment and increase the capacity of the existing New Kelani Bridge by building an additional bridge with six lane facility parallel to the existing bridge with elevated viaducts and interchanges to connect CKE, Colombo Port and Baseline Road. And it will also facilitate a smooth traffic flow along Baseline Road and New Kelani bridge road towards the Colombo port access road.

The project has now entered its feasibility level study which can be broadly separated into three stages, i.e. (1) Review of present traffic status in and around the New Kelani bridge and the draft plan (prepared during prefeasibility), (2) Developing basic design plans (3) Carrying out environmental and social assessments and (4) Project review and preparation of the final report.

At this stage of the project, RDA through the Government of Sri Lanka (GoSL) has requested financial assistance from the Japan International Cooperation Agency (JICA) to carry out the feasibility and detail design studies and subsequently the construction of the new bridge and associated access roads.

1.2 Objective of the proposed project and justification of the project

There are only limited entry routes to Colombo North namely Victoria Bridge (Japan Friendship Bridge), Mattakkuliya Bridge and New Kalani Bridge. Traffic volumes have increased during the recent times and especially after the completion of CKE there will be additional traffic congestion at existing New Kelani Bridge of which the capacity should be augmented by the proposed project. Colombo Harbour Development Project and Port City Project in the future will further increase the traffic volume in this area.

Colombo north is a very important place in the transport network and there is severe traffic congestion in the environs of New Kelani Bridge exerting a burden on the economy of the country as the road network is used for passenger transport as well as goods transport. As road transport usage amounts to 98% compared to other transport media. Therefore improving the road network is essential in the development of transport infrastructure. Thus the implementation of the proposed project is justified.

The objective of the project is to increase the transport efficiency in the environs of New Kelani Bridge and the solution as the nexus between CKE and the city transport network. As the New Kelani Bridge is now in existence constructing an additional bridge adjacent to the New Kelani Bridge and the construction of approach roads using as far as possible the existing road and roadsides is justified. The main permanent impact from the project is the displacement of communities living near by the project area. The project will also have an impact on buildings of few government institutions also located in the project acquisition boundary. The objective of the project could be illustrated as below.

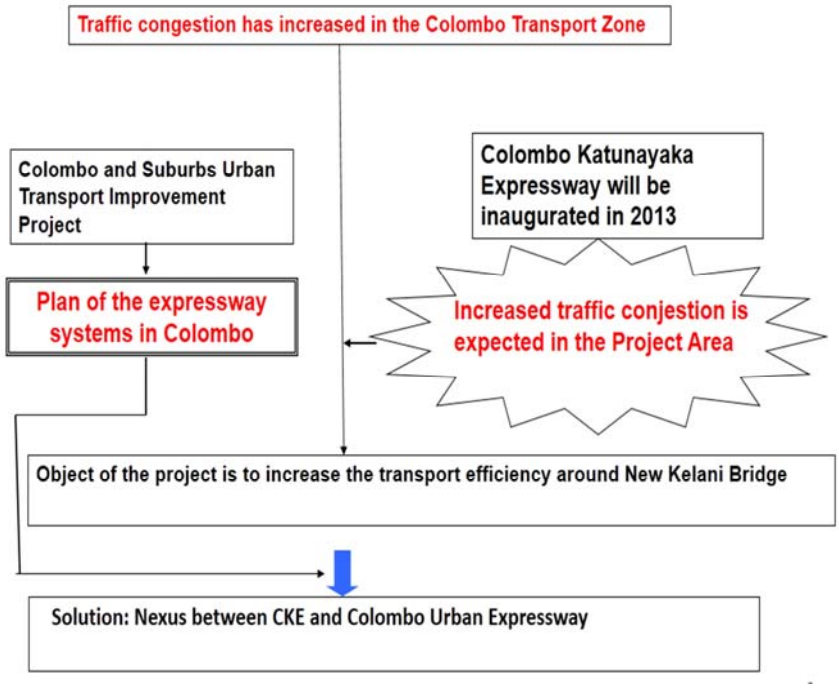


Figure 1-1 Objective of the project

1.3 Project Scope

The scope of work for this project could be summarized as follows;

(1) Construction of an extra dozed main bridge and elevated roadway across the Kelani River connecting Colombo Katunayaka Expressway to Orugodawatte Junction and Port access Road.
(2) Junction improvement for Orugodawatte
(3) Carry out demolition of the affected social and other infrastructure such as households, Government buildings.
(4) Provide compensation or resettlement sites for the affected stakeholders
(5) Provide alternative places for Government buildings affected
(6) Carryout compensatory landscaping for lost trees.

1.4 Objective of the Environmental Impact Assessment (EIA) Report

The main objectives of the EIA study is to describe the project environment, identify and differentiate significant adverse and beneficial impacts of the project, develop feasible mitigation measures to minimize the adverse impacts and to provide guidance to the environmental experts in the detail design team to further strengthen the mitigation measures and incorporate them into respective tender documents. This will enable an effective environmental impact management during the construction period and during the operational stage of the project.

The report will also enable the project proponent (the RDA) to obtain the approval from the Central Environmental Authority (CEA) as well as from JICA for the execution of the project.

This EIA report has been prepared based on the Terms of Reference (TOR) issued by CEA (please refer Annex 1.1.

The EIA Study specifically aims at the following activities:

- ✓ Prepare an EIA report, which should properly address all the items specified in the TOR issued by the CEA and which should be substantially adequate to obtain the environmental approval from the Project Approving Agency (PAA).
- ✓ Assimilate baseline data and information relating to physical, physio-chemical and social environments in and around the project site, and the impact caused by future activities envisaged such as the regular use of the bridge by commuters.
- ✓ Carrying out a noise, vibration, air quality, water quality (both surface water and groundwater)
- ✓ Have a series of dialogue with the line agencies who has jurisdiction regarding the project, local communities/households directly and indirectly affected by the project.
- ✓ Assess the potential impacts that will be generated during the construction as well as operation phases of the project.
- ✓ Formulate necessary counter measures against the potential adverse impacts so as to minimize the possible negative impacts due to project implementation, and ;

- ✓ Prepare an Environmental Management and Plan (EMP) so that the Project Proponent (PP) can prevent negative effects on the environment and take necessary action before the impacts become irreversible.

1.5 Methodologies and technologies adopted in EIA report preparation

1.5.1 General Methodology

The EIA was prepared by a team of consultants. Refer Annex 1.2 for their names, qualifications and tasks undertaken.

The study was based on desk studies as well as field studies to obtain relevant latest field data on the physical, physio-chemical and social environment.

The methodology for this EIA consists of;

- Understanding the nature of the project through the site visits, discussions with RDA, taking part in the introductory meetings with RDA etc.
- Study all documents such as project descriptions prepared by RDA and JICA survey Team,
- Study the conceptual drawings, survey plans etc. related to the proposed project,
- Visit the proposed site at Peliyagoda and its environs where the proposed bridge and the approaches will be establish to assess potential environmental impacts from the proposed works
- Carrying out a social assessment by interviewing the people who live close to the proposed site
- Carry out air quality, water quality (both river water and ground water), noise and vibration measurements at pre-determined strategic locations,
- Carrying out an ecological assessment to assess the baseline ecology and the possible impacts on ecology,
- Proposing mitigation measures to alleviate the possible construction and operational impacts and the social impacts.

The EIA study was carried out for a period of 4 months from March to June 2013.

1.5.2 Methodology for Hydrological Study

Basic hydrological parameters for the area such as rainfall, temperature, humidity etc. were obtained from the Department of Meteorology. Water levels and discharges of Kelani River were obtained from the Department of Irrigation. Simple flood frequency analysis was carried out on the water levels to assess inundation levels.

1.5.3 Methodology for Ecological Study

A habitat survey was carried out to identify the terrestrial and aquatic ecology of the proposed site, to ascertain the habitat types present and the possible impacts on sensitive flora, fauna, and habitats as a result of the proposed project.

Direct observations were made to identify flora, fauna and the existing terrestrial and aquatic habitats (especially in Kelani River) in the vicinity of a proposed development site and the surrounding area. A line transect survey was carried out 50 m either side of the center line of

national roads, beside the municipal and the local road network, around flood bunds, riverine and marshy areas to identified fauna and flora distributed in the area with the habitat information. In addition information was collected from indirect observations and from residences in the project affected area. At the same time data on important religious trees, economically valuable trees, shading species and trees that had been marked on survey map were identified with their names and locations. Several floral species were identified using published descriptions and taxonomic keys (please refer Annex 4.1 for details).

1.5.4 Methodology of the Social Study

The social study was carried out to assess the social impact of the project. The studies were carried out using a social appraisal on a census basis. The said census was carried out using three types of questionnaires;

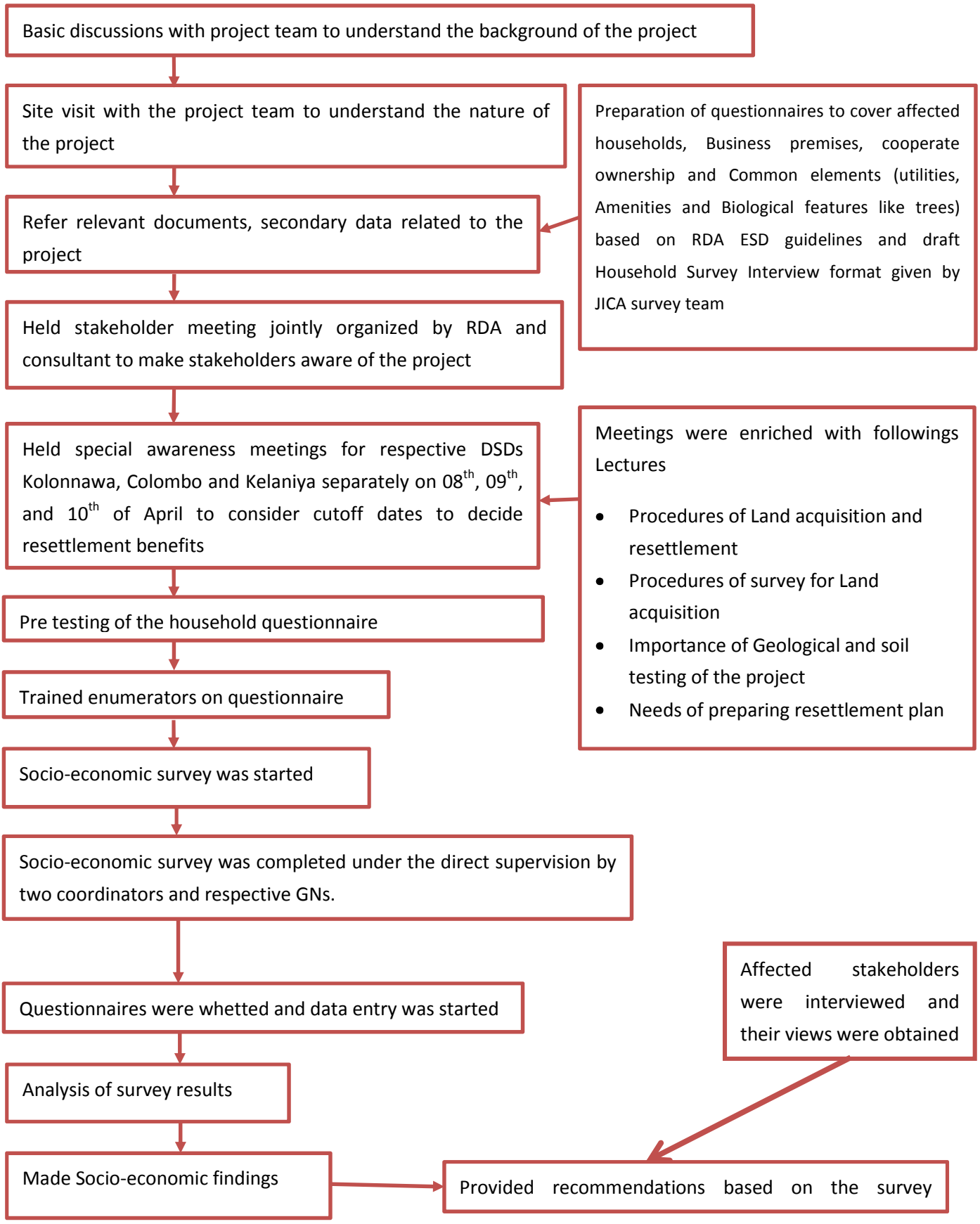
(a) Household survey questionnaire
(b) Questionnaire for business premises
(c) Questionnaire for common properties

The stakeholders affected by the project were interviewed and their ideas were recorded during the household survey. Socially important places such as government institutions, temples, *kovils* etc. were studied. The socially relevant line agencies such as the Divisional Secretary Office, Pradeesheeya Sabha were consulted and their views were mustered.

Major details of the project were revealed to the stakeholders and their socioeconomic status; their views regarding the project especially the impact on their livelihood were discussed and recorded. Their willingness to obtain compensation or alternative resettlement was discussed.

The diagram which is developed for methodology of finding out socio-economic impacts is given below.

Illustrated methodology for the social study



Following key points were considered during the methodology

(a) Obtaining the fullest support from the stakeholders during the socioeconomic survey and to minimize social conflicts between enumerators and stakeholders. The relevant line agency officers especially Grama Niladharis (GNs) of the affected GN divisions were consulted. During the Focus Group Discussions (FGD's) the Project Team tried to maintain gender balance as much as possible. Key informant interviews were also held to cover special issues such as affected religious places and large scale institutions and business premises.
(b) Questionnaires were set in the local language (Sinhala) for easy understanding of the enumerators as well as to maintain the transparency between enumerators and affected parties.
(c) Secondary data on socioeconomic situation of the affected two districts (Colombo and Gampaha) was studied to review the situation of the project area. Throughout the study, secondary data were used as main reference material. They include publications of Dept. of Census and Statistics, Central Banks etc. Publications, administrative records and documents prepared by Divisional Secretariats (Resource Profiles) and line departments were studied.

1.6 Conformity with Government policies and plans

As stated in Section 1.1 development of transport infrastructure is a major Government Policy and there is a marked improvement in the country's transport network by the introduction of expressways, rehabilitating and widening the existing road network etc. The responsibility of the development of the major transport network rests with the Central Government. Plans will be implemented through the Ministry of Transport and the planning activities of the main road network is vested with RDA of ministry of Ports and Highways. Urban Transport System Development Project for Colombo Metropolitan Region and Suburbs under the Ministry of Transport is now underway and this project will fit into that plan.

1.7 Preliminary approvals needed for the project and any conditions laid down by state agencies in granting preliminary clearance for the project

Following approvals will be needed for the project and it is intended to secure all such approvals through this EIA Process.

(1) Approval by JICA for funding
(2) Approval from a Divisional Secretary and Local Government Authorities
(3) Approval from Irrigation Department (As the bridge is across a Provincial River)
(4) Approval from SLLRDC (for any obstruction to the low lying flood plains in Colombo District)
(5) Approval from Colombo Municipal Council and Kolonnawa Municipal Council and approval from other local authorities in the project area (for drainage crossings etc.)
(6) Approval from Coast Conservation Department (CCD) (for any change of the sand bar in the outfall if coffer damming is required for construction of the bridge)
(7) Approval from CEA (EIA Approval)
(8) Clearance from Department of Archeology
(9) UDA approval as it affects town planning

There are no known laid down preconditions from state agencies in granting clearances to the project.

2 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

2.1 Applicable Environmental Legislation in Sri Lanka

- **National Environmental Act (NEA) No 47 of 1980, and its' amendment Act No. 56 of 1988 and Act No. 53 of 2000**

Under provisions of Part IV C of the NEA No. 47 of 1980 and subsequently stipulated in Gazette (Extra Ordinary) No. 772/22 dated June 24, 1993 the government of Sri Lanka (GoSL) made Environmental Assessment (EA) a legal requirement for a range of development projects. The list of projects requiring an EA in the form of Environmental Impact Assessment (EIA) or Initial Environmental Examination (IEE) is prescribed in the above Gazette notification.

In addition, the Gazette notification includes a list of line ministries and agencies that are designated as Project Approving Agencies (PAA). The PAA's are responsible for the administration of the EIA process under NEA. Further amendments to the NEA stipulated environmental approvals for material extraction, emissions, noise and vibration levels These regulations will also have a bearing on this development project.

The provisions of the NEA regulations, the construction of national and provincial highways involving a length exceeding 10 km is listed as a prescribed project which requires an Environmental Assessment (EA), but construction of a new bridge or renovation or expansion of an existing bridge has not been listed as a prescribed project.

In addition, other prescribed projects requiring environmental assessments, listed in the same regulations relevant to the proposed project include;

(i) Reclamation of land, wetland area exceeding 4 hectares;
(ii) Conversion of forests covering an area exceeding 1 hectare into non-forest uses;
(iii) Involuntary resettlement exceeding 100 families, other than resettlement effected under emergency situations;
(iv) Extraction of timber covering land areas exceeding 5 hectares;
(v) Clearing of land areas exceeding 50 hectares;
(vi) Inland deep mining and mineral extraction involving a depth exceeding 25 meters;
(vii) Inland surface mining of cumulative areas exceeding 10 hectares;
(viii) Mechanized mining and quarrying operations of aggregate, marble, limestone, silica, quartz, and decorative stone within 1 kilometer of any residential or commercial areas; and

All projects and undertakings irrespective of their magnitude, if located partly or wholly within 100 meters from the boundaries of or within any area declared under the National Heritage Wilderness Act; the Forest Ordinance; 60 meters from a river or stream bank and having a width of 25 meters or more at any point of its course; any archeological reserve, ancient or protected monument as defined or declared under the Antiquities Ordinance (Chapter 188); any areas declared under the Botanical Gardens Ordinance; and within 100 meters from the boundaries of or within any areas

declared as a Sanctuary under the Fauna and Flora Protection Ordinance. This project has been listed as a prescribed project under the category of "Involuntary resettlement exceeding 100 families, other than resettlement effected under emergency situations

- **Flood protection Ordinance (chapter 449)**

Under this ordinance the relevant minister is empowered to declare any area in Sri Lanka to be a flood area. And while such order remains in force the area indicated shall form a flood area and be subjected to the provisions of this ordinance.

According to the guidelines of this ordinance the Director of Irrigation Department or any other person designated by the relevant minister shall prepare and carry out a scheme for the efficient protection of such area against floods. The proposed project area is located within the Kelani river flood plain declared under this ordinance.

- **Colombo District (Low Lying Areas) Reclamation and Development Board Act No. 15 of 1968**

The Land Reclamation and Development Corporation (SLLRDC) established under this act have power to declare low lying areas within the Colombo district as flood protection areas. The act was amended by Law No. 27 of 1976, Act No. 52 of 1982 and Act. No. 35 of 2006.

The low lying areas within this stretch of Kelani River are declared as flood protection area by SLLRDC.

- **Crown lands Ordinance (Chapter 454)**

This ordinance could be sited as "An ordinance to make provision for the grant and disposition of crown lands in Ceylon; for the management and control of such lands and the foreshore ; for the regulation of the use of the water of lakes and public streams ; and for other matters incidental to or connected with the matters aforesaid".

This ordinance empowers the relevant minister to declare reservations for public streams and protect the source, course or bed of any public stream.

- **Mines and Minerals Act No. 32 of 1992**

The Geological Survey and Mines Bureau was established under the Mines and Minerals act to regulate the exploration of mines and minerals, transportation, processing, trading in or export of minerals.

- **Land Acquisition Act No. 9 of 1950, with the latest amendment in 1986 (LAA)**

The Land Acquisition Act clearly outlines the procedures of land acquisition and compensation for public purposes. LAA sets out the procedures for acquiring land and for payment of compensation for acquiring land. It provides compensation at market rates for land, structures and crops.

- **National Policy on Payment of Compensation**

The National Policy on payment of compensation is effective for any acquisition in respect of which a notice under Section 2 of LAA is published after 01.09.2008 and after this date any existing relief schemes for payment of additional compensation will become null and void.

- **National Involuntary Resettlement Policy of 2001 (NIRP)**

To address the current gaps in the LAA in addressing key resettlement issues such as exploring alternative project options that avoid or minimize impacts on people, compensating those who do not have title to, but are currently using and dependent on, land, or implementation of income restoration measures aimed at the social and economic rehabilitation of project Affected Persons (APs), the Government of Sri Lanka adapted the NIRP in the year 2001. NIRP also highlights the need for AP consultation and participation in resettlement processes.

- **Fauna and Flora Protection (Amend) Act (No. 49 of 1993)**

The Fauna and Flora (Protection) Ordinance No. 2 of 1937, as amended by the Fauna and Flora (Amend) Act No. 49 of 1993 and Act No. 22 of 2009 provides regulations for the protection, conservation and preservation of the fauna and flora of Sri Lanka, for the prevention of the commercial exploitation of such fauna and flora; and to provide for matters connected therewith or incidental thereto". Offenses relating to amphibians and fish included in Schedules III and IV of the Act. Part IV (sects. 42 to 48) concerns the protection of flora.

- **Felling of Trees (Control) Act No 9 of 1951**

The Felling of trees Act No 9 of 1951 (as amended 30 of 1953 and 1 of 2000) provides for the prohibition, regulation or Control of the Felling of Trees in the country.

Accordingly, this act orders prohibiting or regulating the felling of trees, steps for identification of trees and penalty for contravention of an order are included as follows.

(1) The Minister may by Order provide for the prohibition, regulation or Control of the felling of trees of such description as may be specified in the Order.

(2) An Order under this section may be made so as to have effect either throughout Sri Lanka or any particular area in Sri Lanka, and may prohibit the doing of anything regulated by the Order except under the authority of a license granted by such officer as may be specified in the Order.

(3) Every Order made by the Minister under this section shall be published in the Gazette and shall come into operation upon the date of such publication or upon such later date as may be specified therein.

- **Other relevant legislation in Sri Lanka**

There are a number of other laws and regulations applicable which are relevant to the project under which certain approvals have to be obtained for project related activities.(see Table 2-1).

Table 2-1 Other relevant legislation in Sri Lanka for approvals

Activity	Time of obtaining approval	Approving Agency	Implementing Agency
Felling of trees and removal of timber	Before construction and during construction	Forest Department	RDA (the contractor should mark the trees to be removed)
Disposal of excavated soil and waste. Disposal of bentonite if used.	After the mobilization of contractor	Local authorities , SLLRDC and CEA (as betonite disposal belongs to the category of "Scheduled Waste disposal)	Contractor through RDA supervision
Operation of asphalt concrete plant, Concrete batch mixing plant, Crusher plant (If operated by contractor or plants from which the contractor obtains material)	After the mobilization of contractor	Central Environmental Authority for the Environmental Protection license (EPL) and trade license from Local Authorities	Contractor through RDA supervision
Establishment of labour camps	Before construction and during construction	Municipal councils, Labour Department (District Factory Inspection Engineer), CEA for EPL	Contractor through RDA supervision
Environmental safeguards, compliance of material extraction locations , burrow pits, quarries etc. which contractor is going to operate or from which contractor is going to purchase material	Before construction and during construction	Local Authorities (Trade licenses), GSMB , CEA (EPL s)	Contractor/Respective site operators through RDA supervision

2.2 The EIA Process

According to GoSL procedure, all development activities require environmental clearance. The main purpose of an EIA is to ensure that development options under consideration are environmentally acceptable and sustainable. Such activity will help both developer and governing authorities to recognize environmental consequences and to avoid or develop suitable mitigation measures early in the project design stage.

According to the NEA the environmental clearance should be obtained through the Central Environmental Authority or other relevant Project Approving Authority (PAA) as stipulated in the NEA.

The EIA process begins when the Preliminary Information (through a duly filled Basic Environmental Information Questionnaire (BIQ)) is submitted by the Project Proponent (PP) to CEA or respective PAA. This questionnaire requires information from the PP to enable the CEA or PAA to determine the level of environmental analysis required prior to providing approval for the project. Upon reviewing the questionnaire (Scoping), the CEA or PAA determines whether the project requires an Initial Environmental Examination (IEE), or an Environmental Impact Assessment (EIA), or whether no further environmental analysis is required, depending on the nature of the potential impacts.

If the project is considered as "Prescribed" the CEA or PAA will prepare a Terms of Reference (TOR) for the EIA or IEE. Based on this TOR the PP will develop a report and submit to CEA or relevant PAA. This report will initially be checked for its consistency/ adequacy with regard to the information required in the TOR. If the information is deemed adequate the report will be evaluated by a Technical Evaluation Committee (TEC) comprising set of professionals/ officials with adequate knowledge in each field of requirement in the TOR.

If the TEC agrees that the report is adequate an environmental clearance will be given with a set of conditions which the PP should adhere.

In case of an EIA the report is opened to the public for a 30 working day period for comments and questions. These comments and questions should be addressed by the project proponent before the final conditional clearance is given. The EIA procedure is illustrated in Figure 2.1.

2.3 Environmental Institutional Framework

The overall implementing responsibility of the project lies with the GoSL and Ministry of Ports and Highways MoPH is the line ministry for the matters pertaining to the highway sector. RDA being the executive agency for road development, has administrative responsibility for implementation of the project under general supervision of the MoPH.

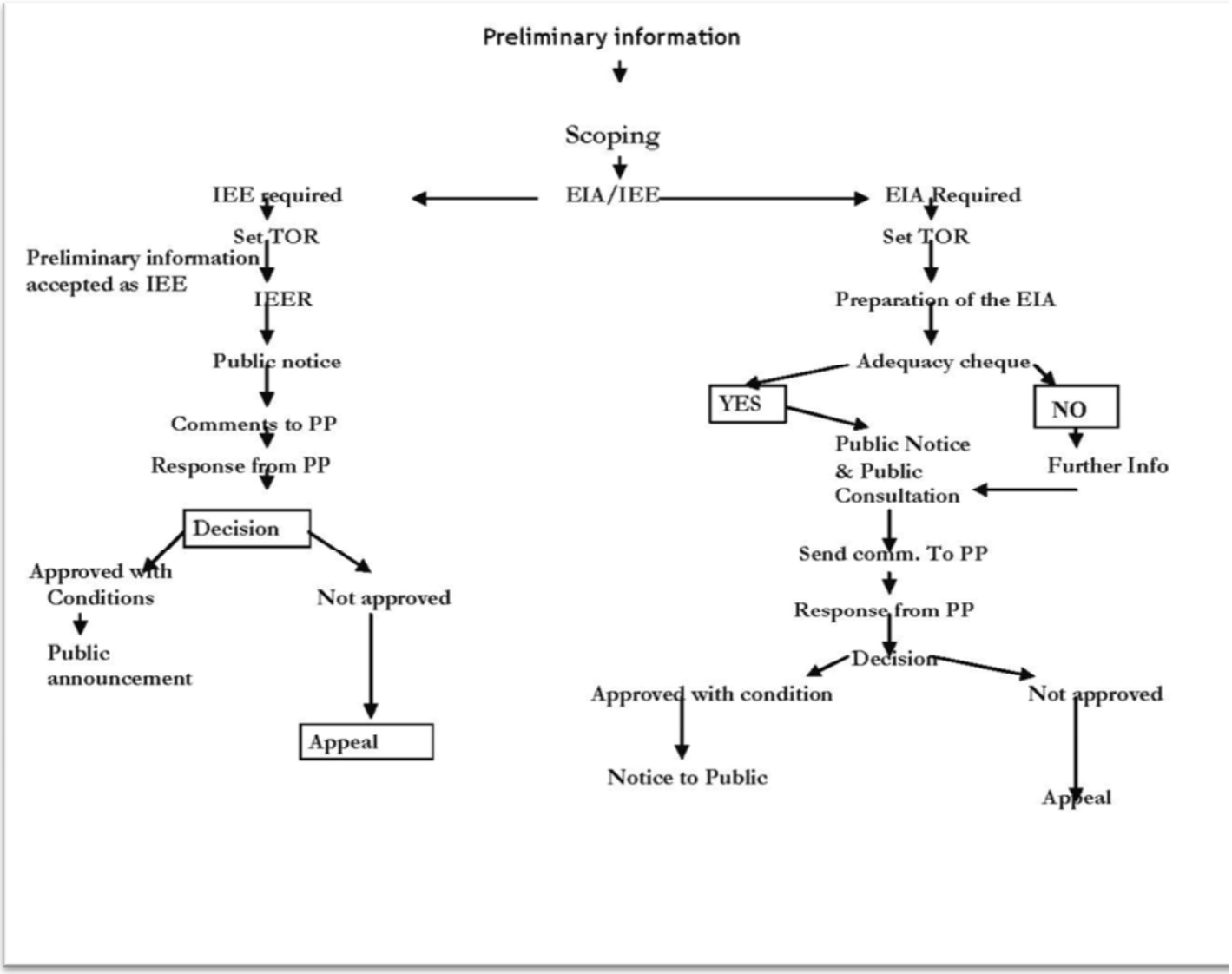
Due to their importance, priority, magnitude of investment and external collaboration etc. the MoPH has established Project Management Units (PMU) for execution of special projects. PMUs have to accomplish a time-bound program through a planned set of interventions agreed upon by concerned authorities. PMUs work under the general supervision of RDA, but have direct linkages and access to MoPH to expedite their work. Thus, PMU is the focal institution responsible for environmental safeguards at project operational level. PMUs have been strengthened with a certain degree of financial autonomy and administrative flexibility subject to the guidance and supervision of the MoPH and directives of the General Treasury.

Environmental and Social Development Division (ESD Division) of RDA will assist the PMU in monitoring the level of environmental compliance by the contractor during the construction works and during operation of the bridge.

As the CEA has been designated as the PAA for this development project, it will monitor the environmental compliances and issues during the construction stage. As the external monitoring agency the CEA will use the "Environmental Management Action Plan" as the primary tool in measuring the level of environmental compliance.

An Environmental Grievance Redress Mechanism will be established at Grama Niladari Level to address any public grievances related to environmental aspects. Any complaint or issue will be recorded by the Grama Niladari and forwarded to the PMU for necessary actions. A three member team comprising of members from the PMU, Engineer and Contractor will visit the relevant site with the Grama Niladari and take action to resolve the issue. If a suitable agreement cannot be made such issues will be referred to ESD division and other relevant divisions of RDA to develop a suitable measure.

EIA PROCESS IN SRI LANKA



RELEVANT STANDARDS

- **Sri Lanka and International standard for environment**

Air quality standards

Sri Lanka standards

The standards for the air quality in Sri Lanka shall be determined in accordance with standards stipulated under the Extraordinary Gazzete, No. 1562/22, August 15, 2008 by the Ministry of Environment and natural Resources of Sri Lanka.

Table 2-2 Permissible Ambient Air Quality Standards

Pollutant	* Average Time	Maximum Permissible Level		+ Method of measurement
		µg/m^3	ppm	
1.Particulate Matter-Aerodynamic diameter is less than 10µm in size (PM_{10})	Annual	50	-	Hi-volume sampling and Gravimetric or Beta Attenuation
	24hrs.	100	-	
2. Particulate Matter-Aerodynamic diameter is less than 2.5µm in size (PM2.5)	Annual	25	-	Hi-volume sampling and Gravimetric or Beta Attenuation
	24hrs.	50	-	
3. Nitrogen Dioxide (NO_2)	24hrs.	100	0.05	Colorimetric using saltzman method or equivalent gas phase chemiluminescence
	8hrs.	150	0.08	
	1hr.	250	0.13	
4. Suplphur Dioxide (SO_2)	24hrs.	80	0.03	Pararosanilene method or equivalent pulse fluorescent
	8hrs.	120	0.05	
	1hr.	200	0.08	
5. Ozone (O_3)	1hr.	200	0.10	Chemiluminescence method or equivalent ultraviolet photometric
6. Carbon Monoxide (CO)	8hrs.	10,000	9.00	Non-Dispersive Infrared Spectroscopy
	1hr.	30,000	26.00	
	Any time	58,000	50.00	

* Minimum number of observations required to determine the average over the specified period-

03 hour average – 03 consecutive hourly average.
08 hour average – 08 hourly average.
24 hour average – 18 hourly average.
yearly average – 09 monthly averages with at least 02 monthly average each quarter.

International standards

Table 2-3 WHO Ambient Air Quality Standards

	Average Period	Guideline Value in µg/m^3
SO2	24-hour	20
	10 minutes	500
NO2	1-year	40
	1-hour	200
PM10	1-year	20
	24-hour	50
PM2.5	1-year	10
	24-hour	25

Water quality standards

Sri Lanka Standards

The standards for the water quality in Sri Lanka shall be determined in accordance with the Proposed Ambient Water Quality Standards for inland water Sri Lanka, Central Environmental Authority, 2001.

Table 2-4 Proposed Ambient Water Quality Standards for Inland water Sri Lanka

Parameter	Unit, type of limit	CLASS 1 Waters	CLASS 11 Waters (Sensitive)				Class 111 Waters (General)
		Drinking water with simple treatment 2	Bathing 3	Fish and aquatic life 4	Drinking water, conventional treatment 5	Irrigation and agriculture 6	Minimum quality other uses 7
General							
1. Colour (after simple filtration	Pt mg/l, max	20	-	-	100	-	-
2. Total dissolved solids (TDS)	mg/l, max	-	-	-	-	500	-
3. Conductivity	dS/m, max	-	-	-	-	0.7	-
4. Odour	-	unobj	unobj	-	unobj	-	-
5. Taste	-	unobj	-	-	unobj	-	-
6. Turbidity	NTU, max	5	-	-	-	-	-
7. Sodium absorption ratio (SAR)	-	-	-	-	-	6-15	-
8. Residual sodium Carbonate (RSC)	meq./l, max	-	-	-	-	1.25	--
9. Total hardness	As $CaCo_3$ mg/l,	250 des, 600 max	-	-	-	-	-
10. pH	-	6.0-8.5	6.0-9.0	6.0-8.5	6.0-9.0	6.0-8.5	5.5-9.0
11. Dissolved Oxygen at 25^{0}C	mg/l, min	6	5	3	4	3	3
12. BOD (5 days at 20^{0}C or 3 days at 30^{0}C)	mg/l, max	3	4	4	5	5	5
Nutrients							
13. COD	mg/l, max	15	20	15	30	-	40
14. Nitrates (NO_3 – N)	mg/l, max	5	5	5	5	5	5
15. Total ammonia (NH_3-N) - pH < 7.5	mg/l, max	-	-	0.94	-	-	9.1
pH= 8.0		-	-	0.59	-	-	4.9
pH= 8.5		-	-	0.22	-	-	1.6
16. Total phosphate (PO_4-P)	mg/l, max	0.7	0.7	0.4	0.7	0.7	0.7
Other Substances							
17. Chlorides (Cl)	mg/l,max	200	-	-	200	100	-
18. Cyanides (CN)	mg/l, max	0.005	0.005	0.005	0.005	0.005	0.005
19. Fluorides (F)	mg/l, max	1.5	-	-	1.5	-	-
20. Sulphates (SO_4)	mg/l, max	250	-	-	250	1000	--
Metals							
21. Total cadmium (Cd)	µg/l, max	5	-	H Cd <60 0.2 60-120 0.8 120-180 1.3 >180 1.8	5	-	5
22. Total chromium (Cr)	µg/l, max	50	-	2	50	-	50
23. Total copper (Cu)	µg/l, max	-	-	H Cu <60 2 60-120 2 120-180 3 >180 4	-	-	100

24. Iron (Fe)	µg/l, max	300 des, 1000 max	-	300	200	-	-
25. Lead (Pb)	µg/l, max	50	-	H Pb <60 1 60-120 2 120-180 4 >180 7	50	-	50
26. Manganese (Mn)	µg/l, max	1000	1000	1000	1000	1000	1000
27. Mercury (Hg)	µg/l, max	1	1	0.1	1	1	2
28. Nickel (Ni)	µg/l, max	100	100	H Ni <60 25 60-120 65 120-180 110 >180 150	100	100	100
29. Selenium (Se)	µg/l, max	10	10	1	10	-	-
30. Zinc (Zn)	µg/l, max	1000	1000	30	1000	1000	1000
31. Boron (B)	µg/l, max	-	-	-	-	500	--
32. Total arsenic (As)	µg/l, max	10	50	50	10	50	50
33. Aluminium (Al)	µg/l, max	200	-	-	200	5.0	-
Organic Micro Pollutants							
34. Phenol index	µg/l, max	2	5	1	5	5	5
35. Oil and grease	µg/l, max	100	200	10	100	-	300
36. Anionic surfactants (detergent) as MBAS	µg/l, max	200	300	1000	200	1000	1000
37. Total pesticides	µg/l, max	10	30	30	30	50	50
Micro Organisms							
38. Total coliform	MPN/100 ml, (*P=95%)	5000	1000	20,000	5000	1000	-
39. Faecal coliform	MPN/100 ml, (*P=95%)	250 des, 600 max	50	-	-	-	-
40. Parsite cysts and ove	Not given	-					

Source: Central Environmental Authority (2001)

Abbreviations : n = Natural or baseline values; H = Hardness in terms of $CaCO_3$ in mg/l; des = Desirable highest level; max = Maximum permissible substances; MBAS = Methylene blue active substances; *P=95% = 95% of the samples give a value that is equal to or less than the indicated limit; Mean – during longer period; Min. daily = average of daily waters; prevention of eutrophication, excessive weed growth, may require lower, site specific, for stagnant waters

International standards

Table 2-5 EHS, IFC Water quality standards

(mg

Pollutant	General EHS guideline of IFC (Indicative Values for Treated Sanitary Sewage Discharges a)
pH	6-9
BOD	30
COD	125
SS	150
n-hexane (mineral oil))	-
n-hexane (animal and vegetable fats)	10
Residual chlorine	-
Phenols	-
Copper	-
Zinc	-
Dissolved iron	-
Dissolved manganese	-
Chromium	-
Cadmium	-
Total cyanogen	-
Total coliform bacteria	400MPN^6/100ml
Nitrogen	10 MPN^6/100ml
Phosphorus	2 MPN^6/100ml

Source ; Environmental Health & Safety (EHS) Guidelines, International Finance Corporation (IFC),2007

Noise standards

Sri Lanka standards

The standards for the noise level in Sri Lanka shall be determined in accordance with regulations made by the Ministry of Transport, Environment and Women's Affairs under section 23P,23Q and 23R of the National Environmental Act, No.47, 1980 read with section 32 of that Act. .

Table 2-6 Permissible Noise Levels in accordance with Noise Control Regulations

Area	L_{Acq} T, dB(A)	
	Day Time	**Night Time**
Low Noise (Pradeshiya Sabha area)	55	45
Medium Noise (Municipal Council/Urban Council area)	63*	50
High Noise (EPZZ of BOI & Industrial Estates approved under part IVC of the NEA)	70	60
Silent Zone (100 m from the boundary of a courthouse, hospital, public library, school, zoo, sacred areas and areas set apart for recreation or environmental purposes)	50	45

* Provided that the noise level should not exceed 60 dB (A) inside existing houses, during day time.

Maximum permissible Noise levels at Boundaries of the land in which the source of noise is located in L_{Aeq} T for construction activities.

Construction Activities

L_{Acq} T, dB (A)

Day Time	Night time
75	50

The following noise levels will be allowed where the background noise level exceed or is marginal to the given levels in the above table.

(a) For low noise areas in which the background noise level exceeds or is marginal to the given level — Measured Background Noise level + 3dB (A)

(b) For medium noise areas in which the background noise level exceeds or is marginal to the given level — Measured Background Noise level + 3dB (A)

(c) For silent zone in which the background noise level exceeds or is marginal to the given level — Measured Background Noise Level + 3dB (A)

(d) For high noise areas in which the background noise level exceeds or is marginal to the given level

(i) For day time — Measured Background Noise level + 5dB (A)

(ii) For night time — Measured Background Noise level + 3dB (A)

International standards

Table 2-7 Noise Level Guidelines- EHS IFC

Noise Level Guidelines- EHS IFC		
	One Hour L_{Aeq} (dBA)	
	Day time 07.00-22.00	Nighttime 22.00-7.00
Residential; institutional; educational	55	45
Industrial; commercial	70	70

Source ; Environmental Health & Safety (EHS) Guidelines, International Finance Corporation (IFC),

Vibration standards

Sri Lanka standards

The standards for the vibration level in Sri Lanka shall be determined in accordance with the Maximum Permissible interim Vibration levels stipulated by the Central Environmental Authority of Sri Lanka for different type of structures. .

Table 2-8 Maximum Permissible Vibration Values

Structure Type	Type of Vibration	Frequency of Vibration (Hz)	Vibration in ppv (mm/sec)
Type 1 structures – Multi story buildings of reinforced concrete or structural steel, with filling panels of block work, brick work or precast units not designed to resist earthquakes	Continuous	0 - 10	5.0
		10 - 50	7.5
		Over 50	15.0
	Intermittent	0 - 10	10.0
		10 - 50	15.0
		Over 50	30.0
Type 2 structures – Two-storey domestic houses and buildings constructed of made of reinforced block work, precast units, and reinforced floor & roof construction, or wholly of reinforced concepts or similar, not designed to resist earthquakes.	Continuous	0 - 10	2.0
		10 - 50	4.0
		Over 50	8.0
	Intermittent	0 - 10	4.0
		10 - 50	8.0
		Over 50	16.0
Type 3 structures – Single and two storey houses and buildings made of lighter construction, using lightweight materials such as bricks, cement blocks etc, not designed to resist earthquakes.	Continuous	0 - 10	1.0
		10 - 50	2.0
		Over 50	4.0
	Intermittent	0 - 10	2.0
		10 - 50	4.0
		Over 50	8.0
Type 4 structures – Structures that, because of their sensitivity to vibration, do not correspond to those listed above 1,2 & 3, & declared as archeologically preserved structures by the Department of Archaeology	Continuous	0 - 10	0.25
		10 - 50	0.5
		Over 50	1.0
	Intermittent	0 - 10	0.5
		10 - 50	1.0
		Over 50	2.0

3 DESCRIPTION OF THE PROPOSED PROJECT AND REASONABLE ALTERNATIVES

3.1 Evaluation of Alternatives

3.1.1 Layout Alternatives

Four layout alternatives have been considered during the feasibility studies and these alternatives are given below.

1. Alternative A- Adjacent to the existing railway
2. Alternative B- Adjacent to New Kelani Bridge
3. Alternative C- Above the existing canal trace
4. Alternative D – Above the existing road trails

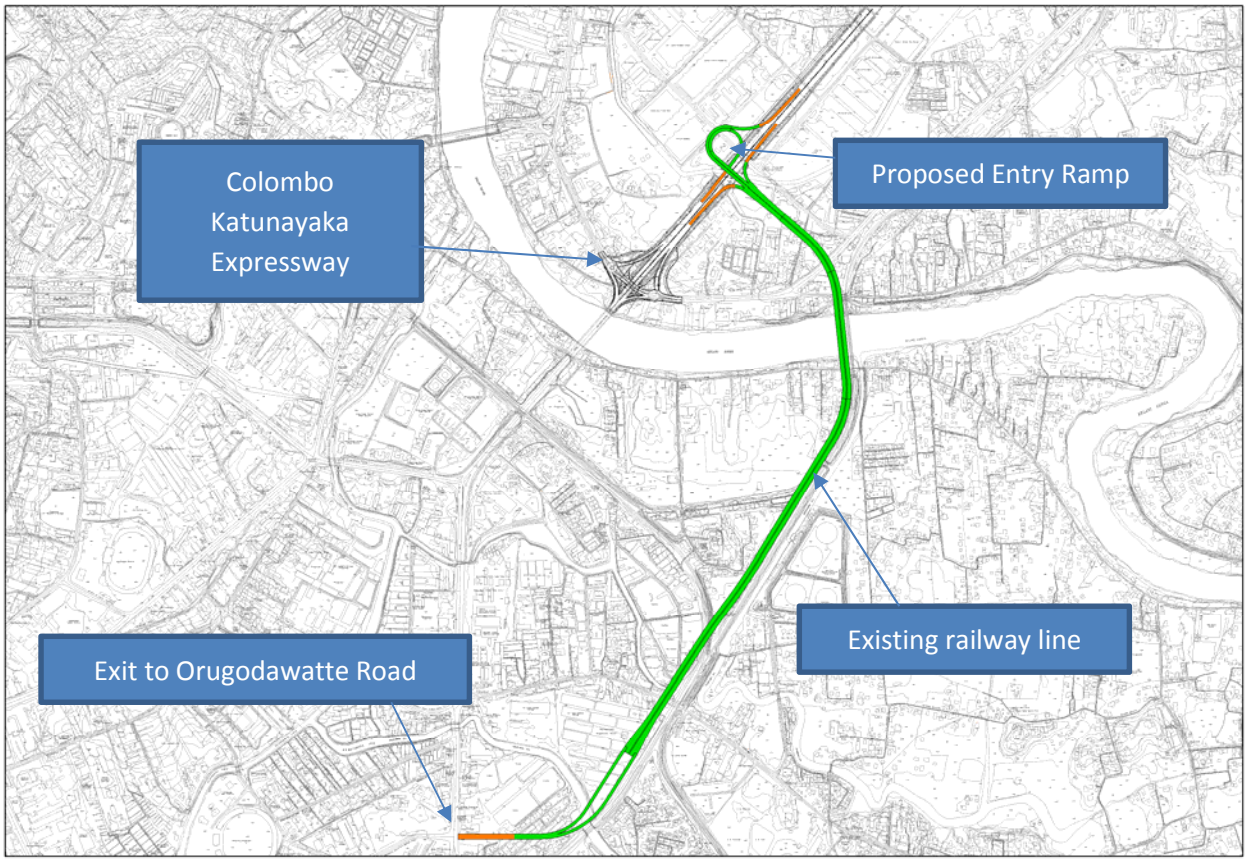


Figure 3-1 Alternative A: Adjacent to the existing railway

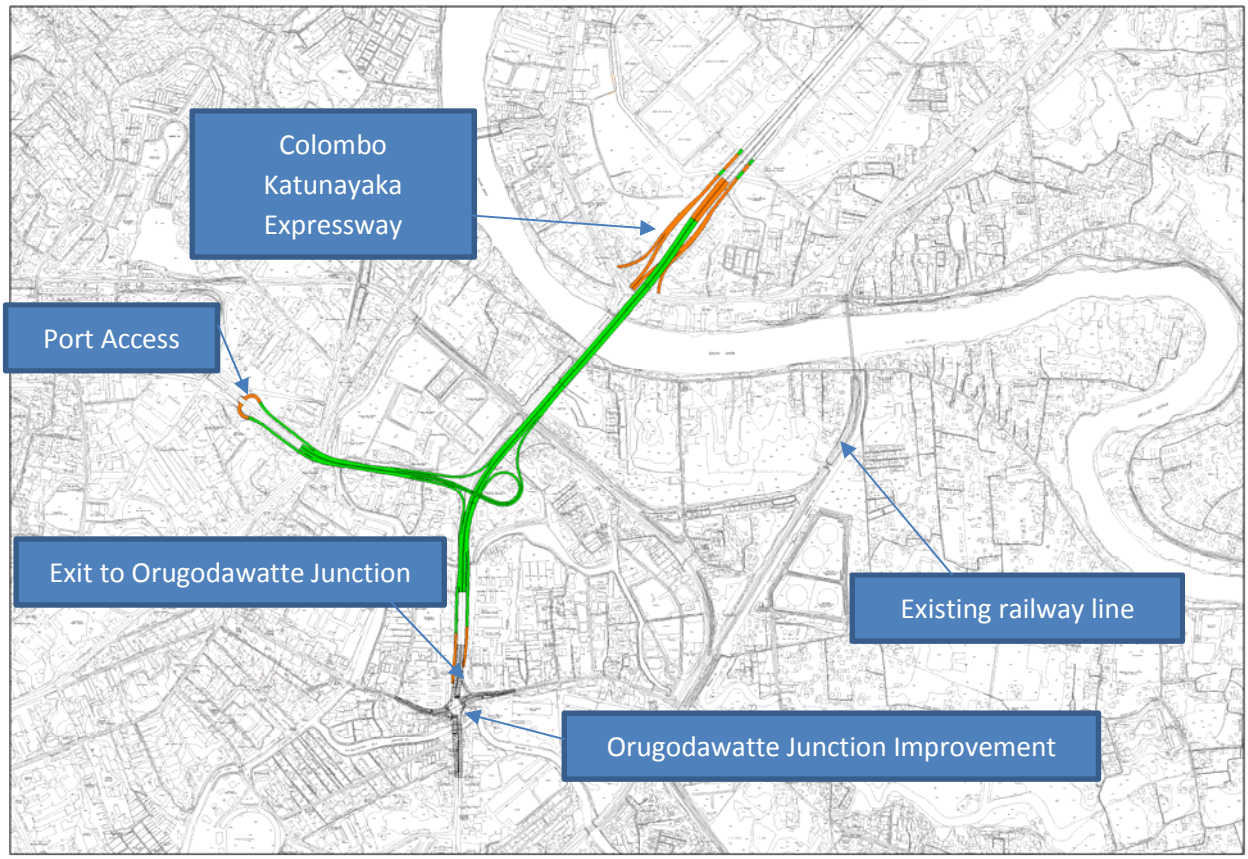


Figure 3-2 Alternative B: Adjacent to New Kalani Bridge

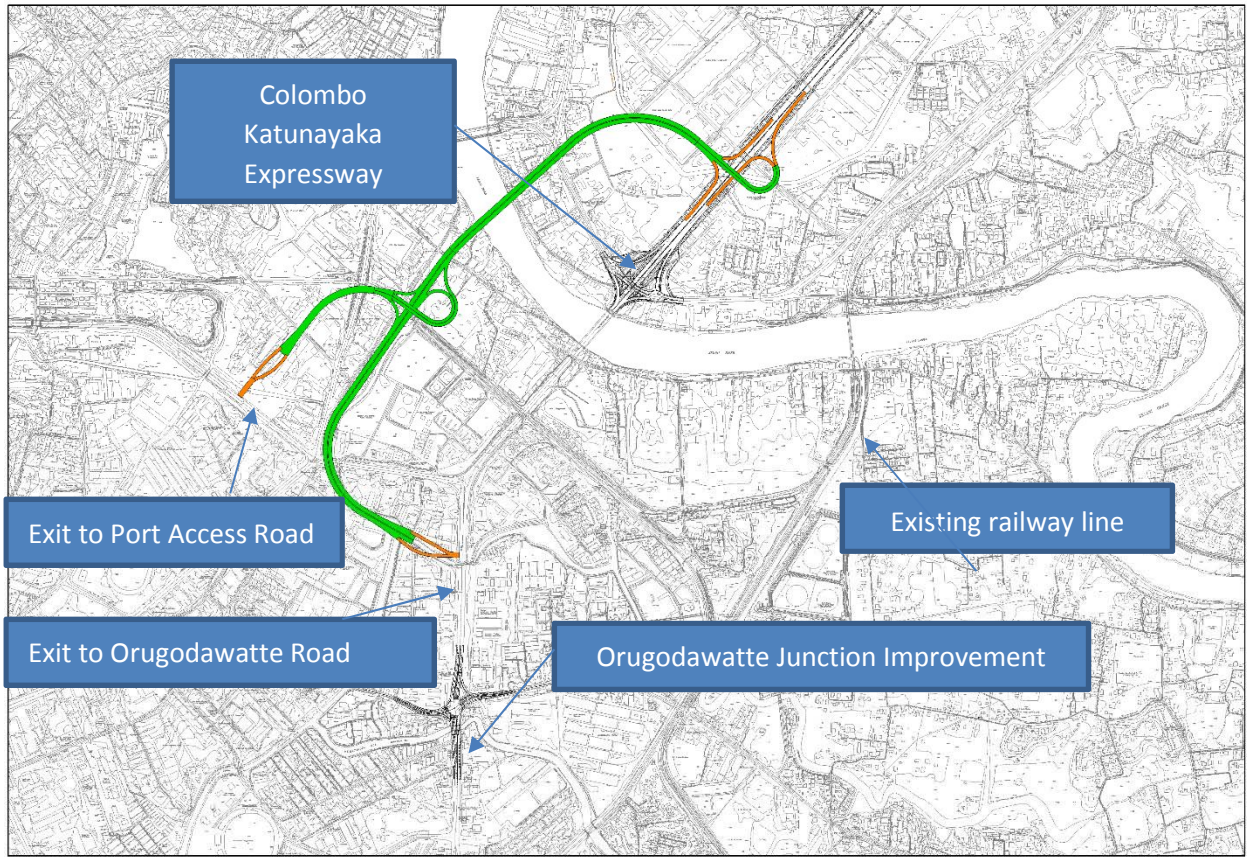


Figure 3-3 Alternative C: Above the existing canal trace

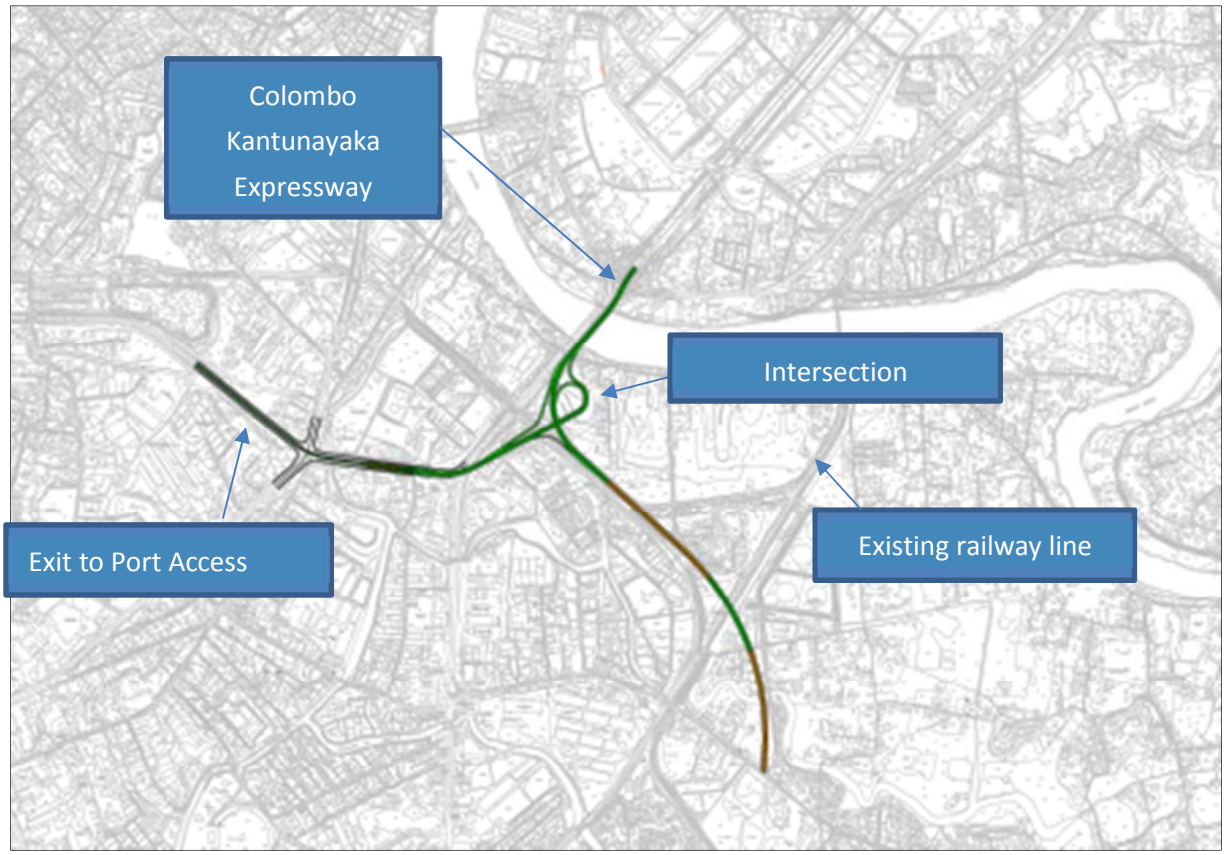


Figure 3-4 Alternative D: Above the existing road

Thought of alternative route candidates

Route A: The Expressway is constructed along the existing railway land in order to minimize the number of affected households.

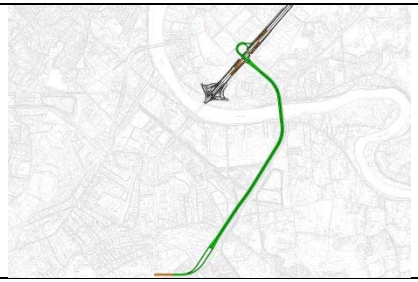
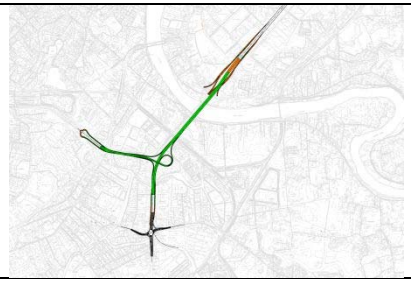
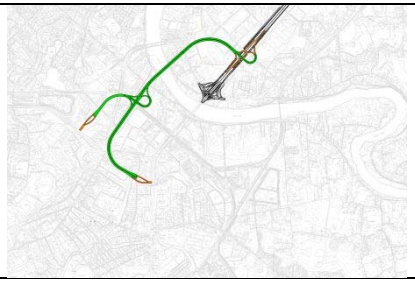
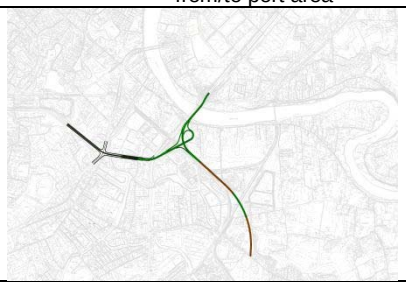
Route B: The Expressway is constructed along and above the Baseline Road in order to lead the vehicles using the Baseline Road to the Expressway, and to reduce traffic congestion in the Baseline Road.

Route C: The Expressway is constructed above the existing canal in order to minimize the number of affected households.

Route D: End point of the Expressway is connected to the Avissawella Road so that the vehicles using the Avissawella Road can access to the Expressway directly without passing Orugodawatta Intersection.

Further details of alternatives is presented in Annex 3.1.

Table 3-1 Comparison of Alternatives

	Alternative A	Alternative B	Alternative C	Alternative D
Summary	• Main line: along the existing railway • Junction: Main line - CKE • On/off ramp: from/to Baseline Road	• Main line: along and above the existing road • Port access: above the existing road • Junction: Main line - Port Access Road • On/off ramp: from/to Baseline Road from/to port area	• Main line: above the existing canal • Port access: in the commercial area • Junction: Main line - CKE Main line - Port Access Road • On/off ramp: from/to Baseline Road from/to port area	• Main line: along the existing road and in new area • Port access: above the existing road • Junction: Main line - Port Access Road • On/off ramp: from/to Avissawella Road from/to port area
Plan View				
Length	• Main line: 2.2 km	• Main line: 1.6 km. • New Port Access Road: 0.7 km	• Main line: 2.3 km. • New Port Access Road: 0.5 km	• Main line: 2.0 km. • New Port Access Road: 1.4 km
Future Urban Expressway Network Plan	• The Project (first step of the urban expressway) is connected to CKE by a junction (not directly). • Port Access Road as a part of urban expressway is not provided. • Future extension to the south can be made but the distance would be longer (higher cost and increased land acquisition). **Poor**	• The Project (first step of the urban expressway) is connected directly to CKE. • Port Access Road as a part of urban expressway is provided. • Future extension to the south will be easily made. **Good**	• The Project (first step of the urban expressway) is connected to CKE by a junction (not directly). • Port Access Road as a part of urban expressway is provided. • Future extension to the south can be made but the distance would be longer (higher cost and increased land acquisition). **Poor**	• The Project (first step of the urban expressway) is connected directly to CKE. • Port Access Road as a part of urban expressway is provided. • Future extension to the south can be made but the distance would be longer (higher cost and increased land acquisition). **Poor**
Traffic Congestion on Existing Traffic	• Reduction of traffic congestion in Baseline Road is expected since the vehicles running Baseline Road can easily access to the Project Road. • Reduction of traffic congestion in A01 (existing New Kelani Bridge and Roundabout at the end of CKE) is expected since most vehicles from/to CKE use the Project Road. • Reduction of traffic congestion in A03 road is limited in the project area, since the new road is far from A03 road. **Fair**	• Reduction of traffic congestion in Baseline Road is expected since the vehicles running Baseline Road can easily access to the Project Road. • Reduction of traffic congestion in A01 (existing New Kelani Bridge and Roundabout at the end of CKE) is expected since most vehicles from/to CKE use the Project Road. **Good**	• Reduction of traffic congestion in Baseline Road is expected since the vehicles running Baseline Road can easily access to the Project Road. • Reduction of traffic congestion in A01 (existing New Kelani Bridge and Roundabout at the end of CKE) is expected since most vehicles from/to CKE use the Project Road. **Good**	• Reduction of traffic congestion in Baseline Road is expected since vehicles moving towards the east side could use Project Road instead of Baseline Road. • Reduction of traffic congestion in A01 (existing New Kelani Bridge and Roundabout at the end of CKE) can be expected but is limited since only those moving to the east side would use Project Road. • Traffic congestion in Avissawella **Poor**

	Alternative A		Alternative B		Alternative C		Alternative D	
							Road will worsen.	
Construction Period	• 36 months	Fair	• 36 months	Fair	• 36 months	Fair	• 36 months	Fair
Constructability	• Traffic control is not required in Baseline Road during construction.	Good	• Traffic control is required in Baseline Road during construction.	Poor	• Traffic control is not required in Baseline Road during construction. • Construct of the viaduct in the existing canal is required.	Fair	• Traffic control is not required in Baseline Road during construction.	Good
Environmental Impacts	• Impact on noise and air quality will be increased along the Project Road since the Project Road will be newly constructed in residential and commercial area.	Poor	• There is a possibility that impact on noise and air quality will be increased along the Project Road, although the Project Road will be constructed along and above the existing road	Fair	• Impact on water quality of the existing canal will be created during construction. • Impact on noise and air quality will be increased along the Project Road since the Project Road will be newly constructed in residential and commercial area.	Poor	• Impact on noise and air quality will be increased along the Project Road since the Project Road will be newly constructed in residential and commercial area.	Poor
Social Impacts	• 355 structures including 12 large scale structures are affected. • Relocation of Automobile Engineering Training Institute is not required.	Fair	325 structures including NAITA Main workshop, Atomic Energy Authority, Amman Kovil are affected. Altogether 4 large buildings. • Relocation of the above large buildings is required.	Fair	• 404 structures including 9 large scale structures are affected. • Relocation of Automobile Engineering Training Institute is not required.	Fair	• 394 structures including 3 large scale structures are affected. • Relocation of Automobile Engineering Training Institute is not required.	Fair
Evaluation			**Recommended**					

Note: Number of structures for Alternative B based on recent social surveys is 449. Affected number of structures in the table is based on satellite imagery. In Alternative B higher number of households are indicated from survey because multiple houses exist inside visibly single housing units which cannot be identified by satellite pictures. Also the current survey figures indicates the actual ground situation.

REASONS FOR SELECTING ALTERNATIVE B

Technical Reasons

1. Urban expressway connecting Colombo northern and southern areas is provided.
2. The Project Road (first step of the urban expressway) is connected directly to CKE.
3. Port access as a part of urban expressway is provided.
4. Reduction of traffic congestion in the project area such as A1, A3 and Baseline Roads is expected.

Social and Environmental Reasons

5. Optimum number (comparably second highest) of large buildings have to be removed.
6. Least number of settlements to be removed (According to the results of satellite imagery analysis)
7. Minimum water quality impacts, as roads are not built directly over canals
8. Alternative B uses existing road trace as far as possible thus minimizing the impacts on residential houses.

Social Impact Minimisation through Alternatives

Various route alternatives were identified in terms of social impact (i.e. displacement of social infrastructure) which has been represented in the figure below. It is seen that Alternative-B has minimum impact as it mostly follows the existing road traces.

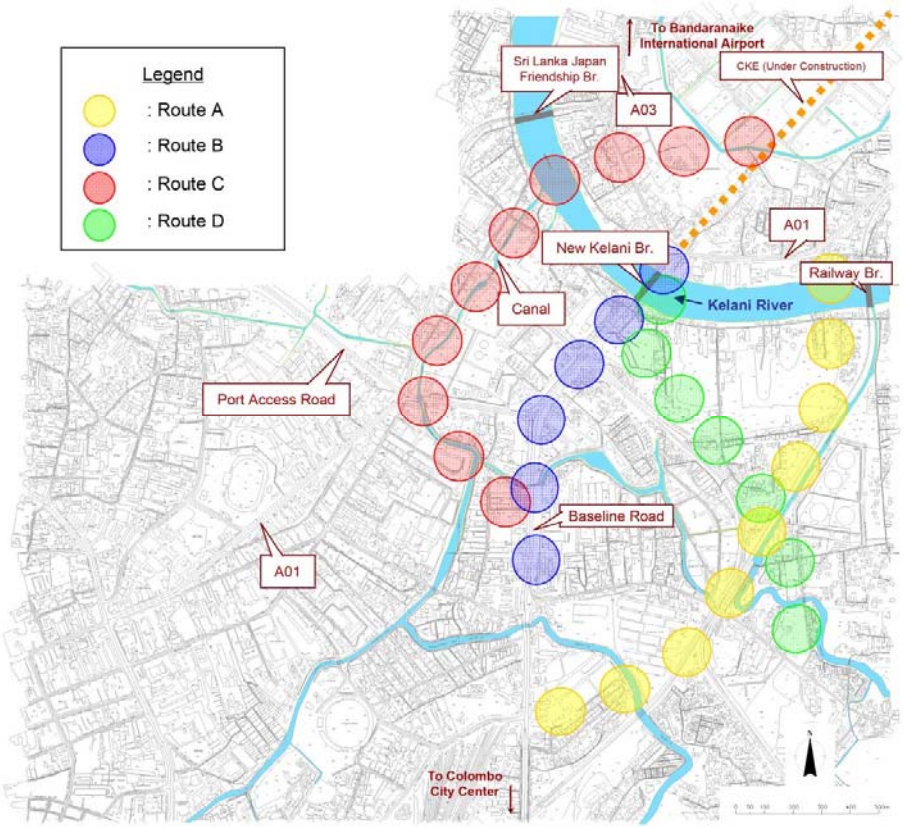


Figure 3-5 Alternative D: Route Alternatives in Social Perspective

The effect of not implementing the project

Three bridges across the Kelani River have been always congested, especially in morning and evening peak hours, due to a high concentration of vehicles on the bridges.

Traffic volume of the Baseline Road near Orugdawatta Intersection is 95,801 veh/day (89,833 pcu/day) in 2012. The traffic capacity on the Baseline Road, which has 6-lane carriageway, is not enough even in the present condition.

In addition, it is forecasted that traffic volume on the Kelani Bridge will increase and the Bridge will become a traffic bottleneck in this area, since some projects such as Colombo - Katunayake Expressway (CKE) (completed in 2013), Outer Circular Highway (OCH) (will be completed in 2015) and the expansion of the Colombo Port, phase one scheduled to open in August 2013.

CKE is connected to the existing New Kelani Bridge, and ramps are connected to two adjacent roundabouts. Traffic congestion in this area will be worsened since a large number of vehicles using CKE, existing New Kelani Bridge, A01 Road and A03 Road will concentrate in this small area.

Therefore, if this project is not implemented, the negative effect on the economy as well as the environment (for example, increase of CO2 emission) will occur in this area.

3.1.2 Construction Alternatives

Various bridge types, ramp arrangements, interchange arrangements, have been selected as construction alternatives and summary of details are given below;

For bridge types following criteria have been considered.

Impact on the river flow:
As the main bridge will be located downstream of the flood plains, it is important not to disturb the river flow, in order to avoid any risk of flooding. The span arrangement of the main bridge will thus have to be adjusted in order to minimize the number of piers located in the river bed. It was noted that by adopting a design which does not make a pier in the Kelani River from environmental considerations, it is not causing harmful interference to the flow of the river

Impact on the existing bridge:
The main bridge will be located 10m upstream of the existing crossing. However there is no impact on the existing bridge since the piers will not be constructed in the river in this project.

Environmental considerations in structural design:
In order not to affect the flow of the river, the designers do not want to build a pier in Kelani River. Regarding the interchange and ramps, the designs were done to avoid the existing structure as much as possible

Constructability of the bridge foundation:
Construction of the bridge foundation in the river bed will be a challenging task as the rock layer on which the substructure can be founded is located 30 meters deep from the actual ground level of the existing bridge according to literature. Therefore the bridge type, without piers in the river was selected considering constructability.

Location of piers on the CKE side:
The current roundabout located near the northern abutment of the New Kelani Bridge is highly congested, as it gathers the traffic coming or going to the Northern part of the country. Therefore construction of piers in the intersection is avoided.

Construction period:
The CKE will start operating before the end of the year 2013, and it will bring additional traffic into an area where road congestion is already a major issue. It is thus essential to select a type of bridge which can be built quickly, so as to minimize the period during which the traffic congestion generated by the new CKE will impact the area. Reducing the construction period is thus one of the main criteria to ensure a successful project implementation. Therefore steel box Girder Bridge was selected in order to shorten the construction period especially above the existing road.

Aesthetics:
The main bridge will cross the Kelani River just after the New Kelani Bridge Interchange, which will connect the International Airport to the Central Area of Colombo, becoming a new landmark of the city. As it will be one of the first major edifices that tourists will see when arriving at Colombo, it will have to symbolize the fast growing development of the country and its beauty. Emphasis should thus be put on the aesthetic aspects of the main bridge. Therefore an extra-dozed bridge which has a symbolic tower and cable arrangement was selected.

3.2 Description of the proposed project - Selected Site

3.2.1 Project Location,

Project Location is presented in Figure 3.5 below. Area bounded by the GN divisions affected by the project was considered as the project area and the project influential area was considered as the respective DS divisions as outlined in Table 3.2 below.

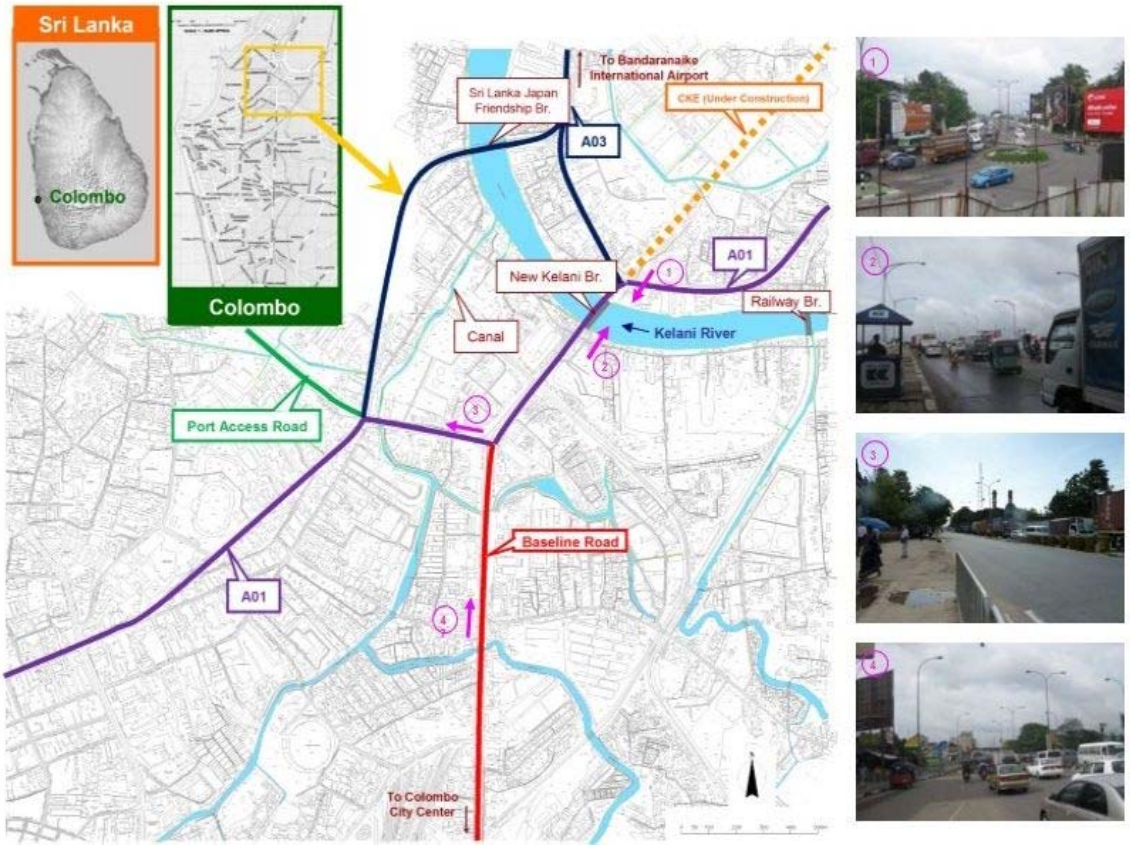


Figure 3-6 Project Location Map

3.2.2 Administrative Divisions

Table 3-2 Project affected administrative divisions

District	DS DIVISION/MC or PS	GN Division
Colombo	Colombo- Colombo MC	Navagampura Grandpass North Bloemendhel
Colombo	Kolonnawa- Kolonnawa UC	Wadullawatte Orugodawatte Sedawatte
Gampaha	Kelaniya- Peliyagoda UC	Peliyagoda Gangabada East

MC= Municipal Council PS= Pradesheya Sabha DS= Divisional Secretariat GN= Grama Niladhari

3.2.3 Bridge Aesthetics

To gain an iconic value to the proposed new bridge across Kelani river facets of national heritage represented by national symbols and other portrayals such as the Kandyan Dancer, Traditional mask of devil (*Gara Yakka*) , national flag, the symbol of the republic, national bird (jungle fowl) and the national flower (*Nil mahanel*) have been made use of.

Portrays of the proposed new bridge along with the national symbols present on the next page.



Figure 3-7 Portrait of the proposed bridge- closer view

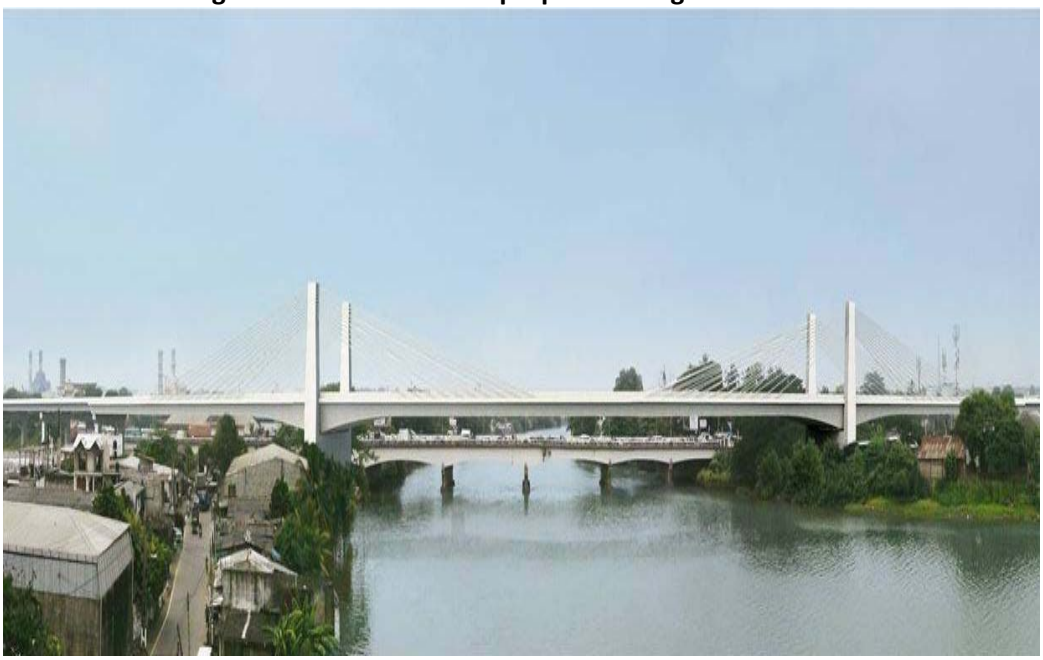


Figure 3-8 Portrait of the proposed bridge- distant view Along with the existing bridge



Figure 3-9 Facets of National Heritage and Symbols Used in the Aesthetic Design of the Bridge

3.3 Location map/s of appropriate scale indicating the road trace and surrounding land use.

Location map showing surrounding land use map of the project area is given in Figure 3.9 below.



Figure 3-10 Land Use Map of the Project Area with Project Location

Source: Department of Survey

3.4 The layout plan of the project at appropriate scale.

Layout Plan for the project area (for the Selected Alternative) is presented in Figure 3.10 below.

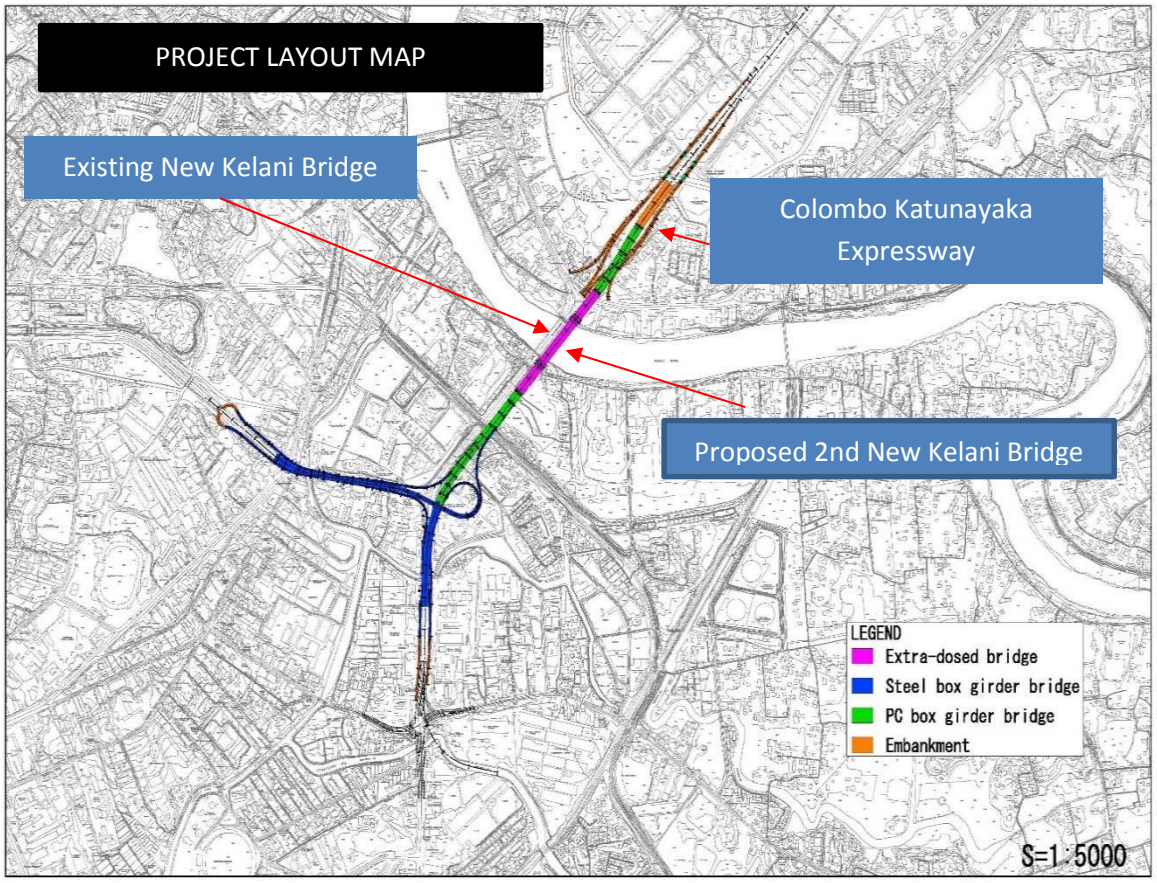


Figure 3-11 Layout Plan for the Project Area

Detailed layout drawings are presented in Annex 3.2.

3.5 Design Details of all Bridge Components Including Design Details of the Bridge, length of traces etc.

Design details of the project components are as follows;

3.5.1 Bridge type:

Overall, each section of the project can be categorized in the following four types of sections as given in figure 3.11.

- Main bridge (the 2nd New Kelani Bridge)
- Approach bridges (Separated section)
- Approach bridges (Overlapped section)
- Ramps

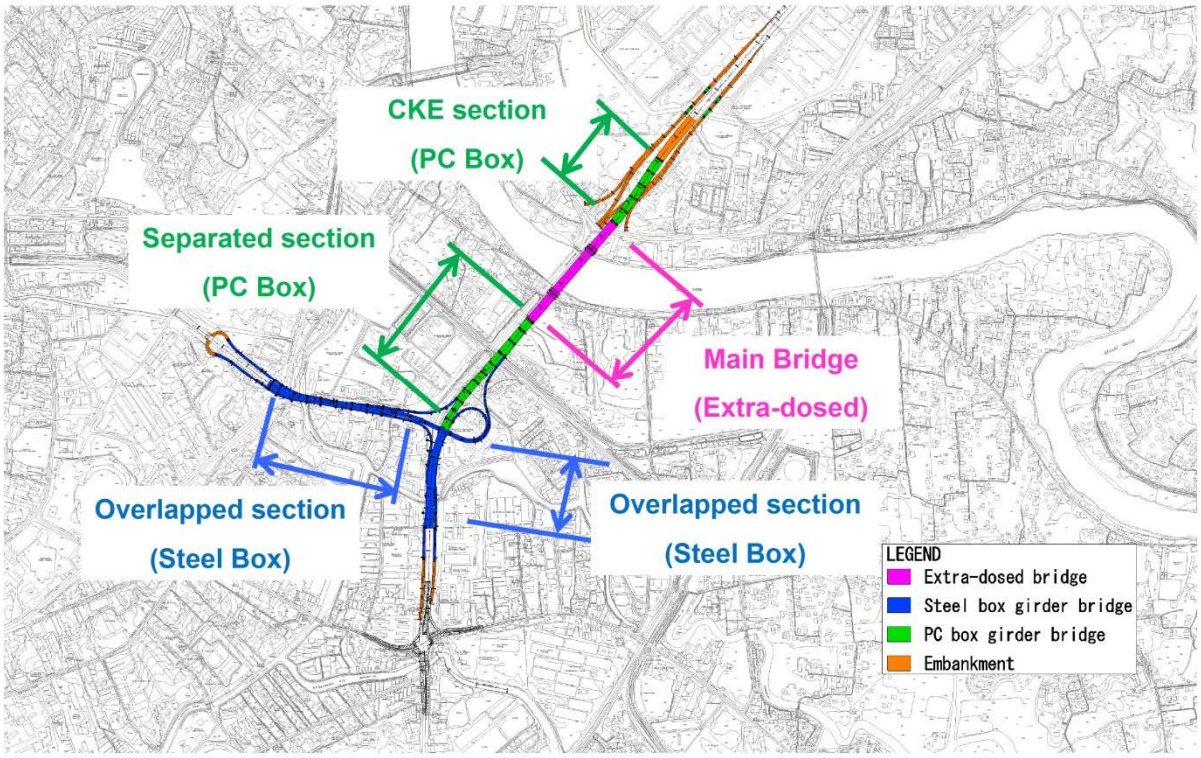


Figure 3-12 Bridge sections of proposed project

- **Main bridge**

The main bridge will be an extra-dosed bridge which crosses Kelani River just downstream of the New Kelani Bridge Interchange, relieving the existing New Kelani Bridge of its increasing traffic. As the CKE will be a six-lane expressway, the carriageway of the Main Bridge will be of six (6) lanes.

The main bridge will be with a single span which has been set at 185m in order to cross the Kelani River without having piers in the river. In order to balance the moments in the different spans during the operation of the bridge, and to ensure positive support reactions on the end piers, the side spans were set at 115m (62% of the main span). The width of the main bridge will be 30.4 m which include six lanes with a total width of 26.5 m and 1m center median (please refer Annex 3.1 for design details and the comparison of different design types for the main bridge).



Figure 3-13 Main bridge across Kelani River (Extra dosed type bridge)

The separated section consists of approach bridges located on both sides of the main bridge, which will be built next to the existing road, without overlapping it. The carriageway of those approach bridges will have six traffic lines, as the separated sections will be built as an extension to the main bridge.

At this stage of the study Precast Box Girder bridges are suggested as the most suitable option for the approach bridges in the separated section. The width of the approach bridges will be 28.4 m and the span length will be 40~50 m (please refer Annex 3.1 for design details and the comparison of different design types for the approach bridges).



Figure 3-14 Images of Precast Box Girder bridges

- **Approach bridges (Viaducts, Overlapped section)**

The overlapped section consists of the approach bridge located between the Kelanitissa Ramps and Orugodawatta Interchange, and the approach bridge located between the Kelanitissa Ramps and the Ingurukade Interchange. Both approach bridges will be built over the existing roads. The width of the bridges will be 21.4 m which includes 19.5 m for four traffic lanes. Bridges of the overlapped sections will be constructed as Steel Box Girder bridges with a span of 40~50 m (please refer Annex 3.1 for design details and the comparison of different design types for the approach bridges).

- **Ramp Bridges**

Ramps Bridges will be used at every interchange of the Project to connect the new infrastructure to the existing road network. A Half Clover Type will be used for the Ingurukade Interchange, a Trumpet A Type for Kelanitissa ramps and side ramps for the New Kelani Bridge interchange. The ramp bridges have been designed with steep longitudinal slope, sharp curves, so as to reduce the land acquisition required for their implementation. Their alignment has been adjusted so that their piers avoid the existing roads and their construction does not impact the traffic on the existing roads.

In this feasibility study it is recommended to construct the ramps with Steel Box Girder. The ramp bridges will have a width of 6.9 m with two traffic lanes and a span of 30~60 m (please refer Annex 3.1 for design details and the comparison of different design types for the ramp bridges).

At this level of the study it has been recommended that all approach roads are placed as viaducts, thus no embankments are required in the project. The only filled sections will be the entry and exit ramps of the approach bridges which merges the elevated bridge sections and ground level roads (existing roads).

- **Drainage provisions**

Storm water drainage provisions will be kept in all bridges and the runoff will be discharged into the Kelani River through roadside drainage structures.

3.6 Methodology of construction

3.6.1 Whether cofferdam is envisaged, sources and quantities of raw material required and locations and quantities of disposal of waste.

Whether Coffer Dammining is Envisaged

Major coffer dams may not be necessary as there are no piers in the river sections except for the end piers. Some coffer dams may be necessary for the end piers. The need will depend on the contractors' method of construction.

Sources and Quantities of Raw Materials Used

All construction materials will be procured as a commercial product basically, and it is not intended to operate quarries, burrow pits or metal crushers directly under the project. However all materials will be obtained from approved sites where EPL and other certificates are available.

Approximate Quantities of Construction Materials

Various road construction materials will be required for the construction, and out of those which are important in an environmental point of view are the materials which will be obtained from natural sources. These materials are rubble (9" for foundation), sand and metal (1" and 3/4") for aggregates and following approximate quantities of each material will be needed for construction work and they have to be sourced from the approved sources (e.g. quarries/burrow pits with EPL, sea sand from SLLRDC sand stockpiles etc.) "

Rubble (9") = 1,650 m^3

Metal (3/4") = 71,000 m^3

Sand = 47,000 m^3

Cement = 38,600 MT

Earth work = 91,000m^3

These amounts were estimated from the bill of quantities provided for project components taking into account rubble and cast in situ concrete components. Soil quantities for coffer damming cannot be estimated at this stage.

Method of Construction

Standard construction techniques in road construction will be employed in construction and most of the construction work will be machinery based. Some water based equipment such as pontoon mounted equipment may be used to work in Kelani River. There will also be a little amount of manual constructions such as providing finishes, lane marking etc.

3.6.2 Details of Construction Space

Construction space will be required along the project road. 10 m or 5 m from the project road edge will be leased during construction. This space is involved in the Resettlement Action Plan (RAP) as a project affected area. In addition, two construction yards will be secured at existing open areas. Demarcation of ROW and Construction Space are presented in Annex 3.3

3.6.3 Other facilities and services to be provided

This is an urban transport improvement project within Colombo city by using the existing road network to cause traffic flow improvement. The roadway and bridge access facilities and related services will be provided within the project scope.

There were some requests from stakeholders of the project area that a pedestrian crossing is very important to cross the existing bridge to reach Orugodawatte. This request was made during the stakeholder meeting held on 26 March 2013. The necessity of having a pedestrian crossing was noted by RDA and it will be included in the designs.

3.7 Requirement and availability of workforce (during construction) labor camps etc.

Construction work will be awarded to a recognized major construction contractor who will recruit a necessary labor force based on the stages of the project. It is not intended to construct temporary labor camps on site as space is limited. Laborers will be brought to site in shifts and there will not be any resident laborers in labor camps at the site. However a limited number of personnel will remain at the site to maintain the site offices and security of construction material and equipment.

The tentative project implementation schedule is presented below.

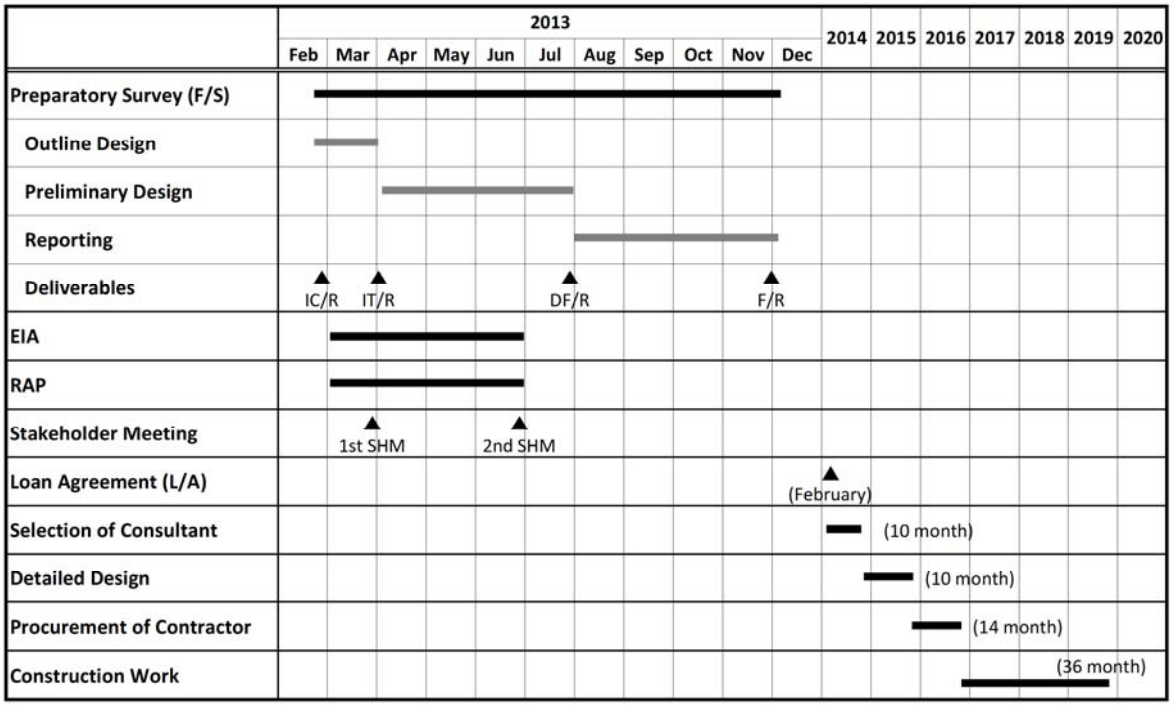


Figure 3-15 Tentative project implementation schedule

3.8 Methodology of operation of the project components, any maintenance requirements during the operational phase and methodologies to be used

Once the main bridge, the approach bridges and ramp bridges are commissioned they will require periodic routine maintenance. Such maintenance work will include cleaning of the road lanes, hydraulic structures, the roadside drains. These works will be handled by RDA through the hierarchical administrative system of Provincial Director, Chief Engineer, Executive Engineer, etc. Funding for such activities will be allocated from the operating budget for RDA. There is no significant impact to the physical environment or to the social environment from such regular maintenance activities.

The latest technology in bridge construction will be used for the project with the aim of minimum maintenance throughout the life span of the bridges. A provision of "Defect Liability Period" will be kept after commissioning the main bridge and other approach bridges where the contractor will be held responsible for carrying out repairs for any defects observed in the bridges. After this period RDA will take over the maintenance.

3.9 Project construction cost

The project construction cost will be approximately Rs. 60.9 billion. As stated in the introduction chapter the GoSL has requested financial assistance from the Government of Japan under JICA funding. Tentative project costs extracted from the JICA Preliminary Design Study are given below.

Table 3-3 Tentative project construction cost (based on preliminary designs)

Item	Description	Amount (LKR.)
1	Civil Works	34,769,000,000
2	Dispute Board	64,000,000
3	Price Escalation	1,968,000,000
4	Physical Contingency	3,680,000,000
5	Consulting services	5,237,000,000
6	Land Acquisition	5,108,000,000
7	Administration Cost	**4,066,000,000**
8	VAT	5,486,000,000
9	Import Tax	0
10	Interest during construction	154,000,000
11	Commitment Charge	367,000,000
	Total	**60,900,000,000**

4 DESCRIPTION OF THE EXISTING ENVIRONMENT

This chapter discusses the existing physical, biological and social environments around the project area. The information presented are based on the field observations and available literature. Baseline standards of ambient air quality, noise levels, vibration levels, and surface and ground water qualities were established by measuring levels of such selected environmental parameters.

4.1 Physical environment:

4.1.1 Topography including existing ground levels with respect to MSL along the trace,

Topography of the area consists of relatively flat terrain which consists of flood plain areas, slightly elevated areas of congested urban character. Existing approximate ground levels in the project area are as follows;

Built up areas	-	+2.2m MSL to 3.9m MSL
Marshes	-	+1.1m MSL or less
Flood Plains (Partially built up)	-	+1.4m MSL to 1.7m MSL

4.1.2 Geology and soil,

The main geological strata type is undifferentiated Proterozoic gneiss: poorly exposed under the thick residual soil, alluvium and paddy clay which belongs to "*Vijayan* complex". The geology map is presented in Figure 4.1

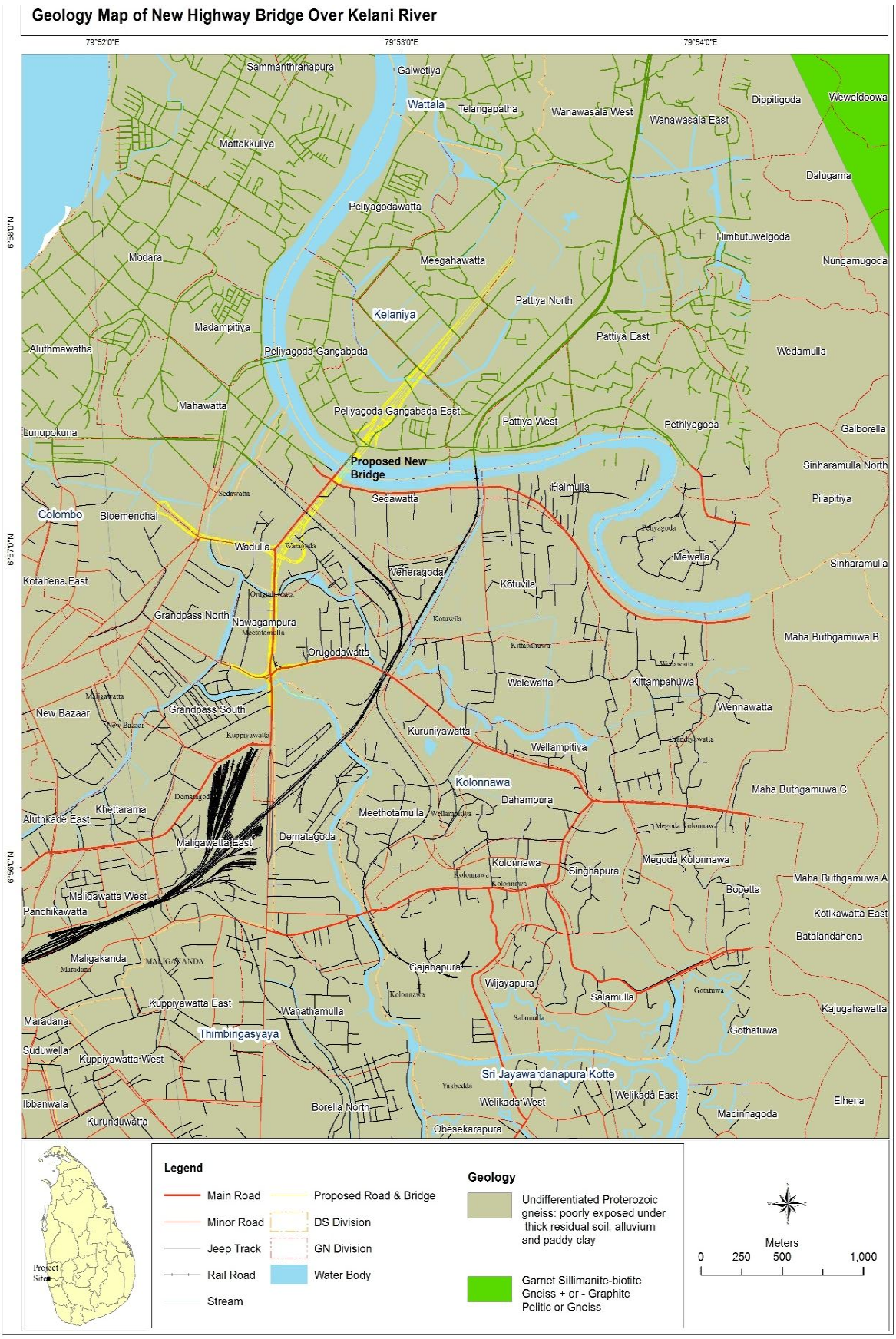


Figure 4-1 Geology Map of the Project Area (Source: Geology of Sri Lanka, P.G. Coorey)

Soil

The predominant soil types in the area are alluvial soils in variable drainage and texture in flat terrain and Red Yellow Podzolic soils with soft and hard Laterite in rolling and undulating terrain.

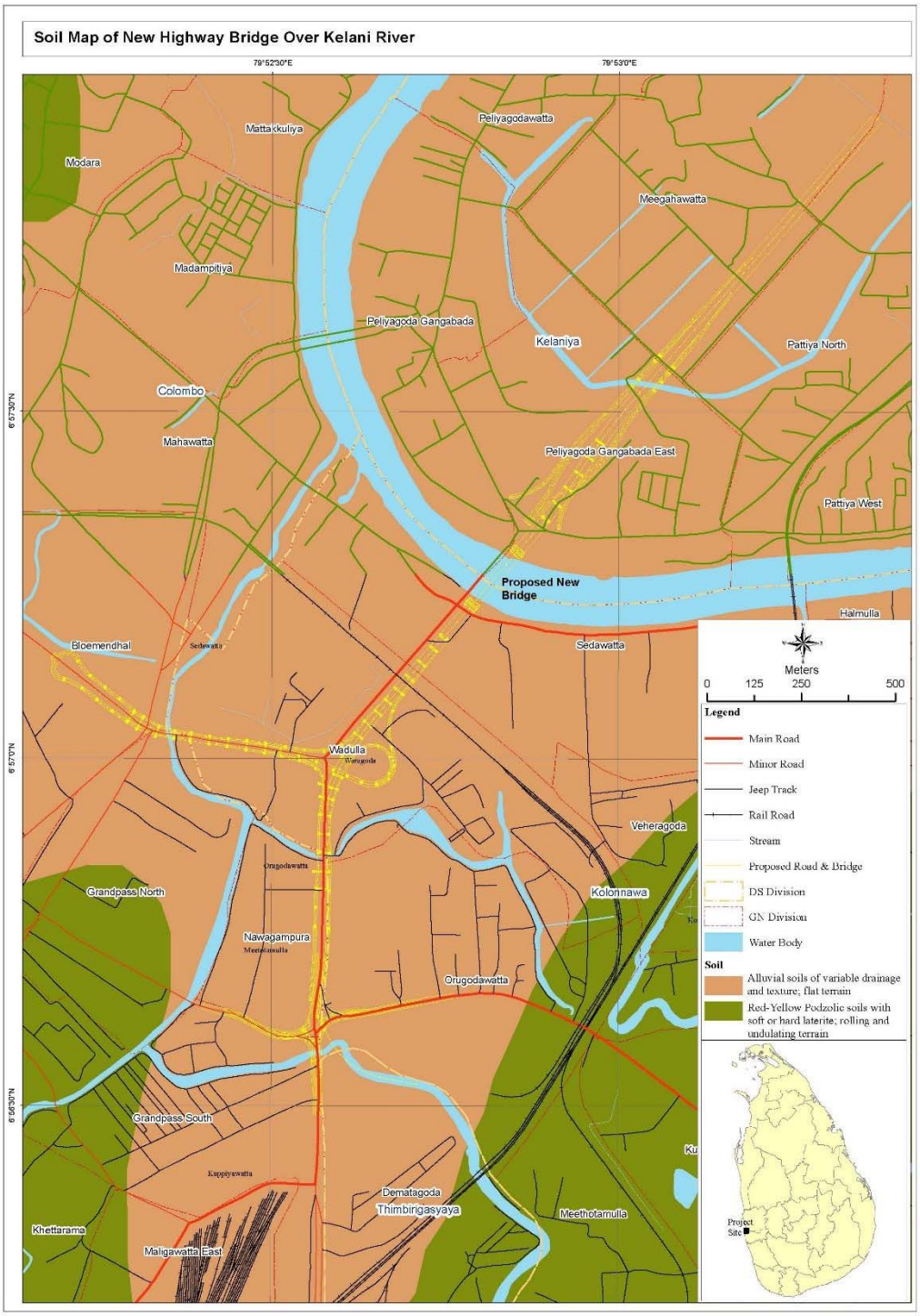
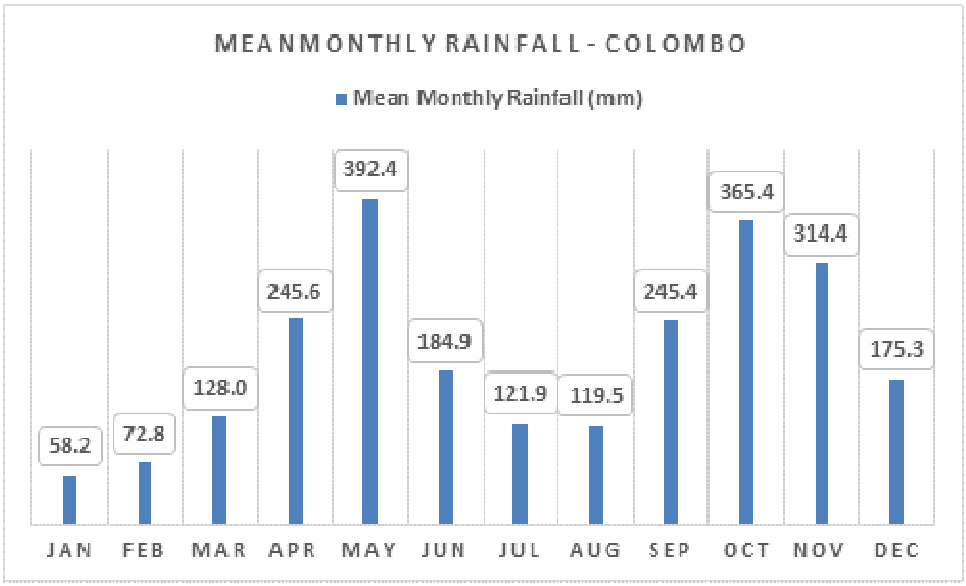


Figure 4-2 Soil Map of the Project Area (*Source: Panabokke C- Soils of Sri Lanka)*

4.1.3 Climate and meteorology etc.

4.1.3.1 Rainfall

Rainfall in Colombo conforms to a Bi-Model pattern where monsoon seasons take place in two phases, as May to August and October to January. In May, Colombo experiences its highest level of precipitation. Rainfall during this period is highest in May and June and begins to get lower in the middle months of July and August. In Colombo, dry season is a hot and humid lasting from December to March. The lowest rainfall level is observed during January. Long term average rainfall for Colombo along with average rainfall days are given in Figure 4.3 below.



Source: Department of Meteorology

Figure 4-3 Average Rainfall Data Colombo

4.1.3.2 Temperature

Colombo weather is fairly temperate throughout the year. However, from December to March the weather remains fairly dry. The average temperature in Colombo is 28 ºC and the maximum temperature is 31 ºC. The temperature during night time drops down to an average of 22 ºC between November and March, where the average temperature remains to be at 27 ºC. The highest temperatures seemed to have occurred in February and March when it rises up to 36ºC, still the average temperature remains at about 28 ºC, which is also equal to the average temperature all through the year. While the daytime temperature usually settles at 28 ºC to 29 ºC, the average daily minimum only falls to 25 ºC to 26 ºC. There is very little range in temperature both during the day and through the whole year. There is high humidity year round, and rainfall fluctuates depending on whether the season is wet or dry. Average high and low temperature values are portrayed in Figure 4.4 below.

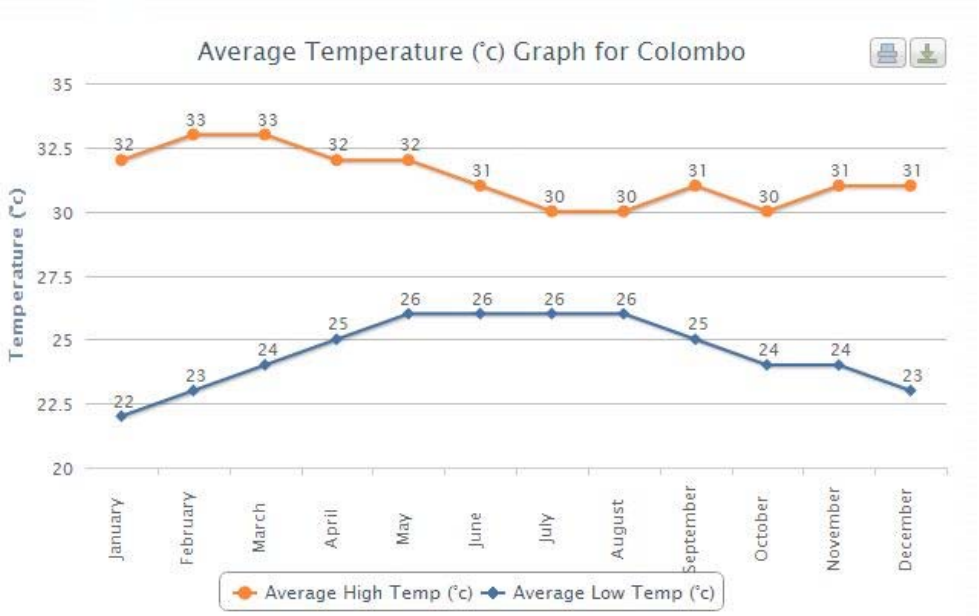


Figure 4-4 Average High and Low Temperature

4.1.3.3 Relative Humidity

Long term relative humidity values for Colombo is illustrated in Figure 4.5 below.

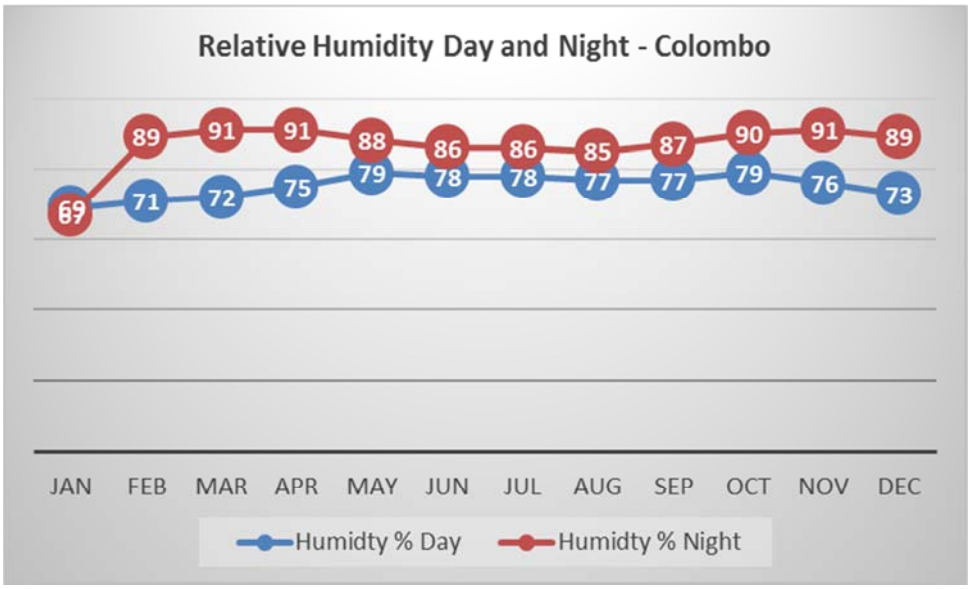


Figure 4-5 Day and Night Relative Humidity in Colombo

Source: Climate of Sri Lanka – Chandrapala L –Unpublished

4.1.3.4 Potential Evaporation

Long term mean potential evaporation for Colombo is given in Figure 4.6 below.

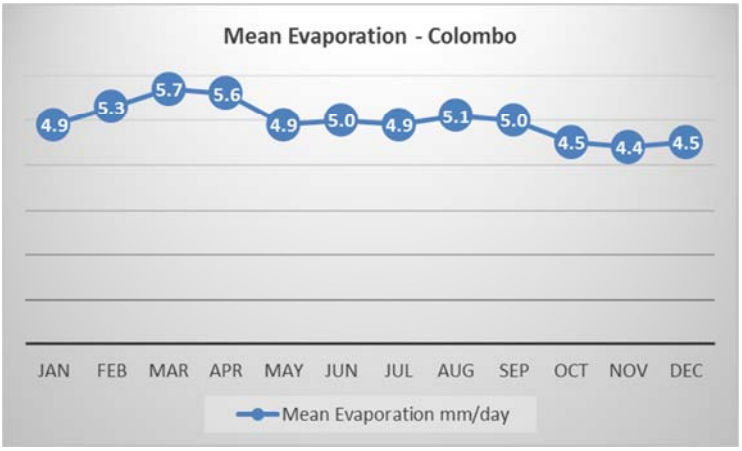


Figure 4-6 Mean Evaporation - Colombo

Source: Climate of Sri Lanka – Chandrapala L –Unpublished

4.1.3.5 Wind

Wind roses for the Colombo meteorological station is presented in Figure 4.7 below.

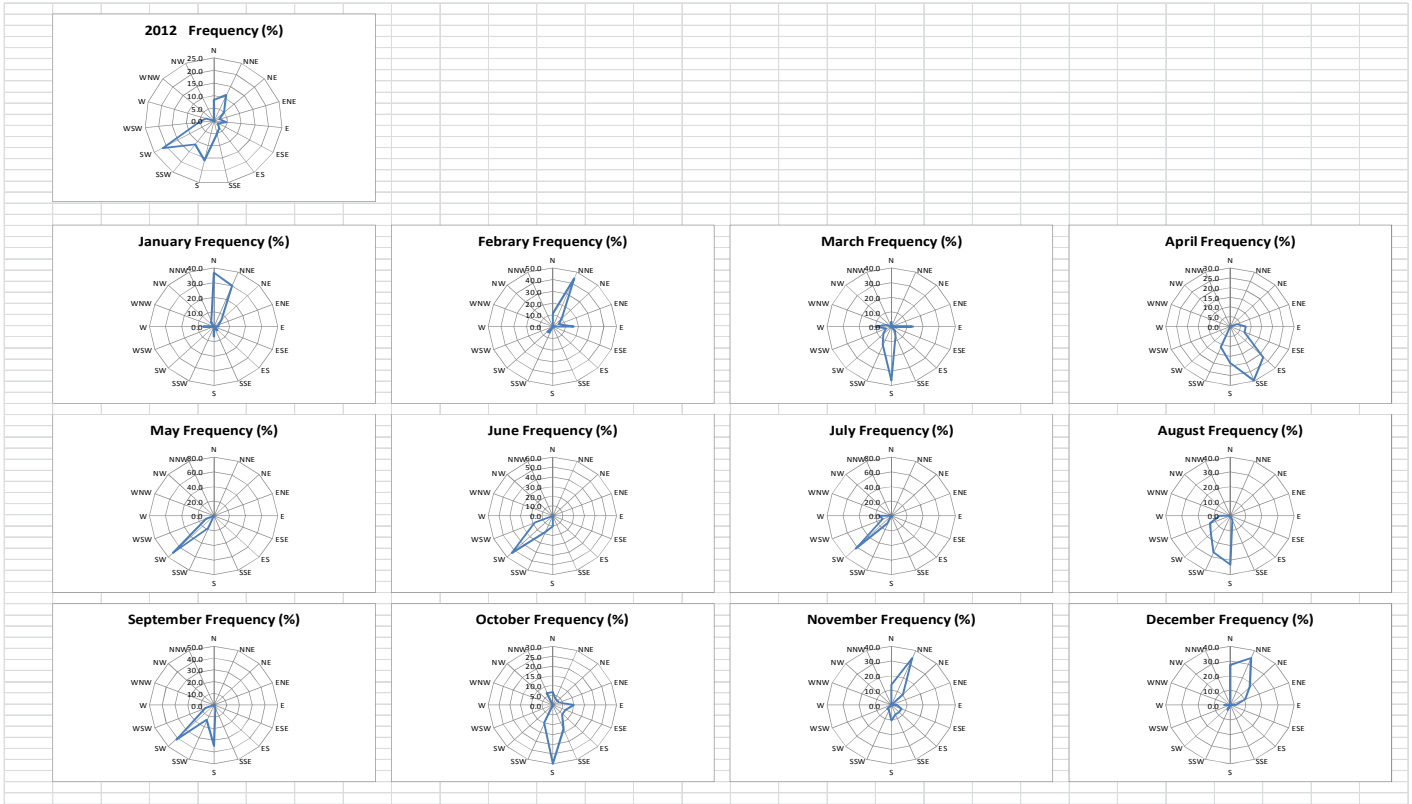


Figure 4-7 Wind roses for Colombo (2012)

4.1.4 Surface and groundwater hydrology and drainage

4.1.4.1 Drainage pattern across the proposed trace

The proposed bridge and the attendant road access improvement take place in the flood plain of the Kelani River and the surrounding high ground area. The drainage pattern of the project area is directed towards the Kelani River and then to sea through the Kelani River outfall. The drainage pattern of the project area is depicted in Figure 4.8 below.

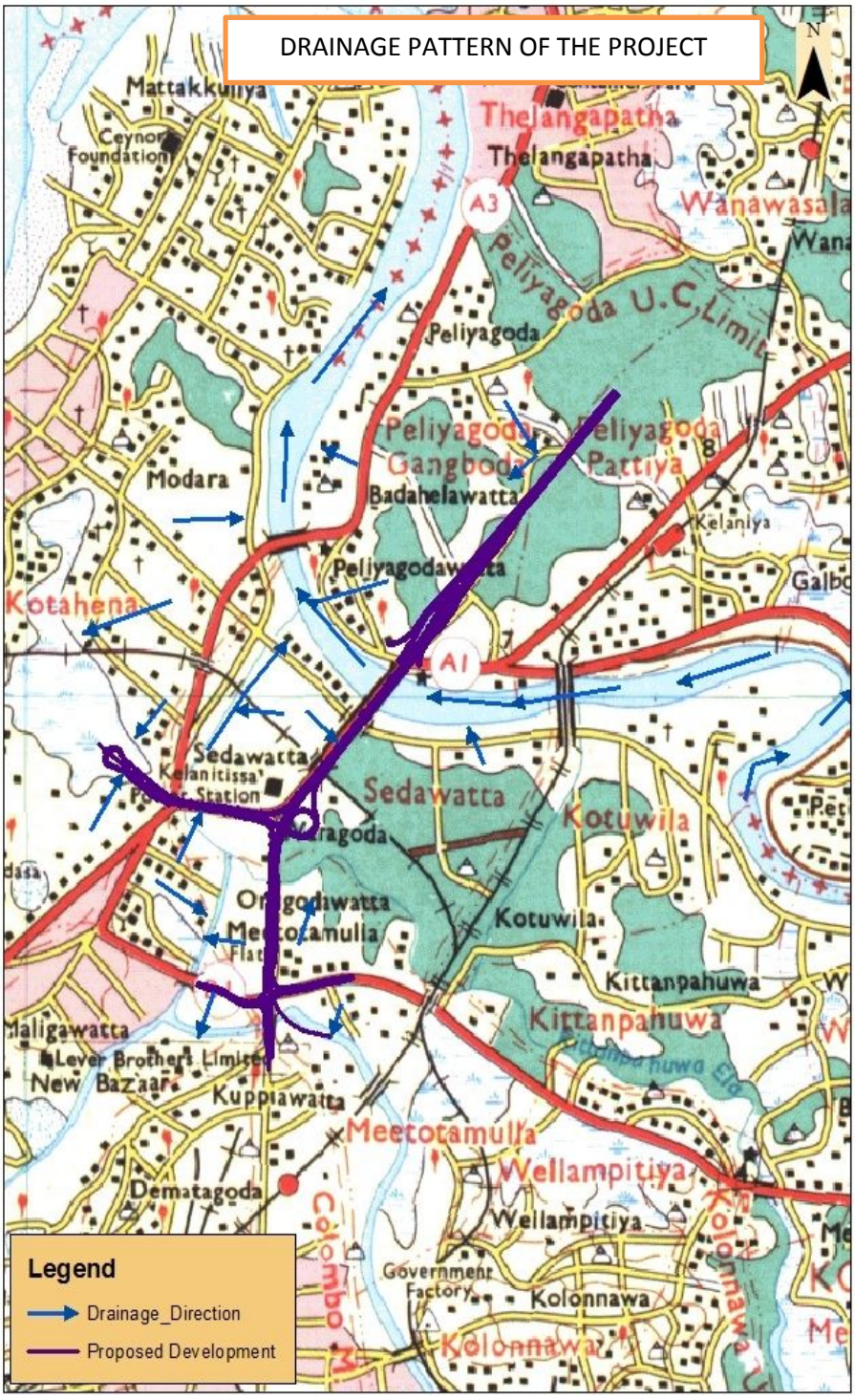


Figure 4-8 Drainage Pattern of the Project Area

Source: Survey Department Topography Maps and Google Earth Maps

4.1.4.2 River Condition and Cross Section of Bridge Site

River condition and cross section of the bridge on the site is presented below.

Table 4-1 River conditions at proposed bridge site

Item	Detail	Remarks
Location	Within 10m upstream of existing Kelani Bridge	
River Cross Section	See figure	
Main River Width	145m	
Minimum Riverbed Elevation	Between -5.0 to -6.0 MSL	
Average Velocity	-0.3 to 1.5 m/s	Tidal Fluctuations
Average Water Level Variations	-0.2 to 0.5 m MSL	Tidal Fluctuations
Flood Level (1989 Flood)	2.79 m MSL	Source: Irrigation Department; Data at Nagalagam Gauging Station (500m downstream of proposed bridge)
Riverbed Soil Condition	Main River – Sand, Clay, Silt Floodplain – Peat, Clay, Silt, Sand	

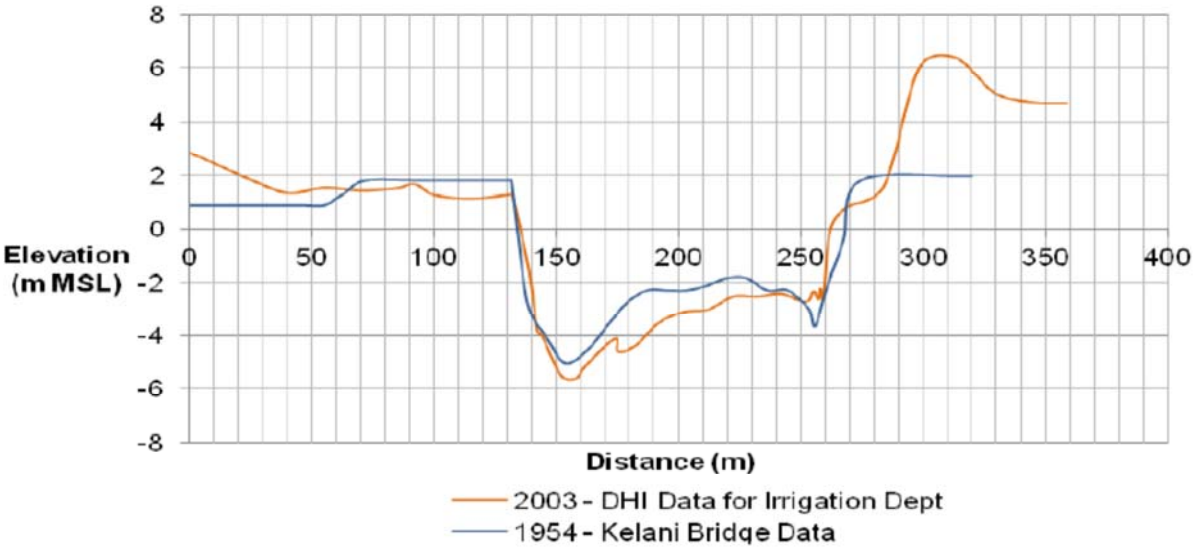


Figure 4-9 River cross section at existing Kelani bridge

4.1.4.3 Flood peak values, inundation levels and retention areas and inundation periods

Flood peak values for different return period for Kelani River has been computed in "Comprehensive Study on Disaster Management in Sri Lanka JICA and Oriental Consultants- March 2009". The relevant values are given in Table 4.2 below. The most relevant station to the present project is Nagalagam Street where 50 year flood peak amounts to 5349m^3/sec.

Table 4-2 Flood Peak Values for Kelani River

Return Period (Year)	Peak Discharge (m^3/s)			
	Glencourse	Hanwella	Kaduwela	Nagalagam
2	1,438	1,566	1,613	1,665
5	2,292	2,569	2,673	2,788
10	2,860	3,247	3,415	3,601
20	3,401	3,886	4,104	4,346
30	3,714	4,263	4,513	4,790
50	4,105	4,735	5,026	5,349

Note: Analysis was based on no river overflow and also no storage in flood basin

Source: Comprehensive Study on Disaster Management in Sri Lanka JICA and Oriental Consultants- March 2009

Flood peak value at Nagalagam Street (see figure 4.11 for location) for year 2005 extreme flood event has been estimated as 2000m3/sec in the study Event Based Flood Modeling in Lower Kelani Basin -M. M. G. T. De Silva1, S. B. Weerakoon*, Srikantha Herath, U. R. Ratnayake- SAITEM RSEA 2012 of which the flood hydrograph is given below in Figure 4.10.

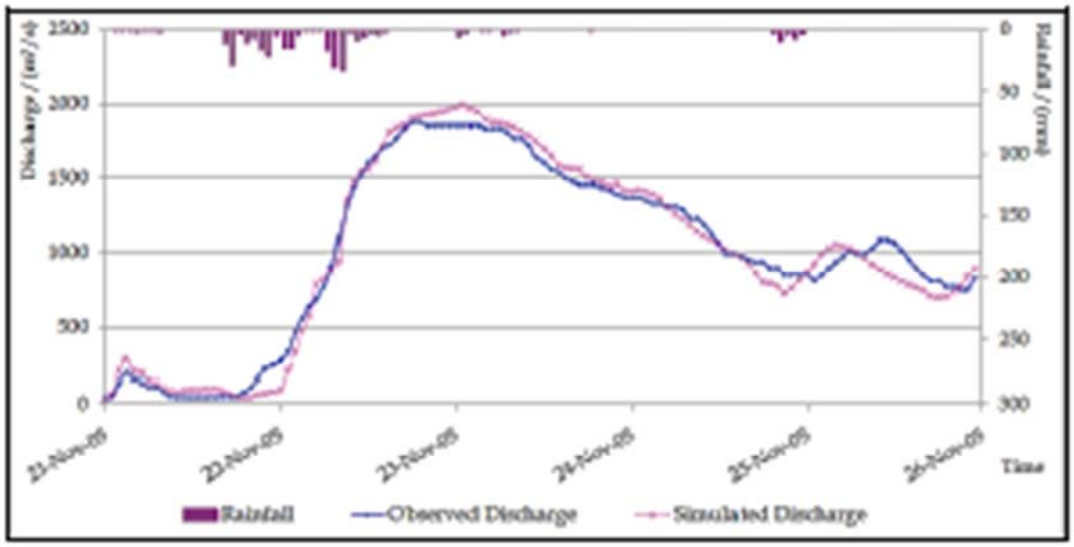


Figure 4-10 Flood Hydrograph for Nagalagam Street for 2005 Extreme Flood

Source: *Event Based Flood Modelling in Lower Kelani Basin -**M. M. G. T. De Silva1, S. B. Weerakoon*, Srikantha Herath, U. R. Ratnayake- SAITEM RSEA 2012***

Predicted flood levels for different return periods were obtained from the stations Nagalagam Street and Kelanimulla between which the proposed new bridge will be constructed. Using water level data available at the Irrigation Department Hydrology Division, flood frequency analysis was carried out. Please refer figure 4.11 for flood level information at above measuring stations and figure 4.12 for the locations of above measuring stations.

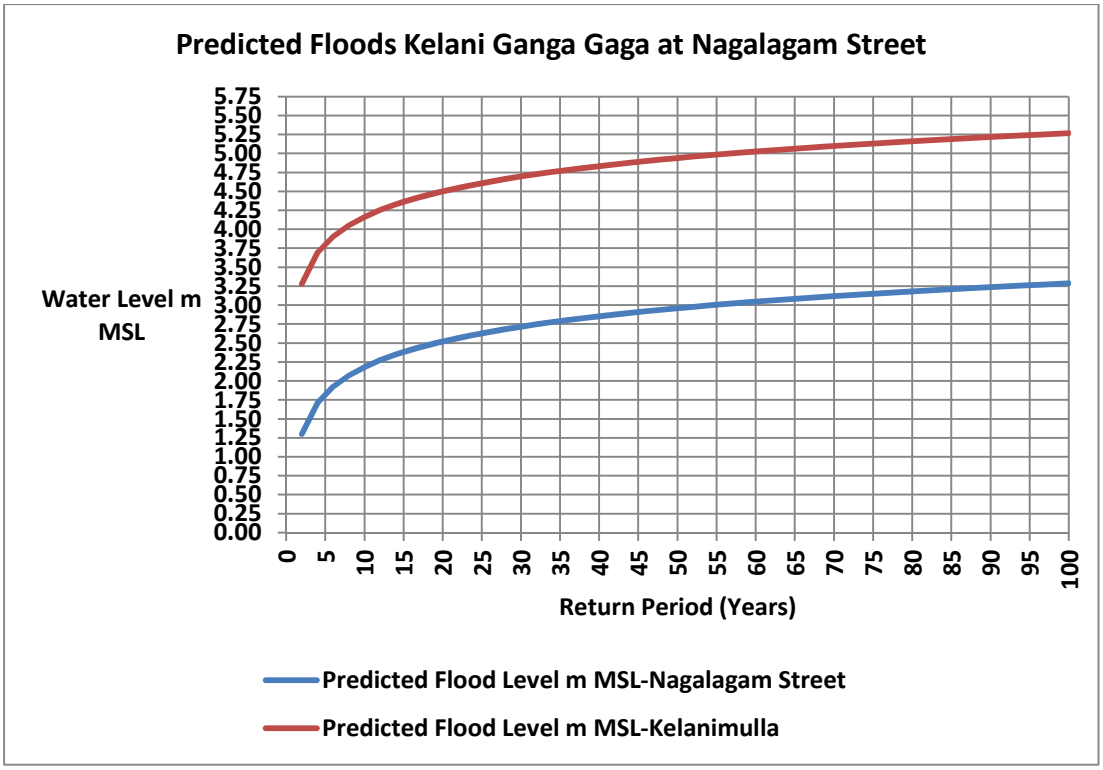


Figure 4-11 Flood Levels of Kelani River

Source: Base Data - Department of Irrigation

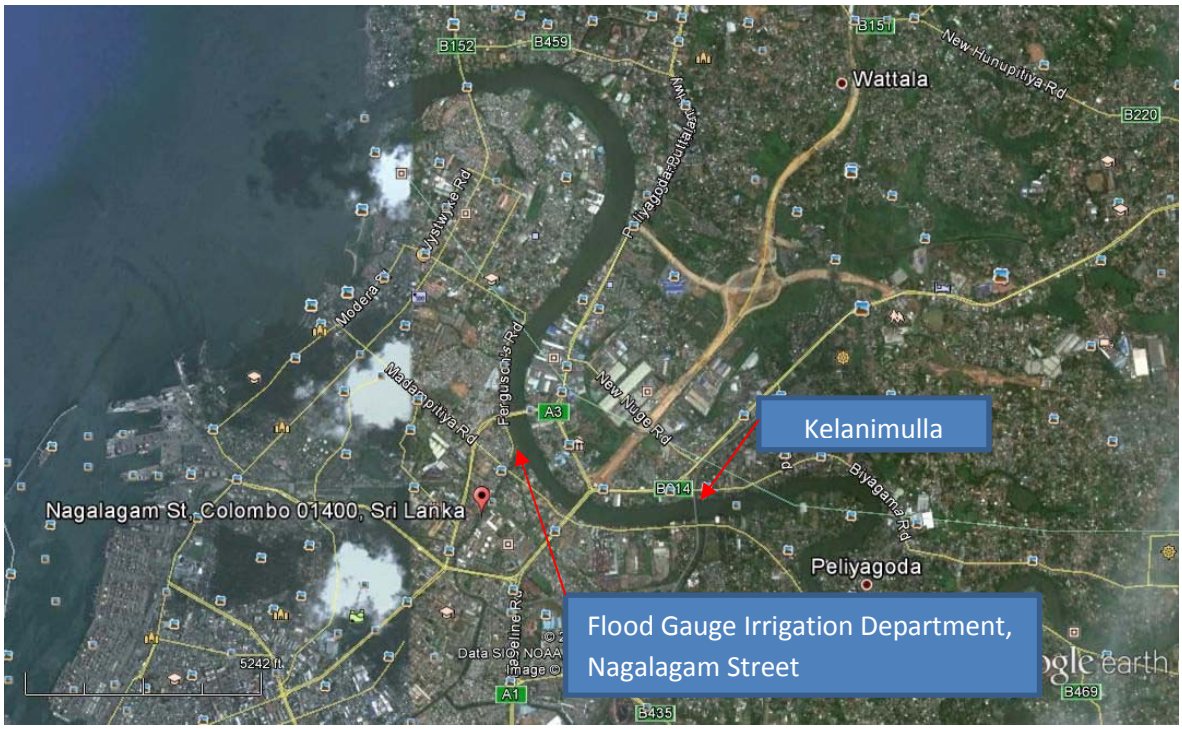


Figure 4-12 Location of Nagalagam Street and Kelanimulla flood level measuring stations

4.1.4.4 List of existing irrigation or drainage flood protection schemes encountered

There are several Irrigation and Flood Protection Schemes situated upstream of Kelani River, and one section of the flood band could be observed parallel to the railway line. Colombo South flood bund is one of the main flood protection structure in the project area.

4.1.4.5 Retention areas, marshlands or any other water bodies encountered

The main retention area is the flood plain of the Kelani River between North and South Kelani Flood Protection bonds. This area is called the unprotected area because it is a flood prone area. The main water body found in the area is the Kelani River and apart from this there are few drainage canals which are connected to Kelani River.

4.1.4.6 Drainage capacity of existing waterways and flood ways across the proposed trace

The main waterway in the project area is Kelani River and there are few small drainage canals which are generally stagnant and they have only a small flood detention capacity because of siltation, non-maintenance, minor widths and very low slope where water is almost stagnant. Drainage capacity of Kelani River is presented in table 4.3 below.

Table 4-3 Drainage Capacity Kelani River

Waterway Name	Drainage Capacity in Discharge Terms	Return Period	Source
Kelani River at Nagalagam Street	1665 2788 3601 4346 4790 5349	2 5 10 20 30 50	Comprehensive Study on Disaster Management in Sri Lanka JICA and Oriental Consultants-March 2009

4.1.4.7 The present flood detention capacity of the lowlands on both sides of the trace

Kelani river flood plains have a very large flood detention capacity. The road segment across this area is planned to allow flood passage by the construction of bridge piers and it does not cause any significant reduction of the flood detention capacity.

4.1.4.8 Bottom Sediment

Bottom sediment data for Kelani River or canals are not readily available. However there is a borehole investigation report carried out for the proposed bridge site and soil data are available for two bore holes taken close to the left and right banks of the river. These bore hole data indicate silty clay, black peat with partially decomposed vegetation, organic silt and fine to medium silty sand. Although the conditions of bottom sediments are such close to the bank, it is likely that the bottom sediment to be silty sand in the mid-range of the river because of water flow velocity.

4.2 Water Quality and Water Usage

4.2.1 Water quality

The water quality of the project area was measured at several locations to obtain a baseline dataset for the project and this measurement was carried out by the National Building Research Organization (NBRO). Summary results of water quality measurements carried out are given in Table 4.4 below. Locations are given in Figure 4.13. (Measurement location of the surface water is near the upstream and downstream of the project site, measurement of groundwater is near the project site's well). The surface water quality was carried out twice and the measurement interval was about two weeks. .



Figure 4-13 Water Quality Measurement Locations
(WQ1-D, WQ2-U: surface water, WQ3, WQ4 and WQ5: ground water)

Table 4-4 Parameter and locations of water quality measurement

Water quality survey	Parameters	Locations
Surface water	pH, Temperature, Turbidity, DO, BOD, SS,	Upstream and downstream from the New Kelani Bridge
Ground water	pH, Temperature, BOD, Total Coliform, Conductivity	Project site and 100m either side of the project side

Surface Water

Kelani River, Sebastian canal and Dematagoda canal and their branch canals are the major surface water bodies located in the project area. Bathing and washing areas could be observed within 50 m upstream and downstream from the existing bridge (New Kelani bridge) Devotees of the Hindu Kovil near Paliyagoda junction uses water from Kelani river to sprinkle water over the sacred Bo tree within the Kovil premises.

During field investigations it was observed that many drainage lines (bringing domestic waste water and storm water) are opened to branch canals of Sebastian and Dematagoda canals. Hence it could be concluded that the water in these canals is already contaminated and polluted. **T**he analysis result is shown in Table 4.5

Table 4-5 Result surface water quality analysis

No.	Parameter	Unit	Standard Criteria		Result			
			Class II Bathing, Drinking	Class II Fish and aquatic life	April 4, 2013		April 19, 2013	
					WQ1-D	WQ2-U	WQ1-D	WQ2-U
1.	Temperature	°C	**Natural**	**Natural**	28.0	27.5	28.8	29.0
2.	Turbidity	NTU	**-**	**-**	9.8	8.6	1.2	2.2
3.	TSS	mg/l	**-**	**-**	3.5	7.1	2.2	1.3
4.	Conductivity	Ds/m	**-**	**-**	2.1	1.4	1.2	2.2
4.	pH	-	**6.0- 9.0**	**6.0 - 8.5**	7.8	7.7	6.5	6.3
5.	DO	mg/l	**4**	**3**	7.8	7.0	6.0	5.4
6.	BOD	mg/l	**4**	**4**	2.6	2.8	2.2	1.3
7.	Coliform Total	MPN/100mg	**1000**	**20000**	NM	NM	NM	NM

Standard Criteria; "Proposed Ambient Water quality Standards for Inland water Sri Lanka," Central Environmental Authority, 2001

Ground water quality

The groundwater in the project area appears to contain high concentrations of Sulfur and Iron. This situation has prompted people not to use groundwater for drinking and other domestic needs.

The analysis result is shown in Table 4.6

Table 4-6- Result of ground water quality analysis

No.	Parameter	Unit	Standard Criteria		Result April 4, 2013		
			Class II Bathing, Drinking	Class II Fish and aquatic life	WQ3	WQ4	WQ5
1	Temperature	°C	**Natural**	**Natural**	26.5	26.0	28.7
2	Conductivity	dS/m, max	**-**	**-**	0.24	0.43	0.81
3.	pH	-	**6.0- 9.0**	**6.0 - 8.5**	7.7	8.4	7.4
4.	BOD	mg/l	**4**	**4**	2.3	2.0	<1.0
5.	Coliform Total	MPN/100mg	**1000**	**20000**	3000	4100	680

Standard Criteria; "Proposed Ambient Water quality Standards for Inland water Sri Lanka," CEA,2001

The full report on water quality is included in volume II B of this report.

4.2.2 Water Usage

There is no major water usage of the project area either groundwater or surface water because of water quality issues. Regarding surface water, the upstream and downstream of the new Kelani Bridge, residents in the vicinity use the river for washing and bathing. However, that use is limited owing to the deterioration of water quality in the dry season from January to April. The Ambatale water supply intake is the only major water use node which is closest to the project area but this intake is located in Kelani River well away from the project area (approx. 9km upstream).

4.3 Existing land use

Main land use types are water bodies, marshy lands, parks and urban built up areas. The east side of Baseline Road, mainly makeshift housing built on encroached land exist. Relatively large buildings such as a factory and the power plant are lined up in the west side. Other major developments on the east side are the Automobile Training Institute and the Atomic Energy Authority. A housing project constructed by UDA is in progress near the port access road. In the north side of the New Kelani Bridge Road, Kelanitissa power plant is located. The building density on the south flank of Port Access Road is high. There is no agricultural land around the project area. Existing land use details are presented in Figure 3.9.

4.4 Ambient air quality and noise and Vibration

4.4.1 Air Quality

The monitoring day was a sunny day with fair scattered wind. The prevailing wind direction and speeds are given in table 4.7. The measurement locations were selected under the following conditions: 1- Sensitive areas (ex. residential area, temple, kovil, etc) along the Baseline road and the Port access road (5 points; L_{eq}3 to 7)), and 2- Other places for judging the project effectiveness (3 points; L_{eq}1,2 and 8). Refer Figure 4.14 below.



Figure 4-14 Locations for Air quality Monitoring

Table 4-7 Wind speed and direction during the sampling time

Time	05 April 2013		06 April 2013		22 April 2013		23 April 2013	
	Wind Direction	Wind Speed (km/hr)	Wind Direction	Wind Speed (km/hr)	Wind Direction	Wind Speed (km/hr)	Wind Direction	Wind Speed (km/hr)
02:30	Calm	0	Calm	0	Calm	0	Calm	0
05:30	Calm	0	S	3.8	Calm	0	E	3.0
08:30	SSE	1.8	SW	2.0	SE	4.6	NE	4.2
11:30	W	6.4	WNW	10.6	S	8.4	SW	4.4
14:30	SW	6.0	W	10.6	SW	10.6	W	5.2
17:30	W	5.0	W	10.8	SW	8.2	NW	4.2
20:30	W	5.6	SW	4	Calm	0	NE	3.6
23:30	Calm	0	SW	2.8	Calm	0	Calm	0

Table 4-8 Measurement Locations

Location	Description	Coordinates
Leq1	At the roadside of Kandy Road, in front of Sri Bhoopala Vinayaker Kovil, Peliyagoda	06^0 57' 20.01'' N 079^0 53' 03.61'' E
Leq2	At the roadside of Negambo Road, Peliyagoda, in front of the Sir Lanka Cement Corperation Outlet	06^0 57' 24.89'' N 079^0 52' 57.38'' E
Leq3	At the roadside of Sedawatha Road, Wellampitiya, close to the Jayantha saw mills	06^0 57' 15.78'' N 079^0 52' 51.59'' E
Leq4	At the Premises of Minimuthu Suppliers, No 43/1, Sedawatha Road, Wellampitiya	06^0 57' 13.21'' N 079^0 52' 56.50'' E
Leq5	At the premises of Sanchi Viharaya, New Kanani Bridge Road, Wellampitiya.	06^0 57' 00.96'' N 079^0 52' 39.74'' E

Location	Description	Coordinates
Leq6	At the roadside, close to the premises of Mr. H.A Piyasena, No.31/10, Orugodawatta, Wellampitiya.	06^0 56' 53.90'' N 079^0 52' 44.60'' E
Leq7	At the premises of Mr.M.J.M. Badurdeen, No 12, Baseline Road, Orugodawatha	06^0 56' 41.17'' N 079^0 52' 42.77'' E
Leq8	At the premises of Sri Somaloka Viharaya, No. 150, Stace Road, Colombo 14	06^0 58' 36.66'' N 079^0 52' 38.95'' E

Table 4-9 Concentration of each parameter at measurement location

Location	Sampling Date	Date of Analysis	Time average	Concentration					
				SO_2 ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	CO (ppm)	CO_2 (ppm)	SPM ($\mu g/m^3$)	PM_{10} ($\mu g/m^3$)
Permissible Air Quality Standards, Sri lanka				80 (24hrs)	100 (24hrs)	9.00 (8hrs)	-	-	100 (24hrs)
WHO ambient Air Quality Standards				20 (24hrs)	200 (one hr)	-	-	-	50 (24hrs)
Leq1	22.04.2013	22.04.13	8 hrs	-	-	6.7	1120	-	-
		23.04.13	24 hrs	24	28	4	670	-	-
		26.04.13	24 hrs	-	-	-	-	72	43
Leq2	05.04.2013	06.04.13	8 hrs	-	-	6.7	1080	-	-
		06.04.13	24 hrs	-	25	4	650	-	-
		10.04.13	24 hrs	-	-	-	-	157	68
Leq3	05.04.2013	06.04.13	8 hrs	-	-	5	960	-	-
		06.04.13	24 hrs	19	33	3	580	-	-
		10.04.13	24 hrs	-	-	-	-	168	67
Leq4	05.04.2013	06.04.13	8 hrs	-	-	3.3	970	-	-
		06.04.13	24 hrs	12	18	2	580	-	-
		10.04.13	24 hrs	-	-	-	-	91	55
Leq5	22.04.2013	22.04.13	8 hrs	-	-	6.7	1030	-	-
		23.04.13	24 hrs	31	33	4	620	-	-
		26.04.13	24 hrs	-	-	-	-	66	39
Leq6	05.04.2013	06.04.13	8 hrs	-	-	3.3	990	-	-

Location	Sampling Date	Date of Analysis	Time average	Concentration					
				SO_2 (μg/ m^3)	NO_2 (μg/ m^3)	CO (ppm)	CO_2 (ppm)	SPM (μg/ m^3)	PM_{10} (μg/ m^3)
		06.04.13	24 hrs	13	17	2	600	-	-
		10.04.13	24 hrs	-	-	-	-	117	44
Leq7	22.04.2013	22.04.13	8 hrs	-	-	5	940	-	-
		23.04.13	24 hrs	17	16	3	560	-	-
		26.04.13	24 hrs	-	-	-	-	52	31
Leq8	22.04.2013	22.04.13	8 hrs	-	-	5	920	-	-
		23.04.13	24 hrs	18	22	3	540	-	-
		26.04.13	24 hrs	-	-	-	-	49	30

Measured existing ambient air quality levels with respect to SO_2, NO_2, CO and PM10 were below the Ambient Air Quality Standards stipulated by the Ministry on Environment and Natural Resources of Sri Lanka. Also measured existing ambient air quality levels with respect to SPM was within the Ambient Air Quality Standards stipulated under the Extraordinary Gazette, No.850/4, December 20, 1994, by the central Environmental Authority of Sri Lanka. These results of existing ambient air quality are described in the NBRO report in Volume IIB.

4.4.2 Noise

High noise levels were recorded in the project area. Movement of vehicles is the main source of noise. Based on the noise levels the project area could be classified as a high noise area.

Measurement of noise level was conducted at 10 locations. The measurement was done on April 5-6, 2013 during 4 times (morning, afternoon, late afternoon and nighttime) per day. Measured locations of noise levels can be seen in Table 4-10 and in Figure 4.15.

It should be noted that Environmental Standards pertaining to Permissible Noise Levels of the High Zone are prescribed in the Regulations (Regulations made by the Ministry of Transport, Environment and Women's Affaires section 23P, 23Q and 23R of the National Environmental Act). This standard is described in the NBRO report in volume II B.

The measurement locations were selected under the following conditions; 1- Sensitive area (ex. residential area, temple, kovil, etc.) along the Baseline road and the Port access road (7 points: N3 to N9), and 2-Other places or judging project effectiveness (3 points; N1, 2 and10).



Figure 4-15 Locations for Noise Measurement

Table 4-10 Noise level measurement locations.

Location	Descriptions	Coordinates
N1	At the roadside of Kandy Road, Close to the Keleniya CTB Deport, Peliyagoda	06^0 57' 20.01'' N 079^0 53' 06.60'' E
N2	At the roadside of Nigambo Road, Peliyagoda, in front of the Sir Lanka Cement Corperation Outlet	06^0 57' 24.89'' N 079^0 52' 57.38'' E
N3	At the roadside of Sedawatha Road, close to the Jayantha saw mills, Wellampitiya,	06^0 57' 15.74'' N 079^0 52' 51.48'' E
N4	At the roadside of Sedawatha Road, close to the Minimuthu Suppliers, No 43/1, Seedawatha Road, Wellampitiya	06^0 57' 13.14'' N 079^0 52' 56.60'' E
N5	At the Nawaloka Ground, Wellampitiya, Close to the residential houses	06^0 57' 08.05'' N 079^0 52' 51.46'' E
N6*	At the roadside, New Kalani bridge road, Wellampitiya, Close to the Nawaloka Ground	06^0 57' 09.46'' N 079^0 52' 49.87'' E
N7	At the roadside of the New Kanani Bridge Road, Close to the Sanchi Viharaya, Wadullawatte.	06^0 57' 01.14'' N 079^0 52' 40.02'' E
N8	At the roadside, close to the premises of Mr. H.A Piyasena, No.31/10, Orugodawatta, Wellampitiya.	06^0 56' 53.90'' N 079^0 52' 44.60'' E
N9	At the premises of Mr.M.J.M. Badurdeen, No 12, Baseline Road, Orugodawatha	06^0 56' 41.17'' N 079^0 52' 42.77'' E
N10	At the premises of Sri Somaloka Viharaya, No. 150, States Road, Colombo 14	06^0 58' 36.66'' N 079^0 52' 38.35'' E

Noise measurement except in locations N3, N5 and N8, have exceeded the environmental standards already. Measurement locations N3 (approx. 40m from road edge), N5 (approx. 65m from road edge) and N8 (approximately 40m from road edge) were set allowing a stated distances from the road edge

Table 4-11 Wind speed and direction during the measurement time.

Time	05 April 2013		06 April 2013	
	Wind Direction	Wind Speed (km/hr)	Wind Direction	Wind Speed (km/hr)
02:30	Calm	0	Calm	0
05:30	Calm	0	S	3.8
08:30	SSE	1.8	SW	2.0
11:30	W	6.4	WNW	10.6
14:30	SW	6.0	W	10.6
17:30	W	5.0	W	10.8
20:30	W	5.6	SW	4
23:30	Calm	0	SW	2.8

Table 4-12 Noise Levels at each measurement location on 5th – 6th April 2013

Location	Measuring Date	Morning			Afternoon			Evening			Night		
		Leq	L_{50}	L_{90}	Leq	L_{50}	L_{90}	Leq	L_{50}	L_{90}	Leq	L_{50}	L_{90}
Permissible Noise level, Sri lanka (L_{Aeq}) High zonw		70			70			70			60		
EHS Noise level guidelines (L_{Aeq}) Industrial, Commercial		70			70			70			70		
N1	6/04/2013	80	**76**	73	81	**76**	74	79	**75**	73	72	**68**	62
N2	6/04/2013	78	**74**	69	75	**71**	67	77	**74**	70	74	**71**	72
N3	6/04/2013	69	**63**	58	64	**59**	54	61	**57**	52	53	**47**	45
N4	6/04/2013	78	**71**	68	64	**57**	52	63	**56**	51	58	**53**	49
N5	6/04/2013	68	**65**	62	66	**62**	60	67	**64**	61	66	**59**	54
N6	5/4/2013	79	**74**	71	78	**74**	70	80	**72**	67	75	**71**	65
N7	5/4/2013	80	**75**	71	77	**74**	70	78	**70**	67	75	**71**	65
N8	5/4/2013	66	**64**	61	65	**61**	58	64	**61**	58	59	**58**	57
N9	5/4/2013	71	**69**	66	70	**68**	66	73	**71**	69	71	**69**	62
N10	5/4/2013	69	**66**	63	70	**67**	65	72	**67**	68	64	**59**	53

4.4.3 Vibration

Measurement of vibration level was conducted at 6 locations. The locations of vibration measurement were been selected in places such as in the vicinity of existing bridge piers, at Sanchi temple and amman Kovil. (Located in the vicinity of observation location V5)

The measurement was done on April 5, 2013 during 4 times (Morning, Afternoon, Evening and Night time) per day. The vibration levels at each measurement location can be seen in Table 4-14 and Figure 4-16.

Measured vibration levels at the locations were well within the intermittent vibration levels stipulated for “type 3 structures” in the Interim Vibration Standard stipulated by the Central Environmental Authority of Sri Lanka. This Interim Vibration standard is described in the NBRO report in volume II B.

The measurement location is presented below. The measurement locations were selected under the following conditions; 1- Sensitive area (ex. Temple, Kovil, V1, 5 and 6) along the Baseline road and the Port access road.



Figure 4-17 Locations for Vibration Measurement

Table 4-13 Vibration levels measurement location

Location	Descriptions	Coordinates
V1	On the basement of the North-western corner of the building of sri Bhoopala Vinaayaker Kovil, Peliyagoda	06^0 57' 19.19'' N 079^0 53' 03.38'' E
V2	On the basement of a building close to the Sri Lanka Cement Cooperation Outlet, Nigambo road, Peliyagoda	06^0 57' 25.18'' N 079^0 52' 79.36'' E
V3	At the ground of about 0.2m to the concrete basement of the Kelani Bridge, Sedawatha road, Wellampitiya	06^0 57' 14.07'' N 079^0 52' 53.86'' E
V4	On the basement of a building,at about 50m from the concrete basement of the Kelani Bridge, Sedawatha Road, Wellampitiya	06^0 57' 13.54'' N 079^0 52' 54.62'' E
V5	On the basement of the building of Sanchi Viharaya, New Kelani Bridge road. Wadullawatte	06^0 57' 00.78'' N 079^0 52' 39.83'' E
V6	On the basement of the premises of Mr. M.J.M.Badurdeen, No 12, Baseline road, Orugodawatha	06^0 56' 41.32'' N 079^0 52' 43.10'' E

Table 4-14 Vibration levels at each measuring location on 5th April 2013

Location	Run Time (min)	Morning		Afternoon		Evening		Night	
		Frequency Range (Hz)	Vibration in ppv (mm/sec)	Frequency Range (Hz)	Vibration in ppv (mm/sec)	Frequency Range (Hz)	Vibration in ppv (mm/sec)	Frequency Range (Hz)	Vibration in ppv (mm/sec)
Interim Standard for Vibration Levels by the CEA (Type 3 structures, intermittent type)		**0-10 10-50 over 50**	**2.0 4.0 8.0**	**0-10 10-50 over 50**	**2.0 4.0 8.0**	**0-10 10-50 over 50**	**2.0 4.0 8.0**	**0-10 10-50 over 50**	**2.0 4.0 8.0**
V1	15	0-10	0.27	0-10	0.23	10-50	0.28	0-10	0.38
V2	15	>50	0.56	>50	0.46	0-10	0.31	>50	0.33
V3	15	10-50	0.60	10-50	0.52	0-10	1.01	10-50	0.78
V4	15	0-10	1.63	0-10	0.63	>50	0.32	>50	0.55
V5	15	10-50	0.58	10-50	0.48	>50	0.72	10-50	0.52
V6	15	>50	0.65	>50	0.56	10-50	0.69	10-50	0.49

Note:	Hz= Frequency range, ppv= Peak Particulate velocity levels (mm/sec)
	taken at 09.00 represent 06.00-11.00 - Morning taken at 13.00 represent 11.00-15.00 - Afternoon taken at 18.00 represent 17.00-21.00 - Evening taken at 23.30 represent 22.00-24.00 - Night

Measured vibration levels at all six (6) locations were well within the intermittent vibration levels stipulated for "type 3 structures" in the interim Vibration Standards stipulated by the Central Environmental Authority of Sri Lanka. Records on natural disasters occurred

4.5 Flood Propagation

Out of disasters such as Tsunami, cyclones and earth slips flood is the only phenomenon which has occurred in the project area in a disaster level. Below given is the flood levels at Nagalagam Street which is downstream of the project area along with the Major and Minor flood level the Irrigation Department standard flood classification for the water level gauge at Nagalagam Street. Refer Figure 4.17 for details.

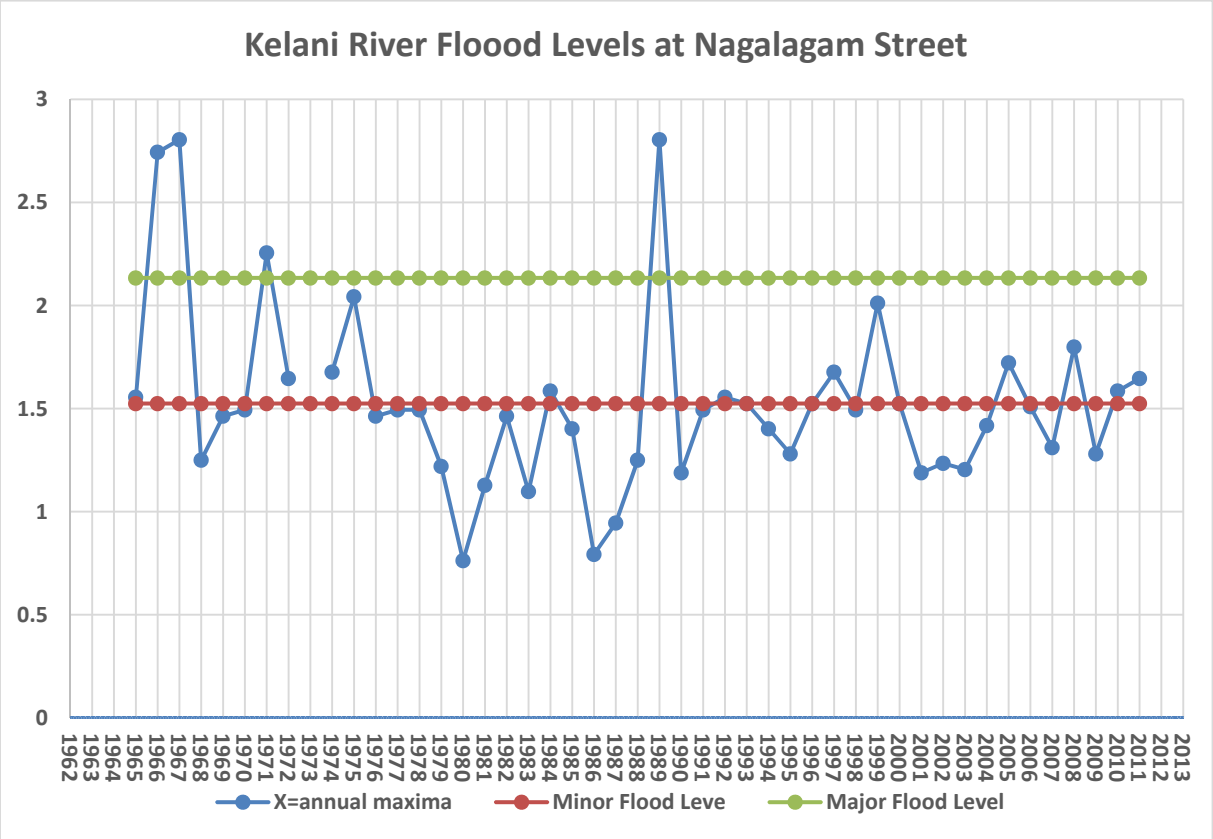


Figure 4-18 Flood Levels at Nagalagam Street

Source: Department of Irrigation

It is seen from the graph above that floods in year 1966, 1967 and 1989 are of disastrous proportions. Propagation of the Tsunami has not exerted any impact on the project area according to the analysis carried out by the Disaster Management Center (DMC).There is flooding in the unprotected area between flood bunds and there is no possibility of flooding in the rest of the area by the floods of lower return periods (i.e. 25 years).

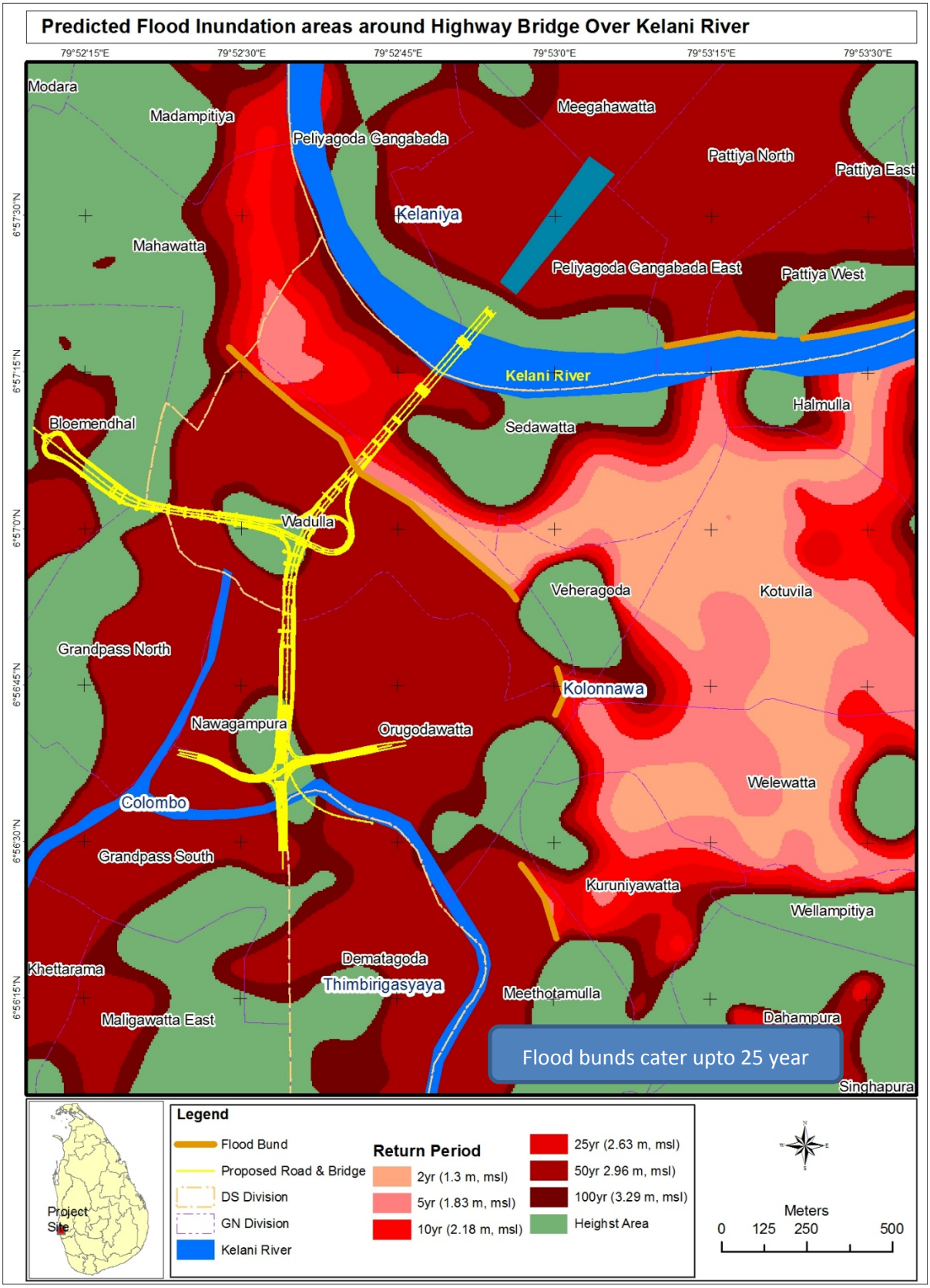


Figure 4-19 Flood Propagation Map

Source- Irrigation Department flood Levels

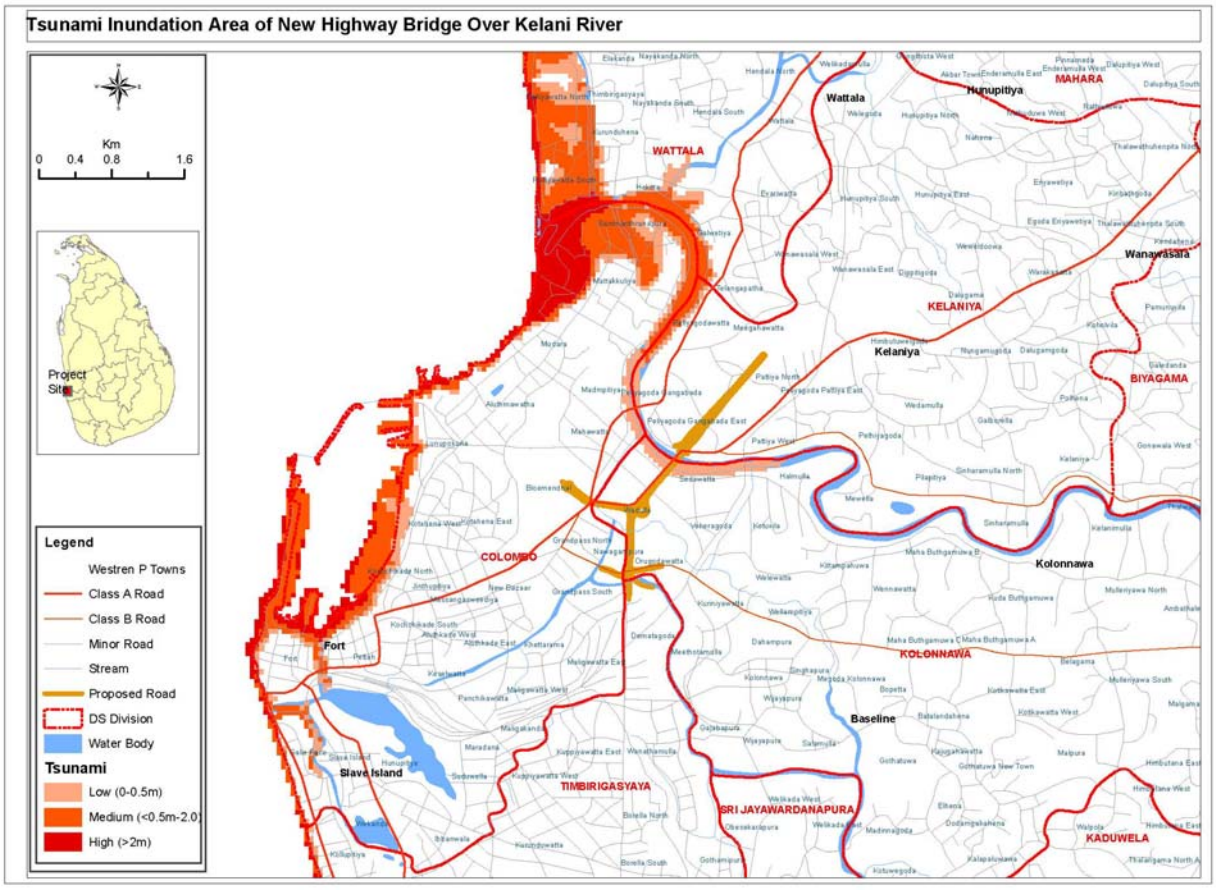


Figure 4-20 Tsunami Propagation Map

Source: Disaster Management Center

4.6 Global Warming

According to the National Climate Change, Adaptation Strategy for Sri Lanka, 2011 to 2016- November 2010[1], Sri Lanka is a negligible contributor to global warming. However, the nation is highly vulnerable to the potential impacts of climate change which include:

- Increases in frequency and intensity of disasters e.g. droughts, floods and landslides;
- Variability and unpredictability of rainfall patterns;
- Increase in temperature; and
- Sea level rise, among others.

Climate change vulnerabilities potentially affect many sectors in the economy, including the transportation sector, and threatens to compromise the investments which are currently being deployed for example for road rehabilitation works.The publication entitled "*Sector Vulnerability Profile – Urban Development Human Settlement and Economic Infrastructure – Supplementary Document to Climate Change Adaptation Sri Lanka* [1]" outlines the impacts on climate change on various sectors in the form of maps and data tables.

[1] Climate Change Secretariat, Ministry of Environment Sri Lanka

The main vulnerability indicators relevant to the project are:

1. Increased vulnerability to floods
2. Sea level rise
3. Increase in temperature

4.6.1 Increased Vulnerability to Floods

4.6.1.1 Increased Rainfall Intensity

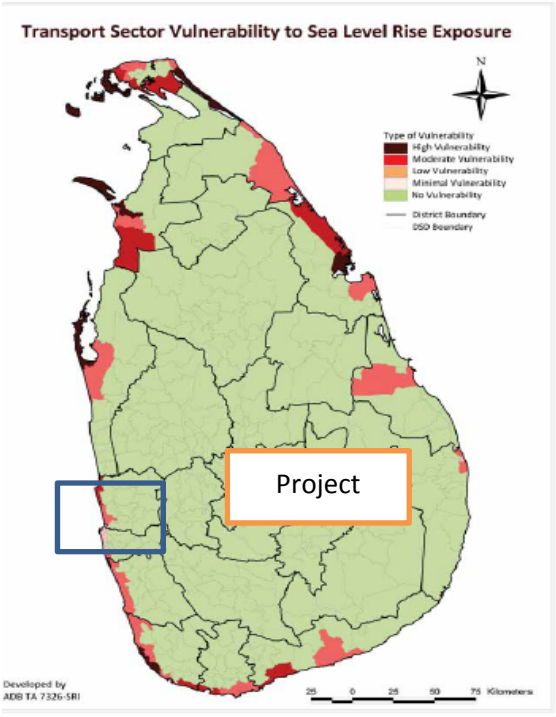
Recent studies by Sri Lanka Land Reclamation and Development Corporation (SLLRDC) has shown that rainfall intensities for Colombo have increased for short duration rains.

4.6.1.2 Flooding

As it was observed that the short duration rains have increased it could be predicted that flood levels also could increase in future.

4.6.2 Rise in Sea Level

Quantification of the Sea Level rise is still non-conclusive and widely varying assessments exist though the occurrence of the sea water level rise is now established globally as a fact. One conservative assessment estimates the sea level rise to be 0.5m over a period of 100 years. Figure



4-21 Transport sector vulnerability to sea level rise exposure

4.6.3 Drought Exposure

4.6.3.1 Increase in Temperature

According to Chandrapala and Fernando there is an ascending temperature trend in most of the climatic stations in Sri Lanka, as detailed in the adjoining table below. The closest meteorological

90)

Climate change in Sri Lanka

Trends of air temperature (1961-1990)

LOCATION	SLOPE – ^{0}C/year	r^2
Ratnapura	0.0175	0.88
Badulla	0.0217	0.85
Kandy	0.0185	0.72
Nuwara Eliya	0.0146	0.56
Colombo	0.0164	0.67
Hambantota	0.0104	0.81
Anuradhapura	0.0364	0.79
Kurunegala	0.0173	0.42
Jaffna	0.0180	0.61

Chandrapala & Fernando, 1995

station to the project is Colombo which has recorded an increase of 0.0164 ^{0}C per year.

4.7 Biological Environment

Biological environment of the area was assessed through a habitat survey as indicated below; In addition, the project area and its vicinity is progressing in urbanization. Protected areas such as national parks is not identified in the project aea.

4.7.1 Habitat survey:

Both terrestrial and aquatic habitats are distributed in the proposed project area. Of these two main terrestrial habitat types and two aquatic habitats were encountered during the field survey.

1. ***Terrestrial habitats***
   - Mixed residential and commercial area
   - Road reservations
2. ***Aquatic habitats***
   - Kelani river and riverine vegetation
   - Canals and associated marshy areas

4.7.1.1 Terrestrial Habitats

- **Mixed Residential and Commercial area**

The project area mainly consists of small, medium and large scale industries, sow mills, garages, container yards, religious places and residences. Large numbers of low income families live within small land plots and are mainly scattered around Kelani Bridge. In addition groceries, business premises and workshops, medium to large scale luxury houses are also located in the area. In several locations bare land plots, playgrounds and small home gardens can be observed.

In the project area, large extents of low-lying area have been reclaimed from time to time for development purposes such as housing, public utilities, industries and warehousing. Some lands which could not be reclaimed for the above purposes were utilized for the disposal of solid waste.

The floral species recorded from residential and commercial area of the project site predominantly include fruits, vegetables, shading and ornamental species. Species such as Jack (*Artocarpus hetarophyllus*), bread fruit (*Artocarpus incisus*) and Coconut (*Cocos nucifera*) are the economically important trees which can be mainly seen in home gardens of the project affected area.

- **Road reservations**

A considerable amount of shading, economically important trees and fruit species are located within the existing Right Of Way (ROW) of the proposed development area. *Mangifera indica (*Mango), *Terminalia catappa (*Kottamba), *Filicium decipiens (*Pihimbiya), *Terminalia arjuna- (*Kumbuk), *Pettophorum pterocarpum- (*Kaha Mara) etc. had been grown as roadside vegetation during different time periods.

As roadside vegetation *Ficus benghalensis* (Nuga), *Ficus religiosa* (Bo), *Albizia odoratissima (*Suriyamara), *Albiziasaman* (Para mara), *Terminalia catappa (*Kottamba), *Polyalthia longifolia* (Villo), *Spathodia campanulata*and *Alstonia scholaris* (Rukattana) are commonly observed by the sides of national roads. Other than that, weedy shrub and herb species were found in some road reservations. Most of these are large trees and have been grown for shading purposes. Compared to the road reservations of Baseline Road and adjoining lands, local road network's reservations occupy only a minimum number of trees that belongs to different species.

4.7.1.2 Aquatic Habitats

- **Kelani River and Riverine Vegetation**

A large amount of aquatic plants were not observed in water logged areas of the Kelani River close to the Kelani Bridge. However, a large number of riverine vegetation could be observed. Since most of the residences and other built up structures are located adjacent to the river bank, riverine species along the river bank is minimal. Both common home garden species as well as riverine species such as *Alstonia scholaris* (Rukattana), *Terminali arjuna,* (Kumbuk), *Albiziaod oratissima* (Suriyamara), *Ficus religiosa* (Bo), *Artocarpus hetarophyllus* (Jack), *Dichrostachys cinerea* (Andara) etc. can be seen beside the river banks of up and down stream.

- **Canals and associated marshy areas**

Canals and drainage systems which run from surrounding areas of the project site directly connect with upstream and downstream areas of the Kelani Bridge. Recent city beautification measures jointly carried out by UDA, Ministry of Defense and Urban Development and Colombo Municipal Council (CMC) have implemented solid waste management and clearing of reservation areas free from weeds etc. to enhance the aesthetic value of the area.

However, water in these canals and drainage systems is polluted, hence it is not used for day to day activities of stakeholders. The water in these canals is green in color with blue green alga and other microorganisms being present. Earlier, a considerable amount of land area around proposed site was marshy lands, but they have been gradually reclaimed for various purposes such as infrastructure development projects, industries, roads, playgrounds, container yards, residences and commercial activities etc. A marshland situated in the vicinity of the project site has been converted to a huge garbage dumping site. This site is known as the Blumendal garbage site adjacent to the Port Access Road which is currently being managed by the Colombo Municipal Council.

4.7.2 Flora, Fauna and Biodiversity

Throughout the study a total of 87 aquatic and terrestrial fauna species was recorded in the project area. Most of the floral species observed in the project area are typical home garden species and shading trees which are distributed in many parts of the surrounding habitats (List Annex 4.1. Terrestrial and aquatic flora found in the proposed project area). During the study a total of 78 species of animals were recorded including 2 species of Dragon flies, 11 species of butterflies, 7 species of fish, 2 species of amphibians, 6 species of reptiles, 36 species of birds and 14 species of mammals (Annex 4.1 Terrestrial Flora found in the Proposed Project Area).

4.7.3 Rare, endangered and endemic species in the project area and its vicinity

During the survey of the project affected area any endemic or threatened floral and fauna species were not observed.

4.7.4 Proposed lands for material storage yards and other activities.

Altogether 3 sites have been identified for the material storage yards, labour camps and other construction related activities within the proposed project area. These include ;

A. Nawaloka ground
B. Ground located on the right side of Colombo-Katunayaka expressway (~0.700 km post)
C. Open area located opposite to the Nawaloka ground

Out of these three, two sites (Site A and B), are being frequently used by the surrounding communities as playgrounds and other social functions. There are no trees located within site A, but few (less than10) trees are located in the periphery of site B. Site C is currently being used as a

container yard by a private company, but no trees are found within this site. Proposed locations A and B are presented in figure 4.21. These proposals are only tentative.

These lands are owned by the government.

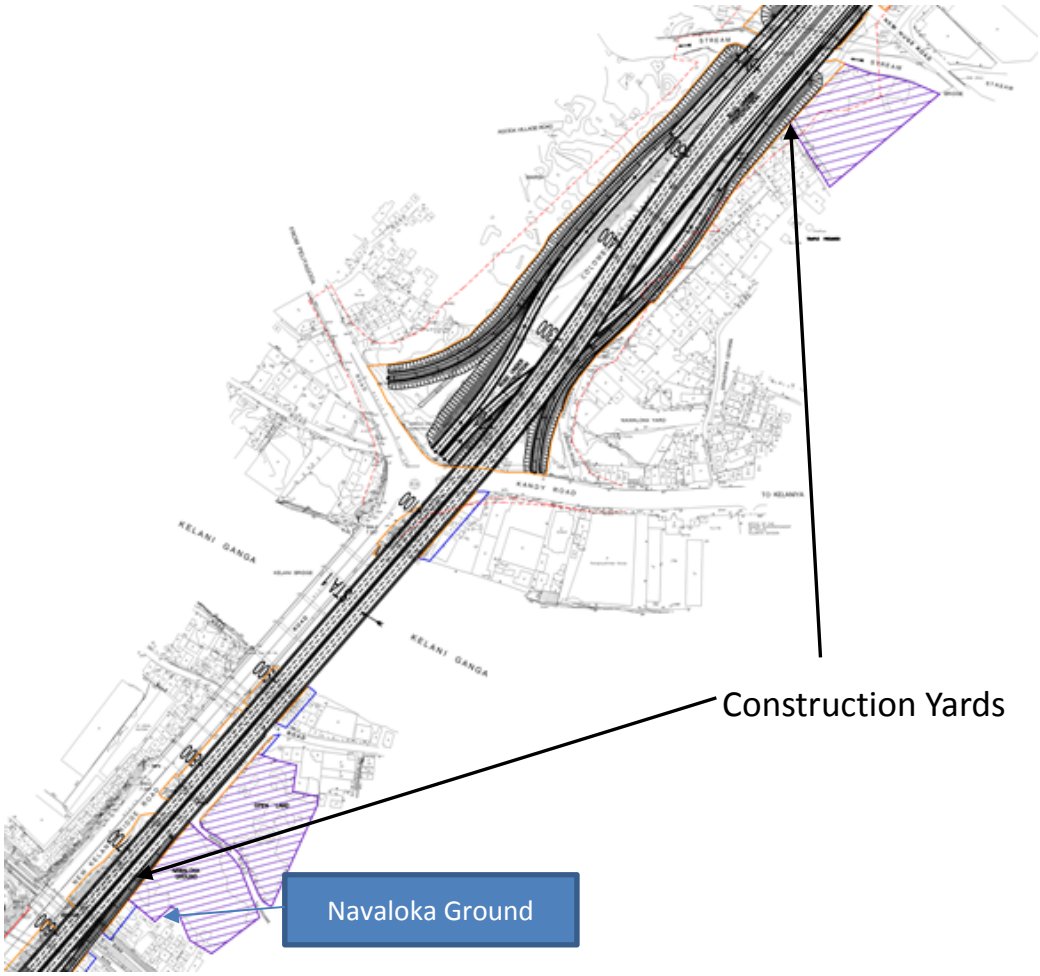


Figure 4-22 Proposed locations for yards

4.8 Socio-cultural Environment

The project area belongs to Colombo and Gampaha districts. In the year 2011 the total population of Sri Lanka is 20,263,723. Out of it 4,604,450 live in Colombo and Gampaha Districts. It is nearly 23% of the total population. The highest amounts of the migrated population also have been recorded in Colombo and Gampaha districts. Percentage of migrated population to total migrated population of Sri Lanka is 16.2 percent for Colombo district and 15.4 percent in Gampaha District. Balance 68.4 percent is shared by other 23 districts. The main reason for migration is employment, marriage, education etc. in Colombo and Gampaha districts.

Apart from the above two categories of the population, large number of commuter population from Northern districts of Colombo daily commute to Colombo district via Gampaha district through the existing New Kelani Bridge.

Project Impact Area and Surroundings

The boundaries of the seven GN divisions affected (i.e. Bioemendal, Grandpass (North), Nawagampura in Colombo DS division, Seedawatta, Wadullawatta, Orugodawatta in Kolonnawa DS division and Peliyagoda Gangabada (East) in Kelaniya DS division) were considered as the project surrounding for the social study. Residential and commercial population within the project boundary area is presented below;

Table 4-16 No. of affected households and population

DS Division	GN Division	Residential Population		Commercial/ Business population	
		Male	Female	Male	Female
Colombo	Grandpass North	0	0	15	2
	Bloemendhol	74	63	60	14
	Nawagampura	44	33	15	6
Kolonnawa	Orugodawatta	22	24	0	0
	Sedawatta	223	252	26	7
	Wadullawatta	468	512	22	5
Kelaniya	Peliyagoda Gangabada East	17	11	0	0
Total		848(48.6%)	895(51.4%)	138(80%)	34(20%)

Other socio-economic status of the project affected area is summarized in sections below.

4.8.1 Existing houses, commercial and government buildings within the direct impact areas and the surroundings

The direct impact area was considered as the area impacted by Right of Way (ROW) and service corridor which is required at some places (please refer Annex 4.2 for these areas).

Surrounding Area

Existing social infrastructure in the surrounding area is presented in the table below.

Table 4-17 Existing houses, commercial and government buildings within the surrounding area

DS division	GN division	No. of houses*	No. of commercial units**	Government Buildings***
Colombo	1 Bloemendhal	3,205	N/A	1.Bloemendhal primary school 2. Bloemendhal Tamil school 3.Cooperative building, Bloemendhal
	2 Grandpass (North)	1,670	N/A	1.Cooperative building, Kosgashandiya 2.Post Office
	3 Nawagampura	1,446	N/A	1.Public hall 2.NHDA housing scheme 3 Ceylon Transport Board premises
	4. Grandpass (South)	3,529		1.Vijayaba Vidyalaya – (School) 2.St. Joseph girls' School 3.St. Joseph's Boy's School 4.Cooperative building, Bodirajaramaya 5. Post Office 6. Rajasingha Maha Vidyalaya – (School)
Kolonnawa	1 Seedawatta	1,572	N/A	1. Siddhartha Central College, Sedawatta 2. Clinic – Sedawatta 3. Dispensary – Sedawatta 4. Indigenous medical center 5. Post office 6. RDA building 7. Cooperative building
	2 Wadullawatta	1,759	N/A	1.GN's office 2.Automobile Engineering Training Institute 3.Atomic Energy Authority 4.Kelanitissa power station 5.Housing scheme 6.CTB depot 7.Vocational training center
	3 Orugodawatta	1,205	N/A	1.Clinic – Orugodawatta 2. Indigenous medical center 3. Post office 4. Flour stores 5.Sri Lanka ports building
Kelaniya	1 Peliyagoda – Gangabada East	466	N/A	1.H.K. Darmadasa school 2. Police station 3.Local Authority building 4. UDA Industrial Zone 5.Govrnmrnt building 6.SDandCC building

*Source: * Department of Census and Statistics 2012 ***Resource profile 2012 Kolonnawa, 2011 Colombo and 2013 Kelaniya*

Note: **No of commercial units for respective GN divisions are not available (N/A) in relevant resource profiles or any other published documents.

Direct Impact Area

Houses and commercial/government buildings in the direct impact area are given in the table below.

Table 4-18 Existing houses and, commercial buildings within the direct impact area

DS division	GN division	No. of houses	No. of commercial units
Colombo	1. Bloemendhal	33	11
	2 .Grandpass (North)	0	5
	3. Nawagampura	14	12
Kolonnawa	1. Sedawatta	93	14
	2. Wadullawatta	240	12
	3. Orugodawatta	9	0
Kelaniya	1. Peliyagoda – Gangabada East	6	0
	Total	395	54

Source: Socioeconomic study April/May 2013

The above table shows that, the affected total physical entities are 449 units and the majority affected are housing units and the number is 395 (88%). Affected number of commercial units is only 54 (12%).

4.8.2 Socio Economic status of population

Social Status

From the household survey data the summary of the social status is highlighted in Table 4.19 given below.

Table 4-19 Summary of Social Status of the Residential Population

No.	Social parameters	Surrounding Area (A)		Direct Impact area (Socioeconomic field survey April/May 2013) (B)		Percentage of B/A	Reference for Detailed Breakdown
		No	%	No	%		
01	Gender Composition (Census 2012)						Table 4.22 (a), 4.22 (b) in the Annex 4.3
	Male	25,857	50%	848	49%	(3.3%)	
	Female	25,845	50%	895	51%	(3.5%)	
	Total	51,702	100	1,743	100	(3.4%)	
02	Ethnic Composition #						
	Sinhala	21,633	33%	680	39%	3.2%	Table 4.22(C), 4.22(d) in the Annex 4.3
	Tamil	26,838	41%	887	51%	3.3%	
	Moor	15,918	24%	168	10%	1.1%	
	Others	1,341	2%	8	0.4%	0.5%	
	Total	65, 730	100	1,743	100		
03	Religious Composition #						Table 4.22(e), 4.22(f) in the Annex 4.3
	Buddhist	19,041	28	631	36%	3.3%	
	Christians	11,768	18	278	16%	2.4%	
	Islam	16,363	24	170	10%	1%	
	Hindu	18,521	28	664	38%	3.6%	
	Others	1,227	2	-			
	Total	66,920	100	1,743	100		
04	Age Composition Census and Statistic 2012)						Table 4.22(g), 4.22(H) in the Annex 4.3
	0 – 5 Years	N/A	N/A	185	11%		
	6 -17 Years	13,547	26	381	22%	2.8%	
	18 – 60 years	33,414	65	1,068	61%	3.2%	
	61 years and over	4,741	9	109	6%	2.2%	
	Total	51,702	100	1,743	100		

Source: Department of Census and Statistics - 2011 and Socioeconomic study April/May 2013

#-(Resource profiles Colombo - 2010/2011, Kolonnawa – 2012, Kelaniya – 2013). There is a difference between resource profile data and census data regarding the total population. Hence results of the resource profile to be considered as approximate.

Gender Composition

The majority of the total population of Sri Lanka comprises with female population which accounts 51.5% out of the total population (Census and Statistic – 2011) Male Female proportion is almost similar in project surrounded area.

Ethnic Composition

In the Western province Sinhala population is the majority. (I.e. Colombo 76.7%, Gampaha 90.6%, - Department of Census and Statistics 2011) However, it is revealed that the Tamil population is higher in the project surrounding area as well as in the direct impact area.

Religious Composition

As far as the religion is concerned Buddhist and Hindus are present in similar percentage in the direct impact project area.

Level of Education

When determining the level of education categories under "illiterate" and "can place signature only" are considered as illiterate. Category under pre - school education applies to young children. Thus the rate of illiteracy among adult population (over 18 years) is 17.8 %

Though the Western Province of Sri Lanka has comparatively better education facilities than the other provinces, the higher rate of Illiteracy within the direct impact project area prevails. The reasons for higher illiteracy is due to poor socioeconomic status, being migrants from less developed areas such as tea estates, lack of education of parents, etc. Illiteracy is highest in Wadullawatta Gn division.

Table 4-20 Level of education –residential population in direct impact area

Level of education	Bloemendhal	Nawagampura	Sedawatta	Wadullawatta	Orugodawatta	Peliyagoda Gangabada East	Total
Illiterate							
1.Illiterate	24	6	57	148	9	2	246
2.Can place signature	6	0	24	31	2	1	64
3.Only pre-school (under 5 years)	2	0	14	35	1	1	53
Primary							
Grade 1 – 5	46	14	96	255	7	3	421
Secondary							
Secondary Grade6 – G.C.E (A/L)	-58	55	281	509	27	18	948
Higher education							
University and above	1	2	3	2	0	3	11
Total	137	77	475	980	46	28	1,743

Source: Socioeconomic study April/May 2013

Economic status of population

Economic parameters such as average household size, average land extent for housing, average household income, average household expenditure, average excess income, per capita income, per capita expenditure, dependency ratio, unemployment, income and expenditure pattern of households, physical infrastructure attached to houses, assets that belong to the household etc. of the affected households were obtained through socio-economic survey which is presented in the table below

Table 4-21 Economic parameters Vs. residential population in each GN area

Economic parameters	Administrative area							
	Colombo (DSD)			Kolonnawa (DSD)			Kelaniya (DSD)	
	Bloemendal	Grandpass (N)	Nawagampura	Seedawatta	Wadullawatta	Orugodawatta	Peliyagoda Gangabada (E)	Total
Total Land area – Surrounding area (Acres)	N/A	N/A	N/A	310 (232h)	675 (245h)	640 (112h)	110.7 (40.1h)	
Total Land area – Direct Impact Area (Perch)	67.28 (0.42A)	8.35 (0.05A)	60.5 (0.38A)	150.3 (0.94A)	284.7 (1.78A)	7.6 (1.78A)	26.6 (0.17A)	605.33 (3.78A)
Impact Land area in the Direct impact area (Perch)	66.06 (98%)	7.87 (94%)	54.8 (90.6%)	150.22 (99.9%)	283.95 (99.7%)	6.89 (90.7%)	26.6 (0.17A) (100%)	596.39 (98.5%)
Total population	137		77	475	980	46	28	1,743
Total housing units	33		14	93	240	09	06	395
Average Household size	4.1		5.5	5.1	4.1	5.1	4.7	4.4
Average land extent for housing	2.04 (perch)		4.32 (perch)	1.62 (perch)	1.19 (perch)	0.84 (perch)	4.43 (perch)	1.53 (perch)
Average population density per perch	2.04		0.79	0.32	0.29	0.17	0.95	0.35
Total income	1,154,200		650,300	4,773,500	7,967,856	394,000	470,400	15,410,256
Average household income	39,975		46,450	51,327	33,199	43,777	78,400	39,013
Total expenditure	907,589		550,633	3,846,102	6,871,621	305,780	198,750	12,698,475
Average household expenditure	27,502		39,330	41,355	28,631	33,975	33,125	32,148
Average excess income per household	12,473		7,120	9,972	4,561	9,802	45,275	6,865
Per capita income	8,424		8,455	10,049	8,130	8,565	16,800	8,841
Per capita expenditure	6,624		7,151	8,097	7,011	6,647	7,098	7,285
Labour force								
1. Male	46		32	146	277	15	13	529
2. Female	44		21	154	297	16	07	539
Total	90		53	300	574	31	20	1,068
Employed population	(54)		(27)	(204)	(395)	(23)	(13)	(716)
Dependents	36 (40%)		26 (49%)	96 (32%)	179 (31%)	8 (25%)	7 (35%)	352 (33%)
Unemployment								
1.Retired/old/disabled	1		6	15	35	1	4	62 (6%)
2.House wife	17		10	49	89	8	3	176 (18%)
3.Students	26		16	103	237	13	6	401 (40%)
4.Unemployed	36		12	91	196	20	2	357 (36%)
Total	**80**		**44**	**258**	**557**	**42**	**15**	**996 (100%)**
Dependency ratio	2.5		2.9	2.3	2.5	2.0	2.2	2.4

Economic parameters	Administrative area							
	Colombo (DSD)			Kolonnawa (DSD)			Kelaniya (DSD)	
	Bloemendal	Grandpass (N)	Nawagampura	Seedawatta	Wadullawatta	Orugodawatta	Peliyagoda Gangabada (E)	Total
Type of Employment								
1.Permanent	9 (7%)		13 (17%)	59 (12%)	89 (9%)	11 (24%)	8 (29%)	189 (11%)
2.Temporary	45 (33%)		14 (18%)	145 (30%)	306 (31%)	12 (26%)	5 (18%)	527 (30%)
3.Unemployed	80 (58%)		44 (57%)	258 (55%)	557 (57%)	21 (46%)	15 (53%)	975 (56%)
4.Foregin employment	3 (2%)		6 (8%)	13 (3%)	28 (3%)	2 (4%)	0	52 (3%)
Total	137 (100%)		77 (100%)	475 100%)	980 (100%)	46 (100%)	28 (100%)	1,743 (100%)
Monthly Income (SL -Rupees)								
1.< 10,000	3		0	2	10	0	0	15 (4%)
2.10,001 – 20,000	8		1	8	61	3	0	81 (21%)
3.20,001 – 30,000	8		3	19	63	2	1	96 (24%)
4.30,001 – 40,000	5		2	22	40	2	2	73 (18%)
5.40,001 – 50,000	1		5	10	24	0	0	40 (10%)
6.50,001 – 60,000	3		1	14	18	1	0	37 (9%)
7. > 60,001	5		2	18	23	1	2	51 (13%)
8. No response	0		0	0	1	0	1	2 (1%)
Total	33		14	93	240	9	6	395 (100%)
Monthly Expenditure (SL Rupees)								
1.< 10,000	3		1	1	4	0	0	9 (2%)
2.10,001 – 20,000	4		0	14	59	2	0	79 (20%)
3.20,001 – 30,000	14		3	18	84	2	1	122 (31%)
4.30,001 – 40,000	4		2	28	43	2	2	81 (21%)
5.40,001 – 50,000	3		5	12	25	0	0	45 (11%)
6.50,001 – 60,000	3		2	5	9	2	2	23 (6%)
7. > 60,001	1		1	14	11	1	0	28 (7%)
8. No response	1		0	1	5	0	1	8 (2%)
Total	33		14	93	240	9	6	395 (100%)
Utilities attached to houses								
Availability of Electricity	20 (61%)		12 (86%)	87 (94%)	203 (85%)	6 (66%)	4 (67%)	332 (84%)
Kerosene for lighting	13 (39%)		2 (14%)	6 (6%)	37 (15%)	3 (33%)	2 (33%)	63 (16%)
Access to safe drinking Piped water (individual and public stand post)	32 (97%)		14 (100%)	89 (96%)	236 (98%)	9 (100%)	6 (100%)	386 (98%)

Source: Socioeconomic field survey April/May 2013

Average household size

Average household size means the number of family members living in a household. Average household sizes in the District Secretariat Divisions around the project area are 4.8 for Colombo DSD, 4.3, for Kolonnawa DSD and 4.1 for Kelaniya DSD while the project direct impact area has an average household size of 4.4.

The highest rate of 5.5 was recorded in Nawagampura GND. These figures highlight the overcrowded situation within the housing units.

Average land extent of housing

The regulation, for minimum lot size for housing in urban areas is 6 perch (approximately 152 m^2). It is 1.53 perch (approximately 39 m^2) in the Direct Impact Project Area, which is very much below the standard regulation. It is very low for the Orugodawatta GND and it further highlights the overcrowded situation in the area. According to UDA regulations for urban low income settlements declared as a special project areas the minimum lot size is 2 perch (50.8 m^2).

Average income and expenditure per household

Income ranges in the affected households are given in Table 4-21 above. It should be specially noted that the income level of 4% of stakeholders are below Rs.10,000 per month which means that there poverty level is very low.

When average in expenditure of the affected parties in GN divisions is considered, it is always less than the average income of AP's for those GN Divisions. Overall average income in the project affected area is Rs.39,013 whereas the corresponding expenditure is Rs.32,148. This shows an excess income. Two percent (2%) of the households spend less than Rs.10,000 per month which directs to a higher poverty level.

Dependency

The dependency ratio in the direct impact project area is 2.3 which means that one person has to look after 2.3 persons on the average. The rate is almost similar in all the GN divisions. However, Bloemendal is has the highest dependency ratio among them.

Unemployment

Unemployment at economically active age group is more than 36%. Total unemployment in the affected households is 56%.

Employment

Daily paid labor is the predominant economic activity found in the direct impact project area. The second highest economic activity is self-employment and requires more livelihood support to improve their self-employment. Households depending on foreign employment is around 3 % .

Physical Infrastructure (Water supply, Telephone, Electricity)

Availability of utility connections to the houses is an indication of the prosperity of the household. Details are given below

Electricity

In the direct impact project area, 84% of households have electricity connection, which is a satisfactory condition. But 16% of households who do not have electricity connection use Kerosene oil lamps for lighting.

Telephone

Fixed telephone facilities in the direct impact project area is very much meagre (only 14%). This is in line with the trend in the country where all grown up members of a family have a mobile phone and the fixed line phones at home are made irrelevant.

Water Supply

Majority (97%) of households has access to safe drinking water through individual water connection or public stand post within the locality. These facilities are maintained by National Water supply and Drainage Board. Other sources are very few and it is only 3%. Well water within the area is not suitable for drinking purposes because of the low lying nature of the locations.

Household Assets

The number of appliances and other assets in a household indicate the socioeconomic status of the occupants. Vehicles, electrical appliances would be of a higher value. The distribution of household assets in each GND is shown in table 4.27 in Annex 4.3.

Factors Affecting the Economic Status of the Population

Economic status of the population might decrease if their employment gets affected by natural disasters such as cyclones, flood etc. In general, employed categories of daily paid laborers, contract laborers and cottage based self-employment categories are mostly liable for such natural disasters. In the direct impact project area, 30% of employed population are within these categories and liable for natural disasters. (Please refer to Table 4.28 in Annex 4.3).

Part of the project area (Wadullawatte and Sedawatte GND's) usually gets flooded due to low-lying nature. The impact of the flood in the direct impact project area is one of the contributing factors to degrade the economic standards of the population further. This happens because 66% of the population in the direct impact project area experience floods, 64% of them have experienced floods more than twice a year, 13% of dwellings had to be abandoned until the recession of flood and 7% of dwellings had to be abandoned totally. The impact of flood on their livelihood, economic activities, property and dwelling are highlighted in Table 4.29 in Annex 4.3.

Gender

In Sri Lanka, both men and women have voting rights since 1931 and two women have served as the nation's President and Prime Minister[2]. The Gender situation in the country is explained in detail in the Annex 4.3 under the topic of Gender.

The gender situation in the project impact area was ascertained after studying the gender of chief householder and participation of women in decision making in households and at community level. The Gender situation in the project area is highlighted in Table 4.30 in the Annex 4.3. In social studies women headed households are considered as vulnerable. Percentage number of households headed by women is presented in the Table below.

Table 4-22 Households headed by women in Direct Impact Area

GN divisions	% of Households headed by women	Remarks
1.Bloemendal	45%	Percentages are higher than National percentage (23% - According to 2013 statistics).
2.Grandpass (North)	20%	
3.Nawagampura	23%	
4.Sedawatta	56%	
5.Wadullawatta	46%	
6.Orugodawatta	33%	
7.Peliyagoda Gangabada (East)	17%	

Reason for the existence of higher rate of women headed households in the area is that most of the males are mostly away from their homes.

Vulnerability of Women Headed Households

Factors such as old age, disability, chronic illness, being a widow are mainly considered as vulnerability factors. Such vulnerability related details are given in Table 4.30 in Annex 4.3. According these statistics three GN Divisions (i.e. Navagampura, Orugodawatte and Peliyagoda East) shows 100% vulnerability as all female heads in these GN divisions possess at least one of the above vulnerability factors.

Women Participation in Decision Making

In the household level, 91% of women who are above the age of 18 years have opportunities for decision making and it reduces up to 71% at the community level. Reasons for women not participating in decision making vary from GN division to GN division according to the character of the community. In Gangabada GN division, the main reason for women in not participating in decision making is that women are not given opportunities by men. In Nawagampura GN division and Orugodawatta GN division, women have no spare time owing to excessive house work and some policies/religious rules in the community that excluded women in participating in decision making

[2] Source: www.undp.org

activities. In Wadullawatta GN division such reasons are mainly attributed to lack of capacity or skills in women for decision making, lower level of education of women, lack of spare time, because of excessive house work etc.

Children's Rights

Some legislations and policies related to children's Rights in Sri Lanka are described in the Annex 4.3 under the topic on Children's Rights.

The majority of the Children in the project affected area live in squatter settlements on government land. There was little evidence of child labour in the communities except for their helping in the household self-employment activities such as small shops, cottage industries.

In the study area, 566 or 33% of the population is children and out of them 381 or 22% are in the school going age (6 – 17 years old). Refer, Table 4.22H in Annex 4.3. This is the group which has compulsory rights to attend schools.

HIV/AIDS

HIV/AIDS cases are recorded highest in the Western Province of Sri Lanka. (Please refer to table 4.32 on HIV/AIDS in Annex 4.3). The project impact area is located within the Western Province. According to the view of Family Health Bureau –Sri Lanka, the project affected GN divisions and the direct impact area of the project could be considered as a susceptible area for HIV/AIDS though it is not recorded. Through the household survey one HIV/AIDS case was recorded in Wadullawatta GN division. (Refer, Table 4.25 in Annex 4.3 on diseases in the direct impact project area).

4.8.3 Principal Economic Activities

The road section from Bandaranayake statue up to Ingurukade Junction and the surroundings of the Port access road are compact with commercial activities in different scales. The economic standard is also comparatively higher along that road section, than that of the other sections.

In the road section from Orugodawatta Junction up to Custom Department premises, commercial activities are predominant but the economic standard is lower than that of the road section from Bandaranayake statue up to Ingurukade Junction and its surroundings.

In the road section from Orugodawatta Junction up to Kelani River, the principal economic activities vary in accordance with the behavioral pattern of the inhabitants in the area. In that road section, majority of the population is squatters on government lands (See Table 4.33- Annex 4.3 for housing ownership in the direct impact project area). The socioeconomic standards of them are very low and they are casual laborers who work at Colombo Port, commercial ventures and government institutions located in the vicinity where the labor demand is high (Refer Social Land Use Map – in the Annex 4.2).

Home based food preparing, selling goods in some cottage based sporadic boutiques could be found as principal economic activities in the area. There are 54 business premises in the direct impact project area with 118 employees which need relocation.

Fishing is not a principal economic activity in the area though the Kelani River flows through the project area and its influence area. Agriculture is also not a predominant economic activity in the area because of higher density of physical development.

The situation of the principal economic activities in the direct impact project area is shown in Table 4.28 in Annex 4.3. Accordingly daily paid laborers are the highest among temporary employment in the area and it is 64% of the total workforce.

The situation of employment (which is an economic activity) in the direct impact project area is shown in Table 4.28 in Annex 4.3. Accordingly salaried employment in the government sector or private sector, salaried employment in skilled labor and salaried employment in unskilled labor could be considered as permanent employment categories in the project area. Other categories such as daily paid labor, contract labor, self-employment and foreign employment could be considered as temporary employment in the project impact area.

4.8.4 Planned development activities

The Katunayake – Colombo Expressway which is near the project is nearing completion. Under Urban Regeneration Project of Urban Development Authority, National Housing Development Authority is in the process of constructing housing apartments for the dwellers who stay in shanties around the project area (e.g. proposed housing scheme in State Timber Corporation Premises).

4.8.5 Availability of infrastructure facilities (roads, railway, water supply, power supply, health care, education etc.

The project area is a heavily urbanized area in the periphery Colombo City and there is a rich network of urban infrastructure and amenities which consists of major and minor roads, power transmission lines, railway , underground water supply network, underground and overhead telecommunication network, schools, religious places, government and private buildings, houses and commercial buildings etc. There is no hospital in the surroundings of the project area, but there are few dispensaries (Western and indigenous) run by Colombo and Kolonnawa Municipal Council.

There is a set of oil pipelines which carry oil from port to Kolonnawa oil storage complex. Location of the pipeline with respect to the project is given in the figure below.

The availability of infrastructure facilities in project surrounding GN Divisions is shown in Table 4.34 in Annex 4.3 and the availability of infrastructure in the direct impact project area are highlighted in the Table 4.35 in Annex 4.3.

Wadullawatta GN division is the highest impacted infrastructure containing GN division of the project and Nawagampura is the second highest.

4.8.6 Culturally, historically and archaeologically important objects/places

4.8.6.1 Culturally Important Places

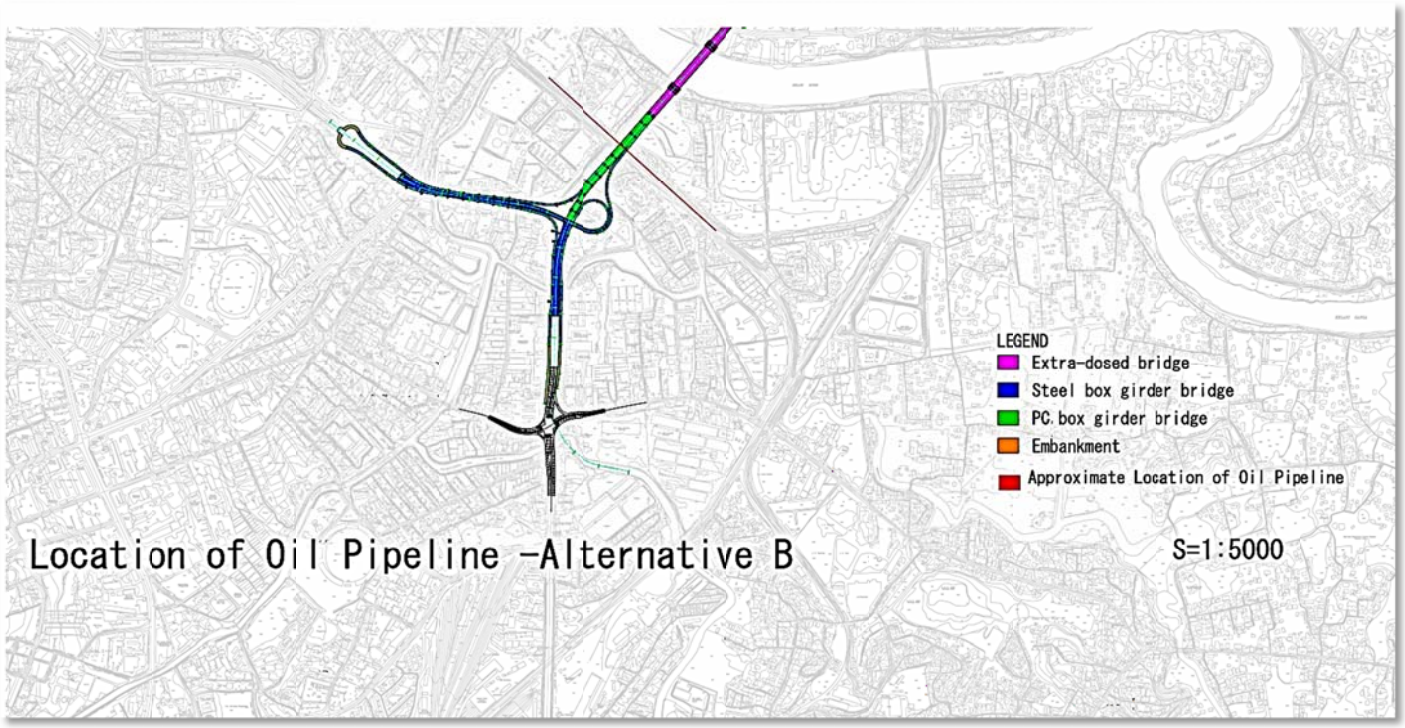
Culturally and religiously important, places in the project area are presented in table 4.23 below.

Table 4-23 Culturally and religiously important places

Type	Kolonnawa DSD			Colombo DSD			Kelaniya DSD	Total	Affected No
	Sedawatta	Wadullawatta	Orugodawatta	Bloemendhal	Grandpass (North)	Nawagampura	Peliyagoda - Gangabada East		
1. Buddhist Temple	02	03	01		01			07	01
2. Christian pray room		01						01	01
3. Hindu Kovil	01	04	01				01	07	01
4. Buddha Statues	02	01	01					04	03
5. Sacred trees (Bo)		01	01		01	01		04	00
6. Statues		01						01	01
Total	**05**	**11**	**04**	**0**	**02**	**01**	**01**	**24**	**07**

Source: Google Earth Satellite Imagery and the socioeconomic survey of JICA Survey Team April/May 2013

Figure 4-23- Location of oil pipelines



1. Buddhist Temples

Seven Buddhist temples could be identified within the project area. Those are Sanchi Viharaya, Swarna Viharaya, Sumedarama Viharaya in Wadullawatta, Sambuddaloka Buddhist Temple in Orugodawatta, Sri Somaloka Viharaya in Grandpass North ,Navaloka Viharaya in Sedawatte and the temple in front of the petrol shed.

The parapet wall which includes a shrine and the entrance pandal (*Makara Thorana*) at the entrance of Sanchiviharaya in Wadullawatta will be affected.

2. Christian Pray Room

The prayer room is the only Church situated in Wadullawatta to serve 16% of Christians in the area and it is culturally and religiously more important to them.

3. Hindu Temples

There are 7 Hindu Temples in the project area. Four are in Wadullawatta GN division, one is in Sedawatta GN division, one is in Orugodawatta GN division and the other is in Peliyagoda Gangabada East GN division. Mentioned 7 Hindu Temples are culturally and religiously important especially for 28% of Hindu population in project influential area.

Out of 7 Hindu Temples Badrakaliamman Hindu Temple in Wadullawatta is partly affected

4. Buddha Statues

Buddha statues are mostly constructed on the edges of public lands where those are facing roads. These have been constructed by Buddhist devotees with the help of political and donor support. In the project area, 4 Buddha statues (one in the parapet wall of Sanchi Temple, two by the roadside of New Kelani Bridge Road and one at Orugodawatte Roundabout) were identified by enumerators of the household survey. Out of 4 Buddha statues 3 (except for the shrine of Orugodawatte roundabout) are fully affected. Affected Buddha statues could however be shifted.

5. Sacred Trees

In Buddhist temples, Bo Trees are sacred. In the project area three Bo trees attached to three temples. One such tree is located at Orugodawatta Junction. These Bo trees are more than 15 years old and culturally important for Buddhist devotees. However, this Bo tree at Orugodawatte Junction will not be fully affected. Other Bo trees will not be affected.

6. Statue

In Sri Lanka, most of the statues are constructed in the name of public figures who had contributed to the wellbeing of the country. In the project area only one statue was identified and it was constructed to commemorate the former Prime Minister Mr. S W R D Bandaranayake. The statue is important due to its Political value and removing or shifting it to somewhere else may create political

issues if not done in a planned manner. In the past, the same statue had to be shifted owing to the road construction on the New Kelani Bridge road.

4.8.6.2 Archeological Sites

No visible archeological sites were observed within the project area. However, RDA has requested the Department of Archeology to complete an archeological assessment covering the project area. The archeological assessment reveals that there are no archeologically important places in the area directly affected by the project. The letter issued by the Department of Archeology is presented in Annex 4.4

According to historical information a ferry system had been operated between the two banks of the Kelani River to move people and goods. However this location is near the present Victoria – Japan Friendship Bridge.

4.8.8 Existing landscape

The project is located mainly within the Kelani river flood plain and in the vicinity the Kelani River flood bunds. The natural landscape in the project area has been greatly modified by human activity. Small huts made out of wood planks and permanent structures of a basic nature could be observed close to the permanent structures of the Atomic Energy Authority and Automobile Training Institute. Branch canals of Sebastian canal and Dematagoda canal are also located within the project area. The Kelani River is the main surface water body in the project area where the main bridge will be located. Existing road network in the project area is mostly at ground level except for the section between the new Kelani Bridge (Colombo end) and junction where the port access road begins. Within this section the existing road is on embankment. There are no noteworthy landscape resources in the project area.

4.8.9 Traffic congestion

Baseline road is a six lane dual carriageway urban highway. According to the observations by ComTrans project of 2013, the traffic volume is 92,720 vehicles/day around the new Kelani Bridge. This figure is already higher than the allowable traffic volume.

Traffic congestion has become routine. Average speed on this section is 20km / h according to ComTrans project's observations.

4.8.10 Noise sensitive receptors such as hospitals, schools etc.

Noise sensitive receptors such as hospitals, schools etc. are not present within the project area, except Rajasingha Central College (Approx. 300m south of the Orugodawatta Junction) in Grandpass (South) GN Division. Some facilities are located in surrounding GN divisions and they are shown in Table 4.34 in Annex 4.3.

4.8.11 Existing environmental considerations, problems or issues prevailing in the area

According to observations, the project area could be considered as a typical low lying area affecting the social and environmental life in the area by way of floods, water stagnation etc. The available canal system in the area is blocked by silted material and garbage and it's a health hazard as it is also a mosquito breeding ground.

Because of the prevailing nature, vector borne diseases are rampant in the direct impact project area. Among the GN divisions Wadullawatta and Sedawatta GN divisions are the foremost in Vector borne diseases because both areas are low-lying and not suitable for human habitation.

During the rainy season water patching is predominant in the area. Because of the flood protection bund of the Kelani River, the project area is not inundated by flood water of Kelani River, except for Seedawatta GN division. The water flowing from Danister De Silva road affects Wadullawatta and Sedawatta GN divisions. This is due to the location of these villages being at a lower elevation than that of the road. The seriousness of the problem was highlighted during the field survey by community leaders in the area.

Large number of squatter housing without sanitary facilities live in the project area. Severe shortage of proper drainage facilities prevalent in the project affected area aggravates health and environmental issues further. The situation in the project affected area is highlighted in Table 4.37 in Annex 4.3. Though the project affected area is in the highly urbanized zone, sanitary toilet facilities are not available for more than 50% of households. The situation is more serious in Wadullawatta area because 65% of households do not have sanitary facilities. As the households in the project affect area do not have sanitary facilities they use public toilets located nearby and far away, under unhygienic conditions. This is a health hazard as well as a violation of the privacy of especially the female population using public toilets. This haphazard lifestyle helps to spread communicable diseases.

A system of proper solid waste collection in this highly urbanized area is prerequisite to keep the environment clean. The direct impact project area and the surrounding DS divisions are in Municipal Council limits where a high density of population concentration is recorded. The situation of solid waste collection in the direct impact project area is given in Table 4.24 below.

Table 4-24 Solid waste collection in Direct Impact Area

DS division	GN division	Total Housing units in GN Division	Availability of solid waste collection			
			Yes		No	
			No.	%	No.	%
Colombo	Bloemendhal	33	32		1	
	Grandpass (North)	0				
	Nawagampura	14	13		1	
Kolonnawa	Seedawatta	93	92		1	
	Wadullawatta	240	238		2	
	Orugodawatta	09	9			
Kelaniya	Peliyagoda– Gangabada East	06	6			
	Total	395	390 (98%)		5 (2%)	

Source: Socioeconomic field survey April/May 2013

The solid waste collection process is available in the area for 98% of the households. But the people in the area say that system is not functioning very well. During the rainy days garbage collection system also gets affected due to the inundation of the roads especially in Wadullawatta area.

Large scale and small scale timber depots function in the area as one of the principal economic activities. Operation of timber depots renders a negative impact to the environment by adding saw dust to the environment including Kelani River. It causes respiratory system diseases to the stakeholders. This can be confirmed by the field survey data which is shown in the following table.

Table 4-25 Diseases in the direct impact area

DSD	GND	Total housing	No. diseases affected persons	Vector borne Diseases	Food and water borne	STDs (including HIV/AIDS	Respiratory system	Communicable	Non communicable
Colombo	1 Bloemendhal	33	115	17(11%)	0	0	5 (9%)	0	0
	2 Grandpass (North)	0	-		0				
	3 Nawagampura	14	64	11(7%)	0	0	2 (4%)	0	0
Kolonnawa	1 Seedawatta	93	410	46(30%)	4	0	13 (25%)	2	0
	2 Wadullawatta	240	867	71(46%)	3	1	30 (58%)	3	3
	3 Orugodawatta	09	67	06(4%)	0	0	2 (4%)	0	0
Kelaniya	1 Peliyagoda – Gangabada East 174B	06	24	04(2%)	0	0	0	0	0
	Total	395	1,547	155 (100%)	7	1	52 (100%)	5	3

Source: Socioeconomic survey April/May 2013

Respiratory system diseases are highest in Wadullawatta and Sedawatta GN divisions.

The water in the Kelani River is also not suitable even for bathing. The stakeholders said that some institutions located along river bank, discharge their solid and liquid waste to the river during the day season. However, people in Sedawatta area widely use the river water for bathing though water quality is not suitable for bathing. According to their experience they avoid bathing or washing during the time that most of the institutions discharge their waste to the river. Further they highlighted that, wastes normally discharging to the river in a particular time of the day and it is easy for them to avoid that time.

4.8.12 Existing Bridge across the Kelani River

The proposed project a six lane bridge across the Kelani River contiguous to the existing New Kelani Bridge. The proposed bridge will be located 10m upstream of the existing crossing. The foundation of the new bridge may cause scouring problems to the existing bridge, because of the disturbance to the current river flow by proposed constructions.

5 ANTICIPATED ENVIRONMENTAL IMPACTS OF PROPOSED PROJECT

As environmental impact is defined as any change to the existing condition of the environment. The summary of environmental impacts of the assessment for pre-construction, construction, and operation stages are presented below. Impacts were determined using a rating score as given below.

Table A: Summary of Environmental Impacts

Impact Ratig: A +/- Significant positive/negative, B: +/- Moderate positive/negative

C +/- : Minor positive/negative D : No impact

Impact Theme	Impact Rating		Reasons for attributed impact rating
	Pre-Construction or Construction	Operation	
Socio Economic			
Land acquisition and resettlement	A-	D	**Pre-Construction or Construction** The number of affected dwellings and small business structure within the proposed ROW and service corridor are 449 and demolition/resettlement causes significant negative impacts. **Operation** No operational impact
Livelihood and economic activities	A-	D	**Pre-Construction or Construction** Livelihood of people will be affected once the land is acquired for the project. This will cause significant negative impacts as the livelihood of some community members will be temporarily lost. **Operation** No operational impact
Disruption of Existing Infrastructure facilities(Utilities)	A-	D	**Pre-Construction or Construction** Shifting of the existing high-tension (32kW) power line, Atomic Energy Authority, the Automobile Training Institute will have temporary adverse impacts as shifting may cause inconvenience to the residents and building occupants and public users. Existing oil pipeline will get affected by construction machinery etc. It is also considered necessary to relocate electricity power lines, telecommunication lines, water supply lines located within the project area during construction causing temporary adverse impacts such as power outage, water shortages etc. As far as possible constructions near oil pipeline should be done carefully without damaging it resulting in oil leakages. **Operation** No operational impact
Nuisance to neighborhood	C-	D	**Pre-Construction or Construction** Loss of access to residences and to social and administrative institutes could be considered as a nuisance to neighborhood during construction. This impact is temporary. **Operation** No operational impact
Violation Children's Rights	D	D	**Pre-Construction or Construction** There is no significant impact as child labour is prohibited by laws of Sri Lanka. **Operation** No operational impact
Spreading of HIV/AIDS	C-	D	**Pre-Construction or Construction** There could be some impact from workers coming from outside the project area. But the effects are minimal as they will be commuting rather than living in the project site. There is only one recorded case of HIV among affected people who will be shifted out before commencement of

Impact Theme	Impact Rating		Reasons for attributed impact rating
	Pre-Construction or Construction	Operation	
			construction. **Operation** No operational impact
Impacts from construction waste and other waste disposal	B+	D	**Pre-Construction or Construction** Loss of retention in marshes , odour emanation, blockage of drainage paths, water stagnation **Operation** No impact
Impacts extraction and transportation of materials	B+	D	**Pre-Construction or Construction** Dust , vibration, public nuisance , drainage congestion, disturbance to landscape **Operation** No impact
Health and safety impairment	B+	C-	**Pre-Construction or Construction** Presence of respiratory diseases because of dust. Spread of communicable diseases because improper solid waste and wastewater disposal. Construction related accidents **Operation** Probable accidents with high vehicular speed
Physical Environment			
Change of Existing landscape	B-	C+	**Pre-Construction or Construction** The existing landscape of the proposed construction area will be temporarily altered by construction activities causing fair negative impacts. **Operation** The iconic nature of the proposed bridge will enhance the future landscape
Hydrological			
River flow and canal flow obstruction	C-	D	**Pre-Construction or Construction** There could be temporary negative impacts during construction because of small coffer dams, sheet piles and such obstructions etc. **Operation** There will not be any significant negative impacts as there will not be any piers inside Kelani River or canals for crossings.
Alteration of the local drainage pattern	C-	C-	**Pre-Construction or Construction** Drainage pattern of the area could be temporarily altered by piles of construction materials causing negative impacts. **Operation** There could be blockage of gullies , inlets etc. causing drainage congestion but this impact will not be prominent as there will be regular maintenance
Damages to flood protection scheme	C-	D	**Pre-Construction or Construction** There could be damages to the flood bund from construction equipment **Operation** No impact
Hindrance to flood propagation	C-	D	**Pre-Construction or Construction** There could be hindrances to flood propagation because of material stockpiles, construction yards on the flood plain. This impact is temporary. **Operation** There will not be any significant impact as the structures will be elevated.
Physio-Chemical Environment			
Water quality (Contamination)	B-	D	**Pre-Construction or Construction** There is a possibility that the loose soil, sewage, oil and grease, bentonite or other chemicals etc. may enter water bodies or penetrate to groundwater causing water quality degradation. However Contractor will have to meet the procedures outlined in the Environmental Management Plan to avoid these effects **Operation** Not significant impact is expected
Air quality degradation	C-	D	**Pre-Construction or Construction** Emission of air pollutant from construction equipment and traffic congestion

Impact Theme	Impact Rating		Reasons for attributed impact rating
	Pre-Construction or Construction	Operation	
			may cause minor negative impacts temporarily. **Operation** Due to an increase in traffic volume, air quality degradation level will increase slightly but, this does not significantly deviate from current air quality levels.
Noise (Public nuisance)	B-	C+	**Pre-Construction or Construction** During construction, noise in the construction area will be generated by the operation of construction machines causing public nuisance. **Operation** The project may have modest positive impacts since driving speed will increase and noise decay distance is extended.
Vibration (Structural Damage)	C-	C-	**Pre-Construction or Construction** During construction vibration in the construction area will be generated by the operation of construction machines causing public nuisance. **Operation** Vibration levels could be increased because of enhanced vehicular speed.
Global warming	D	C+	**Pre-Construction or Construction** Construction machines and vehicles generate greenhouse gases, and quantities of generating gases do not give serious impact as quantities are relatively low according to numerical studies carried out. **Operation** After implementation of the project, the amount of CO2 emission will be decreased with some positive contribution to global warming issue.
Soil Contamination	C+	D	**Pre-Construction or Construction** Soil contamination could take place from oil, grease and wastewater from construction area and this might give a minor negative impact. **Operation** Not impact is expected
Ground subsidence	C-	C-	**Pre-Construction or Construction** Ground subsidence not expected as there is no driven piling. Ground subsidence could take place in river and canal banks **Operation** Long term minor settlements within specified tolerance limits could take place
Bottom sediment disturbances	C-	D	**Pre-Construction or Construction** Bottom sediment of Kelani River may get disturbed because of end pier construction **Operation** No significant impact expected after river bed stabilisation
Traffic congestion	C-	A+	**Pre-Construction or Construction** Traffic congestion may be strictly temporarily **Operation** Traffic congestion will definitely be reduced when new bridge, access roads are operated
Terrestrial and Aquatic Ecology			
Aquatic habitat destruction	D-	D	**Pre-Construction or Construction** There is no significant impact as rare, threatened or endemic aquatic fauna or flora species does not exist. There could be minor hindrances to aquatic life of Kelani River during end pier construction **Operation** Not impact is expected
Terrestrial habitats destruction	C-	D	**Pre-Construction or Construction** Rare threatened or endemic flora species do not exist, however about 260 trees may be removed from the project area. **Operation** No impact is expected
Archaeological sites disturbance	D	D	**Pre-Construction or Construction** Not impact is expected as no archeological sites have been found during the archeological assessment.

Impact Theme	Impact Rating		Reasons for attributed impact rating
	Pre-Construction or Construction	Operation	
			archeological assessment. **Operation** No impacts
Damages to existing New Kelani Bridge	C-	C	**Pre-Construction or Construction** There could be damages to existing New Kelani bridge by construction equipment or piling activities causing vibration **Operation** No impact

5.1 Socioeconomic Impacts

5.1.1 Land Acquisition and Resettlement Impacts

Number of settlements and other institutions to be affected

The proposed project is located in a densely populated area including government and private institutions within Colombo and Gampaha districts. Some religious and culturally important structures are also located within the project area. According to the preliminary designs the number of affected dwellings and small business structures within the proposed Right of Way and service corridor are as follows;

Table 5-1 Project affected dwellings and small business structures

Divisional Secretariat Division	Grama Niladari Division	No. of Affected Structures
Colombo	Bloemendhal	44
	Grandpass North	5
	Nawagampura	26
Kolonnawa	Sedawatta	107
	Wathullawatta	252
	Orugodawatta	9
Kelaniya	Peliyagoda Gangabada East	6
Total No. of affected structures		449

(Source: census survey, 2013)

The majority of these structures are either huts or permanent structures which are basic in nature. The census survey carried out in the project area shows that 395 families occupy these structures at present. The total residential population affected will be 1743 persons (including heads of families).

All above dwellings and small scale business structures will have to be removed from the site. Impact on the government, private and religious institutions are as follows;

Table 5-2 Nature of impact of government and private and religious institutions

Institute	Degree of impact
Atomic Energy Authority	80% of the main building will be affected as the port access road interchange will locate within this area. Therefore the entire building has to be shifted.
Main workshop of Automobile	80% of the main building will be affected as the port access road

Institute	Degree of impact
Training Centre	interchange will locate within this area. Therefore the entire building has to be shifted.
Sanchi Temple	Only the parapet wall (embedded with a shrine) and entrance pandal will be affected
Aman Kovil	Will be partly affected
Kelanithissa power station	Only the parapet wall will be affected.
Timber depot	Only the access is affected.
RDA quarters	80% affected
Wijeya graphics, Jayalath Multi Traders (Pvt) Ltd	Only a part of the front end parking area will be affected due to construction of the port access road. No shifting may be necessary.

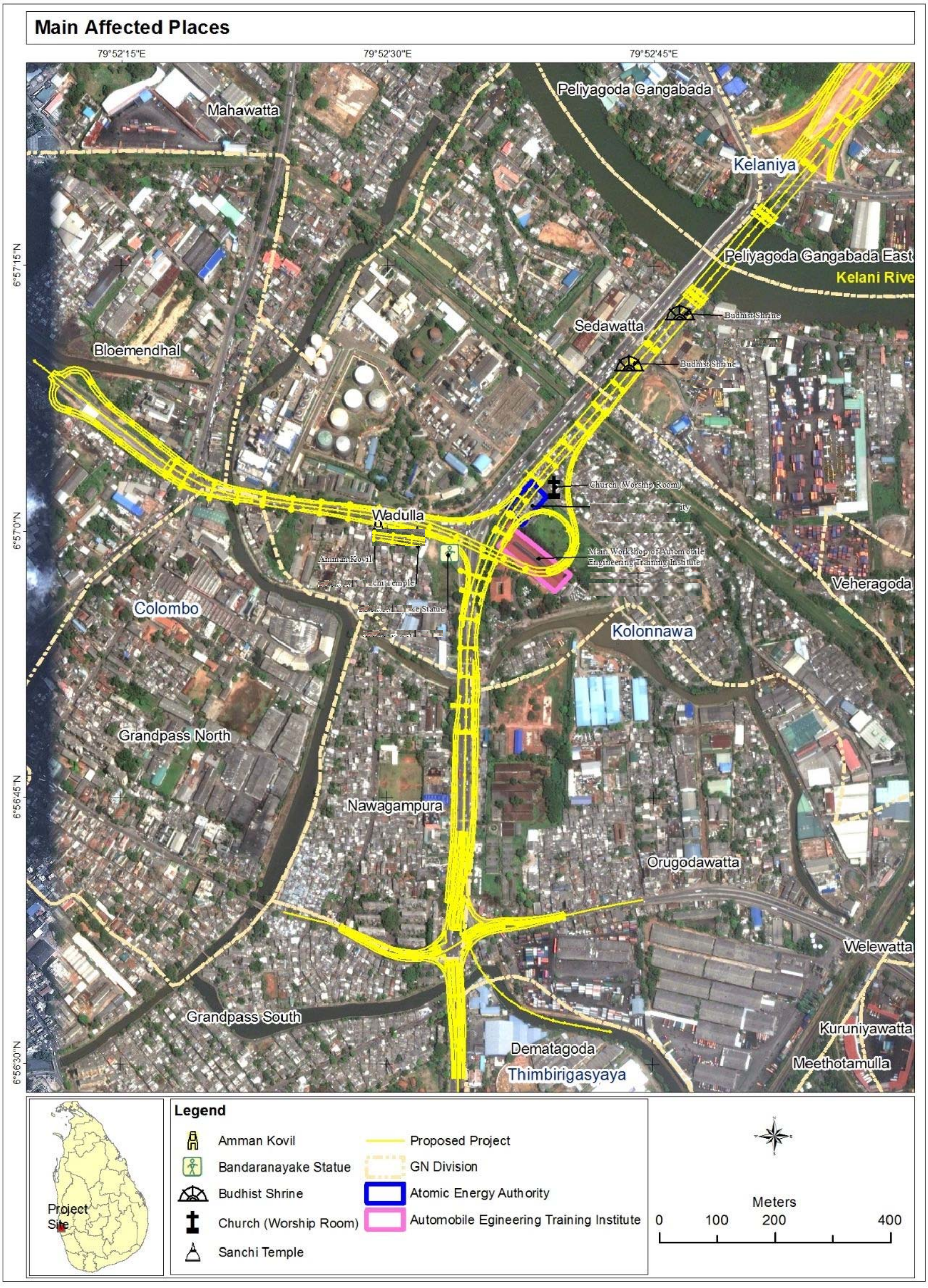


Figure 5-1 Affected Religious and Social Infrastructure

According to the preliminary designs part of the partially constructed shrine of Sanchi Viharaya will be affected. However the edge of the temporary service corridor will be located adjacent to the main hall and shrine of the temple. The shrine close to Nawaloka ground and another roadside shrine will also have to be shifted for the construction of access road to the main bridge.

About 40% of the land and the structure of Amman Kovil will have to be acquired for the proposed Right of Way of port access road and temporary access roads

Junction improvement works at Orugodawatta may have an impact on the shrine and Bo-tree but it may not be needed to be shifted.

See Figure 5.1 for the location of these structures.

Impacts of land acquisition and resettlement

(Before construction)

According to the census survey carried out within the proposed ROW and the service corridor number of affected families is 395, which includes a population of 1743 persons.

Most of these families reside in huts or permanent structures which are basic in nature. Also most of these structures have been built on government lands (unprotected area of Kelani River). According to the Land Acquisition Act such encroachers will not be eligible for compensation for loss of land and they may get a low payment for any development done on land. If such a situation arises these people will be deprived of their basic living needs.

Some of the affected families in Wadullawatta and Bloemendhal GN Divisions could be resettled in proposed housing schemes by UDA. Because UDA has been conducting housing scheme projects for the people of low income group living in the city. The housing construction project under UDA will provide accommodation needs of the affected householders.

But the remaining families will be displaced physically due to the project which will also be a significant and permanent impact. Such relocation will also affect the education of children in these families as most of them go to schools located close to the project area and to tuition classes located at Nugegoda and Borella areas.

According to the information from the affected communities it is observed that these people use government medical and other facilities such as Colombo General Hospital, Eye Hospital for their health and other official needs. If these people are resettled at a place distant to these facilities they will have to spend more money and time to reach these facilities.

5.1.2 Impacts on livelihood and economic activities

(Before construction)

Most of the people living in the affected settlement area work as laborers or porters at Pettah and Colombo port area. During the census survey carried out in the project area it came to light that some households are involved in house level business activities such as manufacturing incense sticks and doormats.

A prominent three wheeler park is located near the entrance to the Nawaloka Ground. Three small scale vehicle repairing centers and a tire repair center is located within Wadullawatta GND.

Livelihood of people will be affected once the land is acquired for the project and when people get displaced.

Loss of parking area will have a negative impact on the private business entities. Also their commercial activities would get temporarily affected as they will lose their entry or they may need to close their business during the construction period. Such a situation may affect the employees working in these private organizations.

In case the project affected persons are resettled at an alternate land, such a land needs to be developed at least with basic living facilities.

5.1.3 Disruption of existing infrastructure facilities

(Before construction)

The proposed new bridge and its approach road along Baseline road are placed at a much higher elevation than the existing road. The existing high-tension (132kV) power line to Kelanithissa power plant may need to be either raised or shifted to another location. At least the existing pylon near the Atomic Energy Authority may have to be shifted. Such an activity will have a temporary impact on the national electrical grid causing temporary power outages.

Shifting of the Atomic Energy Authority building and shifting of the main workshop of Automobile Engineering Training Institute and shifting of Amman Kovil are the other three major adverse impacts on infrastructure facilities located within the project area.

It is also considered to utilize Nawaloka Ground and nearby yard of “Logiventures” as the yard and plant area for this project. However this suggestion is only tentative.

(During construction)

Other than these major impacts the construction work will also require removing and relocating electricity power lines, telecommunication lines, and water supply lines located within the project area.

The Sri Lanka Petroleum Corporation’s oil carrying pipelines are located in the project area and during. construction there is some likely hood for damages to these pipe lines located below ground and precautions need to be taken to protect them and contingency plans are necessary to be put in place to handle emergencies in case of disruptions.

5.1.4 Nuisance to neighborhood

(During construction)

Migrant labor brought in to construction site with different cultural norms may lead to conflicts among the workers and settlers. Activities such as selling of illicit liquor may also increase within the project area.

Loss of access could also be considered as a nuisance to neighborhood during construction of the project.

5.1.5 Violation of Children’s Rights

(During construction)

It is assumed that “children’s rights” is related to “child labor”. Other than child labour there is no impact on “children’s rights” from this project. Child labour has not been recorded in the case of projects under construction, such as OCH Project. Child labor is covered under contract clauses of the contract document (Sub Clause 6.21 of the JICA Standard Contract Documents FIDIC MDB Harmonized Version 2010). Sri Lanka’s labor law specifically states that the minimum age of a laborer should be 18 years. Therefore there will not be any impact on children’s rights.

5.1.6 Spreading of HIV/AIDS

(During construction)

During the construction period there is a possibility of causing spread of various sexually transmitted diseases including HIV/ AIDS. Laborers should be educated on this aspect and general hygiene practices. Strict labor supervision should also be carried out during the construction period to avoid such spread of sexually transmitted diseases. One aid patient was recorded in Wadullawatte area during the household survey. Sub Clause 6.7 Health and Safety of the JICA Conditions of Contract exhaustively deals with the measures for prevention of HIV/AIDS including the conducting of awareness programs and free distribution of condoms. Contractor is required to include these activities in his program and payments will be made under a Provisional Sum

5.1.7 Health and safety impairment

(During construction)

The project is located in a populated area with significant traffic flow, which means that there will be many people around the construction sites. A number of skilled and unskilled laborers will be working at site with heavy machinery and material.

Construction activities such as soil excavation, piling, backfilling, embankment work, steel girder erection and concreting will require operation of heavy machinery. Movement of dump trucks loaded with material will also be common during the early stages of construction. There is a risk of accidents.

The risk of fire and electrocution should also be considered during a project of this magnitude. Risk of fire and electrocution is significant at labor camps, material and fuel stores.

Exposure of workers into hazardous fumes is another occupational hazard during construction. Falling from heights may also happen if the workers do not use proper safety measures when working at heights above 2 m from ground level. There are conditions imposed on the Contractor under the FIDIC Conditions of Contract to ensure health and Safety of Workers and it is a requirement that he appoints an Accident Prevention Officer for this task

Stagnant water and domestic waste collected on site (especially in worker camps) may lead to spread of mosquitoes and flies causing vector borne diseases to workers and neighboring communities. Food borne diseases will also be common if the workers do not have proper facilities for cooking and storing of food items. Unhygienic site conditions will also lead to the spread of other domestic pests such as rats and cockroaches.

5.2 Impacts from construction and other waste disposal

(During construction)

The excavated soil for piers, will be used as embankment materials if the soil condition is deemed to be good.

Volume of excavated soil (Bridge section + earthwork section); 91,000m^3

Volume of backfilling soil; 55,000 m^3

Volume of embankment; 36,000m^3

Excess waste (construction waste or domestic solid wastes from labour camps) disposal will have impacts on the disposal sites causing water stagnation, blockage of drainage paths, odour emanation, surface and groundwater contamination, disturbance to terrestrial and aquatic flora and fauna. If excess waste is disposed to nearby lowlands they too will get similar impacts.

Impacts due to extraction and transportation of construction material

(During construction)

During the construction stage, transportation of material through roads that are narrow and not built to withstand such loads will lead to the deterioration of such roads and this even cause traffic congestions. Such situation will cause great inconvenience to the public who live around the area.

Also falling construction materials from vehicles could lead to the deterioration of the surrounding environment and the increase the possibility of accidents.

Offsite material extraction places such as quarries metal crushers, burrow pits which supply materials, will have various impacts even if materials were purchased to the project as a market product. Such impacts are noise, dust, vibration, abandoned pits causing water stagnation, drainage blockage etc.

5.3 Change of existing landscape

(During construction)

The new bridge and the road network are designed to be built at a much higher elevation than the existing road and bridge structure. Such construction and removal of existing shanty structures will further change the landscape of the project area.

The trees along the existing roadside is the main existing landscape source. Changes in these plants due to the project implementation will directly impact on the existing landscape in the area.

Landscape of marshy lands around the project area, owing to disposal of waste material from construction activities, will be impaired. Refer section 5.2 for related other impacts.

(During operation)

Newly built 2nd New Kelani Bridge and flyovers will give a feeling of pressure, initially. However, it will be the birth of a new urban landscape, within the developed surrounding environment.

A photo documentation of project area landscape is presented in Annex 5.3.

5.4 Hydrological impacts

5.4.1 Hindrance to canal and river flow pattern

(During construction)

The proposed structure has a cross section which is larger than that of the present New Kelani Bridge therefore the proposed Bridge will not hinder the flow of the Kelani River as the existing New Kalani Bridge does not cause any flow hindrance. Ample clearance even on the flood plain is available from the proposed constructions. Proposed elevated structures over canals have adequate clearance for canal flow hence no flow hindrance occur.

5.4.2 Alteration of drainage pattern of the area

(During operation)

There will not be any permanent impact on the drainage pattern of the area as the structures will be elevated and there will be side drains provided to drain off water collected on the road surface.

5.4.3 Damages to flood protection schemes (Flood bunds/ gates etc.)

(During construction)

There are two flood bunds on the left and the right bank flood plain of the river and these flood bunds could get disturbed by the construction equipment, resulting in scrapes and minor damages in the bunds.

(During operation)

The flood bunds on the left and the right bank flood plain of the river will not have any impact as there will not be any flow hindrance caused by the main bridge during the operational stage due to reasons stated in Section 5.2.1.

5.4.4 Hindrance of flood due to loss of retention/ detention area and blockage of drainage pathways.

(During construction/During operation)

The proposed road design does not block any drainage pathways as the system is mostly elevated. Even the bridge across the Kelani River has no piers obstructing the flow. However there could be drainage congestion in interchange areas and in the areas where ramp bridges merges with the existing ground level where there could be embankments.

5.4.5 Impacts on bottom sediment

(During construction)

During construction bottom sediments could be disturbed near river bank areas as these places have to be drilled to install piles for bridge piers. Such bottom sediments may be reused as a soil dressing material, therefore there is no significant impact on bottom sediment

5.4.6 Hydrological Impacts "Without Mitigation Scenario"

If hydrological impacts are not mitigated drainage congestion, creation of backwater, increase of flood levels and delay of flood retention time could transpire. However such a scenario will not be enacted.

5.5 Water quality (contamination)

(During construction)

Spilled/ leaked chemicals, oil and fuel could flow on to the surface and ground water bodies after mixing with storm water or waste water discharged from worker camps, vehicle service and repair stations. Such situation would further deteriorate the surface and ground water quality of the project area.

In this project, a large scale of cut earthworks, excavation is not planned. There is no enough room within the project premises to establish labour camps or service stations. It will not be necessary to locate them close to the site.

However slight changes in groundwater quality due to the piling work is expected, but there is no major impact on wells around the project site, because these wells are not used for drinking purpose.

5.6 Air quality, noise and vibration impacts during construction and operation

5.6.1 Air Quality

The present traffic congestion in the project area already have an adverse impact on air quality because of emissions from slow moving vehicles. Emissions from the Kelanitissa power plant (especially water vapor) also affect the ambient air quality of the project area.

The level of emissions may increase due to movement of construction vehicles on site. Dust will be another substance which will be generated during demolition of existing structures, excavation and earth work. Dust will also be generated from Asphalt plant, concrete batch mixing plant, stockpiles and storage facilities and separate approvals and studies may be required if such plants are established offsite.

Table 5-3 Emission strength for construction work

Item	Unit	Strength of emmission of air polutants (g/unit/day)		Height of exhaust nozle (m)
		Nox	SPM	
Earth work				
	Embankment construction(Road body, Subgrade)	8,600	260	3.0
	Slope shaping	4,400	140	2.4
Soil Improvement work				
	Sand compaction pile driving	34,000	100*	2.3
Pile work				
	Rotary penetration pile	18,000	100*	2.3
Bridge construction woork				
	Steel bridge	15,000	100*	2.1
	PC bridge	15,000	100*	2.1
Pavement woork				
	Asphalt pavement (Surface layer, Base layer)	11,000	100*	1.7
source : Technique of the Road Environmental Impact Assessment , Road environment Institute 2007. *=Assumptions				

Above emission strengths were estimated after a detailed air quality analysis. Refer Annex 5.1 for details.

However, it is anticipated that there will be a reduction of vehicle emissions once the bridge and roads are operational as the movement of vehicles will be improved with less traffic congestion.

Greenhouse Gases

CO_2 emissions factor used on numerical analysis are given below. The analysis is carried out to predict the impact of greenhouse Gases due to implementation of the project.

Table 5-4 CO_2 emission Factor (Unit : g-CO_2/km)

		Standard-sized car	Small-sized cargo carrier	Standard-sized cargo carrier	Bus
Average velocity (km/h)	10	331	315	1345	1016
	20	221	251	1132	781
	30	177	212	963	660
	40	152	185	835	583
	50	138	168	750	537
	60	130	160	706	517
	70	129	159	704	520
	80	132	168	744	547
	90	141	184	826	595
	100	153	208	949	666

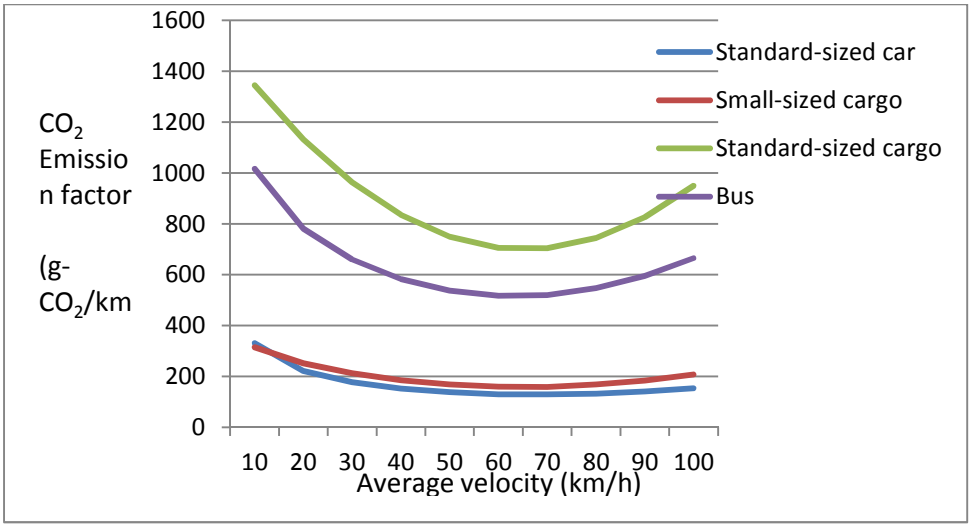


Figure 5-2 CO_2 Emission Factor

5.6.2 Noise

There could be noise generation from the heavy construction equipment such as cranes, backhoes, bulldozers etc. However the baseline noise in the area during the daytime is high as it is a high urban area. Hence noise impact will be aggravated. Noise could cause public inconvenience. Noise will especially impair religious activities of the Buddhist and Hindu temple in the project area.

5.6.3 Vibration

Vibration could be caused by heavy equipment which could crack existing building components, road surfaces and other structural elements. Vibration will also, coupled with noise causes social inconvenience. In addition, traffic vibration will be produced by the vehicles on the road

5.6.4 Overall Impacts on Air Quality Noise and Vibration (with and without the Project)

As a part of the EIA study consultants have evaluated the scenario for Air Quality, Noise, Vibration and Global warming parameters and the results are given below.

5.6.4.1 Air quality

(During construction)

The level of emissions may tentatively increase due to movement of construction equipment and vehicles on site. Dust will be another issue which will be generated during demolition of existing structures and during earthwork operations.

The numerical estimated results on changes in ambient air quality is presented in the following tables. The calculation formulas used for the estimation are presented in Annex 5.1. Background concentration of NO_2 is around 0.1ppm generally, hence adopted 0.09ppm as background concentration of this analysis is the minimum value of the measured result.

Table 5-5 Estimated result of Air quality of Construction work (Annual average value) (Peliyagoda-Kelanitissa)

Construction work	Estimated Air quality	
	Boundary of Construction site	
	NO_2 (ppm)	SPM ($\mu g/m^3$)
Sri Lanka's Ambient Air Quality Stanndard	**0.05**	-
WHO Ambient Air Quality Standard (1 hr)	**0.10**	-
Earth work	0.0206	108.8
Soil Improvement work	0.0209	108.8
Pile work & Bridge Construction work	0.0209	108.8
Pavement work	0.0206	108.8

Background concentration, assuming of the minimum measured value

Table 5-6 Estimated result of Air quality of Construction work (Annual average value) (Kelanitissa-Orugodawatta)

Construction work	Estimated Air quality	
	Boundary of Construction site	
	NO_2 (ppm)	SPM (mg/m^3)
Sri Lanka's Ambient Air Quality Stanndard	**0.05**	-
WHO Ambient Air Quality Standard (1 hr)	**0.10**	-
Pile work & Bridge Construction work	0.0210	108.8
Pavement work	0.0207	108.8

Background concentration, assuming of the minimum measured value

Table 5-7 Estimated result of Air quality of Construction work (Annual average value) (Kelanitissa-Ingurukade junction)

Construction work	Estimated Air quality	
	Boundary of Construction site	
	NO_2 (ppm)	SPM (mg/m^3)
Sri Lanka's Ambient Air Quality Stanndard	**0.05**	-
WHO Ambient Air Quality Standard (1 hr)	**0.10**	-
Pile work & Bridge Construction work	0.0213	108.8
Pavement work	0.0208	108.8

Background concentration, assuming of the minimum measured value

From this result, it was able to determine that there is no significant impact of NO_2 or SPM due to construction work. The value of the estimated results is close to the current measured value in this study. However, there is a possibility that a negative impact could occur as many construction units will move within the project area at the same time, especially when the construction work goes on in full swing.

(During operation)

The amounts of NO_2, SPM, CO and SO_2 emission were estimated based on the increase of vehicle number and velocity.

Table below shows the speed and volume of traffic used for the numerical calculation. Wind direction and average wind speed data of Colombo from Department of Meteorology were used for the analysis. Details of the analysis are presented in the Annex 5.1.

Table 5-8 Traffic conditions for estimation

		2013				2020		
Section		①	②	③	④	(A)	(B)	(C)
Vehicles Number/day		92,721	95,260	86,357	27,075	121,439	107,206	34,075
Average vehicle Velocity (km/h)	Baseline road					40	40	40
	Proposed road					60	60	60
	Baseline road*					20	20	20

① : Peliyagoda-Sedawatta (Baseline road)

② : Sedawatta-Kelanitissa (Baseline road)

③ : Kelanitissa-Orugodawatta (Baseline road)

④: Kelanitissa-Ingurukade junction (Prort access road)

(A): Peliyagoda-Kelanitissa (Baseline road+New road)

(B): Kelanitissa-Orugodawatta (Baseline road+New road)

(C): Kelanitissa-Ingurukade junction (Prort access road + New road)

* : Without project

Traffic volume source;"Urban Transport System Development Project for Colombo Metropolitan Region and Suberbs " The ministry of Transport.2013

The numerical estimated result has been shown in the following table, while the formulas used for estimation is presented in Annex 5.1.

Table 5-9 Estimation of NO_2 emitted (ppm)

Section	①	②	③	④
Sri Lanka's Ambient Air Quality Standard (NO_2)	**0.05**	**0.05**	**0.05**	**0.05**
WHO Ambient Air Quality Standard (NO_2, 1 hr) -	**0.10**	**0.10**	**0.10**	**0.10**
2020 With project	(A) 0. 0233		(B)0.0241	(C)0.0229
2020 Without project	0.027	0.0277	0.0265	0.0250

Standard value of WHO was converted to PPM.

Estimated concentration of NO_2 at the project site along the road, when the project is implemented (With project), has decreased compared to the scenario, when the project is not implemented

(Without project). In addition, predicted NO_2 concentrations are during operation stage are within the Ambient Air Quality Standards of Sri Lanka. Estimation of SPM, CO and SO_2 levels are presented below. The estimations of the SPM, CO and SO_2 levels show a similar trend to that of NO_2. The effectiveness of the project was confirmed through this analysis because the results couldmeet the Ambient Air Quality Standards of Sri Lanka for all items.(The standards shown Annex II-B)

Table 5-10 Estimation of SPM emitted (μg/m3)

Section	①	②	③	④
Japan's SPM standard	**300.0**	**300.0**	**300.0**	**300.0**
2020 With project	（A） 108.8		(B)108.8	(C)108.8
2020 Without project	108.8	108.8	108.8	108.8

Table 5-11 Estimation of CO emitted (ppm)

Section	①	②	③	④
Sri Lanka's Ambient Air quality standard CO (8hrs)	**9.0**	**9.0**	**9.0**	**9.0**
Japan's CO standard (8hrs)	**20.0**	**20.0**	**20.0**	**20.0**
2020 With project	（A） 7.37		(B)7.39	(C)7.37
2020 Without project	7.37	7.37	7.45	7.39

Table 5-12 Estimation of SO_2 emitted (ppm)

Section	①	②	③	④
Sri lanka's Ambient Air Quality Standard SO_2 (24 hrs)	**0.03**	**0.03**	**0.03**	**0.03**
WHO Ambient Air Quality Standard SO_2, (24 hrs) -	**0.008**	**0.008**	**0.008**	**0.008**
2020 With project	（A） 0. 0100		(B)0.0100	（C） 0.0100
2020 Without project	0.0103	0.0103	0.0102	0.0101

Standard value of WHO was converted to PPM. Moreover, it is anticipated that there will be a reduction of vehicle emissions once the bridge and roads are operational as the movement of vehicles will be improved with less traffic congestion.

5.6.4.2 Noise

(During construction)

Construction noise will come from construction machinary and vehicles. However, significant impact does not continue.

Major work which will create noise during construction work are highlighted below. The table also presents the results of the noise estimation generated by construction works. The calculation formulas used for the estimation calculation refer to the Annex 5.1.

Table 5-13 Result Analysis of Noise Level (Peliyagoda-Kelanitissa)

Construction work	Unit	Estimated Noise Level (dB)
		Boundary of Construction site
Maximum Permissible Noise level, Construction activities, -Day time (dB) by Noise Control Regulations, Sri Lanka		**70**
Earth work		
	Slope shaping	77
Soil Improvement work		
	Sand compaction	80
Retaining wall work		
	Cast-in-place retaining wall	77
Pile work		
	Cast-in-place-pile	54
Bridge Construction work		
	PC bridge construction work	77
Pavement work		
	Asphalt pavement work	70

Table 5-14 Result Analysis of Noise Level (Kelanitessa-Orugidawatta)

Construction work	Unit	Estimated Noise Level (dB)
		Boundary of Construction site
Maximum Permissible Noise level, Construction activities, -Day time (dB) by Noise Control Regulations, Sri Lanka		**70**
Earth work		
	Slope shaping	77
Retaining wall work		
	Cast-in-place retaining wall	54
Pile work		
	Cast-in-place pile	62
Bridge Construction work		
	Steel bridge construction work	**88**
Pavement work		
	Asphalt pavement work	78

Table 5-15 Result Analysis of Noise Level (Kelanitessa-Ingurukade junction)

Construction work	Unit	Estimated Noise Level (dB)
		Boundary of Construction site
Maximum Permissible Noise level, Construction activities, -Day time (dB) by Noise Control Regulations, Sri Lanka		**70**
Pile work		
	Rotary penetration pile	68
Bridge Construction work		
	Steel bridge construction work	**94**
Pavement work		
	Asphalt pavement work	**84**

It was predicted that noise associated with road construction work, will have an effect on the residents who live near the construction site. In sections of Kelanitessa-Orungodawatta and Kelanitessa-Ingurukade junction, the impact is greater than other sections owing to closeness to residential areas and construction sites.

(During operation)

The result of mathematical noise estimation is shown in Table 5-16, 5-17 and 5-18. In current time (2013), the values of noise on the boundary of existing roads are shown in bold text on the three

tables. They also present the estimated noise levels once the project is in its operational phase in the year 2020. The calculation formulas used for the estimation calculation refer to the Annex 5.1.

Table 5-16 Result Analysis of Noise Level (Kelanitessa-Ingurukade junction)

Year	Time	**Permissible Noise Level $L_{Aeq,}$ dB(A)**	Estimated Noise Level dB(A)		
			0m	50m	100m
2013	Day	**70**	**79**	68	
2020 with			60	56	55
2020 without			**79**	65	61
2013	Night	**60**	**75**	**66**	
2020 with			56	52	50
2020 without			**76**	**62**	58

Note1) Current evaluated point is 2013: At the boundary of the existing road edge

Note2) Future evaluated point is 2020: At the boundary of the proposed road edge

Note3) Future evaluated point in 2020 (without project) At the boundary of the existing road edge

Note4) Estimation point 0m is boundary of the proposed road edge

Note5) Permissible Noise Levels in accordance with Noise Control regulations, Sri Lanka

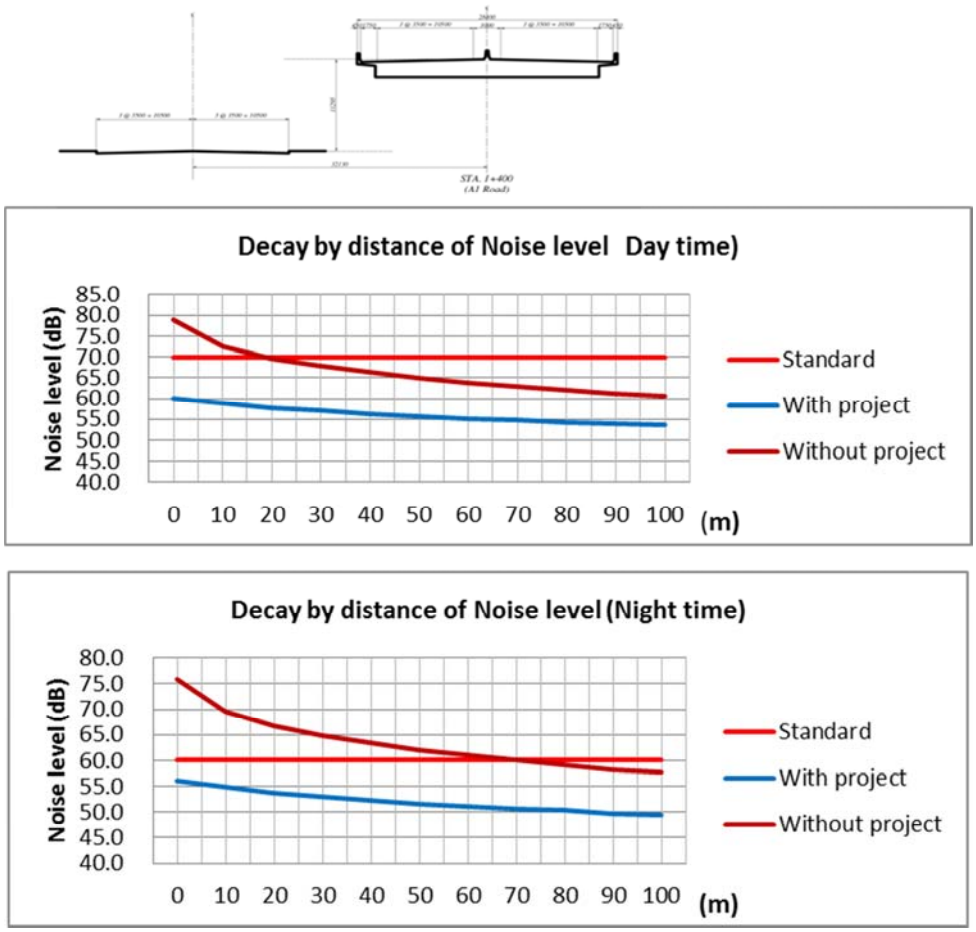


Figure 5-3 Estimated Noise level in the Future (Peliyagoda-Kelanitissa)

Table 5-17 Estimated Noise level in the Future (Kelanitissa-Orugodawatta)

Year	Time	Permissible Noise Level $L_{Aeq,}$ dB(A)	Estimated Noise Level dB(A)		
			0m	50m	100m
2013	Day	**70**	**73**		
2020 with			62	54	51
2020 without			**74**	60	56
2013	Night	**60**	**71**		
2020 with			58	50	47
2020 without			**72**	58	54

Note1) Current evaluated point is 2013: At the boundary of the existing road edge

Note2) Future evaluated point is 2020: At the boundary of the proposed road edgeNote

3) Future evaluated point in 2020 (without project) At the boundary of the existing road edge

Note2) Future evaluated point is 2020: At the boundary of the proposed road edge

Note3) Future evaluated point in 2020 (without project) At the boundary of the existing road edge

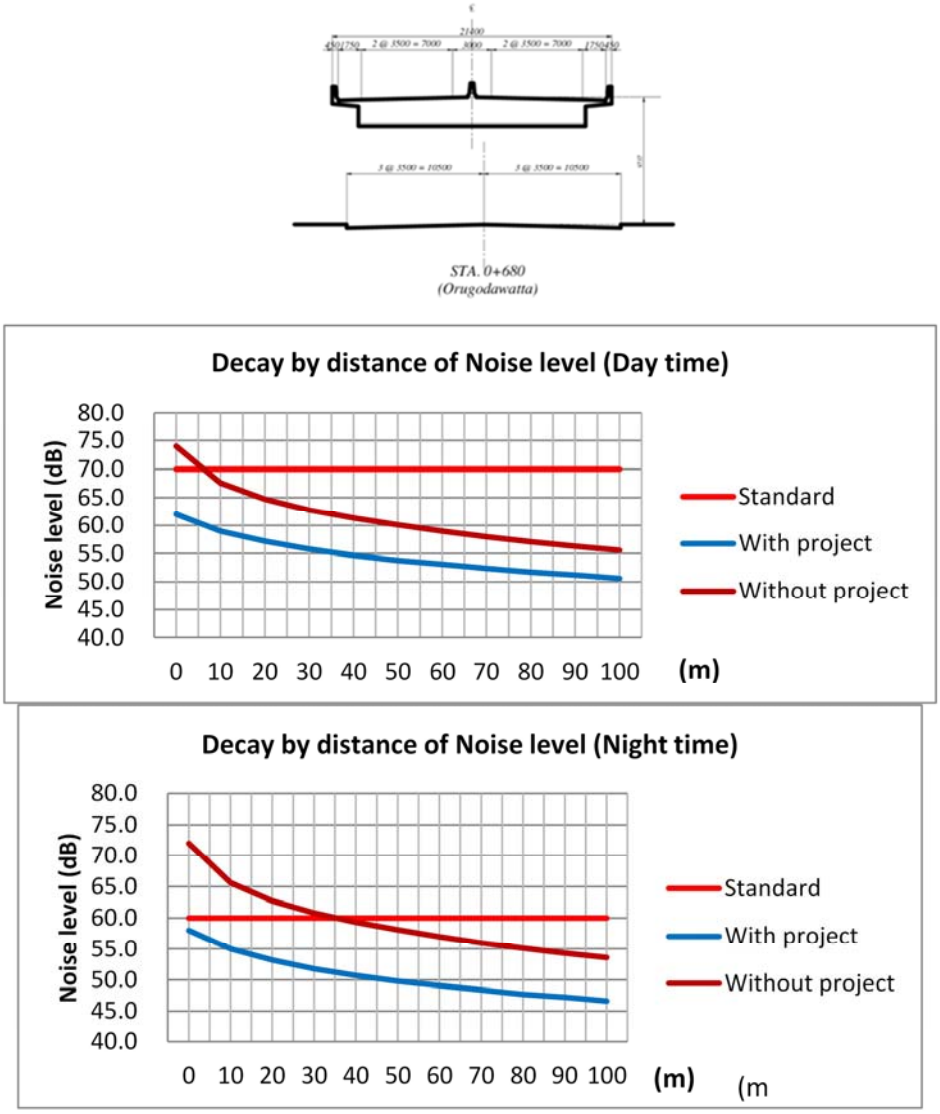


Figure 5-5 Estimated Noise level in the Future (Kelanitissa-Orugodawatta)

Table 5-18 Estimated Noise level in the Future (Kelanitissa-Ingurukade junction, Port access road)

Year	Time	Permissible Noise Level $L_{Aeq,}$ dB(A)	Estimated Noise Level dB(A)		
			0m	50m	100m
2013	Day	**70**	**80**		
2020 with			70	57	52
2020 without			**79**	65	61
2013	Night	**60**	**75**		
2020 with			67	54	50
2020 without			**76**	**62**	58

Note1) Current evaluated point is 2013: At the boundary of the existing road edge

Note2) Future evaluated point is 2020: At the boundary of the proposed road edge

Note3) Future evaluated point in 2020 (without project) At the boundary of the existing road edge

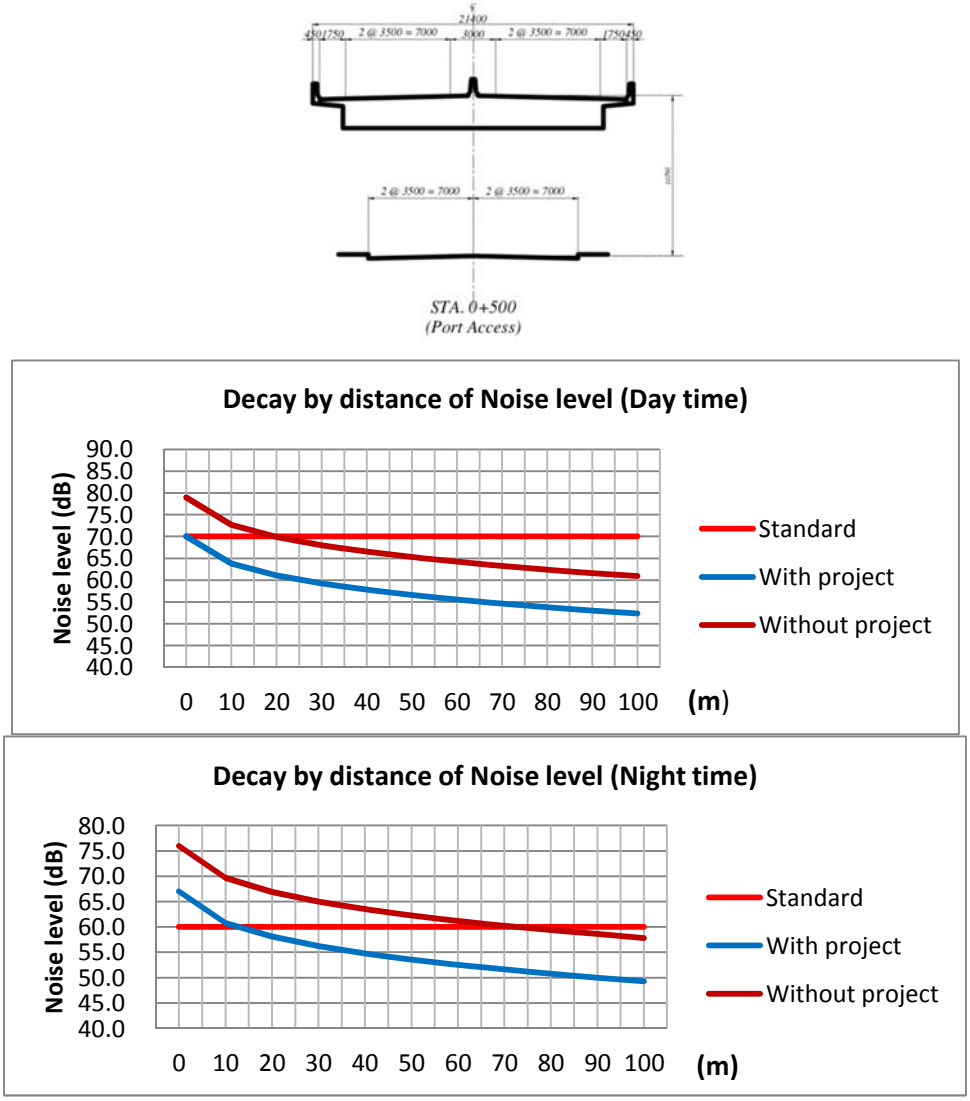


Figure 5-6 Estimated Noise level in the Future (Kelanitissa-Ingurukade junction, Port access road)

According to the estimates, the noise level will be reduced during the day time when the project is operational. However, the noise level predicted will be above the environmental standards during night time. However, it does not further aggravate the present situation, therefore, mitigation measures will not be necessary because the project will not worsen the present environment condition. (The environmental standards shown Annex II-B)

It should be noted that if the project is not implemented the noise level will be above the national standards during both day time and night time. A reduction of noise levels could be anticipated once the new bridge and new roads are opened for traffic.

5.6.4.3 Vibration

(During construction)

Construction work such as earth work, pile work will cause vibration. Below presents the results of the vibration estimation generated by construction works. The calculation formulas used for the estimation are presented in Annex 5.1.

Table 5-19 Result Analysis of Vibration Level (Peliyagoda-Kelanitissa)

Construction work	Unit	Estimated Vibration Level (dB)
		Boundary of Construction site
Earth work		
	Embankment construction	51
Soil Improvement work		
	Sand compaction	69
Retaining wall work		
	Cast-in-place retaining wall	51
Pile work		
	Cast-in-place pile	43
Bridge construction work		
	PC bridge	43
Pavement work		
	Asphalt pavement work	40

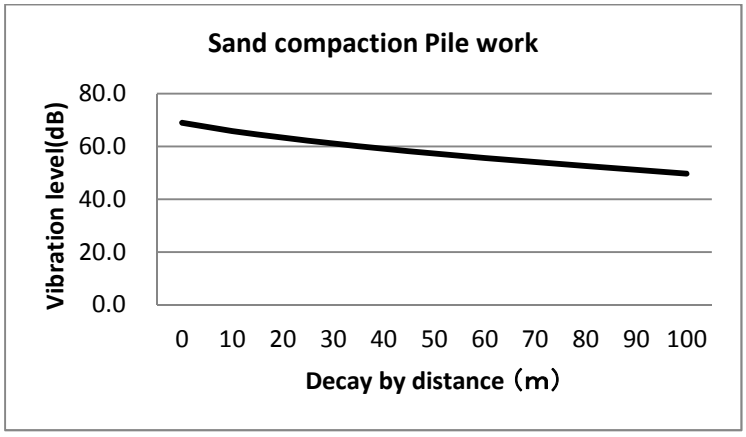


Figure 5-7 Decay by the distance of Vibration level

Table 5-20 Result Analysis of Vibration Level (Kelanitessa-Orugidawatta)

Construction work	Unit	Estimated Vibration Level (dB)
		Boundary of Construction site
Retaining wall work		
	Cast-in-place retaining wall	58
Pile work		
	Cast-in-place pile	50
Pavement work		
	Asphalt pavement work	47

Table 5-21 Result Analysis of Vibration Level (Kelanitessa-Ingurukade junction)

Construction work	Unit	Estimated Vibration Level (dB)
		Boundary of Construction site
Pile work		
	Rotary penetration pile	55
Pavement work		
	Asphalt pavement work	52

In the classification of vibration impact on humans, the vibration level of 40-69 dB is "a sensitive people feel vibration level". Predicted vibration associated with some road construction work is within this range. Thus it is anticipated that there will be some impact of vibration to communities living close to the project construction sites. But this will be a temporary impact, occurring only during the construction period. The impact of vibration will be minimized by not conducting the construction works, which generates large vibration, during night time.

(During operation)

Vibration levels due to the traffic on the road were estimated for year 2035. The estimated traffic vibration levels are shown in Table 5-22. The calculation methodology is shown in Annex 5.1D. Traffic vibration forecast is carried out based on the baseline survey at 6 locations in the morning peak time.

Vibration forecasted values do not exceed Sri Lankan standard at all locations in Type 3 categorized level since approximately 50 % of traffic volume on the existing road will be diverted to the new elevated road. With regard to Type 4 categorized level in the Sri Lankan Standard, the forecasted value at V4 location exceeds the criteria. However the forecasted value is less than current traffic vibration level, thus the project does not give significant negative impact.

Table 5-22- Result of Traffic Vibration Forecast

Location	Baseline in the Morning (peak time 2013)		Standard Value by Type		Evaluation for Baseline Value (Existing Condition)		Forecast Value	Evaluation for Forecasted Value (peak time, 2035)	
	Frequency Range (Hz)	Vibration in ppv (mm/sec)	Type 3	Type 4	Type 3	Type 4	Vibration in ppv (mm/sec)	Type 3	Type 4
V1	0-10	0.27	2	0.5	Not exceed	Not exceed	0.2	Not exceed	Not exceed
V2	>50	0.56	8.0	2.0	Not exceed	Not exceed	0.41	Not exceed	Not exceed
V3	10-50	0.60	4.0	1.0	Not exceed	Not exceed	0.52	Not exceed	Not exceed
V4	0-10	1.63	2.0	0.5	Not exceed	**Exceed**	1.42	Not exceed	**Exceed**
V5	10-50	0.58	4.0	1.0	Not exceed	Not exceed	0.55	Not exceed	Not exceed
V6	>50	0.65	8.0	2.0	Not exceed	Not exceed	0.82	Not exceed	Not exceed

Note)

1) Vibration forecast was carried out at morning peak hour.
2) It is assumed that traffic driving speed is same as current speed: app. 18km/h on the existing road
3) It was forecasted that 50 % of traffic on the existing road is diverted to the new elevated road.
4) Forecast methodology is shown in Annex 5.

5.7 Global warming

(During construction)

Although construction machines and vehicles generate greenhouse gases, the quantities of emissions do not give serious impact and negligible on this item.

(During operation)

Amount of emission of CO_2 gas based on the increase of vehicles are estimated as Table 5.25.

Table 5-23 Amount of CO_2 estimated from vehicles

Year		2013	2020
Vehicles Number		92,721	121,439
Average vehicle velocity km/h	With project		60km/40km
	Without project	20km	20km
CO_2 emission Ton/year	With project		22,082
	Without project	26,665	34,392

Basically the amount of CO_2 emitted will increase proportionate to the increase of vehicle number moving along the project area. With the implementation of the project, vehicle numbers will increase, but the travelling speed of these vehicles will also be correspondingly increased. Hence the emissions of CO_2 will be reduced.

The volume of CO_2 emitted, is also proportional to the fuel consumption. Without the project, emissions of CO_2 gas have increased in proportion to the amount of vehicles, but with the project, the estimation results pointed out an amount which is lower than the existing amount. This indicates that the project will contribute to environmental improvement.

Thus, by the implementation of the project, the amount of CO_2 emission will be decreased aiding the prevention of the global warming issue.

5.8 Soil Contamination

(During construction)

Soil contamination could take place from oil and grease from vehicles, wastewater and solid waste and sewage in or outside the project area. Soil also could get contaminated from the substances used for road pavements, spill of paints and such chemicals.

5.9 Ground Subsidence

(During construction)

As there is no heavy earthwork involved, the impact of ground subsidence is not anticipated. River bank subsidence could take place while bridge abutment construction because of the use of heavy equipment.

There is a possibility of soil and water contamination if bentonite slurry is used for soil stabilization. However since the method of piling is encased bored piling there is a lean possibility of using bentonite

5.10 Traffic congestion

(During construction)

At present the project area faces daily traffic congestions. As indicated the Average Daily Traffic (ADT) values along the existing road and bridge will be drastically increased once the Colombo – Katunayake Expressway is fully operational.

It is also observed that the current turning circles located especially at Orugodawatta and the port access road junctions slows down the traffic flow when turning of long vehicles and containers take place.

Detours have to be made for construction work closing the construction site to vehicular traffic. Frequent passage of construction vehicles are to be expected during the construction stage. Therefore, at the construction stage the project area and its vicinity will face more severe traffic congestions.

(During operation)

However the traffic congestion will be reduced once the new bridge and all access roads of the project are operational. This will also help the county's economy as the precious man hours spent on the road will be greatly reduced.

5.11 Impacts on aquatic/ terrestrial habitats

5.11.1 Effect on flora and fauna

(During construction)

A considerable amount of the project area is covered with man-made habitats. Since the project activities are restricted to the existing RoW and surrounding lands, the project would not lead to loss of habitats. It will not cause changes in the land use pattern and it would not affect the population of any identified floral and faunal species. Modification of existing habitats, impact to native species, causing threats to existing biodiversity or the introduction of invasive species will not be expected through the project activities. Two potential ecological impacts due to proposed construction of the bridge and flyovers include;

(1) Destruction and disturbance of roosting and foraging habitats of several avifaunal and mammalian species which use different species of trees in the proposed construction area
(2) Impact to the aquatic fauna of the Kelani River including fish due to construction activities.

5.11.2 Effect on Flora

(During construction)

About 260 trees have been identified for the removal during the proposed construction and associated work within the proposed site.

- Locations of trees identified for the proposed removal are located in existing road reservations, lands adjacent to the road reservations and bridge mouth. They are in private and government property. Felling of these trees will have an effect on the existing landscape of the project area.

- From the identified trees, 2 species are important as religious trees which belong to a single species Bo (*Ficus religiosa*). Of these, one tree is located within RDA premises at Orugodawatta junction, and the other one is located at Ingurukade Junction adjacent to the road.
- Majority of the trees located within road reservation are shading species such as *Polyalthialongifolia* (Weeping Willow), *Pettophorum pterocarpum* (Kahamara), *Spathodia*

campanulata, Albiziaodo ratissima (Suriyamara), *Albiziasaman* (Para mara) which belong to different species.

- Some trees located in the road reservations and adjacent lands in the proposed construction area are valuable fruit species such as Mango and Jack (*Mangifera indica* and *Artocarpus hetarophyllus*) trees. These are located along the roadside and adjacent lands as closely arranged rows or scattered trees.

The existing environmental friendly sources like trees, water bodies, parks /playgrounds, statues etc. were also considered. Changes in these places due to the project implementation will directly impact on the existing landscape of the area.

Table 5-24 Trees identified in the direct impact area of the project

D.S.Division	Grama Niladari Division	Tree Category			Total
		Large (>30 cm at DBH)	Medium (15 – 30 cm at DBH)	Small (<15 cm at DBH)	
Kolonnawa	Wadullawatta	30	57	110	197
	Sedawatta	6	29	10	45
	Orugodawatta	0	0	0	0
Colombo	Bloemendhal	0	1	3	4
	Nawagampura	0	0	0	0
	Grandpass	0	0	0	0
	Danister Silwa Rd.	6	2	0	8
Klaniya	Peliyagoda Gangabada	2	4	2	8
Total		44	93	125	262

Source: Socioeconomic field survey April/May 2012

5.11.3 Details of the affected trees, locations and other details.

Based on the existing drawings, about 260 trees belong to 22 species should be removed from the proposed construction area, road reservation, river bank, river mouth and government and private properties. However any endemic, threatened or endangered species were not encountered to include in this list.

5.12 Disturbance to Archeological Sites

(During construction)

According to historical information a ferry system had operated between the two banks of the Kelani River to move people and goods. However this location is near the present Victoria – Japan Friendship Bridge. Apart from this site the famous Kelani temple is located about 4.5 km from the project site.

Although no archeological impact is anticipated, the Project Proponent (RDA) has requested the Department of Archeology to carry out an archeological assessment in the project area. Department of Archeology has reported that there are no archeological sites in the project area.

5.13 Damage to existing bridge (New Kelani Bridge) across Kelani River

(During construction/During operation)

The new bridge will be located about 10 m upstream of the existing bridge. As there will be no piers on the riverbed (for the new bridge), it is anticipated that there will be no impact on the piers of the existing bridge.

6 PROPOSED MITIGATORY MEASURES

6.1 Mitigation Measures for Socioeconomic Impacts

6.1.1 Land acquisition and resettlement

Mitigation measures for a number of settlements and other institutions to be affected

The broad objective of this project is to provide an efficient and safe connectivity between CKE, Colombo port and Baseline road, thereby improving the traffic movement around existing New Kelani bridge area. However, as the project is located in a highly populated area, impact on settlements and other institutions were considered as significant. Number of affected structures were a key criterion used in evaluating the four route options. Number of affected structures in each route option could be summarized as follows;

Table 6-1 Number of affected structures in each route option

Route option	Number of affected structures	Remarks
Route A	355 structures including 12 large scale structures	Number estimated from Google maps
Route B (preferred option)	456 structures including Atomic Energy Authority (2 buildings), Automobile Engineering Training Institute (Main workshop)-1building and Amman Hindu Kovil i.e. 1 building-4 large scale buildings altogether.	Number estimated from fiels surveys. Number estimated from Google maps was only 325
Route option C	404 structures including 9 large scale structures	Number estimated from Google maps
Route option D	394 structures including 3 large scale structures	Number estimated from Google maps

The concept of "Mitigation by design" was utilized to further reduce the impacts on settlements and other institutions. Following are a list of such measures taken;

- Changing the location of entry and exit ramps of Port access road to avoid damage to the housing scheme which is under construction by UDA.
- Reducing the area of the service corridor near the Hindu Kovil on New Kelani bridge road to avoid demolition of nearly 90% of the Kovil. The design change helped to retain the main statue of the Kovil, and only 40% of the floor area is now affected
- Impact on Edirisinghe building was reduced by shifting the center line of Port access road.
- Reducing the service corridor area near Sena oil mills to avoid damage to the fuel tanks and cooling tower which were located within the temporary affected area (service corridor).

It is observed that, majority of dwellings affected by the project, are located within the GN divisions of Sedawatta and Wadullawatta. At this stage of the project, RDA considers to join with UDA to build a suitable housing scheme (apartment) to settle these families. The nearby land belonging to the State Timber Corporation which was transferred to UDA recently will be utilized for such a housing project.

The parapet wall of Kelanithissa Power Station could be rebuilt after setting back beyond the acquisition boundary of the project.

Shifting of Automobile Engineering Training Institute should commence as early as possible if the project is intended to commence in the year 2017. This is because such a shifting will not affect its daily academic activities, student and staff requirements. After the discussions with Automobile Engineering Training Institute (AETI) and UDA it was agreed to relocate it the Vocational Training Institute premises nearby.

Jayalath building and associated institutes requested from authorities to construct dedicated parking lots for the clients. Such measures will offset the impact of acquiring strip of land from the parking lots of the above institutes located along New Kelani bridge road.

Although the Atomic Energy Authority (AEA) is willing to be relocated, it is important that such a move is effected according to the international regulations of handling radioactive matter. This is because the authority houses radioactive waste material and the new facility built should have the same facilities. It is suggested that a phased off transfer for the Atomic Energy Authority to a more open area without many settlements is suitable. A land at Mahenawatte Pitipana Homagama area belonging to UDA has been considered for the relocation of Atomic Energy Authority. Accepted international practices should be followed during such shifting. This will be a beneficial fact for the authority as it is now located in a populated and a congested area. Shift may need a separate environmental assessment to identify possible impacts and mitigation measures. Further information refer to the Resettlement Action Plan (RAP) of this project.

Mitigation measures for impacts of relocation

(Before construction)

Out of the 395 total families affected by the project 333 families live within Sedawatta and Wadullawatta GN Divisions. Even though most of these affected families live as encroachers on government land (unprotected area of Kelani River) they would be adequately compensated for the development done on the land.

Payment of compensation would be in line with the (Land Acquisition Act) LAA and Regulations 2008 of LAA. Under Regulations 2008 payment of compensation would be done under the concept of “value to owner”. A Resettlement Plan (RAP) has been prepared for the project with a project specific “Entitlement Matrix” which specifies the entitlements of all affected parties (Please refer Annex 6.1). According to the RAP a budget of approximately Rs. 6 billion will need to be allocated for the payment of compensation .It is the estimated value at the present time. It may change after a detailed study which will be done in future.

It is also required to have a budgetary provision under construction cost or as insurance, to compensate for any other unforeseen/ accidental damage to structures outside the ROW.

An Income Restoration Plan (IRP) and assisting APs on micro credit facilities could also be considered as a means of offsetting any adverse impact of land acquisition and resettlement of the project.

Special attention will also be paid to 96 families in the project affected area with vulnerable persons. A special vulnerable allowance would be paid to these families according to the guidelines of the project approved entitlement matrix.

The new resettlement sites which are to be developed, may be located close to the original living areas of the people. But it is still under consideration by the relevant authorities. Such measure will greatly reduce the impact on livelihood activities of the people as most of them are working as laborers in Colombo Port and Pettah areas. Stakeholder access to existing educational, health and administrative facilities in the project area or its outskirts will not be thus hampered.

Summary Details of Resettlement including locations given in Resettlement Action Plan

In order to discuss the relocation scheme for the AHs, a meeting was held at Sethsiripaya on 27th June 2013 chaired by the Secretary of Ministry of Defense and Urban Development.

There is the Project called "*Urban Regeneration Project*" is being implemented by UDA to eliminate shanties, slums and other dilapidated housing from the city of Colombo by resettlement of the families presently living under unhygienic and poor environmental conditions in such housing in new housing schemes of internationally recognized standards and in doing so to make the City of Colombo the most attractive city in South Asia (http://www.uda.lk/investment_relocation.html)

The Secretary of Ministry of Defense and Urban Development requested the Chairman of the Urban Development Authority to extend their support to provide houses for the Project since this is a national requirement at this time.

As the conclusion, the allocation of 395 housing units which are necessary for resettlement of the AHs of the Project into the "*Urban Regeneration Project*" was proposed and basically agreed between the RDA and Urban Development Authority (UDA) under Ministry of Defense and Urban Development. (The final estimated requirement is only 365 housing units after excluding title holders who will receive compensation for land as well as buildings and will self-relocate)

UDA's officers conducted field visit based on the agreement above to examine the feasibility and the Secretary issued the approving letter for allocation of the units.

The "Urban Regeneration Project"

The "Urban Regeneration Project" will allocate the required housing units for the Project with following three sub-projects.

(1) Timber Corporation Land, Orugodawatta – 1500 housing Units



Source: UDA, Urban Regeneration Project Website

(2) Government Factory Quarters Land, Kollonnawa – 696 housing Units



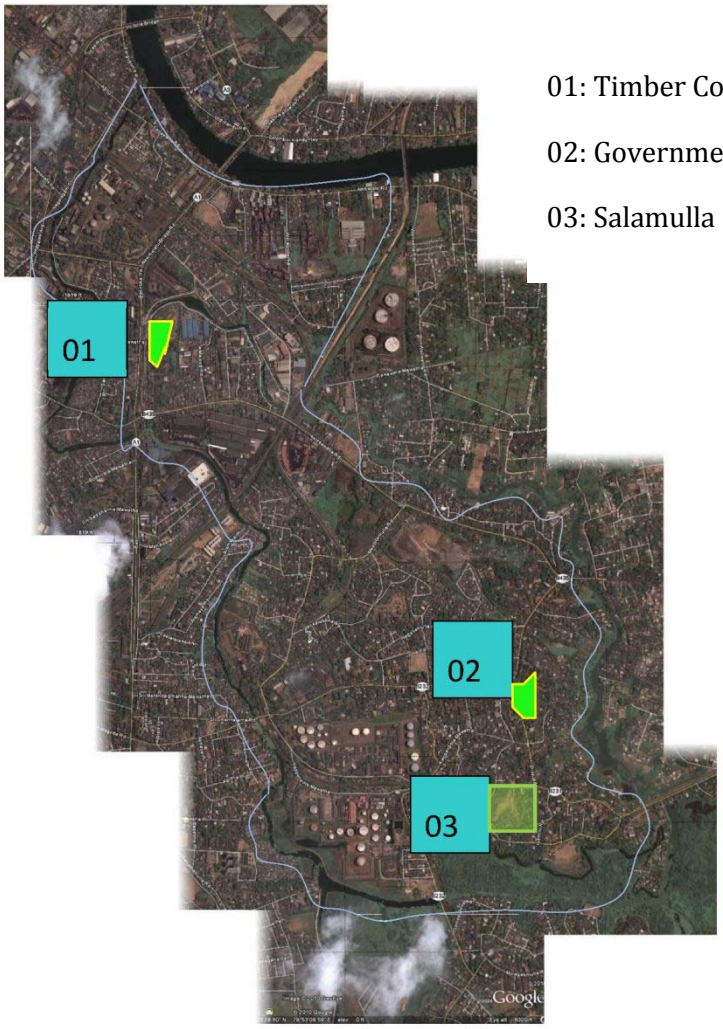
Source: UDA, Urban Regeneration Project Website

(3) Salamulla Relocation site – 1,008 housing Units



Source: UDA, Urban Regeneration Project Website

UDA will decide the Project which will allocate the necessary units through close consultation with the AHs.



01: Timber Corporation Land

02: Government Factory Quarters Land

03: Salamulla Relocation site

Source: UDA, Urban Regeneration Project Website

Figure 6-1 Locations of the resettlement sites

Further details are provided in the Resettlement Action Plan- [Reference 3]

6.1.2 Mitigation measures for impacts on livelihood and economic activities

Any resettlement scheme (apartments) developed, should be at a place where the Affected Persons could continue their livelihood activities. RDA will continue to have discussions with Ministry of Defense and Urban Development and UDA to secure such sites. However, the GOSL will not deprive the existing livelihood and economic activities of the people in the project area, instead the government will assist the public to improve their present status of living conditions.

The project specific entitlement matrix has clearly listed the entitlements that would be applicable for Affected Persons whose livelihood and economic activities are affected (either temporarily or permanently).

A payment based on the salary and allowances would be paid to employees in institutions which need to be closed during the construction period. In case employment is permanently affected, a payment equivalent to 6 months' salary/ wages would be paid and RDA will encourage the employers to provide severance pay for such employees. Where possible such employees would have preferential access to project construction employment (please refer item "Loss of income of employees or hired laborers" of entitlement matrix).

Alternate parking areas will be provided for institutes which lose land from their parking lots. Land area under the pier/ viaduct section could be utilized as effective parking lots especially along New Kelani bridge road where most of these private institutions are located.

6.2 Mitigation measures for impact due to disruption of existing infrastructure facilities (Utilities)

(Before construction)

RDA has already opened a dialog with CEB to shift the 132 KV high tension power line and pylons. At this stage of study it has been proposed to take these high tension power lines underground. Detailed studies need to be carried out jointly with CEB to ensure the viability of such measures.

Ensuring the safety of public, in dealing with other utilities such as oil transmission lines, water supply lines and the power transmission lines etc. is essential. Therefore it is needed that the detailed design team for the project, to work in close coordination with line agency officials on this matter.

Shifting of Automobile Engineering Training Institute should commence as early as possible to avoid any disruption to ongoing training activities. It should also not affect the academic programs of about 1200 students who undergo training in a given year.

RDA with the advice of MOPH will hold discussions with Atomic Energy Authority and Automobile Engineering Training Institute to ensure that these facilities are shifted with no impact to their functionalities.

CMC has pointed out that the condition of the Stace Road Bridge and the present width of Aluth Mawatha will be critical to the project, as during construction diverted traffic in these places will be increased. As mitigation measures the Stace Road Bridge should be replaced with a new one and the narrow section of Aluth Mawatha should be widened before starting the project.

(During construction)

Impacts of shifting electricity lines, water supply lines, telecommunication lines and other resources could be mitigated by proper co-ordination with the concerned authorities, such as the Ceylon Electricity Board, National Water Supply and Drainage Board, Ceylon Petroleum Corporation and Sri Lanka Telecom when shifting the relevant utilities if and when necessary.

Risks of accidental disruption can be reduced by ensuring that machinery such as excavators, cranes are operated by trained personnel and that operations are adequately supervised. A layout plan with location details of all utility lines should be given to the work supervisor. This will allow the supervisor to warn the machine operator about utility lines within the work area.

Advance notice to the public about the times that the utility supplies will be disrupted will help public to adjust to the situation beforehand and thereby minimize the difficulties that they will face in the case of sudden disruption of these services. Temporary water supply, electricity for them may have to be provided.

6.3 Measures to reduce possible nuisance to neighborhood

(During construction)

All possibilities will be considered to secure labor from areas close to construction sites. By such measures the necessity of setting up labor camps could be avoided. When labor is to be brought from outside locations, strict labor supervision is required to avoid any conflicts arising due to migrant labor. Awareness programs will be conducted at worker camps on sanitation, diseases etc. It is necessary to avoid any worker camp waste being disposed near settlement areas to avoid any disease spread.

Providing temporary bypasses during construction, advance notice to the public will reduce the inconvenience caused to the public during the construction stage. Use of flagmen and/or temporary traffic lights to control traffic flows at constricted sites, including safe crossing for pedestrians will also be considered as mitigation measures for the inconvenience to the public.

6.4 Mitigation measures for violation of Children's Rights

As child labour is protect by law there is no significant impacts. Hence no mitigation measures are necessary.

6.5 Mitigation Measures for construction waste and other waste disposal

(During construction)

A large quantity of peat or much is not expected during drilling activities. Disposal sites to dispose peat/muck etc. from construction activities such as excavations, boring for piles have to be identified before construction, through technical investigations and approvals for such disposal sites will be obtained from the local authority and SLLRDC (if it is in a low lying area) . Drainage management plans will be prepared for such sites.

No waste should be disposed to any marsh without such approvals.

6.6 Mitigation measures for impacts of material extraction and transportation

(During construction)

Impacts due to transportation of material could be minimized through adopting the following measures;

Use of covers over for transported materials to guard against dust blow and water spraying to dampen any dusty surface will mitigate the impacts due to transportation of construction material.

6.7 Mitigation measures to minimize health and safety impairement

(During construction)

Ensuring the health and safety of worker groups and the public around the project area could be considered as an important aspect during the construction stage of the project. Following measures will be adopted to ensure health and safety during construction period;

- Awareness programs for all worker groups on sanitation and diseases,
- Regular inspections to worker camps to inspect the level of sanitation maintained at camp sites and waste management,
- Avoid worker camp waste being disposed near settlement areas and to avoid any disease spread,
- Proper briefing and training of workers on safety precautions, and their responsibilities about the safety of themselves and others,
- Providing all workers with protective clothing including hard hats, protective footwear, and high visibility jackets for use when construction activities take place at night,
- Ensuring that plant and vehicle operators are properly licensed, experienced and trained,
- Arranging provision of first aid facilities, readily available trained paramedical personnel, and emergency transport to the nearest hospitals.
- Arranging regular safety checks of vehicles and material, and allocation of responsibility to supervisors on storing material and maintaining vehicles.
- Provision of hazard warning signs around construction sites, and directing vehicle and pedestrian traffic away from work sites.
- Provision of traffic management plans during construction including barricading of openings and lighting at night.
- Placing suitable firefighting material such as sand, different types of fire extinguishers in places where fuel and other flammable chemicals are stored,
- In case of temporary electricity power lines are required within construction area, it is considered that such power lines to be taken below ground level with adequate warning signs to workers and machine operators.
- Special consideration will be given to avoid water stagnation at the work site and labor camps which lead to the breeding of mosquitoes. All such potholes depressions will be filled and leveled so that no water will remain on the surface.
- All food waste material, tin cans and barrels will be placed inside proper garbage collectors with the provisions of roofing to avoid accumulation of rainwater.
- There are special concerns regarding the pipelines of Ceylon Petroleum Corporation which carries oil from Colombo Port to the oil farm. Work near these pipelines should be undertaken with strict supervision of Ceylon Petroleum Corporation.

6.8 Existing landscape

(Before or During Construction)

The project will have a beneficial impact on the existing landscape. This is because the present landscape with many unplanned development (especially within Sedawatta and Wathullawatta GN divisions) will be removed and provided with more systematic settlement schemes.

New tree species will be introduced which will suit the environmental condition in the project area and vegetation will be grown in interchange areas.

6.9 Mitigation Measures for Hydrological Impacts

6.9.1 Mitigation measures for river flow and canal flow obstruction

Provision of elevated sections over canals and river is a mitigation measure. Maximum flood levels of Kelani River and canals have to be obtained from Irrigation Department and SLLRDC. There could be diversions to the existing canals by SLLRDC under Colombo Metro Area Environmental Improvement Project. However at the time of writing of this report no such diversions have been planned. When the detailed designs are carried out these organizations should be consulted to finalise the opening size.

6.9.2 Mitigation measures for alteration of drainage pattern of the area

(During Detailed Designs)

Drainage facilities shall be provided in the following manner.

- Size of facilities will be determined based on water inflow and water levels.
- Drainage crossings for river and canals will be determined based on the agreement by related agencies in Sri Lanka such as SLLRDC and CMC.

No waste should be disposed in the marshy areas or any other place without securing approvals from relevant organisations. For selected waste disposal sites necessary drainage management plans should be formulated. Natural drainage paths should not be disturbed by construction material stockpiles, construction waste disposal etc. If such disturbance takes place temporary diversions should be provided to detour the concerned drainage paths. A drainage management plan should be prepared for the entire worksite area identifying most suitable areas for material stockpiling etc.

6.9.3 Mitigation measures for Impacts on flood protection schemes

(During Construction)

Caution will be exercised when doing construction work near flood bund and construction should be carried out without disturbing the flood bunds as far as possible. The contractor will be instructed to liaise with the Irrigation Department and obtain their instructions.

(During Operation)

As there will be no significant impact no mitigation measures are necessary.

6.9.4 Mitigation measures for Impacts of flood propagation

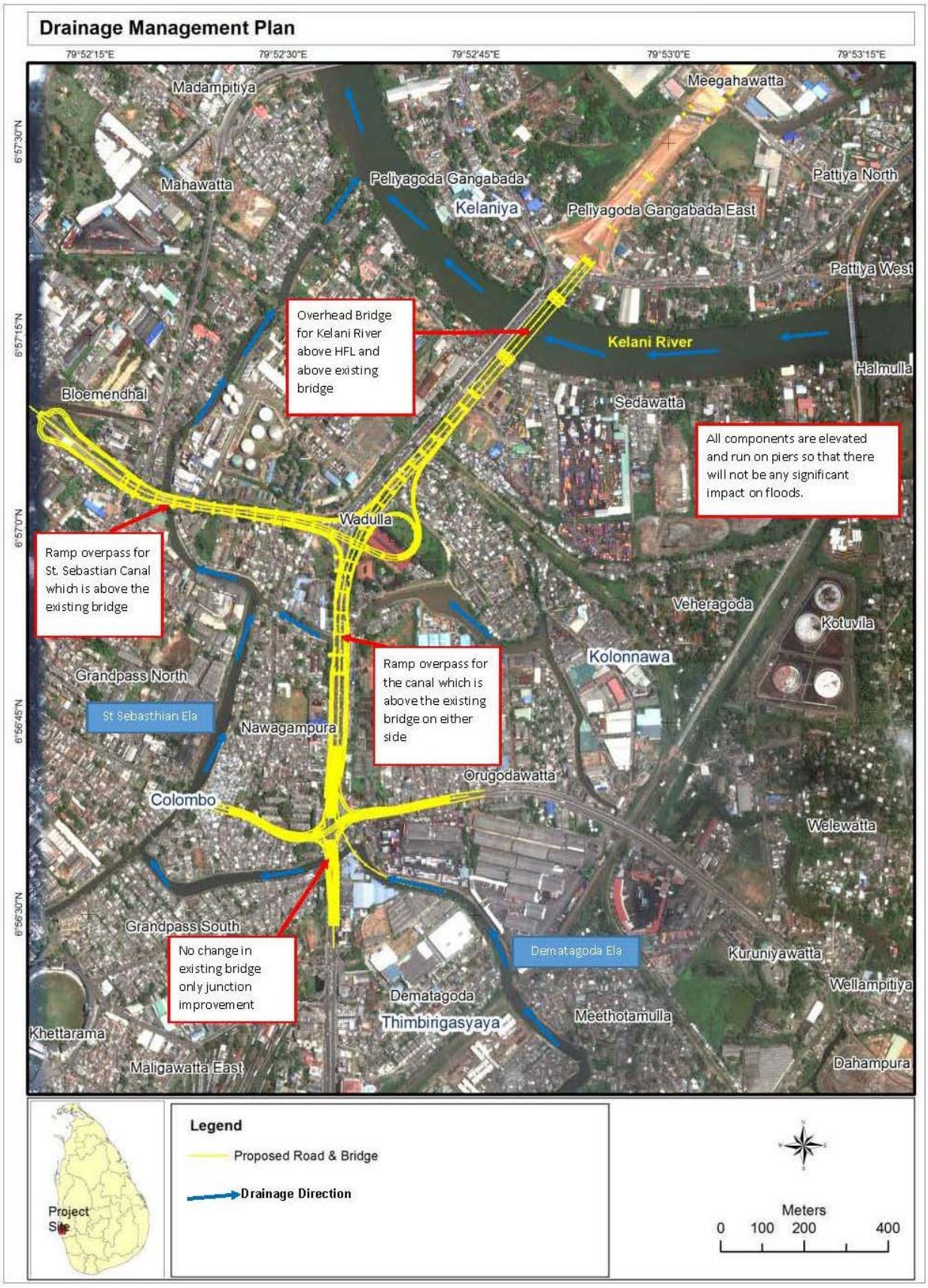
(due to loss of retention/ detention area and blockage of drainage pathways)

(During construction)

There will not be a significant loss of retention as the structures are elevated and floods could pass under the piers.

Tentative drainage management plan is given in the figure below.

Figure 6-2 Drainage Management Plan



6.10 Mitigation measures for water quality (contamination)

(to Mitigate Surface and Groundwater Pollution)

(During construction)

According to the designs for the main bridge across the Kelani River there will be no piers on the river bed. Therefore, during the dredging operations on river bed , increase of the turbidity and suspended solids of river water will not rise. As construction of some end piers will cause disturbance to the river sediments, this activity should be monitored.

Oil and grease traps will be installed at yard and workshop area to filter the waste oil, other petroleum products and wastewater before discharging outside the yard or workshop area. Measures such as a settling tank, will be taken to avoid any direct discharge of waste water on to the soil or nearby surface water bodies to avoid any contamination of surface and groundwater in the project area.

All cement, bitumen (barrels), oil and other chemicals will be stored and handled on an impervious surface (concrete slab) above ground level. The storage facility for cement, bitumen (barrels), oil and other chemicals will be an enclosed structure to ensure that no storm water flows into the structure. A ridge will also be placed around the storage facility to avoid runoff getting into the structure. Such measures will avoid any storm water being contaminated with above materials and subsequently polluting surface and ground water within the project area.

（During operation）

Only road surface drainage of the bridge and ramps will exist, but it does not have a significant impact

6.11 Mitigation Measures for Air Quality, Noise and Vibration Impacts during Construction and Operation

6.11.1 Mitigation measures for impacts on air quality

(During construction)

The impacts of construction emissions near settlement areas can be mitigated by;

- Ensuring that construction vehicles and equipment is maintained to a high operable standard,
- Regular sprinkling of water to dampen the construction surface to reduce emission of dust,
- Covering the construction site especially close to sensitive locations such as near Sanchi temple, Hindu Kovil, settlement area will also reduce the blowing of dust.
- Storage of material such as cement and other flammable chemicals in enclosed structures but with adequate ventilation
- Material such as soil, asphalt should be transported only with proper cover.

In case of Asphalt plants, Concrete batch mixing plants are to be operated they should obtain Environmental Protection Licenses from CEA and operate according to the conditions given in the approval. If such plants, burrow pits are located offsite separate studies will have to be carried out and approvals should be obtained.

Workers should be advised to collect all waste material to a central location and dispose only at approved locations of the Colombo Municipal Council. It is advised to collect and return used cement bags to the cement manufacturer without burning them at site.

(During operation)

A reduction of vehicle emissions could be anticipated once the project comes to operation. This is due to the fact that traffic flow will be eased with less congestion. Thorough traffic rules, such as idling stop is required at the same time.

6.11.2 Mitigation measures for noise and vibration impacts

(During construction)

Noise and vibration nuisance would be significant only during the construction stage where a piling operations and earth compaction works would commence. The impact of noise and vibration nuisance could be minimized through the following measures;

- Fitting of exhaust baffles and maintaining construction vehicle and machinery in a high operable condition,
- Use the low noise, low-vibration type machine and/or vehicles,
- The construction site is separated with corrugated sheets or other suitable material especially at locations near Sanchi temple and Hindu Kovil and residential areas.
- Scheduling of construction work that cause high noise and vibration must be within authorized construction embodiment times with the least inconvenience to the public,
- Avoid construction work on Poya days and days of other religious importance,
- Carry out a property condition survey of nearby structures and record the present condition of the structure,

(During operation)
However, it is anticipated that the noise levels may reduce during the operational stage of the project as the movement of vehicles will be improved.

6.12 .Mitigation measures for global warming

As there is no significant impact no mitigation measures are necessary

6.13 Mitigation measures for soil contamination

(During construction)

Most of the mitigation measures give under Section 6.9 applies. Bentonite slurry will not be used in the cast-in-place pile method which uses an enclosed casing. However, using a settling tank for drain the sediments from excavated soil, muddy water etc. will be required to avoid soil contamination.

6.14 Mitigation measures for ground Subsidence

(During construction)

A precondition survey of the properties within 25m corridor on either side to the proposed ROW will be carried out before the construction works. These records will be useful in determining any damages caused to buildings in case of ground subsidence occur. However, the contractor will also maintain records of any settlement of soil fills and foundations.

Kelani River banks should be stabilized with sheet piles etc. if there is a risk of ground subsidence during bridge pier construction.

6.14.1 Mitigation measures for impact on bottom sediments

As the impact on bottom sediment will be temporary no mitigation measures are necessary.

6.15 Mitigation Measures to Avoid Traffic Congestion

(During construction/During operation)

The main objective of the project is to reduce the present traffic congestion around the New Kelani bridge area. This objective will be fulfilled once the project is operational. However, as stated in Chapter 5, it is anticipated that severe traffic congestions would arise during construction.

If traffic will be diverted along sub/minor roads the capacity of those should be confirmed and they should be in motorable conditions. This aspect should be considered in the traffic management plan which should be formulated before construction.

A dedicated service corridor about 10 m width will be partly placed outside the ROW for movement of construction vehicles. However, traffic diversion plans at the New Kelani bridge interchange, Kelanithissa intersection and Orugodawatte interchange are suggested to manage the traffic congestion during the construction period. A detailed account of these traffic diversion plans are given in Annex 6.2.

6.16 Mitigation Measures for Impacts on Flora and Fauna Including Aquatic Flora and Fauna

Terrestrial and aquatic habitat destruction

(During construction)

Attention should be made especially during the construction phase to avoid or minimize clearing of natural habitats, replacement of natural vegetation and activities which can cause the introduction of invasive species.

The contractor should especially be made aware not to introduce invasive species during construction related activities such as transportation of construction materials, machinery, vehicles or equipment from the outside areas, sometimes from other countries.

Proposed mitigation actions for Impact to the flora (trees)

- Landscaping should be done to minimize the impact caused by clearing of natural vegetation. Removed essential tress will be replanted considering the possibility of practical survival under future conditions.
- Minimize impact to the night roost of avifaunal species will occur if tress are felled during the dry season. Because, during the rainy season it is not difficult for avifauna to find a new roosting places.
- Reduce impact to the foraging behavior of birds and mammals (squirrels and bats), by conducting felling of fruit trees etc. during the no-fruit season.
- When conducting tree felling it is important to confirm that no eggs and nestlings or roosting are there. Also it is important to remove trees during the non-breeding season.
- Avoid removal of trees from temporarily used lands for the project activities such as material storage yards, labor camps etc. unless it is very essential.
- Any guidelines and recommendations made by the CEA or other line agency with regard to felling of trees should be strictly followed

6.17 Mitigation Measures for disturbance on Archeological sites or artifacts

(During construction)

The following mitigation measures should be included in the contract documents to safeguard any artifact which may get exposed during the construction period even if there are no archeological sites in the project area.

- All fossils, coins, articles of value of antiquity and structures and other remains or things of geological or archaeological interest etc. discovered on the site during construction work shall be the property of the Government of Sri Lanka, and shall be dealt with according to provisions of the Antiquities Ordinance of 1940 (Revised in 1956 and 1998).
- Instructing the contractor to take reasonable precaution to prevent his workmen or any other persons from removing and damaging any such article or thing.
- All construction activities within 100m in all directions from the point of interest should be stopped until further instructions from Supervision Consultant/ Engineer and RDA.
- The RDA should without any delay inform the Department of Archeology about the incident and obtain their expertise to relocate the artifact from the site.
- Sub Clause 4.24 Fossils, of the FIDIC Conditions of Contract covers the actions to be taken by the Contractor if any archeological artefacts are found during construction

6.18 Mitigation Measures for any Damages on Existing Bridge

(During construction)

The construction site of the main bridge to be covered and separated from existing bridge.

Under FIDIC Conditions of Contract Sub Clause 4.15 Access Routes, the Contractor is responsible to maintain the access routes including the existing bridge if he uses it. Any damage due to contractor's activities will be rectified by him.

A precondition survey will be carried out on the existing bridge and its support structures. Such measures will enable the contractor and RDA to have an idea on the condition of existing bridge and to rectify any serious defects before any further damages are caused to the bridge. Separate technical study is needed in this regard.

Table 6-2 Summarized Significant Potential Negative Impact and Mitigation measures including Brief Monitoring Aspects

Item	Proposed Mitigation Measures			Monitoring Plan
	Before construction	**During construction**	**During operation**	
Involuntary Resettlement (impacts of relocation)	Minimizing the affected area in a design. Developing awareness among the public about the project. Carry out a census survey of all affected persons and developing a Resettlement Plan with a project specific "Entitlement Matrix" in RAP. Acquiring land and paying compensation according to Land Acquisition act, Regulations 2008 and entitlement matrix of the proposed project.	Further assistance to affected persons according to guidelines of "entitlement matrix" (if required).	Not required.	***Before construction*** Monitoring and evaluation of the implementation of resettlement plan **Implementation Organization**: RDA **Supervising Organisation**: ESD RDA, UDA **Estimated Cost**: Included in the RAP
Economic factors such as employment and livelihood etc.	Payment of compensation according to the entitlement matrix. Assisting affected persons to restore the livelihood activities through Income Restoration Programs.	Providing adequate parking areas for private institutions which lose land from their parking lots.	Not required.	***Before and during construction*** Monitoring and evaluation of resettlement plan **Implementation Organization**: RDA **Supervising Organisation**: ESD RDA , Engineering hierarchy RDA **Estimated Cost**: Included in the RAP
Disruption of existing infrastructure facilities	Relocation of Workshop of Automobile Training Institute, Atomic Energy Authority Building, 132 KV power lines in consultation and satisfaction of relevant line agencies. Design of bridge piers will be avoided near oil transmission lines	Risks of accidental disruption can be reduced by ensuring that trained personnel operate heavy machinery and that operations are adequately supervised. A layout plan having location details of all utility lines should be given to the work supervisor/s.	Not required.	***During construction*** Monitor the shifting of the facilities and other utility supply lines **Implementation Organization**: RDA **Supervising Organisation**: ESD RDA, PIU ,UDA, Local Authorities **Estimated Cost**: Included in the contract for civil works
Possible nuisance to neighborhood	Not required	Thorough briefing to workers about site management Providing temporary bypass during construction	Not required	***During construction*** Monitoring of labor camp facilities at least once a month **Implementation Organization**: RDA **Supervising Organisation**: PIU , Local Authorities **Estimated Cost**: Included in the contract for civil works
Accidents, worker health and safety	Informing the public about the project.	Awareness programs for all worker groups on sanitation and diseases. At every workplace, first aid kit shall be provided. Contractor shall comply with the provisions under the Factory Ordinance about health and safety measures at work place. All workers employed in hazardous activities shall be provided with the necessary protective gear. Precautions will be taken for electrocution prevention. Danger signboards, red lights, fencing will be provided to protect the public and workers. Enforcement of traffic control plan. Contractor will be required to adhere to Clause 6.7 Health and Safety, of the Contract Conditions (JICA Standard Contract Documents, FIDIC MDB Harmonized Version)	Not required	***During construction stage*** Monitor and record the frequency of accidents of workers and traffic accidents Monitor complaints related to the environment **Implementation Organization**: RDA **Supervising Organisation**: ESD RDA, PIU , District Factory Inspection Engineer Labour Department **Estimated Cost**: Included in the contract for civil works
Transportation of construction materials	Not required.	Use of covers over transported materials to guard against dust blow.	Not required.	***During construction*** Monitor the compliance of contractor **Implementation Organization**: RDA

Item	Proposed Mitigation Measures			Monitoring Plan
	Before construction	During construction	During operation	
				Supervising Organisation: ESD RDA, PIU,Local Authorities **Estimated Cost**: Included in the contract for civil works
Existing landscape	Not required	Adoption of a design that enhances the existing landscape	Not required	**During Operation** Monitor and maintain landscape Monitor the compliance of contractor **Implementation Organization**: RDA **Supervising Organisation**: ESD RDA, PIU, Local Authorities ,UDA **Estimated Cost**: Included in the contract for civil works
Hydrological condition	Planning of construction schedule to coincide with the dry flow period of Kelani River.	Carry out construction work during dry flow period of Kelani River. Contractor to continually liaise with Irrigation Department and obtain their flood warnings for the use of evacuation and withdrawal from the site.	Not required	***During construction and operation*** Monitoring of the maintenance of drainage structures **Implementation Organization**: RDA **Supervising Organisation**: ESD RDA, PIU, SLLRDC, Irrigation Departments, Local Authorities **Estimated Cost**: Included in the contract for civil works
Water quality (Surface and Groundwater)	Not required.	Oil and grease traps should be installed at yard and workshop area to filter the waste oil, other petroleum products and wastewater before discharging outside the yard or workshop area. Avoid any direct discharge of waste water on to soil or nearby surface water bodies. All cement, bitumen (barrels), oil and other chemicals should be stored and handled on an impervious surface (concrete slab) above ground level. All bentonite clay and other materials will be recovered and any waste will be disposed off site in approved locations. Provisions are given in FIDIC sub Clause 4.18, Contractor will follow the Environmental Management Plan approved by the Employer	Not required.	***During Construction*** Measuring selected water quality parameters according to the EMoP **Implementation Organization**: RDA **Supervising Organisation**: ESD RDA, PIU **Estimated Cost**: Included in the contract for civil works
Air quality	Not required.	Construction vehicles to be serviced and maintained on a regular basis. Regular sprinkling of water over construction surface. Transporting aggregate, other construction material with proper cover. Storage of cement and other chemicals in an enclosed environment with adequate ventilation Use of shielding to separate construction area from residential areas and other sensitive areas such as temple, Hindu Kovil. All plants to be operated according to the stipulated guidelines in EPL.	Regular cleaning of road surface to remove dust.	***During Construction*** Measure dust level at locations where air quality was measured during the baseline survey. Once a month. ***During Operation*** Measuring air quality at same locations for confirmation of effects. **Implementation Organization**: RDA **Supervising Organisation**: ESD RDA, PIU **Estimated Cost**: Included in the contract for civil works
Noise and Vibration	Not required	Fixing construction work hours Consideration for religious activity times. Set up sound barriers on the construction boundary as required Consider using of low vibration type construction machine	Not required	***During Construction*** Measure noise and vibration level at baseline, once a month. ***During operation*** Measure noise level at same locations for confirmation of effects. **Implementation Organization**: RDA

Item	Proposed Mitigation Measures			Monitoring Plan
	Before construction	**During construction**	**During operation**	
				Supervising Organisation: ESD RDA, PIU **Estimated Cost**: Included in the contract for civil works
Flora, Fauna and Biodiversity	Not required	Replant street trees at the roadside to enhance landscape. Trees should not be felled during roosting or fruit bearing times.	Study of recovery degree of the Natural environment	***During Construction*** Site verification of tree survey **Implementation Organization**: RDA **Supervising Organisation**: ESD RDA, PIU **Estimated Cost**: Included in the contract for civil works
Soil and ground subsidence	A precondition survey of the properties within a 25 m corridor on either side to the proposed ROW to be carried out before the construction works.	Vehicles/ machinery and equipment servicing and maintenance work shall be carried out only in designated locations/ service stations approved by the engineer. Waste oil, other petroleum products (e.g. in storage tanks and containers) and untreated wastewater shall not be discharged to the ground to avoid soil pollution.	Not required.	***During Construction*** Monitoring waste quantity and quality, such as excavated soil, waste soil and so on. **Implementation Organization**: RDA **Supervising Organisation**: ESD RDA, PIU ,Local Authorities, Irrigation Department **Estimated Cost**: Included in the contract for civil works
Traffic congestion	Not required	Set up diversion for minimization of construction traffic congestion, employ flagmen, provide temporary traffic lights etc. Setup of pedestrian sidewalk along the construction area	Not required	***During construction stage*** Monitoring of traffic congestion **Implementation Organization**: RDA **Supervising Organisation**: ESD RDA, PIU ,Local Police, Local Authorities **Estimated Cost**: Included in the contract for civil works
Waste	Not required	• Contractor before commencement of work shall provide a lists of hazardous chemicals or materials that will be used in the project. • Labor camps shall be provided with facilities for disposal of sewage and solid waste. The sewage systems shall be properly designed, built and operated so that no pollution of ground or adjacent water bodies or watercourses takes place. • Waste, oil and grease from service yards and workshop areas should only be disposed at approved locations after collection. • Used cement bags should not be burned, they should be sent for recycling. • Approval should be obtained for waste dumping sites. Waste should not be disposed to the low lying area close to the site. • The contractor shall clean up any area including water-bodies affected or contaminated. Contractor is required to clear site as per Sub Clause 11.11 of the FIDIC Conditions of Contract	Not required	***During Construction*** Periodical monitoring of waste dumping sites **Implementation Organization**: RDA **Supervising Organisation**: ESD RDA, PIU , Local Authorities, SLLRDC **Estimated Cost**: Included in the contract for civil works

Note: CEA will only conduct periodic monitoring or it will conduct ad hoc site inspections, sometimes based on public complaints

7 Public Participation and Information Disclosure

7.1 Introduction and Background

Public participation is a must for proposed development projects at the initial steps of the project in JICA funded projects. This process aims at getting the views and experience of the stakeholders to amend development plans if necessary. In this project Public Participation was done in different ways to disclose the project information as well as to obtain ideas, views and experience of stakeholders for the project development.

7.2 Overview of Public Consultation and Information Disclosure Process

Public consultation and information disclosure process is a two way process of exchanging information regarding the project. There are three main processes and they are;

(1) Inform all stakeholders about the key features of the project through newspaper advertisements, leaflets, stakeholder meetings, presentations, oral explanations, project layout drawings, maps etc. and provide a good idea of the project features to the likely affected stakeholders so that they could express their views regarding the likely adverse impacts.

(2) Obtaining detailed information about the stakeholders such as their economic background, property rights and ownership, employment etc. so that a compensation method for the affected parties could be determined. During this information elicitation process information regarding, likely impacts from the project, will also be assessed. The intentions of the stakeholders regarding compensation type (i.e. alternative houses, land for resettlement or a compensation payment in lieu of the impacts) will be identified.

(3) Making efforts to muster the opinions of ethnic minority, women, and vulnerable persons.

This three way process was designed to muster a broader and a comprehensive view regarding the project induced impacts, to disclose the proposed mitigation action by the project team, to assess the mitigation measures expected by the stakeholders, and to identify other facilities requested by the stakeholders etc.

7.3 Information Disclosure

Information disclosure to all relevant stakeholders is very essential for the successful implementation of the project. During the meeting details of the project was fully disclosed to public through presentations, explanations, maps, figures, explanations etc. Some explanations were given at the project site itself. All public questions were answered as far as possible according the information available.

For the local level awareness, leaflets printed in local languages were used and distributed among households during the household survey (please refer Annex 7.1).

7.4 Overview of Stakeholder Meetings (SHM)

7.4.1 Meeting Types

Stakeholder meetings in various forms cited above, were held to elicit the views of stakeholder and line agency views regarding the project induced impacts. A brief description of each meeting type is given below.

(1) Formal Stakeholder meetings (awareness meetings) at different levels i.e. Divisional Secretary Level , Project Level (i.e. organized by RDA)

(2) Formal household surveys – carried through a pre designed questionnaire

(3) Informal social participatory rapid surveys

(4) Informal pocket group meetings/Individual discussions

(5) Informal homogeneous groups meetings

(6) Formal meetings with public parties and religious sector organizations etc.

TYPE (1) **Formal Stakeholder Meetings**

Stakeholder meetings were held at the project level and as well as at DS level and the details of these meetings are given under "Overview of Stakeholder Meeting". The main participant group in these meetings were the line agency officials.



TYPE (2) **Formal Household Surveys**

All the likely impacted households were surveyed using a pre designed questionnaire. This questionnaire was comprehensively prepared as detailed information of the stakeholders were a requirement of the resettlement survey concurrently carried with the EIA study.

TYPE (3) **Informal Social Participatory Rapid Survey (SPRS)**

This survey was conducted using random samples of stakeholders without any pre-determined pattern. However in general the project area was covered during this survey. Stakeholders in various business premises, people who were even idling at roadside were interviewed. Ideas of small groups were mustered and recorded.

TYPE (4) **Informal Pocket Group Meetings/Individual discussions**

While the household survey was in progress as a main activity individual group discussions were also held simultaneously. During these discussions with small groups or individuals people were interviewed at random and their views were recorded.

TYPE (5) **Informal Homogeneous Group Meetings**

During these discussions various homogeneous groups were separately interviewed. Some of the groups are (1) persons who produce incense sticks as self-employment (2) Stakeholders who use Kelani River for bathing (3) Three wheeler drivers (4) School children etc. Their views were recorded regarding probable project impacts.



TYPE (6) Formal <u>Meeting with Public Parties and religious sector organizations etc.</u>

This was a special meeting with the officials of the affected government institutions and clergy of the affected temples, *kovils* etc. as they were not normally interviewed during the household surveys or during the other category of meetings.



Table 7-1 Details of Stakeholder Meetings

Meeting Type	Venue	Date Held	Key Participants	Remarks
1st Stakeholder meeting (Project Level) **TYPE (1)** Annex 7.1 Paper advertisement	Foundation Institute	25.03.2013	Member of Provincial Council, Western Province, Director General (RDA) and other officials, , DS Colombo, DS Kolonnawa, DS Kelaniya ,JICA representatives of Colombo office, Oriental consultants, CEAA(Consulting Firm)	Advertised in newspapers Refer, Annex 7.1 – Social for more detail
2nd awareness meeting (DS level) **TYPE (1)**	Respective DS office Kolonnawa Colombo Kelaniya	08.04.2013 09.04.2013 10.04.2013	Divisional Secretary – Colombo, Kolonnawa and Kelaniya, Assistant Divisional Secretary – Colombo, Kolonnawa and Kelaniya, RDA Officials, Consultant (Land acquisition), SLLRDC, Survey Superintendent, Dept. of Survey, Scientist fromNBRO, Resettlement officer, ESD, RDA, Resettlement Consultant, CEAA, Safeguard Consultant, CEAA, Socio-economist, CEAA, Coordinator, Social projects, CEAA, Supervisor, CEAA	Refer, Annex 7.1– Social for more detail
3rd awareness creation at field level **TYPE (1)**	Community Hall, Wadullawatta	25.05.2013	Officer from ESD, RDA, GN, Wadullawatta, Team Leader, JICA Survey Team, Resettlement Specialist, JICA Survey Team Road Engineer, JICA Survey Team, Representative of Colombo office, JICA Survey Team, Managing Director, CEAA, Resettlement Specialist and Team Leader CEAA, Consultant (Land acquisition), SLLRDC, Coordinator, Social projects, CEAA, Supervisor, CEAA	Refer, Annex 7.1 – for more detail
4th awareness creation at field level **TYPE (5)**	Community Hall, Wadullawatta	11.06.2013	CEAA Officers , GN Wadullawatte, Women participants Wadullawatte	

Meeting Type	Venue	Date Held	Key Participants	Remarks
5th awareness creation at field level **TYPE (5)**	Grandpass Temple	13.06.2013	CEAA Officers , GN Grandpass, Women participants Wadullawatte, Chief Incumbent of Sri Somaloka Viharaya	
Meeting with impacted property owners of public sector and religious organizations **TYPE (6)**	Ministry of Ports and Highway, 9th Floor, Sethsiripaya, Battaramulla	10.05.2013	Chief Incumbent, Sanchi Viharaya, Nawagampura, Rev. Shiwasri, Chief Incumbent, Badrakaliamman Kovil, Nawagampura, Secretary, Ministry of Ports and Highways, RDA officials, General Manager, State Timber Corporation, General Manager, State Development andConstruction Corporation, Head of the Department of Electrical Engineering, Automobile Engineering Training Institute, Director Administration and HR, Director, Vocational Training Authority, Director, Atomic Energy Authority, Director/Principal, Automobile Engineering Training Institute, Additional Director, Vocational Training Authority, SDD, Atomic Energy Authority, Deputy principal, Automobile Engineering Training Institute, Bridge Engineer, Oriental Consultant, Construction Planer, Oriental Consultant, Resettlement Export, Oriental Consultant, Environmentalist, Oriental Consultant	Refer, Annex 7.1 – Meeting with impacted property owners of public sector and religious organizations
2nd Stakeholder meeting **TYPE (1)** Annex 7.1 Paper advertisement	Foundation Institute	11.07.2013	Cabinet ministers, Officials of RDA, Officials of CEA, Sri Lanka Land Reclamation and Development Corporation, Atomic Energy Authority, UDA, Ministry of Defense, Sri Lanka Police, Colombo Municipal Council, Member of Provincial Council, Ceylon Petrolium Corporation, NWS and DB, Provincial Council MP's,Municipal Council MP's, Divisional Secretaries, Grama Niladari's, Government MP's from Colombo Districts, JICA, Clergy from Amman Kovil ad Sanchi Temple, Oriental consultant, CEAA. Stakeholders (affected persons, and/or their replesentatives) from affected GN Divisions (Wadullawatta, Sedawatta,Navagampura, Granspadass,Peliyagoda Gangabada and Bloemandhal), Media personnel	Advertised in newspapers Refer, Annex 7.1 – Social for more detail

Note: All formal meeting types could be recorded in this fashion.

Table 7-2 Brief Overviews of the "1st Stakeholders' meeting"

Date	25th March 2013
Time	9.30 am
Venue	Auditorium of Sri Lanka Foundation Institute, Colombo 7
Method of consultation	Verbal explanation first in general by the host and individual question/answers by the host and participants
Language spoken	Sinhalese
Agenda of the presentation	1. Brief of the Project Purpose, by Director General RDA, Mr. W A S Weerasinghe 2 Contents of the Projects, by Director ,Planning division RDA, Mr. Bandara 3. EIA survey items and survey methods, RAP survey contents, by ESD-RDA Director, Mr. Hudson de Silva 4. Q and A
Q and A	1.Regarding resettlement, affected area and contents, transfer destination 2. Inconvenience under construction. Ensuring safety 3. After the project, the need for further measures to eliminate road congestion 4. Implementation structure of the field survey work 5. etc.
Entry	Approximately 70 persons

Table 7-3 Number of participants of the 1st stakeholder meeting

Organisation	Gentleman	Lady
Governmental institutions	22	12
Local people	7	1
NGOs	2	None
Media	3	None
Consultant/Study team	14	3
Other	4	0
Total	51	16

Table 7-4 Brief Overviews of the "2nd Stakeholders' meeting"

Date	11th July 2013
Time	9.30 am
Venue	Auditorium of Sri Lanka Foundation Institute, Colombo 7
Method of consultation	Verbal explanation first in general by the host and individual question/answers by the host and participants
Language spoken	Sinhalese
Agenda of the presentation	1.Brief of the Project Purpose, by Cabinet Minister Mr.A H M Fowzie and Secretary to the Ministry of Ports and Highways Mr. R W R Premasiri 2.Contents of the Project, by Director ,Planning division RDA, Mr. H M K G G Bandara 3.Regarding EIA study results and results of RAP study methods, by ESD-RDA Director, Mr. Hudson de Silva 4. Q and A
Q and A	1. Regarding 25 families affected due to the shifting of Amman kovil. 2.Regarding resettlement location, stakeholders want a close location with facilities 3. Regarding the purpose of this project 4.Regarding proposed relocation site and relocation plan by the Atomic Energy Authority 5. Regarding the project schedule and the affected area 6. Starting date of construction and compensation payment time
Entry	329 participants

Table 7-5 Number of participants of the 2nd stakeholder meeting

Organisation	Gentleman	Lady
Governmental institutions	55	6
Local people	106	95
NGOs	4	6
Media	6	4
Consultant/Study team	10	2
Other	32	3
Total	213	116

7.4.2 Social Participatory Rapid Survey

Social Participatory Rapid Survey (SPRS) was done by a project consulting team on 11th March 2013 to obtain general views of the affected people. Majority of householders' view was that the proposed project would help to increase their socioeconomic standards. This is because at present most of the householders are squatters who live on government land which are of low-lying nature and which are not fit for human habitation. They expect better housing with individual ownership within easy access to their present job locations.

Their general views are compatible with the more detailed formal household survey (TYPE (2)) of which the relevant results are highlighted in the table below.

Table 7-6 Views on resettlement

No.	Criteria	Bloemend.	Grandp. (North)	Nawagam.	Seedawa.	Wadullaw.	Orugodaw.	Peliyago. Gangabada (East)	Total
01	**Willingness to vacate the present location**								
	1. Yes	42	3	22	102	236	0	4	409 (91%)
	2. No	1	1	4	4	15	0	1	26 (6%)
	3. No idea	1	1	0	1	1	9	1	14 (3%)
	Total	44	5	26	107	252	9	6	449
02	**Expectations for compensation**								
	1.Land for Land	1	1	0	0	3	0	0	5 (1%)
	2.Cash Compensation	6	3	1	25	9	0	1	45 (10%)
	3.House for house	35	0	21	78	220	0	3	357 (80%)
	4.Not decided	1	0	0	51	5	0		7 (1%)
	5. Other	1	1	4	3	15	9	2	35 (8%)
	Total	44	5	26	107	252	9	6	449
04	**Expectation for resettlement**								
	1.Resettlement in a village	8	**	6	49	97	0	1	161
	2.Resettlement in Flat	24	**	5	20	131	0	2	182
	3.No idea	1	**	3	24	12	9	3	52

Source: Socioeconomic field survey April/May 2013

According to the above information majority (91%) wish to vacate the present location. Seventy nine percent (79%) households opt for alternative houses. This may be because majority of affected householders live in encroached government lands and they do not have titles for the land.

The views collected through SPRS are generally similar in the case of house as well as business premises in residential areas. However, the views of the operators of some large scale business

premises which are situated by the side of the Port Access road are somewhat different. They wanted to continue their business at similar locations because of the large scale of the investments.

Summary of All Stakeholder and Line Agency Views

This is an overall summary of the stakeholder views which were expressed during the public participation process. Views of people regarding the project and provided answers to their questions are given below as a sample in Table 7-7. Further details are given in Annex 7.1. Overall summarized stakeholder views are also presented after Table 7-7.

Table 7-7 Summary of Discussion in the 1st and 2nd Stakeholder Meetings

Position	Sex	Comment/Question	Answer by RDA officials
GN	Male	• I am often asked by local people about the compensation package for land acquisition applying to this Project. • Most of the people who live in Wadullawatte are working in Pettah of Colombo, so they hesitate to move to a remote place from the original location. • There should be some action to preserve the acquired land for the project. If not people will encroach the acquired site according to past incidents. • Also the people ask about the width of the affected areas for the road Project in terms of land acquisition	• Feasibility studies have just been started and exact widths of the roadway has not been decided as yet. Surveys will be conducted to obtain information to arrive at decisions. Access is needed for surveys as generally people oppose to surveys. • Socio economic data will be collected with the help of GN. • Resettlement method will be decided after socio economic surveys which will be done house to house. • Further discussions will be held with the affected parties after socio economic data collection.
Local People	Male	• I use the bridge daily. I think that the reason of traffic congestion from Dematagoda to Kiribathgoda is due to poor road condition which induces the decreasing vehicle speed. • Until the project is implemented, short term mitigation measures for the traffic jam should be proposed, for example the introduction of passage control by “One way operation”.	• RDA has been already conducting study on solutions for traffic congestion under JICA’s assistance to formulate short, medium and long term plans. • Land acquisition for widening of Mattakkuliya Bridge is underway. • At present any container truck that goes to the ports have to move along this road section twice as the weigh bridge is located on Orrugodawatte – Ambatale road. • This is greatly affecting the traffic movement along this road. • A plan is being formulated to shift this weigh bridge to a location close to Colombo port. • The road condition at the Peliyagoda side will be improved immediately.
Secretary of Private Organaization	Male	• It is important to consider loss of employment as there could be pavement hawkers etc. • It is important also to consider the construction of the Lake line Road which will connect the Project road before, in order to avoid additional traffic congestions.	• The survey and initial work for constructing the Lake line road is being done and the project will be implemented if finances are available.
Member of Municipal Council	Male	• Some affected people are renting their shops or bearing a load of debt for their small business. The Project should consider the restoration of the livelihood of those people. Sedawatte timber mill operators should be especially considered. • The local transportation of surround area of the Project road is in very dangerous condition presently, especially for pedestrians. So, the safety of pedestrians should be considered, for example, the establishment of pedestrian way at the side of the road.	• Resettlement will be done based on JICA and Government Policy. Voter’s list will be examined to ascertain the nature of residents. Help from GN is needed in this regard. Loss of business etc. will be studied case by case. • The necessity of having a pedestrian crossing was noted and it will be included in the designs. • A series of pocket group meetings will be held within the project influence area with the

Position	Sex	Comment/Question	Answer by RDA officials
		• Municipal Councils will help to implement the project but. Many people are squatters and may do not have formal land deeds. There are also a number of people who reside on payment of rent and they will be severely affected.	assistance from local politicians and community leaders to socialize the project.
Member of Provincial Council	Male	• According to the notions of the President of the Country all settlers will have a better living condition after resettlement than before, as was done in past projects. • Discussion with AP's and line agencies before finalizing the project is an excellent measure on the part of RDA. • Better to resettle people at a closer location to the original site in a flat etc. or provide money to resettle at a place on their own choice. A market complex a new city is needed in parallel with the proposed project. • It is appropriate to do social consultations in a place closer to their residences.	• No party will be let down in the process of resettlement. RDA will take all steps towards ensuring better living conditions to all affected communities. • Resettlement options will be discussed with affected communities, local politicians and community leaders.
Member of Provincial Council	Male	• I would like to propose that the RDA coordinates closely with DSs and GNs when the socio-economic field survey will be carried out to avoid unnecessary social friction with local people.	• RDA will consider this suggestion
Residents	Male	• It is said that extra 25 houses will be affected because of the shifting of Amman Kovil decision have been taken yet regarding this. • People will face inconvenience because of this later development. • In the affected area there are title holders, persons with no land titles, rentees etc. and all of them should be suitably considered. • Rentees should be especially considered as they are very innocent people.	• No firm decision has been taken yet regarding the demolition of extra 25 houses. Current (18/8/2013) is to rehabilitate the kovil in the same land without affecting houses.
Residents	Male	• We do not know exactly how many houses will be affected in Kamkarupura. • Resettlement should be at close proximity. If resettled at a far off place our livelihood will be affected. Please relocate us around Orugodawatte Junction.	• None will be resettled at far off places. All will be resettled at close proximity according to the decision taken by the Ministry of Port and Highways.
Residents	Male	• We need resettlement at a nearby place. If we will be resettled at Homagama (unconfirmed information) our livelihood would be affected our children's schooling will be affected. Some houses are divided houses running up to 4 divisions and those should be considered. We need resettlement in Kollonnawa electorate itself. We need facilities like electricity, toilets ware supply etc.	• None will be resettled at far off places. All will be resettled at close proximity according to the decision taken by the Ministry of Port and Highways. Title holders and non-title holders will be suitably considered.
Staff of Ceylon Petroleum Corporation	Male	• Many fuel bowzers ply this road and wanted to check whether there is a solution for that from this road improvement.	• However this matter has to be taken up in the District Development Meeting as it is not directly related to this project
Atomic Energy Authority	Male	• We would like to be relocated in the land at Malabe and not in Homagma	• This has to be resolved through UDA
Affected Business man	Male	• They wanted to know approximately when the project will start. If the affected area could be marked it will be better.	• Only preliminary designs are available now. Exact boundaries will be marked after the detailed designs.

Summarised Stakeholder Views

1. Uncertainty exist about the land area affected and the method of compensation. However RDA officials explained to the stakeholders that a 100m corridor has been selected. But that does not mean that all the area within this corridor will be acquired and structures within this corridor will be affected.
2. Newcomers (as squatters) to the area will increase because of the resettlement benefits accrued to them by the project. It was agreed to declare a cutoff date (8 April 2013 for Kolonnawa DS, 9 April 2013 for Colombo DS and 10 April 2013 for Kelaniya DS) for offering resettlement benefits.
3. Stakeholders wanted to know information about RAP. It was explained to them that RAP will be available in all 3 languages in the DS office for interested partied to refer.
4. There was a request from some GN's that tenants should be offered appropriate compensation as they are a highly vulnerable group.
5. Facilities such as access roads for residents who live outside the affected area should also be improved.
6. Taxpayers who do not live on site also should be benefited.
7. Stakeholders were keen to know how the resettlement process proceeds. Temporary settlements will be handled first and permanent settlement will be handled later and resettlement in a permanent settlement will be carried out in a single step, was the explanation accorded to them by the officials.
8. There is no objection to the project if the stakeholders are provided with better facilities
9. Stakeholders need additional space to continue their livelihood (e.g. production of incense sticks) in addition to housing. Also they will lose their market for these products. Housing in flats should not be offered to the people who produce incense sticks as they need space for drying their products.
10. As the road is constructed mostly on piers demolition of existing structures could be avoided in some cases.
11. The place where the road is very close to building could be damaged especially by pile driving and such impacts should be minimized.
12. Nearly 40% of Badrakaali *Amman Kovil* (Hindu temple) will be affected and the chief priest and devotees of the Kovil wished to know whether the area of the shrine stone (main shrine) in the center could be saved. The hall which is used for wedding and ceremonies can be used by the project. They requested to rebuild a kovil in a nearby premises.
13. Buddhist temple *Sanchi Vihara* will not be affected much, therefore the incumbents expect reasonable compensation to make necessary adjustments.
14. Stakeholders in Navagampura GN are now residing in Kamkarupura flat and they want a similar place in the vicinity. They go to the same family doctor and that pattern will break if they were to be resettled elsewhere. Even the doctor if shifted will lose his clientele. Transportation cost will be unaffordable to them if they are settled at a far off place.

Children's schooling will get affected as children go to school unaccompanied. Finding new schools for children elsewhere will be difficult.

15. In Wadullawatte, Nawagampura GN divisions, disabled persons, patients (e.g. with wheeze and diabetics), mothers and infants used to patronise the existing clinics in the area and they will lose that pattern of medical care if resettled in a far off place.
16. Most of the blue collar workers are coolies (*nattami's*) who go to Pettah for their day to day livelihood and if shifted elsewhere they will have to incur additional transport cost and time. Even women need extra time to take children to schools etc.
17. Affected stakeholders do not like to move to a transitional site. They need a permanent place for resettlement at once before the construction period of the project begins.
18. Parking spaces for three-wheelers will be lost (e.g. Wadullawatte) as the three wheeler drivers have got registrations for three wheeler parks.
19. Loss of English private classes to children and respective teachers will lose business.
20. Small scale sellers of bites, betel, string hoppers, vegetables, snacks etc. (mostly women) lose income and loose customers as residential flats are not suitable for such a purpose.
21. People who produce flower arrangements and incense powder to kovil lose their livelihood if the *kovil* is shifted. They also need a water supply to avoid withering of flowers.

7.5 Outcome of the meeting held with Secretary Ministry of Defense and Urban Development Authority

As the resettlement was the major aspect of this project, it was decided to have a special meeting with the secretary of the Ministry of Defense and Urban Development and UDA. The meeting was held on the 27 of June, 2013 where the following key issues were discussed;

1. Resettlement of families (especially non-title households),
2. Relocation of the main workshop of Automobile Engineering Training Institute (AETI),
3. Relocation of Atomic Energy Authority,
4. Relocation of Amman Kovil.

Following decisions and guidance was given by the Secretary of Defense and Urban Development.

1. To develop a new resettlement scheme at the newly acquired land by UDA (former land of State Timber Corporation) and in turn UDA will provide RDA with the necessary number of units for resettlement of affected people
2. RDA to provide financial assistance to UDA for construction work. Commencement of construction work as early as possible to allow the affected people to relocate themselves before the commencement of the proposed road project.
3. Relocate the main workshop of the AETI at nearby land of Vocational Training Institute Orugodawatte.
4. Relocate the Atomic Energy Authority in the new land at Mahenawatte Pitipana Homagama.
5. Shift back the Kovil at the same location and rehabilitated without any relocation of existing houses.

8 EXTENDED COST BENEFIT ANALYSIS

8.1 General Conditions of Cost Estimation

(1) Term of Cost estimation

Unit prices of resources (materials, equipment and labor) considered for this estimation reflects the actual price of resources as of October 2012. They are based on the following decisions and documents:

- Decisions of the meetings with Road Development Authority during the design period.
- Standard Specifications for Construction and Maintenance of Roads and Bridges, second edition June 2009, published by the Institute of Construction Trading and Developments, Sri Lanka.
- Highway schedule of rates Issued by Road Development Authority, Sri Lanka in year 2012.
- ICTAD Bulletin for construction statistics for the month of October 2012, issued by Institute for Construction Training and Development, Sri Lanka.
- Outer Circular Highway Southern Sector Project-Bills of Quantities and rate analysis.
- Outer Circular Highway Northern Sector Project-Bills of Quantities and rate analysis.
- Current market prices for materials and equipment prices in Sri Lanka.
- Current market prices for structural steel and related work items from Japan.

(2) Exchange Rate

The exchange rate adopted for this cost estimate is the prevailing average rate of exchange in July 2013, as shown below;

US$ 1 = 97.4Yen
US$ 1 = 126.3LKR
LKR 1= 0.771Yen

(4) Taxes and Duties

1. All the prices and rates are exclusive of VAT.
2. Locally imposed taxes (except Value Added Tax-VAT) in Sri Lanka for materials and works are included in the rates of the estimate.

8.2 Construction Cost

The Construction Cost has been estimated based on the following types of structure for each section:

1. Main Bridge: Extra-dosed type with PC box girders and RC piers and RC Pile foundation.
2. Approach bridges - Separated Section: PC box girders with RC piers and RC Pile foundation.
3. Approach bridges - Overlapped Section: Steel box girders with steel piers and RC Pile foundation.
4. Ramp bridges (Orugodawatta Junction IC ramps, Kelanitissa ramps, New Kelani Bridge IC ramps, Ingurkade Junction IC ramps): Steel box girders with steel piers and RC Pile foundation.

   The construction cost estimation is given for each of the selected options is given in Table 8.3

8.3 Maintenance Cost

The maintenance cost has been estimated in order to ensure proper operation and maintenance of the new infrastructure. As concrete structures will require less maintenance than steel structures, their maintenance cost has been neglected.

Table 8-1 Table Maintenance Cost

Maintenance Items	Maintenance Interval	Cost(LKR)
Routine Maintenance	Every year	1,373,627
Highways		
Periodic Inspection	Every year	157,248
Pavement	10	383,387,293
Steel Bridge		
Periodic Inspection	5	157,248
Painting	20	43,601,605
Expansion Joint	20	267,858,360
PC Bridge		
Periodic Inspection	5	157,248
Expansion Joint	20	89,521,740
Bearing	40	380,880,000
Extra-dosed Bridge		
Periodic Inspection	5	157,248
Expansion Joint	20	86,088,600
Bearing	40	27,600,000
PC Cable	75	1,114,878,900

Only the maintenance cost of the steel structures, which mainly consists of the repainting cost, have been estimated. The following table shows recommended cost of painting, it was selected based on the cost, maintenance frequency and aesthetic aspect.

Table 8-2 Cost of paint

Painting Specification	Normal Painting t=300 microns
Unit rate	7,800Rs/m^2
Paint Area	50,840m^2
Initial cost	397billion Rs
Repair rate	7,600Rs/m^2
Repaint Area	50,840m^2
Repair cost	386bill Rs
Repair interval(year)	30

Note:

- As the box girders of steel bridge are embedded in piers, support bearings are not required. Thus their maintenance cost can be deducted.
- An extra cost of steel is added to the unit rate for the atmospheric corrosion resisting steel.

8.4 Total Cost

-

The total project cost estimated during the feasibility study is LKR. 60.9 billion. Table 8.2 presents the details of costs.

Table 8-3 Summary of Total Cost

Item	Description	Amount (LKR.)
1	Civil Works	34,769,000,000
2	Dispute Board	64,000,000
3	Price Escalation	1,968,000,000
4	Physical Contingency	3,680,000,000
5	Consulting services	5,237,000,000
6	Land Acquisition	5,108,000,000
7	Administration Cost	**4,066,000,000**
8	VAT	5,486,000,000
9	Import Tax	0
10	Interest during construction	154,000,000
11	Commitment Charge	367,000,000
	Total	**60,900,000,000**

8.5 Environmental Benefits

Benefit cost analysis aims to express all the costs and benefits of a project in monetary terms. Although the environment provides a range of functions for the general economy to operate effectively, most environmental goods and services are not valued at all in the market place. And hence not included in the conventional benefit cost analysis. The extended benefit cost analysis attempts to evaluate all environmental impacts of a project and assesses the viability of the project from both an economic and environmental perspective. In an extended benefit cost analysis, where possible, the environmental consequence is quantified using various valuation techniques. In cases of market failure, as for most environmental goods, shadow prices and surrogate market are used as these reflect the social opportunity cost of the goods. However in some cases these environmental costs and benefits cannot be quantified, even through direct or indirect market techniques are employed.

This study is at feasibility level, and detailed quantities have not been computed. During the operation of the project, positive impacts are anticipated economically and environmentally compared to the case of "No Action Alternative".

Reduced air pollution levels

During the construction period the community living close to the project construction site will be affected by increased dust levels from site clearance, movement of heavy vehicles and other construction activities. In the long-term view, however, the impact of air pollution may decrease due to the project. The congestion on the existing roads is expected to reduce thereby reducing the concentration of the emission levels. Overall, the project is expected to benefit from the reduction in air pollution levels.

Reduced noise levels

During construction, noise from construction area and operation of construction machine and heavy vehicles will be generated. In the long term view, however, the project may have positive impacts since driving speed will Increase, in consequence generation level of noise due to running vehicle is reduced. Overall, the project is expected to benefit from the suppression in noise levels.

Birth of a new urban landscape

The present ad hoc landscape will metamorphose to a new urban landscape as the new bridge and flyovers to be built by this project. Will give a good impression on people entering the Colombo central by using the CKE. Therefore, environmental value of the area will increase.

9 ENVIRONMENTAL MANAGEMENT PLAN INCLUDING MONITORING PROGRAMME

The mitigation measures discussed in chapter 6 should be considered important in avoiding and mitigating any adverse impact during, construction and operational stages of the project. However, this project is still in the feasibility study level. Hence the impacts and mitigation measures discussed under chapters 5 and 6 are based on the initial design criteria which are on a much lower perspective. During the detailed design stage these designs will be improved (to be more project specific) mainly in terms of construction aspects, economic aspects, environmental and social aspects. Even though the impacts would remain the same, more specific mitigation measures could be suggested based on the specific design details.

An Environmental Management Plan (EMP) was developed based on the impacts and mitigation measures discussed under chapters 5 and 6. This EMP is presented as Annex 9.1 of this report. It is important that this EMP is revised during the detailed design stage and the updated EMP should be part and parcel of the contract documents. Implementing the EMP during the construction period is a responsibility of the contractor under the supervision of RDA. A budgetary provision should be kept for such measures.

Even though the EMP is in place it is still important to monitor the effectiveness of the mitigation measures adopted especially by the contractor during the construction stage. This is because the construction stage is the period where most critical impacts arise. A set of baseline data was measured for this project through measuring ambient air quality, surface and ground water quality, noise and vibration levels at selected locations within the project area. The Environmental Monitoring Plan (EMoP) presented in Annex 9.1 lists out the environmental parameters that need to be measured periodically or on a complaint basis.

As stated above execution of mitigation measures during the construction period is a main responsibility of the contractor. The project proponent (RDA) holds the responsibility of carrying out the supervision of mitigation measures during construction and during operation stages. The Environmental and Social Development Division (ESD Division) of RDA will be responsible for monitoring the implementation of EMP as an internal monitor while CEA will be an external monitoring agency for the project. It is required that ESD carries out regular inspection of the project site to monitor the compliance levels, while CEA could carry out inspections on a quarterly basis.

The contractor should recruit a dedicated Environmental Officer to advise the construction staff on the needs of environmental compliance. The supervision consultant should obtain the services of an Environmental Specialist to advise the Contractor in implementing the EMP during the construction period. Contractor should conduct environmental monitoring associated with the construction, after that the contractor shall report them to the PMU (Project Management Unit). The Report is submitted to the PMU, and then PMU shall submitted it to ESD, finally ESD shall submit it to CEA after checking the report.

Below, shown is the procedure and relationships needed in carrying out the Environmental Monitoring Program by the Project Management Unit towards the implementation of the project. Effectual management and smooth progress of the project is required. PMU will be established before the commencement of detailed design. All tasks to be carried out for the project will be managed by PMU.

Implementation of the Environmental Management Plan (EMP) will also be carried out under the control of the PMU. For that purpose, an environmental division will be established within PMU in collaboration with ESD and CEA. About the implementation of EMP for the project effective guidance for the contractor will be provided at the same time.

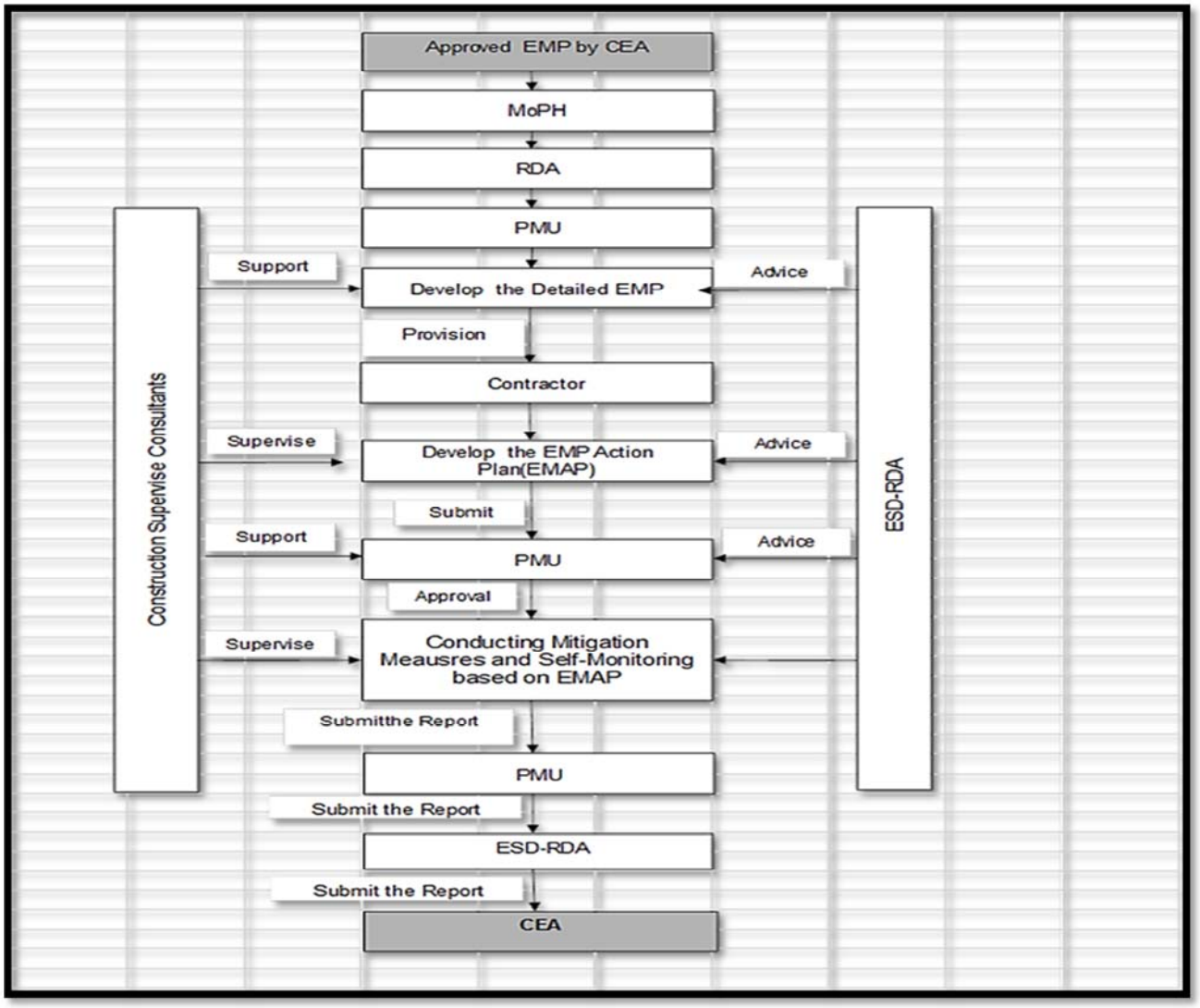


Figure 9-1 Procedure and relationship of Environmental Management Plan

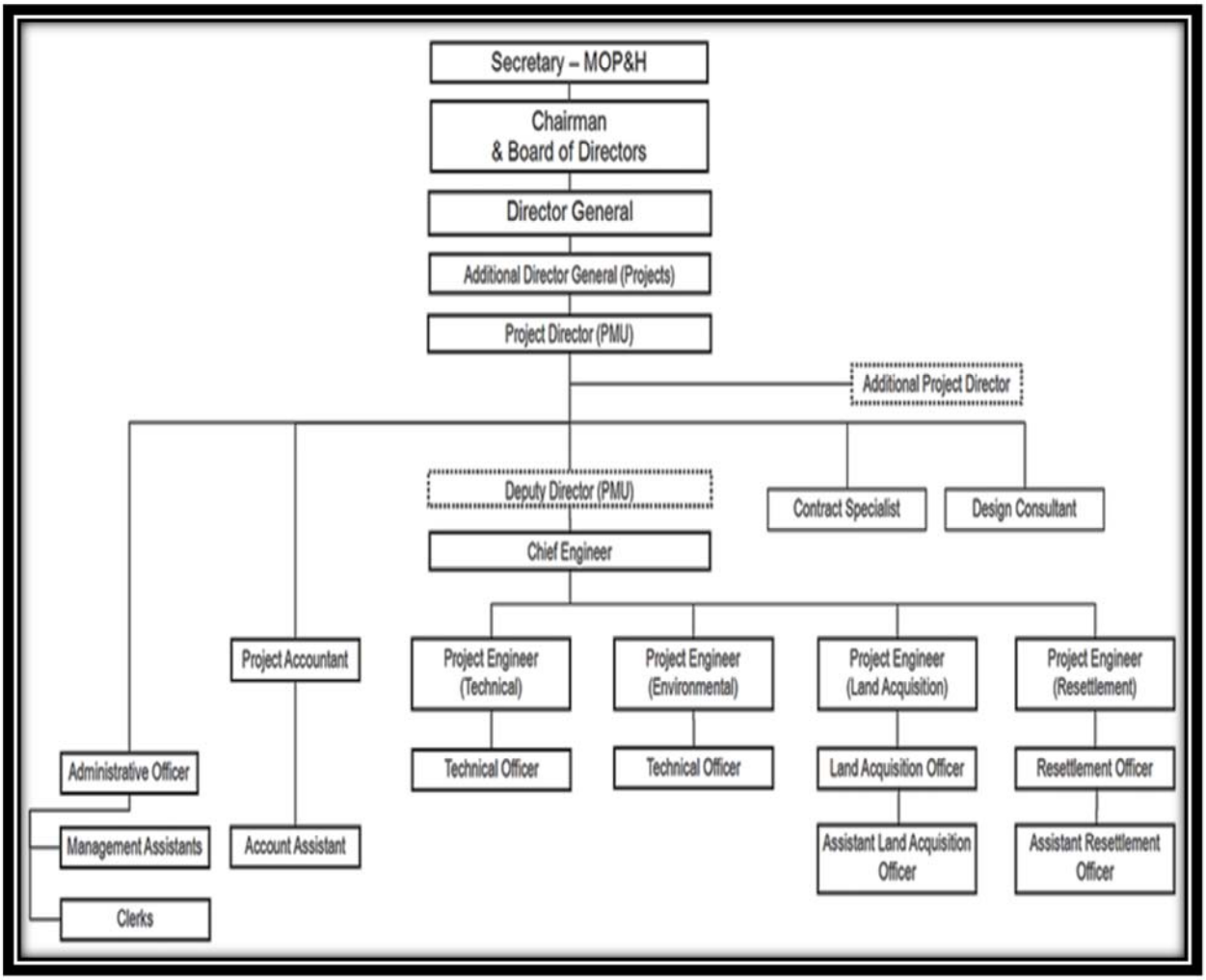


Figure 9-2 Organization of proposed Project Management Unit (PMU)

10 CONCLUSION AND RECOMMENDATIONS

10.1 General

Resettlement is a significant impact as the project displaces more than 100 families. In addition to families many small business ventures are also affected. Details are given Table 10-1 below.

Table 10-1 Summary of Affected Persons, Structures and Method of Compensation

TYPE	Number of Units	Number of occupants	Number of Employees	Mitigation Measure(Compensation Package)
Houses				
Number with titles	42	1743	Not applicable	Offer compensation to find alternative resettlement at their wish Offer houses in UDA housing scheme at State Timber Corporation site as an alternative Compensation payments for affected structures and payments for loss of livelihood
Number without Titles	353			Offer houses in UDA housing scheme at State Timber Corporation site Compensation payments for affected structures and payments for loss of livelihood
TOTAL	395			
Business Premises				
Number with titles	15	Not applicable	Not applicable	Compensation payments for affected structures and land and payments for loss of business.
Number without Titles	39	Not applicable	Not applicable	Compensation payments for affected structures and payments for loss of business
Number of employees	Not applicable	**	118	For employees a salary based compensation for affected employment
GRAND TOTAL	**449**	**1743**	**118**	

Estimated cost of resettlement is Rs.6 billion.

10.2 Conclusions

The following broad conclusions could be reached from this study.

1. Alternative B layout is an optimum layout for implementation in terms of transport efficiency, environmental impact, construction ease, connectivity with the existing road network etc.

2. The project in the long run will ease traffic congestions on the New Kelani Bridge and the vicinity and improve transport efficiency.

3. According to the findings of the EIA study it could be concluded that the proposed project (Alternative B) will not cause significant adverse impacts to the environment physically, chemically or ecologically.

4. However as this area is a very congested area and some negative short term significant impacts such as temporary traffic jams, noise, vibration, air pollution and some social inconvenience will take place because of construction and shifting of major buildings.

5. Most of the impact are social impacts arising on construction, displacement of people, and resettlement hence impacts of livelihood of people could occur temporarily.

6. There are minor to significant impacts on religious and cultural structures (e.g. Sanchi Temple-Marginal demolition, Amman Kovil-Partial demolition and rehabilitation, Christian pray room-full demolition etc.).

7. The present social environment, even though not very congenial at present, is an environment very familiar to the stakeholders and to their livelihood. It is firmly interwoven with the present complex social behavior pattern. There could be temporary psychological impacts on them because of displacement, even though with better living conditions.

8. It was observed that the stakeholders do not protest against the project which is an encouraging factor. Most of them are willing to move to alternative places which will not disturb their connections with external social infrastructure such as religious places, work places, and hospitals, other medical facility providing places, schools etc.

9. There are no serious hydrological or drainage impacts as most of the structures are elevated.

10. Almost all the impacts including significant social impacts related to displacement could be mitigated.

10.3 Recommendations

The following recommendations are made in this study.

10.3.1 Overall Recommendations

1. Implementation of the Alternative B layout is recommended subject to mitigation measures, Resettlement Action Plan and Environmental Monitoring and Management Plans.

2. All proposed mitigation measures and environmental monitoring and management actions should be counted as recommendations.

3. Stakeholder views should be considered as far as possible in providing those places for resettlement and/or compensation.

4. Replacement of government buildings will have to be carried out in collaboration with all relevant line agencies to suit the needs of the occupants of Government buildings, relevant institutions and the concerned public.

5. Alterations to the religious buildings should be carried out with minimum damage to the buildings and with minimum impacts to the devotees. Ideas expressed by the clergy of these religious places should be considered.

10.3.2 Special Recommendations to Address Social Concerns

1. The project area is a heavily urbanized area in the periphery of Colombo City and there is a rich network of urban infrastructure and amenities which consists of major and minor roads, power transmission lines, railway, underground water supply network, underground fuel pipelines of the Petroleum Corporation underground and overhead telecommunication network, schools, religious places, government and private buildings etc. Continuous dialogs with relevant authorities related to affected infrastructure have to be consulted to get their fullest corporation for the project development.

2. Due consideration should be given to all religious and cultural sites affected by the project.

3. Shifting of the statue of late Mr. S.W.R.D. Bandaranayake (a former head of the country) need to be done with due respect and political patronage.

4. Carry out continuous dialog with affected persons and use simple language for awareness meetings during the resettlement.

5. Women headed households, families with elderly household heads and families with disabled persons are considered as vulnerable. Special attention needs to be given to these families during implementation of the resettlement plan for the project.

6. It is important to execute the recommendations and decisions taken during the meeting held with the Secretary to the Ministry of Defense and Urban Development on 27 June, 2013 before commencing the construction works.

REFERENCES

1. Preliminary Design Study for the 2nd New Kelani Bridge Project – Oriental Consultants Japan Final Report January 2013

2. JICA guidelines for environmental and social considerations April, 2010

3. Preparatory Survey on Traffic Improvement around New Kelani Bridge – Draft Final Report – Volume 4- Resettlement Action Plan (RAP)- Oriental Consultants Japan and Consulting Engineers and Architects Sri Lanka- August 2013

4. Preparatory Survey on Traffic Improvement around New Kelani Bridge- Design Critera Oriental Consultants and Kathahira and Engineers International– January 2013

ROAD DEVELOPMENT AUTHORITY
MINISTRY OF PORTS AND HIGHWAYS
THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA

Preparatory Survey on Traffic Improvement Project around New Kelani Bridge

DRAFT FINAL REPORT VOLUME3: Environmental Impact Assessment

JULY 2013

JAPAN INTERNATIONAL COOPERATION AGENCY

ORIENTAL CONSULTANTS CO., LTD.

KATAHIRA & ENGINEERS INTERNATIONAL

Volume II A
Annexes

Annex 1.1
Terms of Reference

(13)

Annex 1.1

ඔබේ යොමුව
உமது தொடர்பு
Your Ref.

අපේ යොමුව
எமது தொடர்பு
Our Ref. 08/EIA/Trans/02/2013

දිනය
திகதி
Date 05.03.2013

මධ්‍යම පරිසර අධිකාරිය
மத்திய சுற்றாடல் அதிகாரசபை
Central Environmental Authority

''පරිසර පියස'', 104. ඩෙන්සිල් කොබ්බෑකඩුව මාවත, බත්තරමුල්ල, ශ්‍රී ලංකාව.
"பரிசர பியச", 104, டென்சில் கொப்பேகடுவ மாவத்தை, பத்தரமுல்ல, ஸ்ரீ லங்கா.
"Parisara Piyasa", 104, Denzil Kobbekaduwa Mawatha, Battaramulla, Sri Lanka.
Web : www.cea.lk

08 MAR 2013
ENVIRONMENTAL AND SOCIAL DIVISION
ROAD DEVELOPMENT AUTHORITY
Received by.....
Ref. No.....
Action.....

Director/ Planning Division,
Road Development Authority,
"Sethsiripaya",
Battaramulla

THE SECOND NEW KELANI BRIDGE PROJECT

This has reference to the application dated 31.01.2013 submitted to the CEA and to the environmental scoping meeting held on 14.02.2013 at the CEA regarding the above subject.

As decided at the above meeting, you are required to prepare an Environmental Impact Assessment (EIA) report in respect of the above project, the Terms of Reference (ToR) of which are attached hereto.

The EIA report must address all significant impacts of the project. If the EIA report fails to address such matters it will render the EIA report inadequate and you will be required to make necessary amendments and re-submit the report.

Please submit draft final EIA report for the purpose of checking for adequacy. Once checked for adequacy, required number of copies of the EIA report has to be submitted for the purpose of technical and public review. Please note that the EIA report should be translated into Sinhala and Tamil languages and copies thereof should also be furnished.

Letter No. H/Exp/AIA/WP/2013 dated 20.02.2013 sent by the Department of Archaeology is also attached herewith for necessary action.

① Mr. Malaka (PP-II (ESD))
pl. discuss v. early
2013/03/08

Kanthi De Silva
Director (EIA)
CENTRAL ENVIRONMENTAL AUTHORITY

Cc : 1. Director General/ Road Development Authority
2. Director/ Envt. & Soc. Dev. Division/ RDA

EDSL

② PP-II (ESD)
gave a copy of the TOR to Mr. Tashima of JICA
pl. make a file.
2013/03/11

Mr. Malaka
f.u.a.

2013/03/11

TERMS OF REFERENCE

(This ToR is valid only for one and half years from the date of issue.)

This ToR has been issued by the CEA only as a means of providing guidance for preparation of the EIAR for the proposed project. Required information on impacts mitigation measures etc. which will be useful in decision making should be incorporated in the EIA report based on the findings of the EIA study.

Issuance of the ToR does not in any way reflect an agreement on the part of the CEA regarding the granting of approval for the project. It is the responsibility of the project proponent to clear any issues regarding land ownership and to obtain approvals required from agencies other than the CEA. In the case where the project is to be sited on state land we recommend obtaining "in principle" approval of the land owner, prior to embarking on the EIAR preparation. The CEA will not be responsible for any costs incurred by the project proponent in EIAR preparation in case the project is rejected.

Project Name	:	**THE SECOND NEW KELANI BRIDGE PROJECT**
Project Proponent	:	Road Development Authority
Project Approving Agency	:	Central Environmental Authority
Report requirement	:	Environmental Impact Assessment (EIA) report
Date of issue of the ToR	:	05.03.2013

Report format :

Executive Summary

1. Introduction
2. Description of the Project and reasonable alternatives
3. Description of the existing environment
4. Anticipated environmental impacts of proposed project
5. Proposed mitigatory measures
6. Cost - Benefit Analysis
7. Monitoring Programme
8. Conclusion and Recommendation

Annexures

I Terms of Reference
II References
III Sources of data & information
IV List of preparers including their work allocation (Report should be authenticated by the preparers.)
V Comments made by the public, NGOs and other agencies during formal and informal scoping meetings held by the EIA Team.
VI Complete set of relevant maps, tables, charts, layout plans and other details.



Executive Summary

The summary should be a brief, non-technical summary of the justification of the proposed project, description of the salient features of the project, the existing environment of the project sites and its environs, key environmental impacts, the measures proposed to mitigate the environmental impacts, monitoring programme and conclusions. A one page summary table indicating the significant impacts and proposed mitigatory measures should be presented.

1. INTRODUCTION

- Background of the project (Brief history of the project, its current status, implementing agency etc)
- Objective of the proposed project and justification of the project (Summarize the need or problem being addressed by the project and how the proposed project is expected to resolve the problem or the issue).
- Objective of the EIA report (Specify the objectives of the assessment and the relationship of the results to project design and implementation).
- Methodologies and technologies adopted in EIA report preparation
- Conformity with Government policies and plans
- Preliminary approvals needed for the project and any conditions laid down by state agencies in granting preliminary clearance for the project

2. DESCRIPTION OF THE PROPOSED PROJECT AND REASONABLE ALTERNATIVES

2.1 Evaluation of Alternatives

- Describe reasonable alternatives considered in the course of developing the project (e.g. design, siting, technology selection, construction techniques, no action alternative etc.).
- Compare alternatives in terms of potential environmental impacts, mitigatory measures, capital and operating costs, reliability etc and give a clear recommendation.

2.2 Description of the proposed project

Following details should be given in order to get a clear picture of the project.

- Location, indicating the Divisional Secretariat Division/s and the Local Authority area/s within which the project site falls. GPS coordinates of the Centre Line of the final trace and the bridge to be given.
- Location map/s of appropriate scale indicating the road trace and surrounding land use.

- The layout plan of the project at appropriate scale. This should indicate all the project components and reservation area/s to be maintained.

- Design details of all project components including design details of the bridge (number of piers, bridge span, length, width), length of the traces, viaduct sections, cut/fill sections, height of the embankment, width of the ROW, number of lanes, interchanges, grade separated crossings (overpasses, underpasses etc), drainage provisions etc

- Methodology of construction including whether a cofferdam is envisaged, sources & quantities of raw material required and locations & quantities of disposal of waste

- Details of service roads to be built/ improved, other facilities and services to be provided.

- Requirement and availability of workforce (during construction), labour camps etc

- Details of time schedule.

- Methodology of operation of the project components, any maintenance requirements during operational phase and methodologies to be used

- Project cost, investment and funding sources.

3. DESCRIPTION OF THE EXISTING ENVIRONMENT

Study Area

The study area for the assessment shall include the following;

i) Project site (area within proposed Right of Way) and 100m either side of the project site

ii) Any area beyond the above corridor, where there is potential for environmental impacts due to the project

Assemble, evaluate and present available baseline data on the relevant environmental characteristics of the study area.

This chapter should provide information on physical, biological socio-economic, archaeological and cultural aspects of the environment likely to be affected by any activity of the project during and after the project construction period. Information should be presented in a comprehensive format using photographs, tables, maps and diagrams where appropriate. The maps provided must be clear, readable and in coloured form and appropriate scale. An updated satellite images may also be used. The methods used to collect data should be clearly stated under each category.

The existing environment should be described under following;

3.1 Physical environment:

- Topography including existing ground levels with respect to MSL along the trace, geology and soil, climate and meteorology etc

- Surface and groundwater hydrology and drainage
  - Drainage pattern across the proposed trace
  - Flood peak values, inundation levels and retention areas and inundation periods
  - List of existing irrigation or drainage / flood protection schemes encountered
  - Retention areas, marshlands or any other water bodies encountered
  - Drainage capacity of existing waterways and flood ways across the proposed trace
  - Present flood detention capacity of the lowlands on both sides of the trace

- Water quality, sources of water pollution if any etc
- Existing land use
- Ambient air quality and noise
- Records on natural disasters occurred

3.2 Biological Environment:

- An assessment of the present ecological status including the presence of sensitive habitats and their importance.

3.3. Socio-cultural Environment :

- Existing houses, commercial and government buildings within the direct impact area and the surroundings.
- Socio Economic status of populations
- Principal economic activities
- Planned development activities
- Availability of infrastructure facilities (roads, railways, water supply, power supply, health care, education etc.)
- Culturally, historically and archaeologically important objects/places
- Noise sensitive receptors such as hospitals, schools etc.
- Existing environmental considerations, problems or issues prevailing in the area.

4. ANTICIPATED ENVIRONMENTAL IMPACTS OF PROPOSED PROJECT

This chapter should show the overall effects of the project on the individual environmental components. Impacts should include the direct and indirect, long and short-term, positive and negative effects. When describing the impacts indicate which are irreversible or unavoidable and which can be mitigated to the extent possible. Wherever possible describe impacts quantitatively.

Significance of impacts should be assessed using appropriate techniques. Impacts should be discussed in the order of significance.

Special attention should be given to;

(1) Socio economic impacts
- No. of settlements and other institutions to be affected
- Impacts of relocation
- Impacts on livelihood and economic activities
- Impacts due to disruption of existing infrastructure facilities
- Possible nuisance to neighbourhood during construction and operation.
- Health and safety impacts
- Any other socio economic issues

(2) Hydrological impacts
- Impacts on natural flow / pattern of the Kelani river
- Impacts on drainage pattern of the area
- Impacts on flood protection schemes. (Flood bunds/ gates etc.)
- Impacts during floods due to loss of retention/ detention area and blockage of drainage pathways.

Note : Impacts on the natural drainage system should be studied using a mathematical model and the model should be calibrated and verified for several flood scenarios so that the impacts in both construction and operational phase of the proposed bridge on the drainage could be analyzed properly.

(3) Air quality, noise and vibration impacts during construction and operation

(4) Traffic congestion

(5) Impacts on aquatic / terrestrial habitats

5. PROPOSED MITIGATORY MEASURES

This chapter should set out the proposed measures to minimize the impacts identified in Chapter 4 to acceptable levels including conformity to regulations and national standards. Alternative methods of mitigation should be discussed and effectiveness of the proposed measures that are to be provided should be stated. Mitigation methods should be defined in specific practical terms. A rationale should also be presented for selection of chosen mitigatory measures.

Schedule of implementation of mitigation plans, responsible agencies, budget estimates, staffing and other necessary support services to implement the mitigatory measures/alternatives should be planned/ prepared.

6. EXTENDED COST BENEFIT ANALYSIS

Extended cost benefit analysis for the selected option of the project (if any). (The cost of the proposed remedial/ mitigation measures should be included in the project cost)

7. ENVIRONMENTAL MONITORING PROGRAMME

A suitable monitoring programme should be submitted to monitor the changes of environment and implementation of mitigatory measures. This plan should include the following;

- Parameters to be monitored and methodology to be used
- Monitoring locations, frequency and timing of sampling (should be decided base on the activities, sensitivity of the receptors etc.)
- Institutional arrangements for mitigation and monitoring of impacts, monitoring and reporting
- Responsible agency/ agencies of monitoring and reporting
- Availability of funds, expertise and facilities

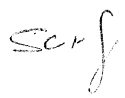
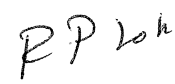
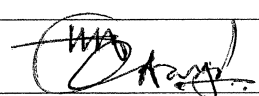
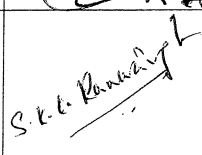
8. CONCLUSION AND RECOMMENDATION

The environmental acceptability of the proposed project and key findings and recommendations of the assessment should be clearly stated.

Any programme to improve general environmental conditions can also be stated here.

Annex 1.2
List of Experts

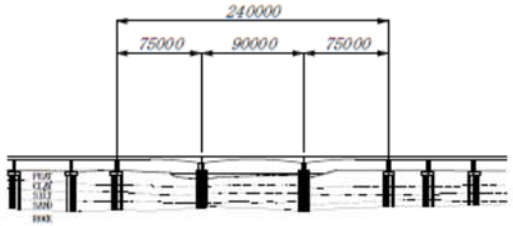
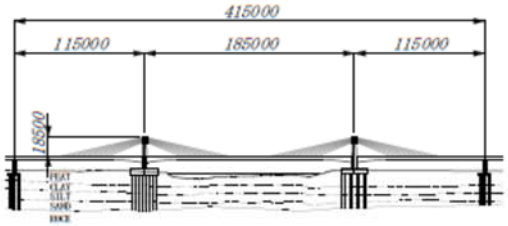
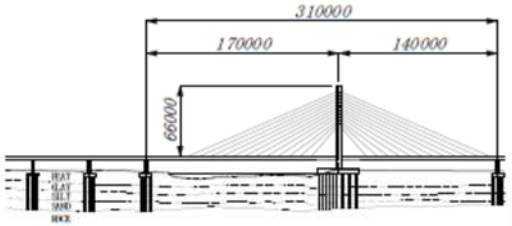
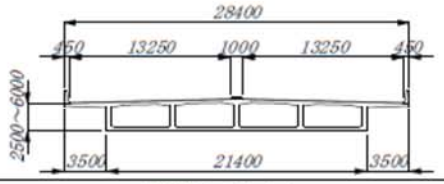
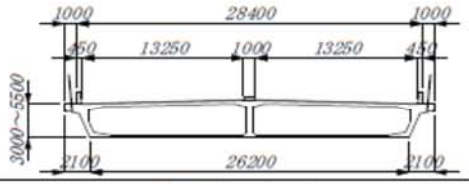
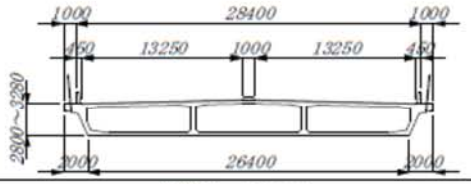
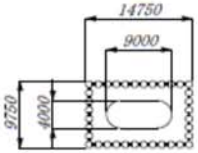
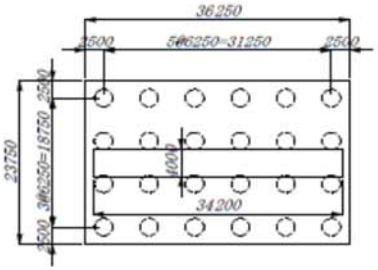
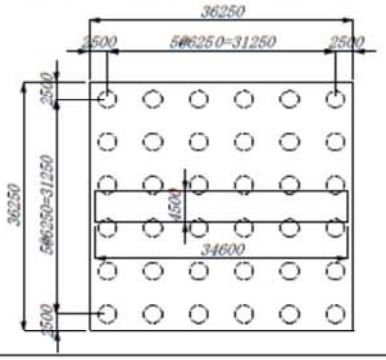
Annex 1.2- List of Experts Involved in the EIA Study

Name	Position	Qualifications	Duties carried out	Signature
Mr.D. A. J. Ranwala	Team Leader	B.Sc. (Eng.), M.Eng, FIE(SL), C. Eng., MIEP (SL), Chartered Environmentalist	Overall team direction, Hydrological and drainage aspects, formulation of the report	
Mr. G.M.S.W.B Gajasinghe	Environmentalist	B.Sc.(Sp), M.Phil, Chartered Environmentalist	General environmental aspects on impacts and formulation of environmental management and monitoring programs.	
Mr. R.P. Lokuratna	Civil Engineer	B.Sc. Eng. (Hon.), MEng (Melb), Grad. Dip (Deakin), MIE (Aus.) CPEng.	All design and construction aspects	
Dr. P.M.C. Bandara Digana	Ecologist	B.Sc., PhD	Ecological analysis and mitigation	
Mrs. P.M.H.G.S. Arangala	Socio-economist	B.Sc. (Sp), M.Sc. (Special)	Socio-economic analysis	
Mrs. S.K.K. Ranasinghe	Coordinator – (CEAA)	B. A. (Hons) Economics, PG. Dip (Marketing)	Line agency coordination. Organizing and monitoring household surveys	

Annex 3.1
Further Details of Alternatives

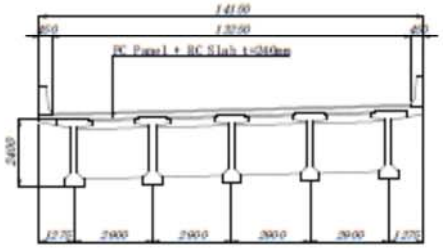
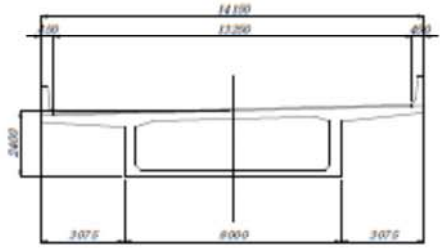
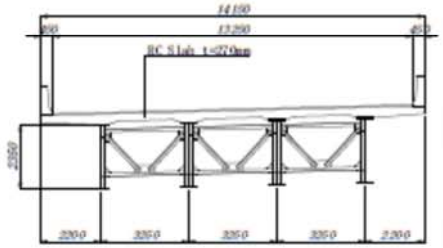
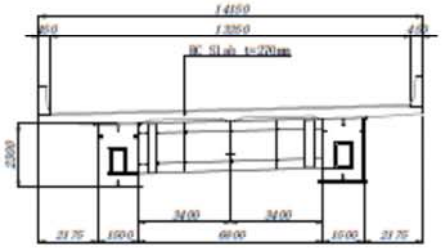
Annex 3.1- Further Details of Alternatives

Design details and the comparison of different design types for the main bridge

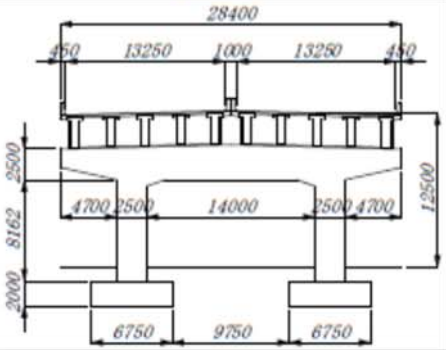
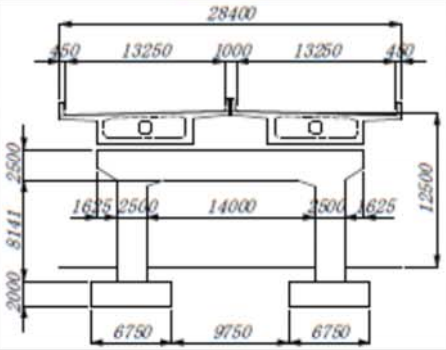
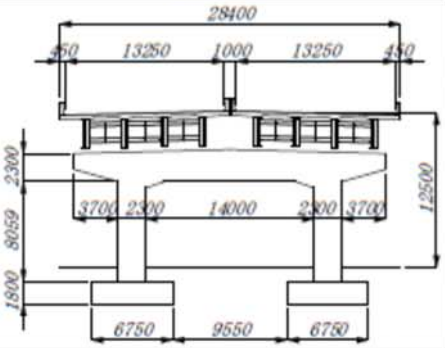
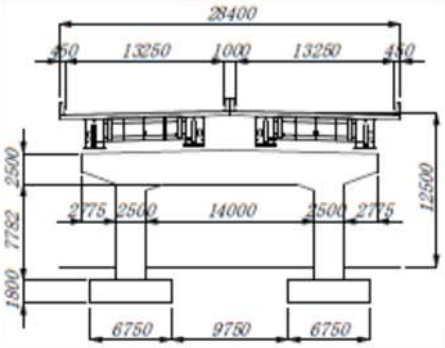
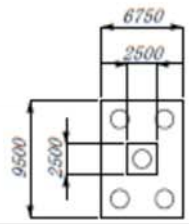
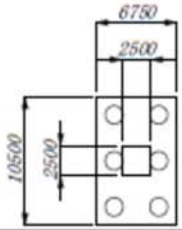
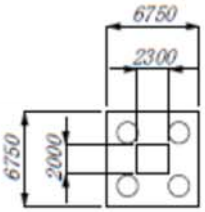
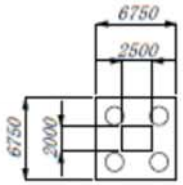
Bridge Type	Option 1 Box Girder Bridge	Option 2 Extra-Dosed Bridge	Option 3 Cable Stayed Bridge
Side View			
Span Length	50m～140m	100m～200m	100m～250m
Cross Section			
Self-weight	860kN/m (Girder)	1,010kN/m (Girder)	850kN/m (Girder)
Foundation	36-Steel Pile Well Foundation D=1.0m L=40m 	24-Cast in Place Bored Pile D=2.5m L=30 	36-Cast in Place Bored Pile D=2.5m L=30 
Aesthetic	Normal	Good (Symbolic)	Good (Symbolic)
Scouring	Depth=9.3m	No Problem	No Problem
Constructability	2 Piers in the river	Good (Cantilever)	Good (Cantilever)
Construction Period	32 Month	36 Month	48 Month
Construction Cost	4,082 mill Rs (1.00)	4,507 mill Rs (1.10)	6,026 mill Rs (1.48)
Maintenance Cost	Low	Normal	High

Design details and the comparison of different design types for the approach bridges (viaducts, separated section)

Comparison study for superstructure types, Separated section

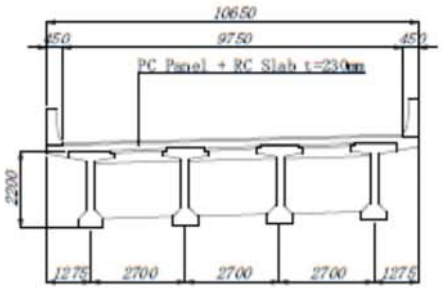
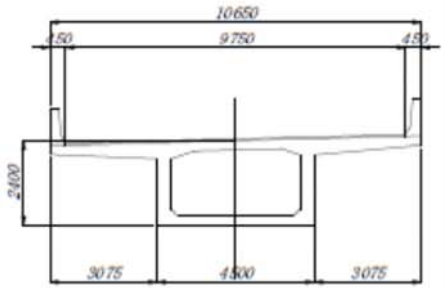
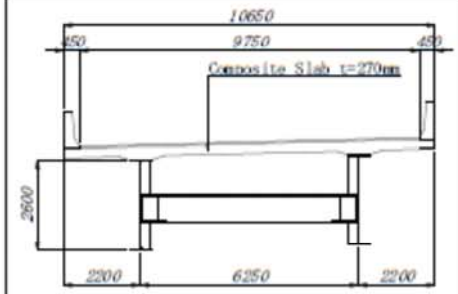
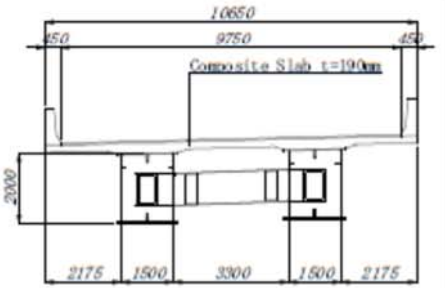
	Option 1	Option 2	Option 3	Option 4
	PC I Girder Simple	PC Box Girder Continuous	Steel I Girder(Conventional) Continuous	Steel Box Girder(Conventional) Continuous
Slab	Cast in place with PC plate form	Common as the upper flange	Cast in place with timbering form	Cast in place with timbering form
Cross Section				
Span Length	25m～45m (Adopted 40m)	30m～110m (Adopted 50m)	30m～60m (Adopted 40m)	40m～80m (Adopted 50m)
Self-weigh	253kN/m (Ratio:1.00)	265kN/m (Ratio:1.05)	176kN/m (Ratio:0.70)	187kN/m (Ratio:0.74)
Structural Feature	Most general girder. Design & fabrication method are well known. Big substructure & foundation are necessary.	Long overhang slab & torsional rigidity. Adaptable for sharp curve section. Big substructure & foundation are necessary.	Thin steel plates & stiffened members. Design & fabrication method are well known. Substructure & foundation are smaller than PC.	High flexural & torsional rigidity. Most adaptable for sharp curve section. Substructure & foundation are smaller than PC.
Production Fabrication work	Wide production yard is necessary. PC cable arrangement in thin web is difficult. Suitable for mass production.	Wide construction yard is necessary. Management is more difficult than PC-I Girder. Impossible to produce without erection method.	Special factory is necessary. The production period is long. Easy quality inspection & erection reinforcement.	Special factory is necessary. The production period is long. Easy quality inspection & erection reinforcement.
Erection work	Handling weight is heavy. Big equipments are necessary. Limited transportation weight & size.	Handling weight is the heaviest. Big equipments are necessary. Limited transportation weight & size.	Handling weight is the lightest. Stability in a single member is low. Erection at narrow space is possible.	Handling weight is light. Stability is high. Erection at narrow space is possible.
Aesthetic	Complex shape does not suit for urban highway.	Due to smooth surface, its view looks clear.	Bottom view shall be complicated.	Bottom view shall be simple.
Constructability	Normal	Good	Good	Good
Construction Cost	1.00	1.49	2.29	2.68
Maintenance Cost	The cost for many expansion joints & bearings is necessary.	Costs are cheaper than other options.	Paint or atmospheric corrosion resistant steel plate is necessary.	Paint or atmospheric corrosion resistant steel plate is necessary.

Comparison study for superstructure types, Separated section with piers

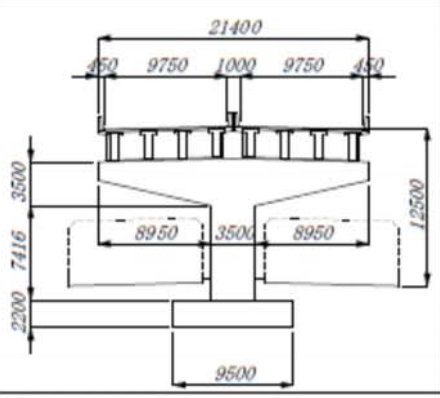
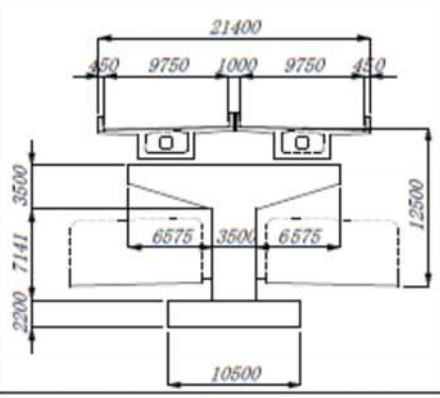
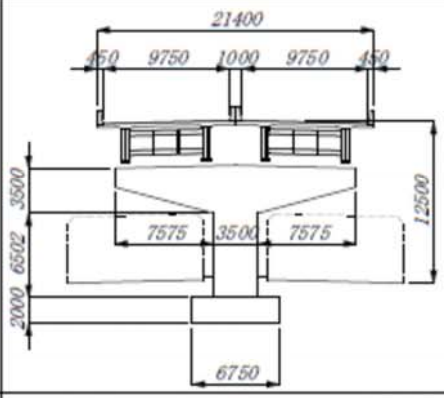
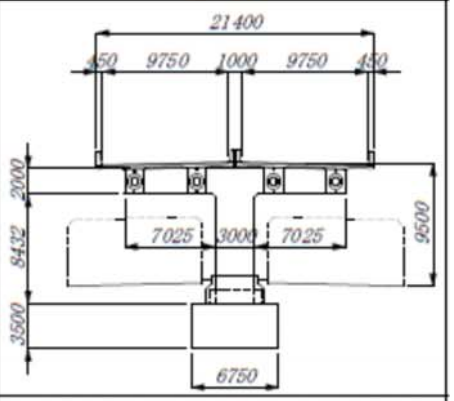
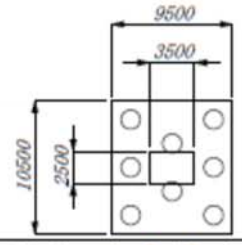
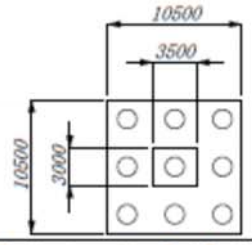
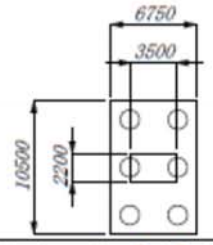
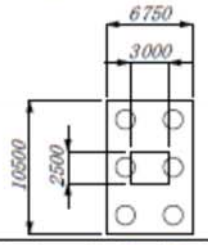
	Option 1	Option 2	Option 3	Option 4
	PC I Girder Simple	PC Box Girder Continuous	Steel I Girder(Conventional) Continuous	Steel Box Girder(Conventional) Continuous
Span Length	40m	50m	50m	50m
Reaction	25,678kN	32,588kN	21,394kN	24,768kN
Cross Section				
Substructure	RC Pier	RC Pier	RC Pier	RC Pier
Footing				
Pile	10-Cast in place piles D=1.5m L=30m	12-Cast in place piles D=1.5m L=30m	8-Cast in place piles D=1.5m L=30m	8-Cast in place piles D=1.5m L=30m
Aesthetic	Poor	Good	Poor	Good
Constructability	Normal	Normal	Good	Good
Construction Period	40 Month	36 Month	36 Month	32 Month
Construction Cost	184.454 Rs/m^2 (Ratio:1.00)	212,894 Rs/m^2 (Ratio:1.15)	270,332 Rs/m^2 (Ratio:1.47)	285,172 Rs/m^2 (Ratio:1.55)
Evaluation		Recommended		

Design details and the comparison of different design types for the approach bridges

Comparison study for superstructure types, Overlapped Sections

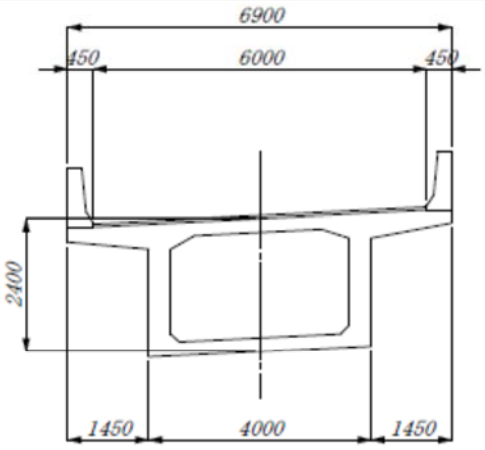
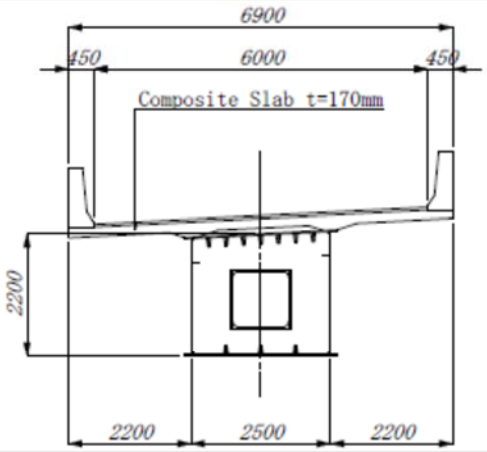
	Option 1 PC I Girder Simple or Combined girder	Option 2 PC Box Girder Continuous	Option 3 Steel I Girder(Fewness) Continuous	Option 4 Steel Box Girder(Fewness) Continuous
Slab	Cast in place with PC plate form	Common as the upper flange	Cast in place with steel composite slab	Cast in place with steel composite slab
Cross Section				
Span Length	25m～45m (Adopted 40m)	30m～110m (Adopted 50m)	30m～60m (Adopted 40m)	40m～80m (Adopted 50m)
Self-weight	193kN/m (Ratio:1.00)	198kN/m (Ratio:1.03)	139kN/m (Ratio:0.72)	126kN/m (Ratio:0.65)
Structural Feature	Most general shape. Design & fabrication method are well known. Big substructure & foundation are necessary.	Long overhang slab & torsional rigidity. Adaptable for sharp curve section. Big substructure & foundation are necessary.	Thick plates & few members. Highest girder. Substructure & foundation are smaller than PC.	High flexural & torsional rigidity. Most adaptable for sharp curve section. Substructure & foundation are smaller than PC.
Production Fabrication work	Wide production yard is necessary. PC Cable arrangement in thin web is difficult. Suitable for mass production	Wide production yard is necessary. Management is more difficult than PC-I Girder. Impossible to produce before erection method.	Special factory is necessary. The production period is long. Easy quality inspection & erection reinforcement.	Special factory is necessary. The production period is long. Easy quality inspection & erection reinforcement.
Erection work	Handling weight is heavy. Big equipments are necessary. Limited transportation weight & size.	Handling weight is heavy. Big equipments are necessary. Limited transportation weight & size.	Handling weight is the lightest. Stability in a single member is low. Erection at narrow space is possible.	Handling weight is light. Stability is high. Erection at narrow space is possible.
Aesthetic	Complex shape does not suit for urban highway.	Due to smooth surface, its view looks clear.	Bottom view shall be simple.	Bottom view shall be simple.
Constructability	Normal	Good	Good	Good
Construction Cost	1.00I	1.47	2.20	2.38

Comparison study for superstructure types, Overlapped Sections with piers

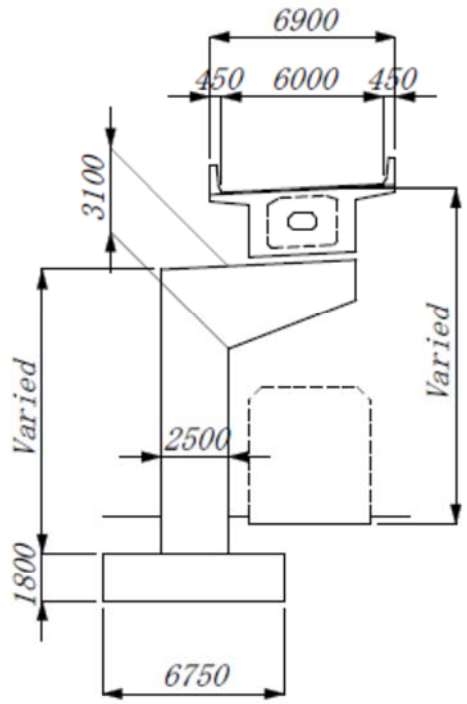
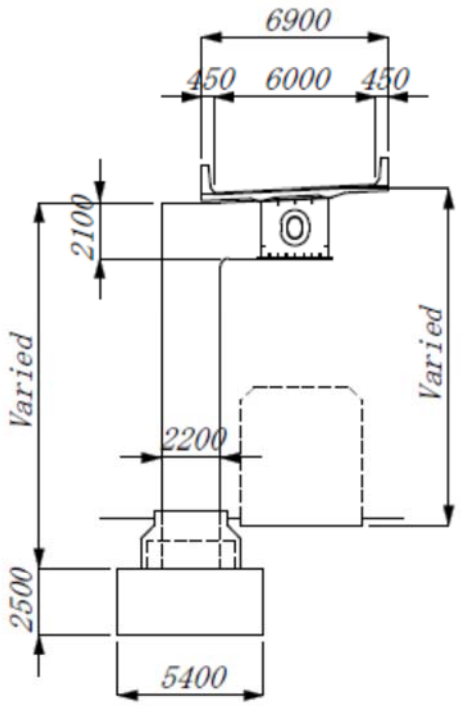
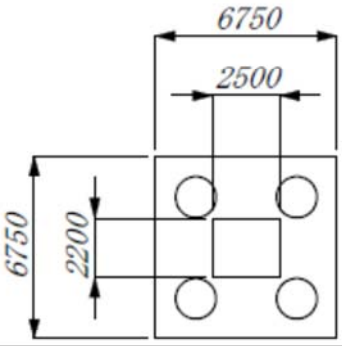
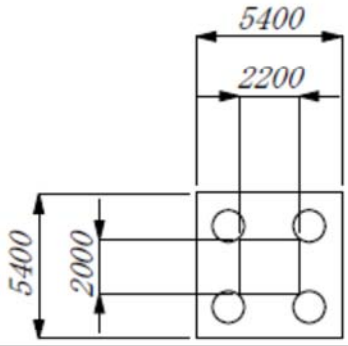
	Option 1	Option 2	Option 3	Option 4
	PC I Girder Simple	PC Box Girder Continuous	Steel I Girder(Conventional) Continuous	Steel Box Girder(Conventional) Continuous
Span Length	40m	50m	40m	50m
Reaction	19,862kN	24,748kN	17,026kN	18,330kN
Cross Section				
Substructure	RC Pier	RC Pier	RC Pier	Rigid Steel Pier
Footing				
Pile	8-Cast in place piles D=1.5m L=30m	9-Cast in place piles D=1.5m L=30m	6-Cast in place piles D=1.5m L=30m	6-Cast in place piles D=1.5m L=30m
Road Elevation	High	High	High	Low
Aesthetic	Poor	Good	Poor	Good
Construction Period	40 Month	36 Month	36 Month	24 Month
Construction Cost	200,148 Rs/m^2 (Ratio:1.00)	229,808 Rs/m^2 (Ratio:1.15)	285,780 Rs/m^2 (Ratio:1.43)	300,664 Rs/m^2 (Ratio:1.50)
Evaluation				Recommended

Design details and the comparison of different design types for the ramp bridges

Comparison study for superstructure types, Ramp Bridge

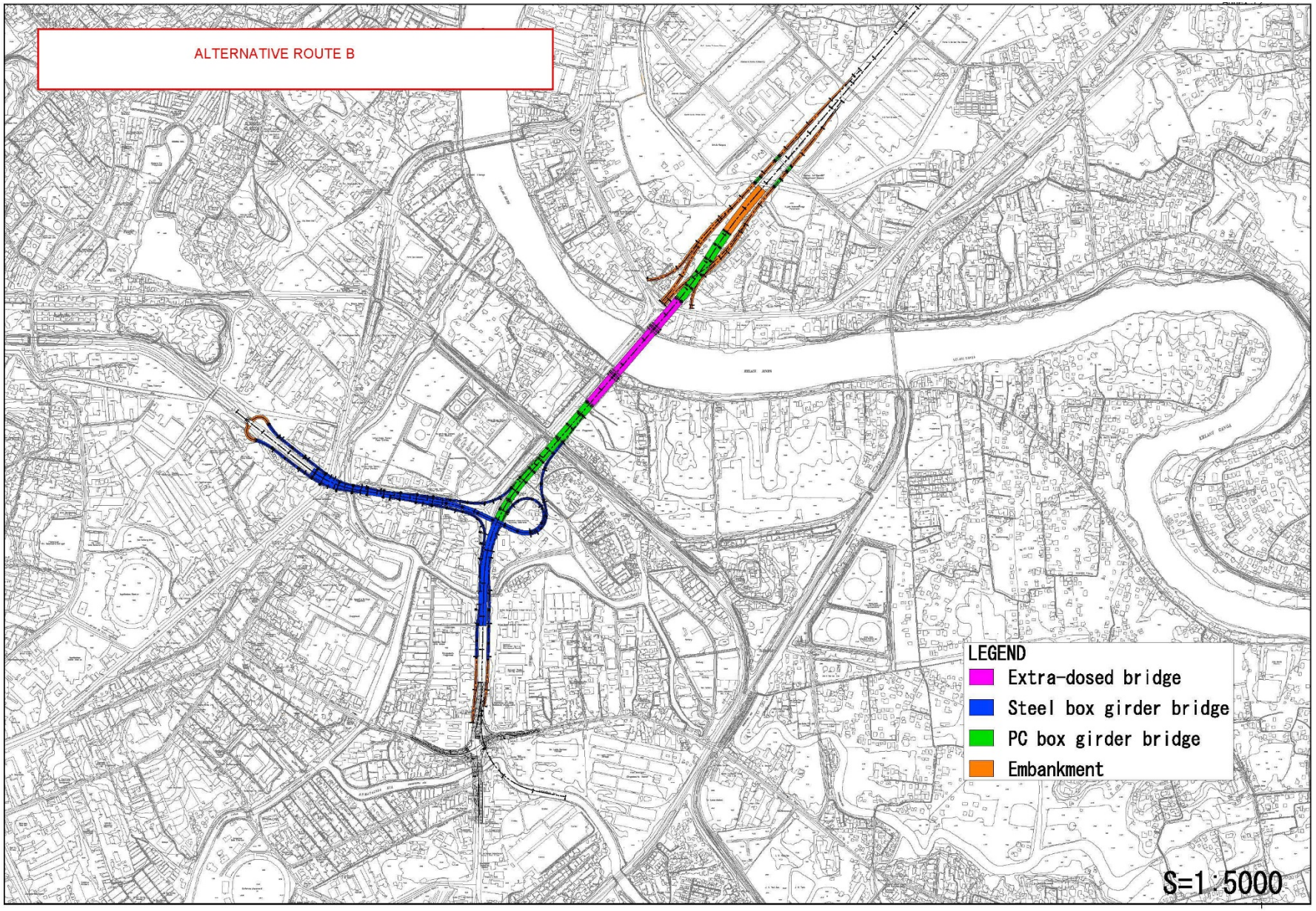
	Option 1 PC Box Girder Continuous	Option 2 Steel Box Girder Continuous
Slab	Common as the upper flange	Cast in place with steel composite slab
Cross Section		
Span Length	30m~60m (Adopted 50m)	40m~80m (Adopted 50m)
Minimum Radius	50m	30m
Self-weight	152kN/m (Ratio:1.00)	105kN/m(Ratio:0.78)
Structural Feature	Torsional rigidity. Adaptable for sharp curve section.	High flexural & torsional rigidity. Adaptable for sharp curve section. Substructure & foundation are smaller than PC Box Girder.
Production Fabrication work	Wide construction yard is necessary. Production management is difficult. Impossible to produce without erection method.	Special factory is necessary. The production period is long. Easy quality inspection & erection reinforcement.
Erection work	Handling weight is heavy. Big equipments are necessary. Limited transportation weight & size.	Handling weight is light. Stability is high. Erection at narrow space is possible.
Aesthetic	View looks clear.	View looks clear.
Constructability	Normal	Good
Construction Cost	1.00	1.55

Comparison study for bridge types, Ramp section with pier

Bridge Type	Option 1 PC Box Girder Continuous	Option 2 Steel Box Girder Continuous
Span Length	50m	50m
Reaction	9,466kN	7,109kN
Cross Section		
Substructure	RC Pier	Steel Pier
Footing		
Pile	4-Cast in place pile D=1.5m L=30m	4-Cast in place pile D=1.2m L=30m
Aesthetic	Good	Good
Constructability	No Good	Good
Construction Period	30 Month	18 Month
Construction Cost	307,448 Rs/m^2 (Ratio:1.00)	354,426 Rs/m^2 (Ratio:1.15)
Evaluation		Recommended

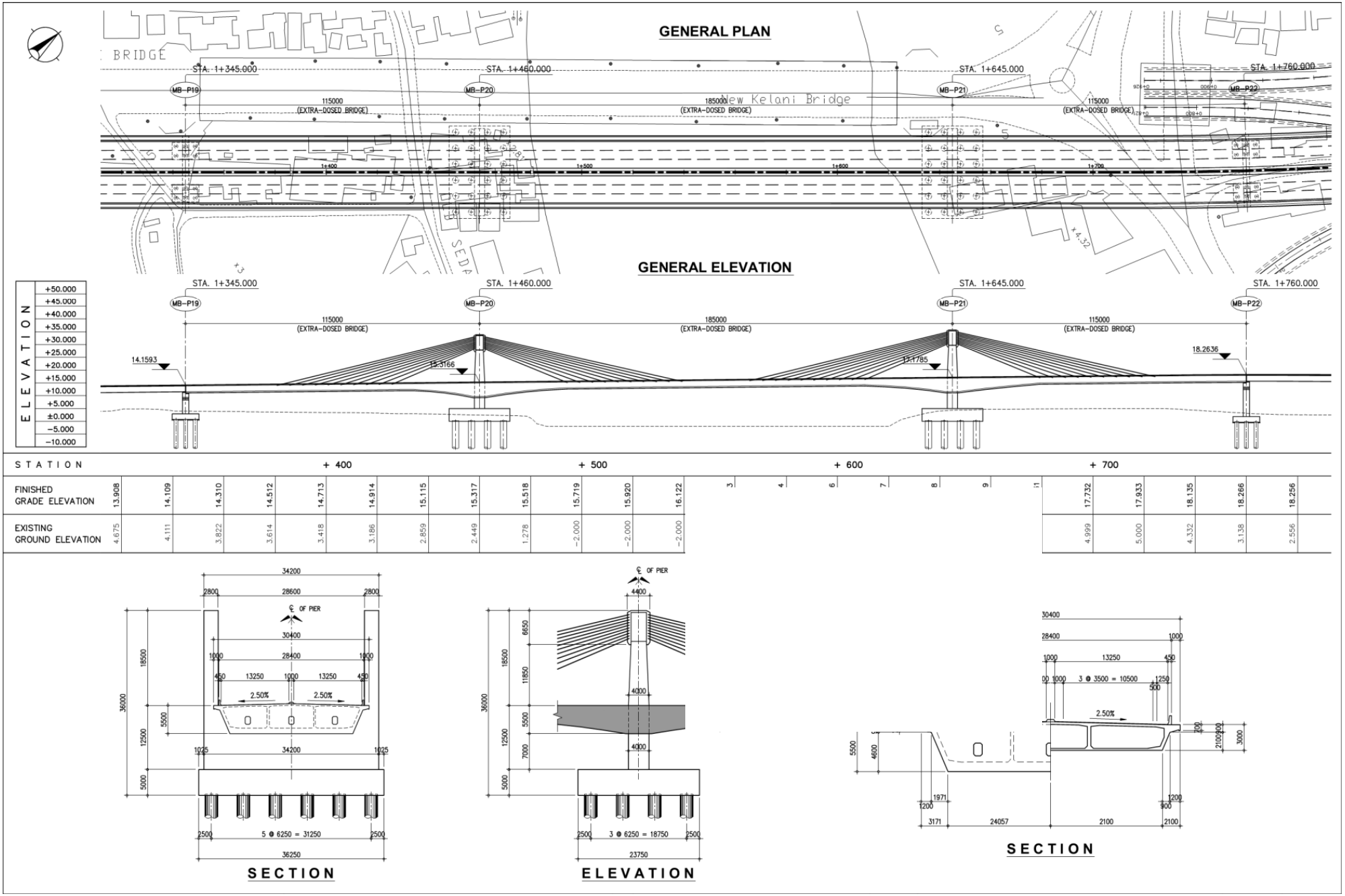
Annex 3.2
Details of Selected Alternative – Final Alignment

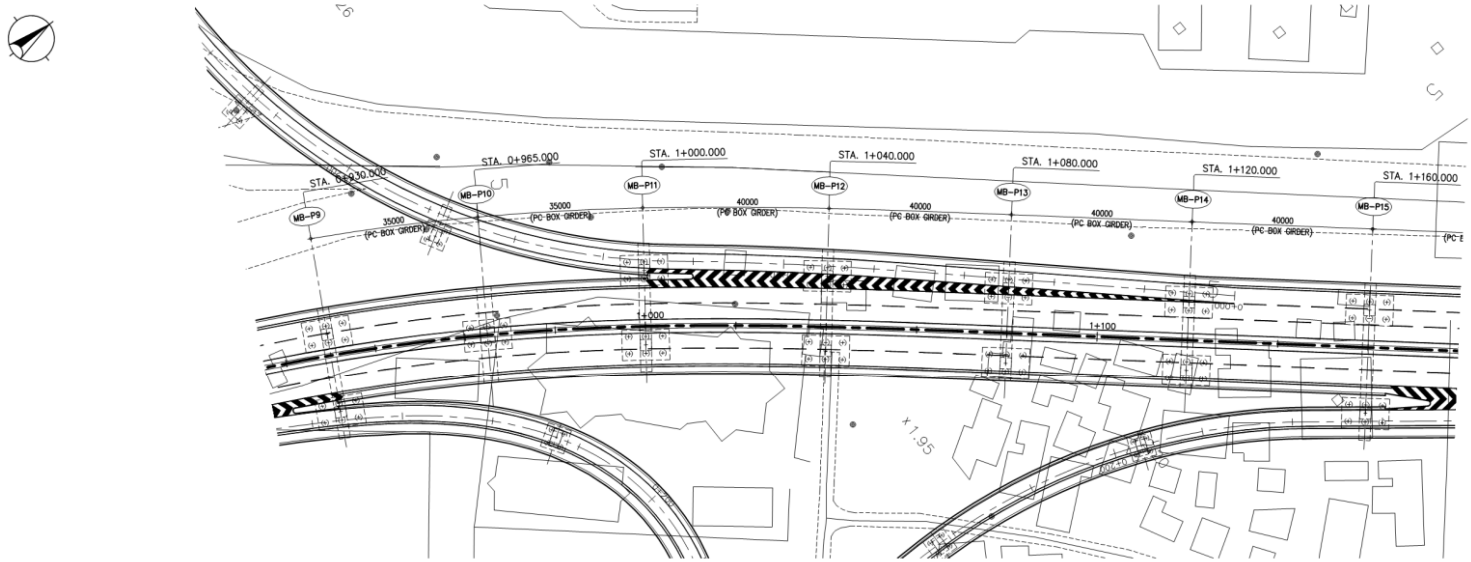
Annex 3.2 – Details of Selected Alternative – Final Alignment



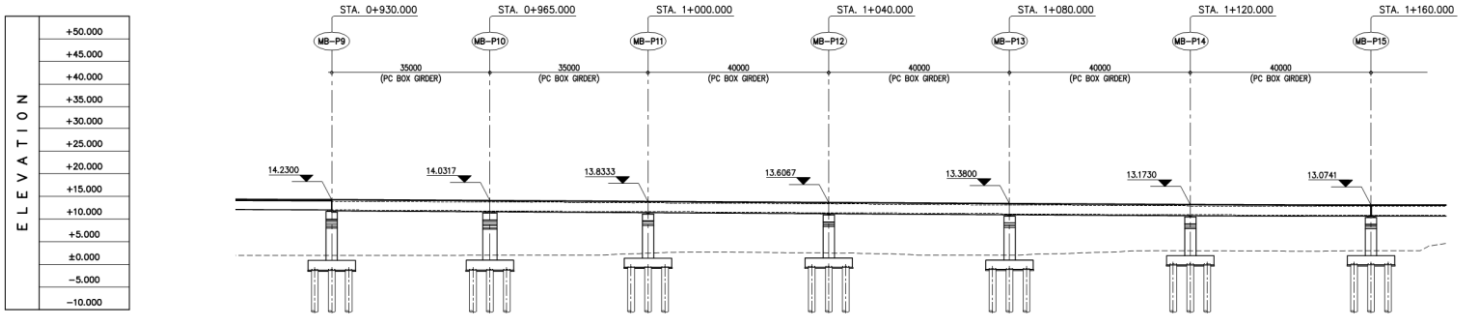
Bridge Main River

Annex 3.2



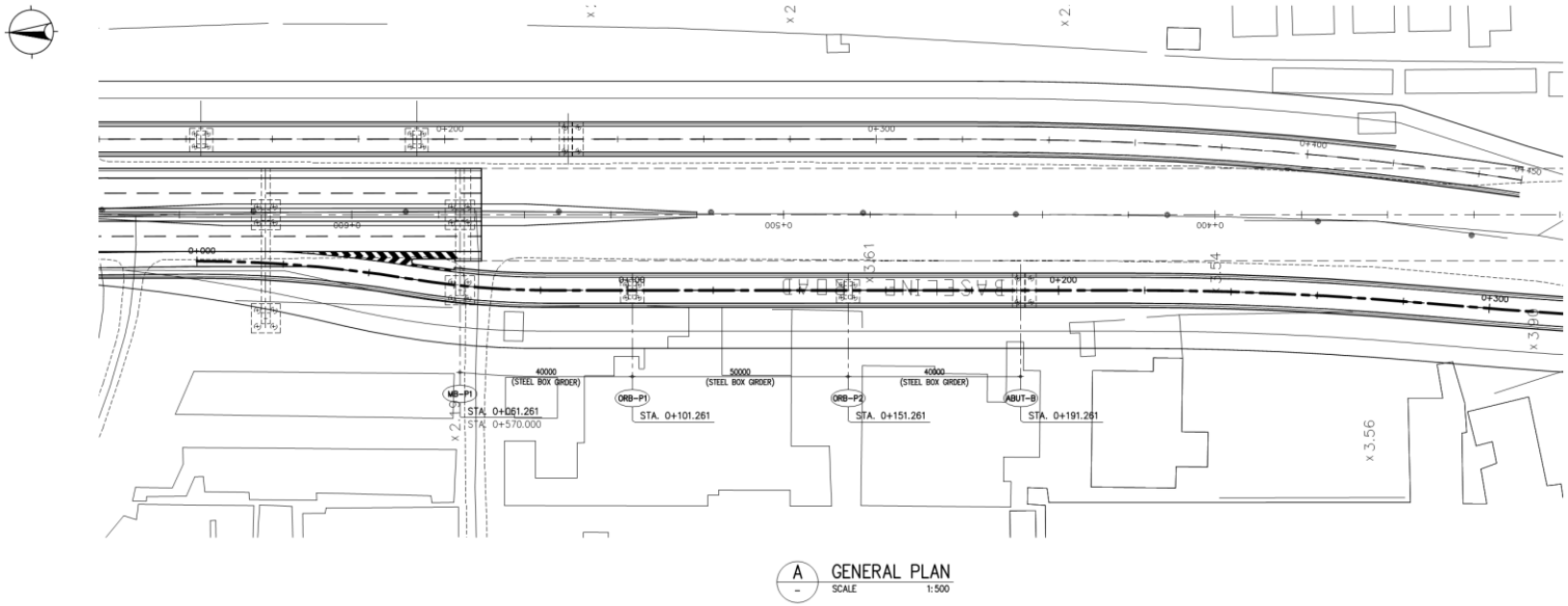


A GENERAL PLAN
SCALE 1:500

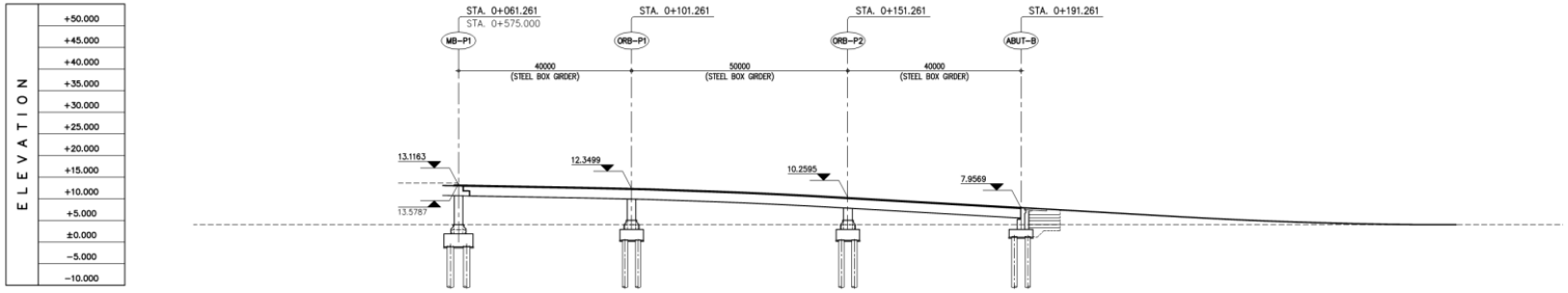


STATION	1 + 000									+ 100			
FINISHED GRADE ELEVATION	14.279	14.173	14.060	13.947	13.833	13.720	13.607	13.493	13.380	13.267	13.169	13.103	13.068
EXISTING GROUND ELEVATION	1.996	1.997	1.999	2.023	2.448	2.699	2.475	2.057	2.000	2.645	2.976	2.891	2.984

B GENERAL ELEVATION
SCALE 1:500



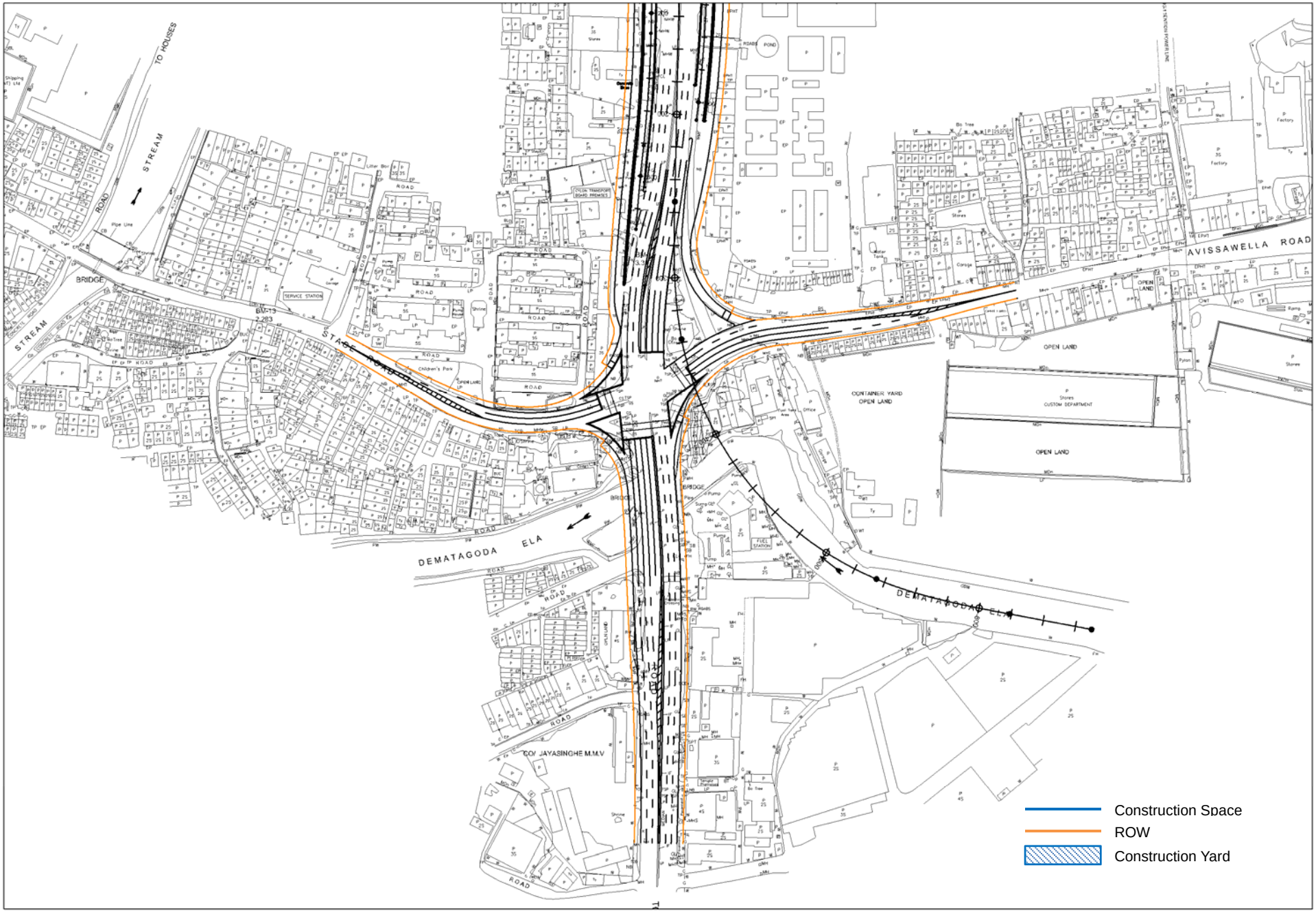
A GENERAL PLAN
SCALE 1:500

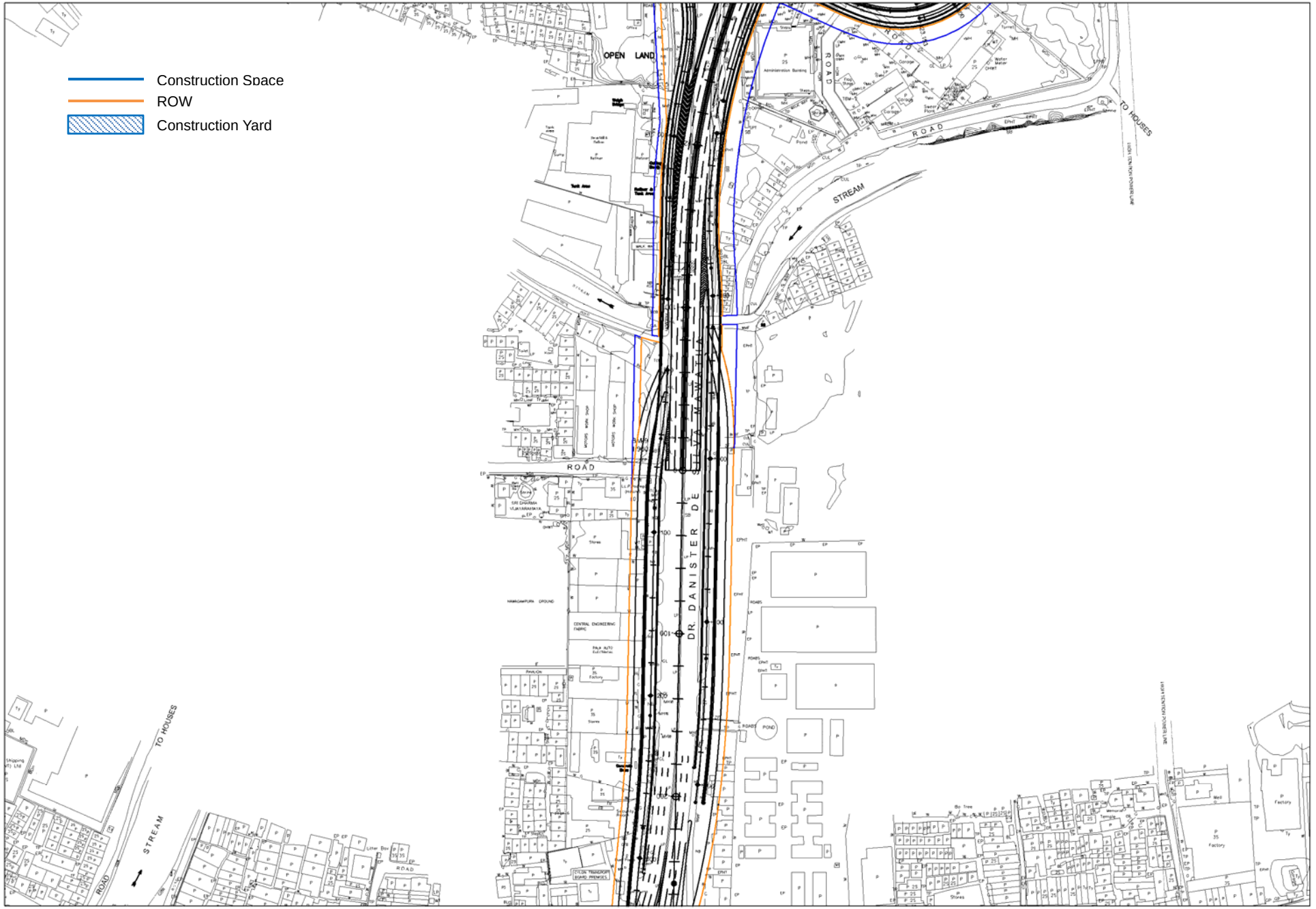


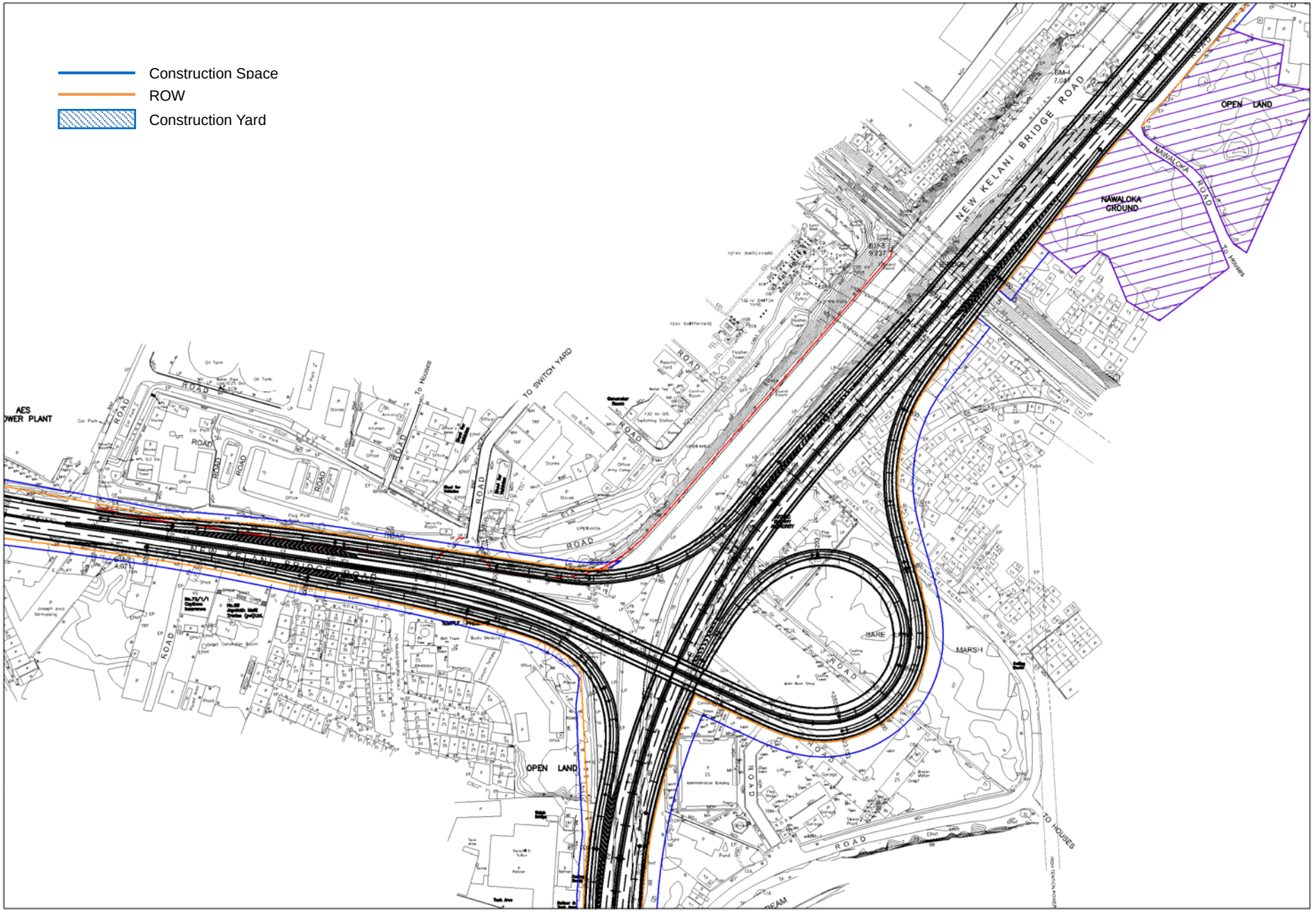
STATION	0 + 000			+ 100						+ 200					+ 300
FINISHED GRADE ELEVATION				13.139	12.779	12.386	11.762	10.875	9.756	8.605	7.454	6.303	5.215	4.458	4.063	
EXISTING GROUND ELEVATION	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000

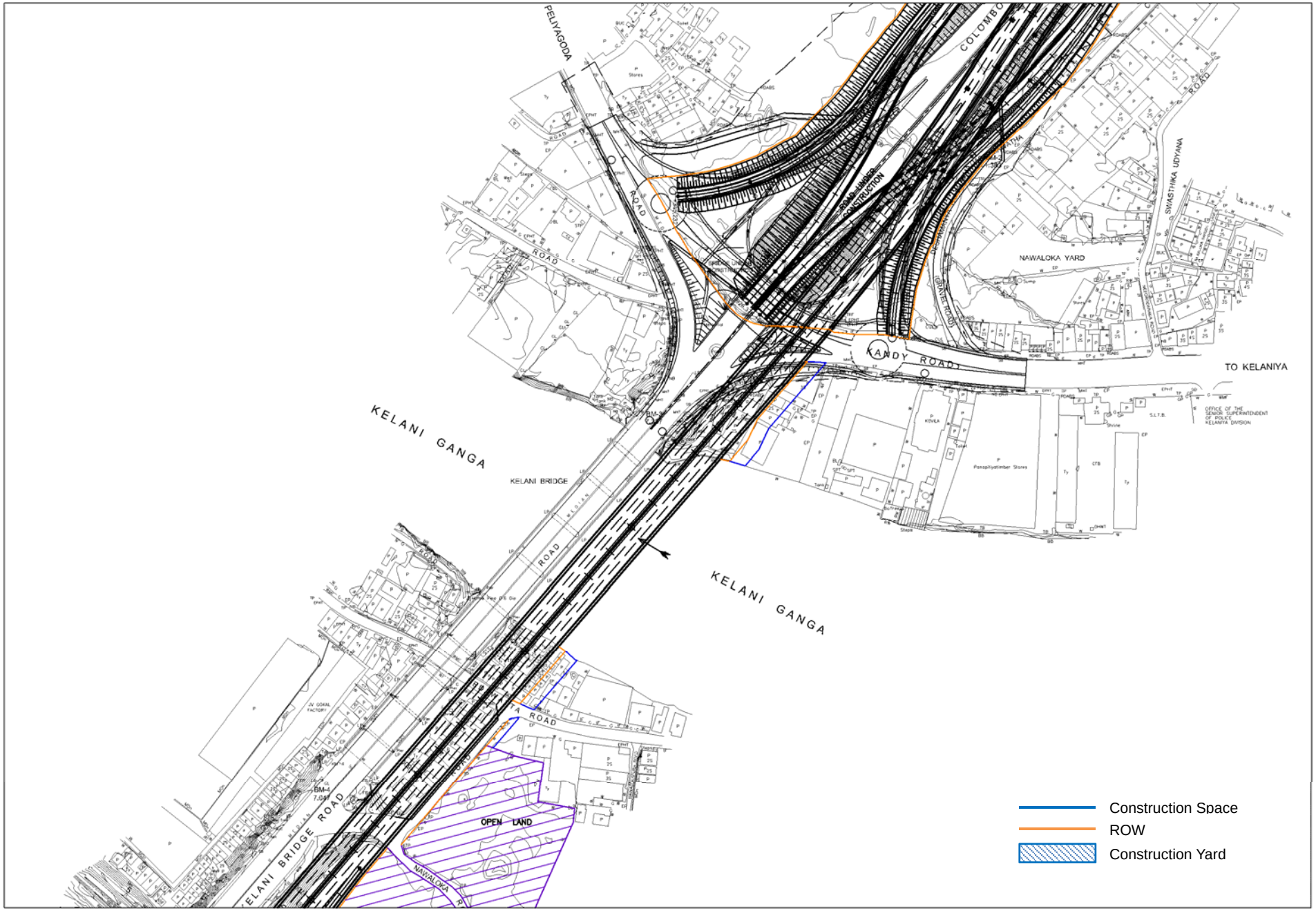
B GENERAL ELEVATION
SCALE 1:500

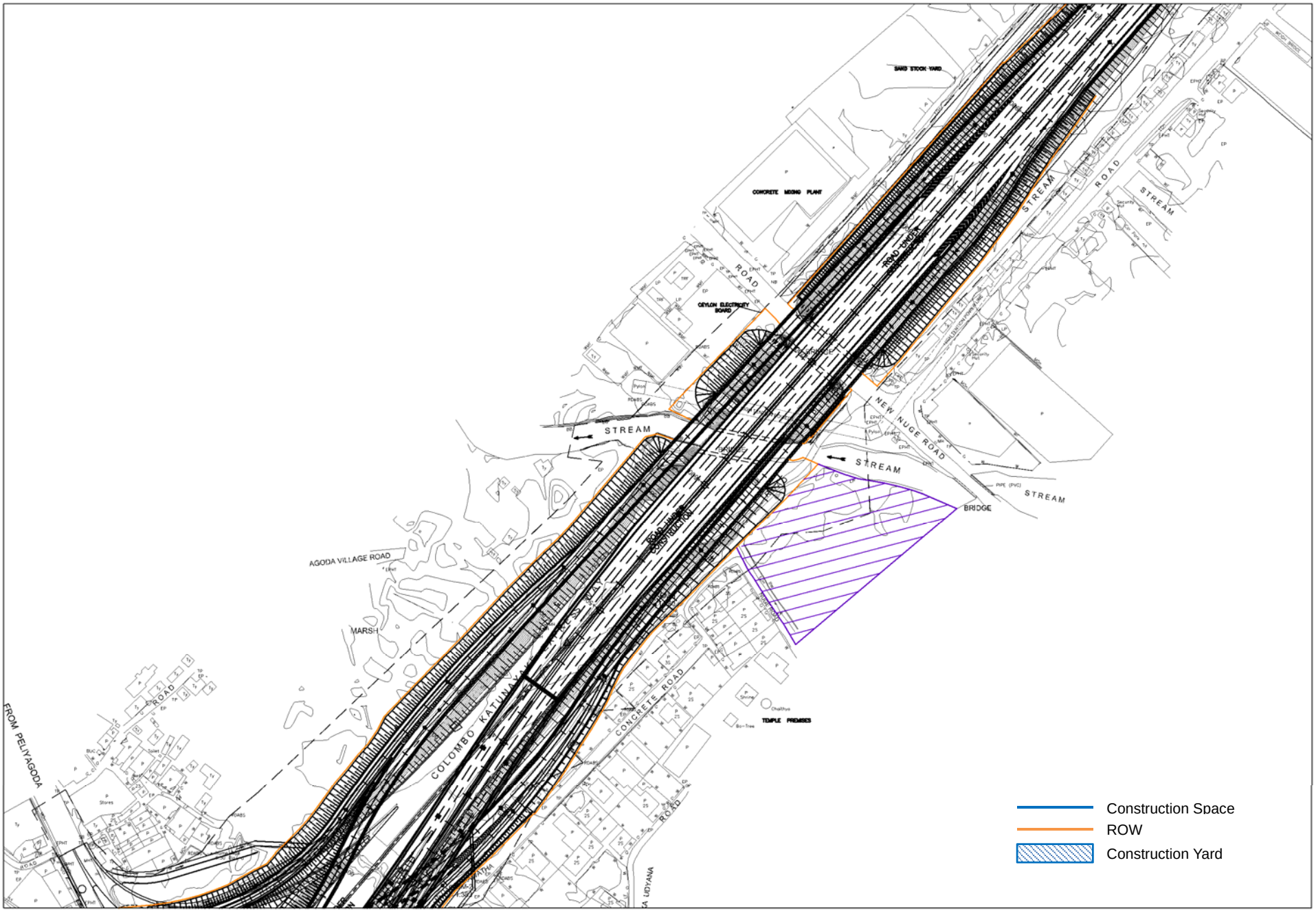
Annex 3.3
Details of Acquisition and Project Structure Boundaries

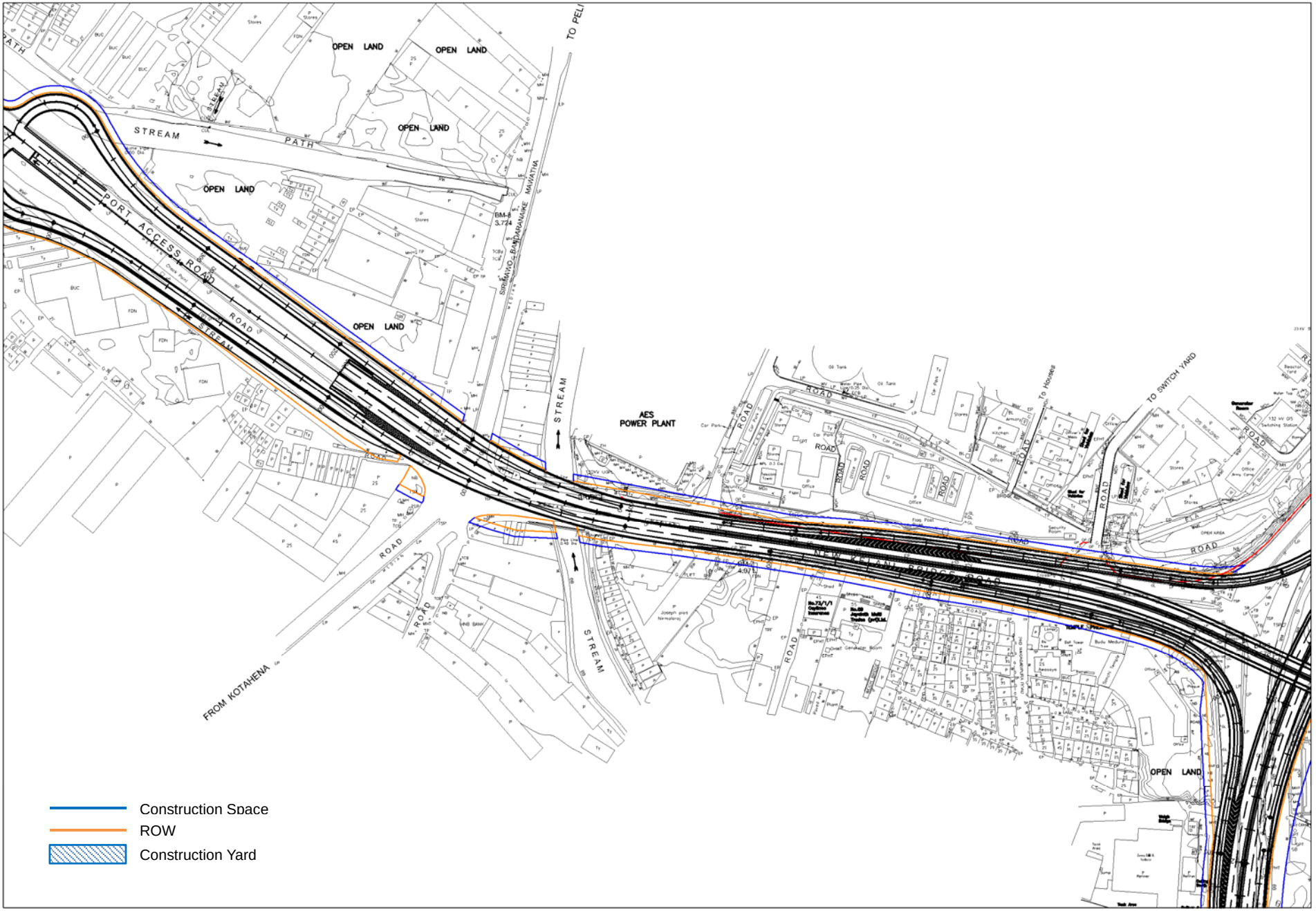

TO HOUSES
STREAM
ROAD
BRIDGE
STREAM
BUS 13
283
STAGE POINT
ROAD
Children's Park
SERVICE STATION
ROAD
ROAD
ROAD


Construction Space
ROW
Construction Yard
OPEN LAND
ROAD
TO HOUSES
STREAM
DR. DANISTER DE SILVA MAWATHA
POND


Construction Space
ROW
Construction Yard
NEW KELANI BRIDGE ROAD
NAWALOKA GROUND
NAWALOWA ROAD
OPEN LAND
TO SWITCH YARD
TO HOUSES
BARE
MARSH
ROAD


PELIYAGODA
COLOMBO
ROAD
ROAD UNDER CONSTRUCTION
NAWALOKA YARD
SWASTHIKA UDYANA
GRAVEL ROAD
KANDY ROAD
TO KELANIYA
KELANI GANGA
KELANI BRIDGE
KELANI GANGA
ROAD
ROAD
KELANI BRIDGE ROAD
OPEN LAND
NAWALOKA
Construction Space
ROW
Construction Yard


SAND STOCK YARD
CONCRETE MIXING PLANT
CEYLON ELECTRICITY BOARD
ROAD UNDER CONSTRUCTION
ROAD
STREAM
NEW NUGE ROAD
BRIDGE
PIPE (PVC)
AGODA VILLAGE ROAD
MARSH
CONCRETE ROAD
TEMPLE PREMISES
FROM PELIYAGODA
Construction Space
ROW
Construction Yard


OPEN LAND
OPEN LAND
OPEN LAND
OPEN LAND
OPEN LAND
STREAM
PATH
PORT ACCESS ROAD
ROAD
STREAM
BM-8
3.774
SIRIMAVO BANDARANAIKE MAWATHA
TO PELI
AES
POWER PLANT
STREAM
ROAD
ROAD
ROAD
ROAD
ROAD
ROAD
ROAD
ROAD
ROAD
ROAD
ROAD
ROAD
TO SWITCH YARD
To Houses
NEW PALAI BRIDGE ROAD
STREAM
STREAM
FROM KOTAHENA
OPEN LAND
Construction Space
ROW
Construction Yard

Annex 4.1
Details of Flora & Fauna-Ecology

Annex 4.1 Details of Flora & Fauna - Ecology

Table 5.9 Details of the affected trees due to proposed construction

Location	Species	Number of trees	Important
From Kelani river up to Orugodawaththa junction (Left side	*Alstonia scholaris*- Ruk attana	**04**	The Bo tree (*Ficus religiosa*) located in Orugoda watta junction is religiously important tree Most of the trees observed within the premises of Atomic Energy Authority and Administration building
	Polyalthia longifolia –Villo	**16**	
	Mangifera indica – Amba	**07**	
	Filicium decipiens – Pihimbiya	**10**	
	Palm Spp.	**10**	
	Pettophorum pterocarpum –Kaha mara	**04**	
	Azadirachta indica – Kohomba	**07**	
	Madhuca longifolia – Mee	**03**	
	Cocos nucifera – Pol	**10**	
	Terminalia arjuna- Kumbuk	**04**	
	Tectona grandis- Thekka	**01**	
	Ficus religiosa – Bo	**02**	
	Artocarpus hetarophyllus – Kos	**01**	
	Albizia saman- Para mara	**02**	
	Persea Americana - Ali pera	**01**	
	Pettophorum pterocarpum		
From Orugodawaththa junction up to Ingurukade junction (Left side)	*Azadirachta indica* – Kohomba	**07**	The Bo tree (*Ficus religiosa*) located in Ingurukade junction is religiously important
	Albizia odoratissima - Suriya mara	**02**	
	Polyalthia longifolia –Villo	**02**	
	Mangifera indica – Amba	**02**	
	Ficus religiosa – Bo	**03**	
	Spathodia campanulata	**02**	
	Alstonia scholaris- Ruk attana	**07**	
	Ficus benghalensis- Nuga	**02**	
	Casia spp-Ehela	**06**	
	Pettophorum pterocarpum- Kaha Mara	**03**	
	Tectona grandis- Thekka	**07**	
	Cocos nucifera – Pol	**08**	
	Mangifera indica – Amba	**01**	
	Dichrostachys cinerea- Andara	**02**	
From Ingurukade junction up to Kelani bridge (Left side)	*Alstonia scholaris*- Ruk attana	**08**	Most of the trees located adjacent to the Road within CEB premises
	Azadirachta indica – Kohomba	**01**	
	Spathodia campanulata	**03**	
	Mangifera indica – Amba	**12**	
	Artocarpus hetarophyllus – Kos	**01**	
From Kelani bridge up to proposed section of Nigambo road	*Ficus religiosa* – Bo	**01**	
	Cocos nucifera – Pol	**01**	
	Artocarpus hetarophyllus – Kos	**02**	
	Swietenia macrophylla – Mahogany	**01**	
	Mangifera indica – Amba	**06**	
	Terminalia catappa – Kottamba	**03**	
	Azadirachta indica – Kohomba	**02**	
	Filicium decipiens – Pihimbiya	**04**	
	Alstonia scholaris- Ruk attana	**03**	

Location	Species	Number of trees	Important
	Ficus religiosa – Bo	**01**	
	Acasia spp-Narrow leaves	**05**	
From Kelani bridge up to proposed section of Kandy road	*Terminalia catappa* – Kottamba	**08**	Some trees located in bridge mouth has already removed
	Artocarpus hetarophyllus – Kos	**05**	
	Mangifera indica – Amba	**08**	
	Alstonia scholaris- Ruk attana	**01**	
	Ficus religiosa – Bo	**01**	
	Albizia odoratissima - Suriya mara	**01**	
	Kasuarina spp. Kasa	**01**	
Proposed section of Stace road from Orugoda waththa junction	*Albizia odoratissima* - Suriya mara	**13**	
	Polyalthia longifolia –Villo	**01**	
	Ficus religiosa – Bo	**01**	
	Spathodia campanulata	**01**	
	Terminalia catappa – Kottamba	**01**	
	Pettophorum pterocarpum- Kaha Mara	**01**	
	Casia spp- Ehela	**01**	
	Acasia spp-Narrow leaves	**01**	
Proposed section of Awissawella road from Orugodawaththa junction	**No trees**		
Port access road	**No trees**		
Proposed section of Dr Danister de Silva Mw, from Orugodawaththa junction	*Polyalthia longifolia* –Villo	**14**	
	Terminalia catappa – Kottamba	**04**	
	Albizia saman- Para mara	**01**	
	Dichrostachys cinerea- Andara	**01**	
	Artocarpus hetarophyllus – Kos	**01**	

Terrestrial and aquatic floral species found in the proposed Bridge construction area.

TS - Taxonomic status **CS**: Conservation status **N –** Native
I – Introduced **E -** Endemic T**R**- Threatened
T - Tree **S -** Shrub **H -** Herb
C - Climber **Ep -**Epiphytes **AQ –** Aquatic
KRV- Kelani River & Riverine Vegetation **RR**- Road Reservations
CAA-Canals & Associated Areas **MRC**- Mixed Residential and Commercial area

IUCN Sri Lanka 2012

Scientific name	Common name	Habit	TS	CS	Habitats			
					MRC	RR	KRV	CAA
Polyalthia longifolia	Villo	T	I		+	+	-	-
Spathodia campanulata		T	I		-	+	-	-
Palm spp.		T	I		-	+	-	-
Pettophorum pterocarpum	Kaha Mara	T	I		+	+	-	-
Aegle marmelos	Beli	T	I		+	-	-	+
Aeschynomene indica	Diyasiyambala	Aq H	N		-	+	-	+
Casia spp	Ehela	T	I		-	-	-	-
Albizia odoratissima	Suriya mara	T	N		+	+	+	-
Albizia saman	Para mara	T	I		+	+	-	-
Alocasia macrorrhizos	Habarala	H	N		-	+	+	+
Alstonia scholaris	Ruk attana	T	N		+	+	+	-
Alternanthera sessilis	Mukunuwenna	H	N		+	+	-	-
Amaranthus viridis	Kura tampala	H	N		-	+	-	-
Anacardium occidentale	Caju	T	I		+	-	-	-
Annona glabra	Wel-atta	S	I		-	-	-	+
Areca catechu	Puwak	T	N		+	-	-	-
Artocarpus hetarophyllus	Kos	T	I		+	+	+	-
Artocarpus incises	Rata del	T	I		+	-	+	-
Azadirachta indica	Kohomba	T	N		-	+	-	-
Basella alba	Niviti	H	I		+	-	-	-
Bougainvillea spp.	Bougainvillea	S	I		+	+	-	-
Bumbusa vulgaris	Una	T	N		+	+	+	-
Caesalpinia pulcherrima	Monara mal	S	I		-	+	-	-
Calotropis gigantean	Wara	S	N		-	+	-	-
Capsicum annuum	Miris	H	N		+	-	-	-
Carica papaya	Papol	H	N		+	-	-	-
Cassia fistula	Ehela	T	I		-	+	+	-
Cassia occidentalis	Peni tora	H	N		+	+	-	-
Cassia tora	Tora	H	N		-	+	-	-
Cebera odollam	Gon kaduru	S	I		-	+	+	+
Ceiba pentandra	Pulun	T	N		+	-	+	-
Cocos nucifera	Pol	T	N		+	-	+	-
Colocasia esculenta	Gahala	H	N		-	+	-	-
Datura metel	Attana	H	I		-	+	-	-
Delonix regia	Mal mara	T	I		--	+	-	
Dendrophthoe falcate	Pilila	E	N		-	+	-	--
Desmodium heterocarpon	Et undupiyali	H	N		-	+	-	-
Desmodium triflorum	Heen Undupiyali	H	N		-	+	-	-
Dichrostachys cinerea	Andara	S	N		-	+	+	-
Eichhornia crassipes	Japan jabara	Aq H	I		-	-	-	+
Elaeocarpus serratus	Weralu	T	N		+	+	-	-
Ficus benghalensis	Nuga	T	N		-	+	+	+
Ficus religiosa	Bo	I	N		-	+	+	+
Filicium decipiens	Pihimbiya	T	N		+	+	+	-

Flueggea leucopyrus	Katu pila	S	N		-	+	-	-
Gliricidia sepium	Weta hiriya	T	I		-	-	+	-
Hedyotis neesiana	Pita sudu pala	H	I		-	+	-	-
Hibiscus rosa sinensis	Wada	S	I		+	-	-	-
Hibiscus rosa-sinensis	Wada	T	I		+	-	-	-
Hibiscus tiliaceus	Beli patta	T	N		-	-	-	+
Ipomoea aquatica	Kankung	Aq	N		-	-	-	+
Lantana camara	Ganda pana	S	I		-	+	-	-
Lasia spinosa	Kohila	N	N		+	-	-	+
Leucaena leucocephala	Ipil ipil	T	I		+	+	+	-
Macaranga peltata	Kenda	T	N		-	+	+	-
Madhuca longifolia	Mi	T	N		-	+	-	-
Mangifera indica	Amba	T	I		+	+	+	-
Manihot esculenta	Manyokka	T	I		+	-	-	-
Melia azedarach	Lunu midella	T	N		+	-	-	-
Mikania cordata	Vatu palu	C	N		-	+	-	-
Mimosa pudica	Nidi kumba	H	I		+	+	-	-
Mitragyna tubulosa	Helamba	T	N		-	-	+	-
Muntingia calabura	Jam	T	I		+	+	-	+
Musa x	Kessel	T	N		+	-	-	-
Nephelium lappaceum	Rambutan	T	I		+	-	-	-
Pandanus kaida	Weta keyiya	S	N		-	+	+	+
Pandanus odoratissimus	Watake	S	N		+	-	-	+
Persea Americana	Ali pera	T	I		+	-	-	-
Pistia stratiotes	Diya parade	Aq H	I		-	-	-	+
Plumeria rubra	Araliya	S	N		+	+	-	-
Pongamia pinnata	Karada	T	N		-	+	-	+
Psidium guajava	Pera	T	I		+	-	-	-
Ricinus communis	Endaru	S	I		+	+	-	+
Ricinus communnis	Beheth endaru	S	I		-	+	-	+
Sesbania grandiflora	Katuru murunga	T	I		+	-	-	-
Spathodia campanulata		T	I		-	+	-	-
Spondias dulcis	Ambarella	T	I		+	-	-	-
Stachytarpheta jamaicensis	Balu nakuta	H	I		-	+	-	-
Swietenia macrophylla	Mahogany	T	I		-	-	-	-
Tabernaemontana divaricate	Wathu sudda	T	I		+	-	-	-
Tectona grandis	Thekka	T	I		+	+	-	-
Terminalia arjuna	Kumbuk	T	N		-	+	+	-
Terminalia catappa	Kottamba	T	I		+	+	+	+
Typha angustifolia	Hambu pan	H	N		-	-	-	+
Vernonia cinerea	Monara kudumbiya	H	N		-	+	-	-

Terrestrial and aquatic faunal species found in the proposed Bridge construction area..

SS: Species status
CS: Conservation status
TR- Threatened
EN- Endemic
MI- Migrant

EX: Exotic
CAA-Canals & Associated Areas
M**RC**- Mixed Residential and Commercial area
RR - Road Reservations
KRV- Kelani river& Riveraine Végétation

IUCN Sri Lanka 2012

Scientific Name	Common Name	Status		CAA	RRH	MRC	KRV
		SS	CS				
Order: Odonata	**Dragonflies**						
Family: Libellulidae							
Neurothemis tullia	Black velvet wing	-	-	+	-	+	
Rhyothemis variegate	Variable glider	-	-	+	+	-	+
Order: Lepidoptera	**Butterflies**						
Family: Papilionidae							
Graphium doson	Common jay	-	-	+	-	+	-
Family: Pieridae							-
Leptosia nina	Psyche	-	-	-	-	+	-
Delias eucharis	Jezerbel	-	-	+	-	+	-
Erema hecabe	Common grass yellow	-	-	-	-	+	-
Family: Danaidae							
Danaus chrysippus	Plain tiger	-	-	-	-	+	-
Euploea core	Common crow	-	-	-	-	+	-
Family: Nymphalidae							
Neptis hylas	Common sailor	-	-	-	+	+	-
Junonia atlites	Grey Pansy	-	-	+	+	-	-
Family: Satyridae							
Melanitis leda	Common evening brown	-	-	+	-	-	-
Ypthima ceylonica	White four ring	-	-	-	-	+	-
Elymnias hypermnestra	Common palmfly	-	-	-	-	+	-
Class: Osteicthyes	**Bony fishes**						
Family: Poeciliidae							
Poecilia reticulate	Guppy	EX	-	+	-	-	-
Family: Cichlidae							
Oreocromis mosambicus	Tilapiya	EX	-	-	-	-	+
Trichogaster pectoralis	Snake skin-guramy	EX	-	+	-	-	
Family: Channidae							
Channa striata	Murrel	-		-	-	-	+
Family: Anabantidae							
Channa punctate	Spotted snakehead	-		-	-	-	+
Anabas testudineus	Climbing perch	-		+	-	-	
Family: Loricariidae							
Hyposarcus pardalis	Sucker-mouthed cat fish	EX		-	-	-	+
Class: Amphibia	**Amphibians**						
Family: Ranidae							
+Euphlyctis hexadactylus	Edible frog	-	-	+	-	-	-
Family– Bufonidae							
Bufo melanostictus	Common house toad	-	-	-	-	+	-
Class: Reptilia	**Reptilels**						

Family-Gekkonidae							
Hemidactylus frenatus	Common house gecko	-	-	-	+	+	-
Family: Agamidae							
Calotes calotes	Green garden lizard	-	-	-	-	+	-
Family: Varanidae							
Varanus salvator	Water monitor	-	-	+	-	+	-
Varanus bengalensis	Land moniter	-	-	+	-	+	-
Family: Elapidae							
Naja naja	Cobra	-	-	+	-	+	-
Family: Colubridae							
Ptyas mucosa	The common rat snake	-	-	-	-	+	-
Class: Aves	**Birds**						
Family: Phalacrocoracidae							
Phalacrocorax fuscicollis	Indian Shag	-	-	+	-	-	-
Phalacrocorax niger	Little cormorant	-	-	+	-	-	+
Family: Ardeidae							
Casmerodius albus	Great egret	-	-	+	-	-	+
Egretta grazetta	Little egret	-	-	+	-	-	+
Butorides striatus	Little green heron	-	-	+	-	-	-
Ardeola grayii	Pond heron	-	-	+	-	+	+
Family: Accipitridae							
Spiloris cheela	Crested Serpent eagle	-	-	-	+	-	-
Haliastur Indus	Brahminy kite	-	-	-	+	-	-
Accipiter badius	Shikra	-	-	+	+	-	-
Family: Rallidae							
Amaurornis phoenicurus	White-breasted water hen	-	-	+	-	+	+
Family: Charadriidae							
Vanellus indicus	Red wattled lapwing	-	-	+	-	-	-
Family: Columbidae							
Streptopelia chinensis	Spotted dove	-	-	+	+	+	+
Columba livia	Domestic pigeon	-	-	+	+	+	+
Family: Psittacidae							
Psittacula krameri	Rose-ring parakeet	-	-	+	+	-	+
Family: Cuculidae							
Eudynamys scolopacea	Asian Koel	-	-	-	-	+	+
Centropus sinensis	Common coucal	-	-	+	+	+	+
Family: Alcedinidae							
Halcyon smyrnensis	White breasted kingfisher	-	-	+	+	+	+
Family: Meropidae							
Merops philippinus	Blue tail bee eater	-	-	+	-	-	-
Family: Capitonidae							
Megalima zeylanica	Brown headed barbet	-	-	-	+	+	+
Megalima rubicapilla	Small barbet	-	-	-	+	-	-
Family: Picidae							
Dinopium bengalensis	Red backed woodpecker	-	-	-	+	+	-
Family: Pittidae							
Pitta brachyuran	Indian pitta	MI	-	-	-	+	-
Family: Hirundinidae							
Hirundo rustica	Barn swallow	MI	-	+	+	-	-
Family: Pycnonotidae							
Pycnonotus cafer	Red vented bulbul	-	-	+	+	+	+
Family: Laniidae							
Lanius cristatus	Brown shrike	MI	-	-	-	-	-
Family: Turdidae							
Copsychus saularis	Magpie robin	-	-	+	-	-	-
Family: Timaliidae							

Turdoides affinis	Common babbler	-	-	+	+	+	+
Family: Sylviidae							
Orthotomus sutorius	Tailor bird	-	-	+	+	+	+
Family: Dicaeidae							
Dicaeum erythrorhynchos	Small frowerpecker	-	-	-	-	+	-
Family: Nectariniidae							
Nectarinia zeylonica	Purple rumped sunbird	-	-	+	+	+	-
Nectarinia lotenia	Long billed sunbird	-	-	+	+	+	+
Family: Estrididae							
Lonchura striata	Black rumped munia	-	-	-	-	-	-
Family: Sturnidae							
Acridotheres tristis	Common myna	-	-	+	+	+	+
Family: Oriolidae							
Oriolus xanthornus	Black headed oriole	-	-	+	-	+	+
Family: Dicruridae							
Dicrurus caerulescens	White vented drongo	-	-	+	-	-	+
Family: Corvidae							
Corvus macrorhynchos	Black crow	-	-	+	+	+	+
Class: Mammalia	**Mammals**						
Family: Muridae							
Mus musculus	House mouse	-	-	-	-	+	-
Rattus rattus	House rat	-	-	-	-	+	-
Bandicota indica	Bandicote rat	-	-	-	+	+	-
Rattus norvegicus	Brown rat	-	-	-	-	+	-
Family: Sciuridae							
Funambulus palmarum	Palm squirrel	-	-	-	+	+	-
Family-Leporidae							
Lepus nigricollis singhala	Black napped hare	-	-	-	-	+	-
Family: Bovidae							
Bos indicus	Domestic cow	-	-	-	+	+	-
Family- Canidae							
Canis familiaris	Domestic dog	-	-	-	+	+	-
Felis cattus	Domestic cat	-	-	-	+	+	-
Family: Pteropodidae	**Bat**						
Pteropus giganteus	Flying fox	-	-	-	+	+	+
Rousettus leschenaultia	Dog faced fruit bat	-	-	-	+	+	+
Cynoptrrus sphinx	Short nosed fruit bat	-	-	-	+	+	+
Family- Viverridae							
Paradoxurus hermaphrodites	Indian palm cat	-	-	+	-	+	-
Family-Hystricidae							
Hystrix indica	Indian crested procupineu	-	-	+	-	-	-

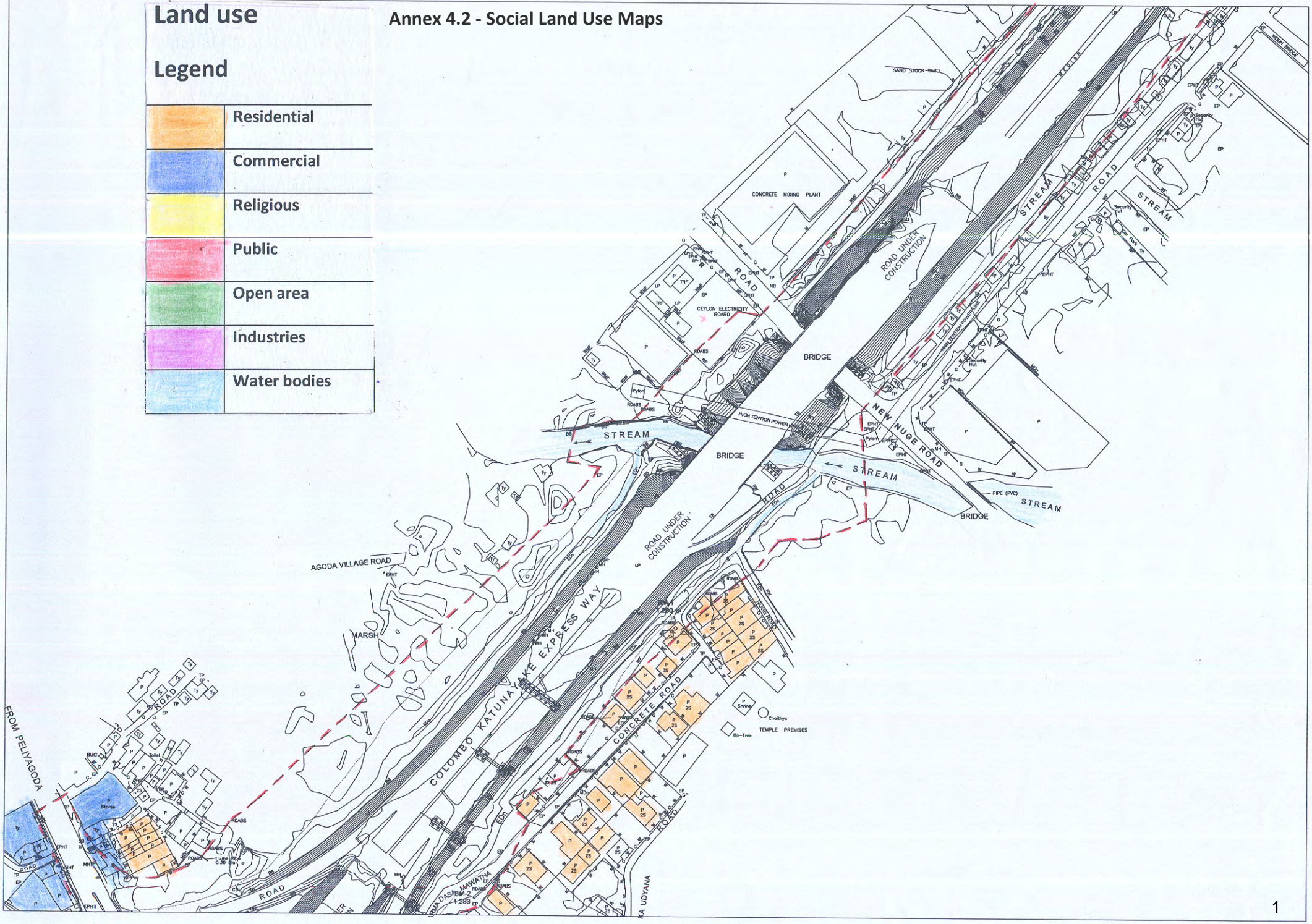
Annex 4.2
Social Land Use Maps

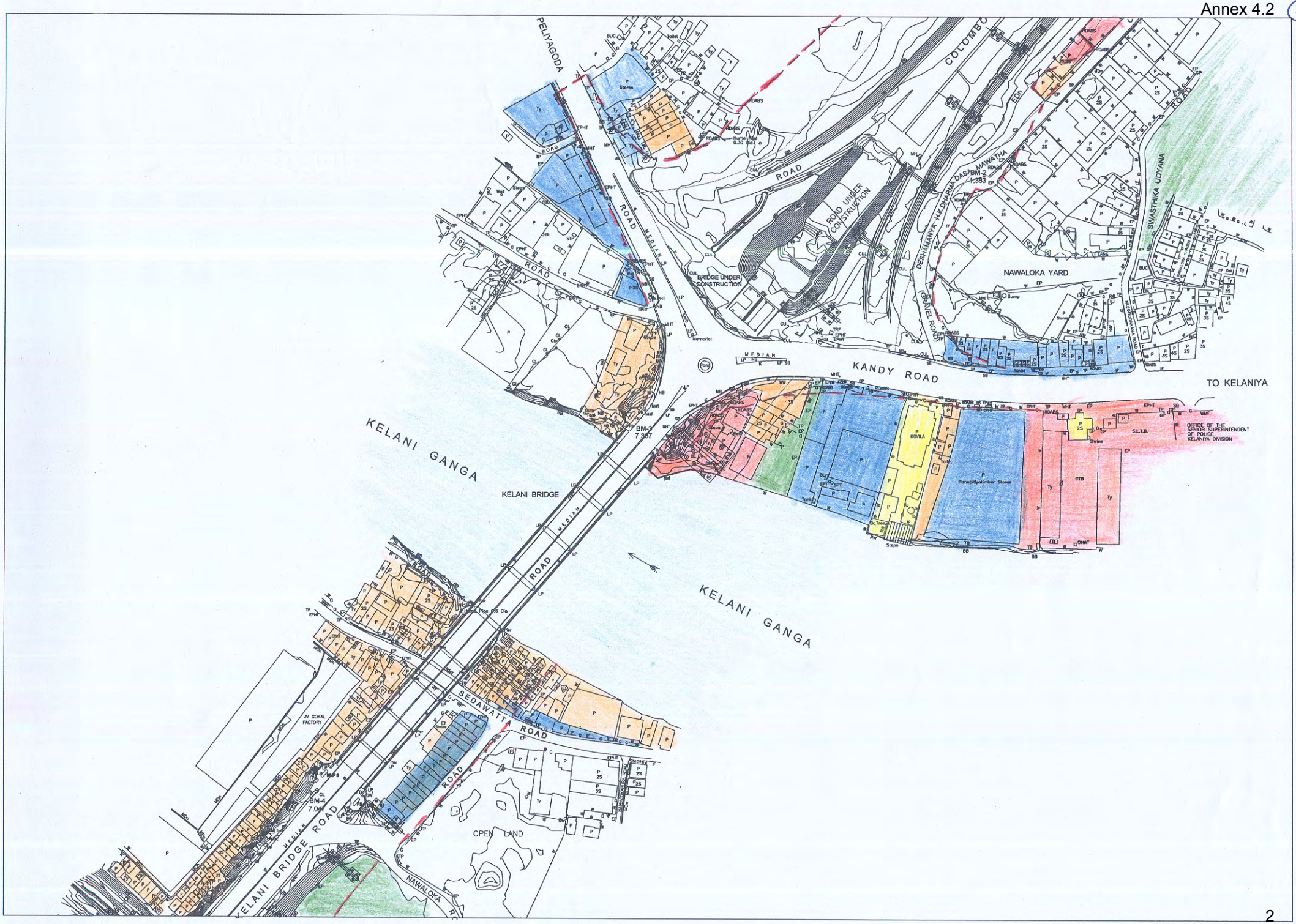
Annex 4.2 - Social Land Use Maps

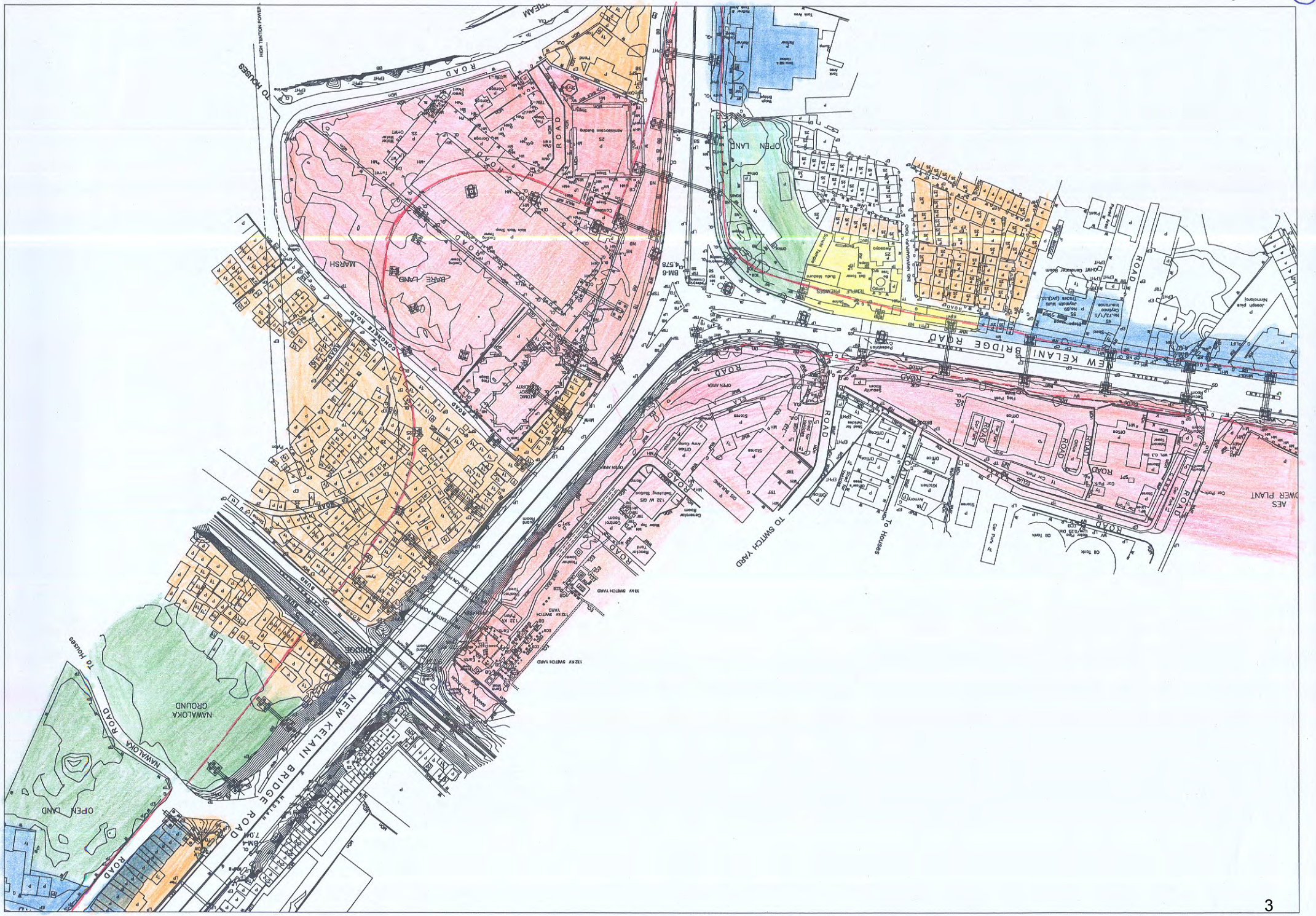
Land use

Legend

	Residential
	Commercial
	Religious
	Public
	Open area
	Industries
	Water bodies




PELIYAGODA
ROAD
ROAD MEDIAN
ROAD UNDER CONSTRUCTION
BRIDGE UNDER CONSTRUCTION
DESHAMANYA H.K.DHARMA DASA MAWATHA
SWASTHIKA UDYANA ROAD
NAWALOKA YARD
GRAVEL ROAD
MEDIAN
KANDY ROAD
TO KELANIYA
BM-2
4.383
BM-3
7.367
KELANI GANGA
KELANI BRIDGE
KOVILA
Peneptiyotimber Stores
S.L.T.B.
CTB
OFFICE OF THE SENIOR SUPERINTENDENT OF POLICE KELANIYA DIVISION
JV GOKAL FACTORY
SEDAWATTA ROAD
KELANI BRIDGE ROAD
BM-4
7.094
OPEN LAND
NAWALOKA RD


NEW KELANI BRIDGE ROAD
NAWALOKA ROAD
NAWALOKA GROUND
OPEN LAND
MARSH
BARE LAND
CHONDITE ROAD
TO HOUSES
TO SWITCH YARD
AES POWER PLANT
BM-6
BM-4


DR. DANISTER DE SILVA MAWATHA
ROAD
STREAM
HIGH TENTION POWER LINE
TO HOUSES
POND
OPEN LAND
STREAM
TO HOUSES
HIGH TENTION POWER LINE


PATH
OPEN LAND
OPEN LAND
OPEN LAND
OPEN LAND
STREAM
PATH
PORT ACCESS ROAD
ROAD
STREAM
BM-8
3.724
SIRIMAVO RANDARANAIKE MAWATHA
STREAM
AES
POWER PLANT
Car Park
ROAD
TO HOUSES
TO SWITCH YARD
NEW KELANI BRIDGE ROAD
BRIDGE
ROAD
STREAM
FROM KOTAHENA
TEMPLE PREMISES
OPEN LAND
5


DEMATAGODA ELA
ROAD
OPEN LAND
CONTAINER YARD
OPEN LAND
CUSTOM DEPARTMENT
AVISSAWELLA ROAD
GM TENTION POWER LINE
POND
DEMATAGODA ELA
BRIDGE
STACE ROAD
STREAM
TO HOUSES
BRIDGE
STREAM
ROAD

Annex 4.3
Socio Economic Data

Annex 4.3 – Socio Economic Data

Section No 1.2 Socio Cultural Environment

Section 1.2.2 Socio Economic Status of Population

Further Details

Table 4.22(a) Gender composition - within the surrounding GN divisions

DS division	GN division	Total population	Male	Female
Colombo	1 Bloemendhal	13,752	6,749	7,003
	2 Grandpass (North)	8,798	4,329	4,469
	3 Nawagampura	6,773	3,453	3,320
Kolonnawa	1 Sedawatta	6,887	3,488	3,399
	2 Wadullawatta	7,582	3,801	3,781
	3 Orugodawatta	5,882	3,022	2,860
Kelaniya	1 Peliyagoda – Gangabada East 174B	2,028	1,015	1,013
	Total	51,702	25,857 (50%)	25,845 (49.9%)

Source: Department of Census & Statistics - 2012

Table 4.22(b) Gender composition - within the direct impact area

DS division	GN division	Total population	Male	Female
Colombo	1 Bloemendhal	137	74	63
	2 Grandpass (North)	-	-	-
	3 Nawagampura	77	44	33
Kolonnawa	1 Sedawatta	475	223	252
	2 Wadullawatta	980	468	512
	3 Orugodawatta	46	22	24
Kelaniya	1 Peliyagoda – Gangabada East 174B	28	17	11
	Total	1743	848 (49%)	895(51%)

Source : Socioeconomic field survey April/May 2013

Table 4.22(c) Ethnic composition - within the surrounding GN divisions

DS division	GN division	Total population	Sinhala	Tamil	Moor	Others
Colombo (Resource profile 2010/2011)	1 Bloemendhal	18,529	7,050 (38%)	8,738 (47%)	2,312 (13%)	429 ((2%)
	2 Grandpass (North)	11,298	2,422 (21%)	1,810 (16%)	6,782 (60%)	284 (3%)
	3 Nawagampura	13,538	4,066 (30%)	5,548 (41%)	3,720 (28%)	204 (1%)
Kolonnawa (Resource profile – 2012)	1 Sedawatta	6,879	3,131 (45%)	2,746 (40%)	947 (14%)	55 (1%)
	2 Wadullawatta	7,579	2,007	4,580	815	177

DS division	GN division	Total population	Sinhala	Tamil	Moor	Others
			(26%)	(60%)	(12%)	(2%)
	3 Orugodawatta	5,882	1,402 (24%)	3,110 (53%)	1,212 (21%)	158 (3%)
Kelaniya (Resource profile – 2013)	1 Peliyagoda – Gangabada East 174B	2,025	1,555 (77%)	306 (15%)	130 (6%)	34 (2%)
	Total	65,730	21,633 (33%)	26,838 (41%)	15,918 (24%)	1,341 (2%)

Source: Department of Census & Statistics, 2012

Table 4.22(d) Ethnic composition - within the direct impact area

DS division	GN division	Total population	Sinhala	Tamil	Moor	Others
Colombo	1 Bloemendhal	137	62 (45%)	59 (43%)	16 (12%)	0
	2 Grandpass (North)	-				
	3 Nawagampura	77	30 (39%)	30 (39%)	17 (22%)	0
Kolonnawa	1 Sedawatta	475	233 (49%)	182 (38%)	56 (12%)	4 (1%)
	2 Wadullawatta	980	330 (34%)	581 (59%)	65 (7%)	4
	3 Orugodawatta	46	16 (47%)	16 (35%)	14 (19%)	0
Kelaniya	1 Peliyagoda – Gangabada East 174B	28	9 (32%)	19 (68%)	0	0
Total		1,743	680	887	168	8

Source: Socioeconomic field survey April/May 2013

Table 4.22(e) Religious composition - within the surrounding GN divisions

DS division	GN division	Total population	Buddhist	Christian	Islam	Hindu	Others
Colombo (Resource profile 2010/2011)*	1 Bloemendhal	19,171	5,645 (30%)	5,598 (29%)	2,353 (12%)	4,924 (26%)	651 (3%)
	2 Grandpass (North)	11,575	2,100 (18%)	1,210 (10%)	6,828 (59%)	1,143 (10%)	294 (3%)
	3 Nawagampura	13,809	3,796 (27%)	1,689 (13%)	3,782 (27%)	4,263 (31%)	279 (2%)
Kolonnawa (Resource profile – 2012)	1 Sedawatta	6,879	2,886 (42%)	1,080 (16%)	1,017 (15%)	1,896 (27%)	0
	2 Wadullawatta	7,579	1,780 (23%)	1,219 (16%)	957 (13%)	3,621 (48%)	2
	3 Orugodawatta	5,882	1,335 (22%)	808 (14%)	1,282 (22%)	2,456 (42%)	1
Kelaniya	1 Peliyagoda –	2,025	1,499	164	144	218	0

DS division	GN division	Total population	Buddhist	Christian	Islam	Hindu	Others
(Resource profile – 2013)	Gangabada East 174B		(74%)	(8%)	(7%)	(11%)	
		66,920	19,041 (28%)	11,768 (18%)	16,363 (24%)	18,521 (28%)	1,227 (2%)

Source: Department of Census & Statistics -2012

Note: Total population for ethnic composition and religious composition in same resource profile shows difference.

Table 4.22 (f) Religious composition - within the direct impact area

DS division	GN division	Total population	Buddhist	Christian	Islam	Hindu
Colombo	1 Bloemendhal	137	57 (42%)	35 (26%)	16 (12%)	29 (21%)
	2 Grandpass (North)					
	3 Nawagampura	77	30 (39%)	0	17 (22%)	30 (39%)
Kolonnawa	1 Sedawatta	475	226 (48%)	89 (19%)	56 (12%)	104 (22%)
	2 Wadullawatta	980	295 (30%)	147 (15%)	67 (7%)	471 (48%)
	3 Orugodawatta	46	14 (30%)	7 (15%)	14 (30%)	11 (25%)
Kelaniya	1 Peliyagoda – Gangabada East 174B	28	9 (32%)	0	0	19 (68%)
Total		1,743	631 (36%)	278 (16%)	170 (10%)	664 (38%)

Source: Socioeconomic field survey April/May 2013

Table 4.22 (g) Age composition - within the surrounding GN divisions

DS division	GN division	Total population	Less than 15 years	16 – 59 years	60 years & over
Colombo	1 Bloemendhal	13,752	3,467 (25%)	8,918 (65%)	1,367 (10%)
	2 Grandpass (North)	8,798	2,458 (28%)	5,428 (62%)	912 (10%)
	3 Nawagampura	6,773	1,752 (26%)	4,445 (66%)	576 (8%)
Kolonnawa	1 Sedawatta	6,887	1,843 (27%)	4,580 (66%)	464 (7%)
	2 Wadullawatta	7,582	2,018 (27%)	4,975 (65%)	589 (8%)
	3 Orugodawatta	5,882	1,594 (27%)	3,720 (63%)	568 (10%)
Kelaniya	1 Peliyagoda – Gangabada East 174B	2,028	415 (20%)	1,348 (67%)	265 (13%)
	Total	51,702	13,547 (26%)	33,414 (65%)	4,741 (9%)

Source : Department of Census & Statistics -2012

Table 4.22 (h) Age composition - within the direct impact area

DS division	GN division	Total population	Age 0 -5	Age 6 - 17	Age 18 – 60	Age 61 & above
Colombo	1 Bloemendhal	137	17	23	90	7
	2 Nawagampura	77	4	11	53	9
Kolonnawa	1 Sedawatta	475	51	94	300	30
	2 Wadullawatta	980	106	242	574	58
	3 Orugodawatta	46	5	8	31	2
Kelaniya	1 Peliyagoda – Gangabada East 174B	28	2	3	20	3
	Total	1,743(100%)	185 (11%)	381 (22%)	1068 (61%)	109 (6%)

Source : Socioeconomic field survey April/May 2013

Table 4.25 Condition of housing – within the surrounding GN divisions

DS division	GN division	Total Housing units in GN Division	Permanent		Semi-permanent		Temporary		No response	
			No	%	No	%	No	%	No	%
Colombo	1 Bloemendhal	3,205	2,116	66	587	18	499	16	03	0
	3 Grandpass (North)	1,670	1,126	67	506	30	33	03	05	0
	3 Nawagampura	1,446	1,012	70	283	20	149	10	02	0
Kolonnawa	1 Sedawatta	1,572	1,121	71	194	12	245	16	12	01
	2 Wadullawatta	1,759	1,034	59	293	17	341	19	91	05
	3 Orugodawatta	1,205	926	77	209	17	64	05	06	01
Kelaniya	1 Peliyagoda – Gangabada East 174B	466	310	67	71	15	85	18	0	0
	Total	11,323	7,645	**68%**	2,143	**19%**	1,416	**12%**	119	**01%**

Source : Socioeconomic field survey April/May 2013

Table 4.26 Condition of housing and commercial - direct impact area

DS division	GN division	Total units in GN Division	Permanent		Semi-permanent		Temporary	
			No	%	No	%	No	%
Colombo	1 Bloemendhal	45	17		25		3	
	3 Grandpass (North)	05	5		0		0	
	3 Nawagampura	26	20		1		5	
Kolonnawa	1 Sedawatta	107	80		15		12	
	2 Wadullawatta	252	22		82		148	
	3Orugodawatta	9	7		2		0	

Kelaniya	1 Peliyagoda – Gangabada East 174B	06	6		0		0	
	Total	450	157 (35%)		125 (28%)		168 (37%)	

Source : Socioeconomic field survey April/May 2013

Table 4.27 Household assets – in the direct impact area

Assets	Bloemend.	Grandp. (North)	Nawagam.	Seedawa.	Wadullaw.	Orugodaw.	Peliyago. Gangabada (East)	Total
Electrical Items & others								
1.Television	21		14	72	161	6	5	279
2.Radio/CD player	16		9	47	106	4	5	187
3.Sewing machine	4		6	25	42	2	1	80
4.Fan	9		4	40	135	2	3	193
5.Refrigarator	8		10	32	37	3	5	95
6.Gas cooker	12		10	43	71	4	3	143
7.Kerosene cooker	21		9	60	171	6	1	268
8. Air conditioner	1		0	3	0	0	1	5
9.Motor cycle	0		2	16	14	1	0	33
10.Bicycle	3		1	17	39	3	1	64
11.Three wheeler	2		1	14	23	3	0	43
12.Car/cab	0		0	0	0	0	0	0
13.Bus/Van	0		0	0	3	0	0	3
14.Water pump	0		0	2	1	0	1	4
15.Washing machine	1		3	10	6	1	0	21
16.Other	2		0	3	17	0	0	22

Assets	Bloemend.	Grandp. (North)	Nawagam.	Seedawa.	Wadullaw.	Orugodaw.	Peliyago. Gangabada (East)	Total
Total	**100**		**69**	**384**	**826**	**35**	**26**	**1,440**

Source: Socioeconomic field survey April/May 2013

Table 4.28 Categories of employment – direct impact area

Occupation	Bloemend.	Grandp. (North)	Nawagam.	Seedawa.	Wadullaw.	Orugodaw.	Peliyago. Gangabada (East)	Total
Permanent								
1.Salary employment	1		7	16	13	7	3	47
2.Salaried employment (Skilled)	3		4	21	36	2	2	68
3.Salaried employment (unskilled)	5		2	22	40	2	3	74
Total	**9**		**13**	**59**	**89**	**11**	**8**	**189 (11%)**
Temporary								
1.Daily paid labor	29		9	97	196	8	2	341 (19%) (daily paid labour to total temporary 64%)
2.Contract labor	2		0	0	7	0	0	9
3.Self employment	14		5	48	103	4	3	177
Total	**45**		**14**	**145**	**306**	**12**	**5**	**527 (30%)**
Foreign employment	**3**		**6**	**13**	**28**	**2**	**0**	**52 (3%)**

Occupation	Bloemend.	Grandp. (North)	Nawagam.	Seedawa.	Wadullaw.	Orugodaw.	Peliyago. Gangabada (East)	Total
Unemployment								
1.Retired/old/disabled	1		6	15	35	1	4	62
2.House wives	17		10	49	89	6	3	174
3.Students	26		16	103	237	8	6	396
4.Un employed	36		12	91	196	6	2	343(20%)
Total	**80**		**44**	**258**	**557**	**21**	**15**	**975 (56%)**
Grand total	**137**		**77**	**475**	**980**	**46**	**28**	**1743(100%)**

Table 4.29 Impact of flood on dwelling & livelihood – direct impact area

No.	Views	Bloemend.	Grandp. (North)	Nawagam.	Seedawa.	Wadullaw.	Orugodaw.	Peliyago. Gangabada (East)	Total
01	**Experience in floods**								
	1. Yes	5		1	67	183	5	0	261 (66%)
	2. No	25		13	26	58	4	6	132 (34%)
	Total	30		14	93	241	9	6	393 (100%)
02	**Frequency of impact(as an average) past ten years**								
	1.Once	1		0	14	25	1	0	41 (15%)
	2.Twice	0		0	14	40	0	0	54 (21%)
	3.More than twice	4		0	41	121	4	0	170 (64%)
	Total	5		0	69	186	5	0	265
03	**Degree of impact**								
	1.Dewelling not abandoned (until	4		0	50	147	3	0	204 (77%)

No.	Views	Bloemend.	Grandp. (North)	Nawagam.	Seedawa.	Wadullaw.	Orugodaw.	Peliyago. Gangabada (East)	Total
	recession of flood)								
	2.Had to abandon the dwelling totally (until recession of flood)	1		0	15	18	1	0	35 (13%)
	3.Had to abandon the livelihood totally (during flood time)	0		0	4	14	1	0	19 (7%)
	4.Destruction to production	0		0	0	1	0	0	1 (1%)
	5.Products un saleable	0		0	0	3	0	0	3 (1%)
	6.Others	0		0	0	2	0	0	2 (1%)
		5		0	69	185	5	0	264 (100%)

Source : Socioeconomic field survey April/May 2013

Gender

Sri Lanka has gained considerable progress in human development since its independence in 1948. Sri Lanka ranks mid-way on the United Nations Gender – related Development Index (#99 out of 177 countries).Life expectancy at birth in 2005 was 75.6 years for women and 67.9 years for men. High life expectancy rate for women reflects adequate nutrition and universal free health care. The adult literacy ratio for females in 15+group for female are 89.1 and for male are 92.3%. The combined gross enrolment rate for primary, secondary and tertiary education is quite close for women and men at 64% and 63% respectively. Sri Lankan women have relatively higher status than those in other developing countries[1]

Sri Lanka's gender achievements are the dividends of extensive social welfare programs such as for free education, free health care and free food rations implemented by successive Governments since, the independence in 1948. The status of women in the project area is highlighted in Table 4.30

Table 4.30 Women status - direct impact area

[1] Country Gender Assessment, Sri Lanka, South Asia Regional Department and Regional and Sustainable Development Department, Asian Development Bank, Manila, Philippines, 2004

No.	Women Status	Bloemendal	Grandpass (North)	Nawagampura	Seedawatta	Wadullawatta	Orugodawatta	Peliyagoda Gangabada (East)	Total
01	**Gender of chief householder**								
	1. Male	24 (55%)	4 (80%)	20 (77%)	47 (44%)	136 (54%)	6 (67%)	5 (83%)	242 (54%)
	2. Female	20 (45%)	1(20%)	6 (23%)	60 (56%)	116 (46%)	3 (33%)	1 (17%)	207 (46%)
	Total	**44 (100%)**	**5**	**26 (100%)**	**107 (100%)**	**252 (100%)**	**9 (100%)**	**6 (100%)**	**449 (100%)**
02	**Vulnerable status**								
	1.Old aged	0		0	2	0	1	0	3 (3%)
	2.Disabled	4		2	13	3	0	0	22 (24%)
	3.Chronically ill	4		2	9	1	1	0	17 (20%)
	4.Widowed	3		2	17	25	1	1	49 (53%)
	Total	**11**		**6**	**41**	**29**	**3**	**1**	**91 (100%)**
	Percentage - Total Female headed HH to total vulnerability HH	55%		100%	68%	25%	100%	100%	
03	**Women participation in decision making – Household level**								
	1. Yes	21 (95%)		14 (88%)	60 (94%)	154 (89%)	9 (90%)	6 (100%)	264 (91%)
	2. No	1 (5%)		2 (12%)	4 (6%)	19 (11%)	1 (10%)	0	27 (9%)
	Total	22 (100%)		16 (100%)	64 (100%)	173 (100%)	10 (100%)	6 (100%)	291 (100%)
04	**Participation in decision making – Community level**								
	1. Yes	21		7	48	124	2	6	208 (71%)
	2. No	1		9	16	49	8	0	83 (29%)
	Total	22		16	64	173	10	6	291 (100%)

Source : Source : Socioeconomic field survey April/May 2013

Children's rights

There are number of Legislations and policies are prevalent to protect children's rights in Sri Lanka. In 1996, a Presidential Task Force on the prevention and control of child abuse was set up, which made far-reaching recommendations, including the establishment of a National Child Protection Authority (NCPA) its basic goal being elimination of child abuse in all its forms and manifestation operating on four main areas; protection, advocacy, rehabilitation, and legal reform. Very often, child abuse entails an element of trafficking. The NCPA is the pre-eminent national agency driving the anti-trafficking mission. In March 2001, Sri Lanka ratified the ILO Convention No. 182 and developed a National Plan of Action (NPA) to combat trafficking of children for sexual and labour exploitation

In Sri Lankan Constitution, 1978, Article 27 (13) Directive Principles of State Policy and Fundamental Duties, the state pledges to 'promote with special care the interest of children and youth so as to ensure their full development, physical, mental, moral, religious, social and to protect them from exploitation and discrimination'. In addition, the draft Constitution (August 2000) Article 22, entitled special rights for children, gives constitutional guarantees to the right of a child to be protected from abuse; to have access to free education between the ages of 5 to 14, and to not be employed in any hazardous activity. It also defines conclusively a child as a person under the age of 18 years.

The minimum age for employment of children was raised to 14 years in December 1999 by an amendment to the employment of women, young persons and children Act (No.47), 1956. Further, through the Ministry of Labour, the legislation has been amended to provide for payment of compensation to victims, by employers violating this minimum age. Under the regulations framed in 1997, under the Education Ordinance of 1940, education and attendance at schools were made compulsory for every Sri Lankan child aged between 5 and 14 years. In August 2006, there has been a change in the legislation which now empowers the Ministry of Labour to enact laws that prohibited the employment of children in hazardous forms of child labour. Accordingly, a list of hazardous form of child labour is in the process of being finalized.

Various surveys carried out by institutions on child labour indicate the degree of significance of child labour use in economic activities (informally) in the country. This indicates the gravity of labour in the country. Most of these child labour pockets are confined to certain areas of the country where poverty is acute, up country tea plantation areas, slum and squatter settlements in Colombo district and some agriculture areas in dry zone of the country.

In September 2007, A Youth Employment Policy & National Action Plan, supported by the ILO, was presented for eliminating child labour by placing great emphasis on the issue of access of quality education.

In June 11, 2008 – Sri Lanka marked the World Day against child labour. The theme was "education is the right response to child labour". To support these activities in the island were designed to raise general awareness on the importance of education.

HIV/AIDS

According to UNAIDS/WHO, Sri Lanka, with a population of 20 Million, is a low HIV prevalence country in the South Asia Region with an estimated adults prevalence rate of less than 0.1%[2]. Two decades since the detection of the first HIV infection in Sri Lanka, a cumulative total of 957 HIV infections and 266 AIDS cases have been detected in the country[3].

Hence, Sri Lanka remains one of the few countries in the region with a low-level HIV epidemic. Many infections are associated with overseas work. HIV prevalence appears to be low, even in populations such as sex workers, despite their vulnerability and exposure to risks. It is apparent that some important vulnerability factors are either absent or operating at a low level in Sri Lanka. High literacy rates, the relatively high status of women and good access to health-care services all act to protect individuals and communities against HIV infection. Condition of high vulnerability, on the other hand, include conflict, high mobility of the military, internally displace persons (IDPs), and separation of spouses due to overseas employment. Moreover, new economic developments such as the expansion of international free trade zones, and broad social changes such as the increasing migration of young adults from rural areas to large urban centers might, in the future, result in further expansion of social vulnerability factors.

The Western Province as the highest population concentrated Zone (29% of the population are concentrated in Colombo (2,309,809), Gampaha (2,294641) and Kalutara (1,217,260) of the country, has higher probability of having and spreading of HIV/AIDS due to number of vulnerability factors in the zone are supported positively. To prove the factor, cumulative HIV cases by province of residence by end of the year 2012 is given below.

Table 4.32 Cumulative HIV cases by province of residence by end 2012 – (Latest up dated on 27.03.2013)

Province	**Number**	**%**	**% Out of total known**
Western	926	56.15	59.2
North Western	137	8.30	8.8
Central	122	7.39	8.0
Southern	106	6.42	6.8
Nothern	62	3.75	4.0
Eastern	61	3.69	3.9
Sabaragamuwa	71	4.30	4.5

[2] Sexually Transmitted Diseases (STD) clinic in Sri Lanka

[3] Dr. Samarakoon, Current HIV/AIDS situation in Sri Lanka and its impact on the world of work, 2005

Province	Number	%	% Out of total known
North-Central	48	2.91	3.1
Uva	32	1.94	2.0
Total Known	1,565	94.90	100
Unknown	84	5.09	-
Grand Total	1,694	100	

Source : Web site: www.aidscontrol.gov.lk

Table 4.33 Housing ownership - direct impact area

DS division	GN division	Total Households	Title holders	Government owned houses for rental	Private owned Houses for rentals	Share ownership	Squatter on Govt. land	Squatters on private land	Uncertain ownership	Others
Colombo	1 Bloemendhal	33	1				31		1	
	2 Grandpass (North)	0								
	3 Nawagampura	14	8	4	1		1			
Kolonnawa	1 Seedawatta	93	20		2		70		1	
	2 Wadullawatta	240	2		2		236			
	3 Orugodawatta	9					9			
Kelaniya	1 Peliyagoda – Gangabada East 174B	6	4		2					
	Total	**395**	**35**	**4**	**7**	**0**	**347 (88%)**		**2(1 %)**	**0**

Source : Socioeconomic field survey April/May 2013

Table 4.34 Availability of infrastructure - surrounding GN divisions

No.	Infrastructure in GN divisions	Latitude	Longitude	Affected infrastructure
01	**Bloemendhal**			
	1.Port access Road			Affected
	2.Jayantha Mallimarachchi Road			
	3.Agamethi Vidyalaya school	6.958161	79.868781	
	4.Housing scheme	6.951978	79.871999	
	5.Irrigation Dept. (Mahawatta GND)*	6.955087	79.876791	
	6.Flood Gague station (Mahawatta GND)*	6.954962	79.876760	
	7. Bloemendhal primary school			
	8. Bloemendhal Tamil School			
02	**Grandpass(North)**			
	1.Sirima Bandaranayake Road			Affected
	2.Nagalagam Street			
	3.Temple	6.950664	79.873932	
	4.Irrigation Dept. (Mahawatta GND)	6.955087	79.876791	
03	**Nawagampura**			
	1.Stace Road			Affected
	2.Pragathi Mawata Road			
	3.Samagimawata Road			
	4.Denister de. Silva Mawatha (End part of the Base Line Road)			Affected
	5.Nawagampura play ground	6.946272	79.877753	
	6.Nawagampura Community Hall			
	7.Nawagampura Housing scheme			

No.	Infrastructure in GN divisions	Latitude	Longitude	Affected infrastructure
	8.CTB premises	6.945334	79.878082	Affected
	9.Sena Oil Mill	6.948917	79.878097	Affected
	10.Central Engineering Fabrics			Affected
	11.Pala Auto Electrical			Affected
	12.St. Sebastian Canal			
04	**Grandpass (South)**			
	1.Rajasinghe Central College			
05	**Sedawatta**			
	1.New Kelani Bridge Road			Affected
	2.Seedawatta-Ambatale Road			Affected
	3.Nawaloka Ground Road			Affected
	4.Nawaloka Cross Road			Affected
	5.Nawaloka Ground	6.952733	79.881324	Affected
	6.RDA yard	6.953662	79.881679	Affected
06	**Wadullawatta**			
	1.New Kelani Bridge Road			Affected
	2.Port access Road			Affected
	3.2nd Nawagampura Road			Affected
	4.Kovil by Road			Affected
	5.NAITA Training Center Road			Affected
	6.Kelanitissa Power station (distance from fuel department to inter change at New Kelani Bridge Road 300m)	6.952354	79.876658	
	7.Old Kelanivelly Railway line & flood controlling bond			Affected
	8.132kv High-tension Power transmission line			Affected
	9.Church	6.950878	79.879835	
	10.Shrine (distance from NITA training centre 92M)	6.950878	79.880735	

No.	Infrastructure in GN divisions	Latitude	Longitude	Affected infrastructure
	11.NITA Workshop	6.949819	79.879523	Affected
	12.Atomic Energy Centre	6.950802	79.879336	Affected
	13.GN Office (distance from NITA Training Centre 100^{m})	6.949619	79.880866	
	14.Housing scheme – 1(distance from NITA Training Centre 110$^{m)}$	6.949069	79.881209	
	15.Housing scheme – 2(distance from NITA Training Centre100$^{m)}$	6.948701	79.879753	
	16. Temple – Sanchi Viharaya	6.950223	79.877745	Affected
	17.Sacret Bo tree (distance from service corridor of proposed project)	6.950241	79.877381	
	18.Badrakali Amman Hindu Temple (Kovil)	6.950450	79.876873	Affected
	19.Canal (Branch of Orugodawatta)			
07	**Orugodawatta**			
	1.Railway line (distance from Orugodawatta Junction750^{m})			
	2.Avissawella Road			Affected
	3.Majeed Road			
	4.Sri Saddatissanahimi Road			
	5.Sacret Bo tree and shrine at the Orugodawatta Junction	6.944069	79.788331	Affected
	6.RDA quarters	6.945125	79.878555	
	7.Hindu Temple (Kovil) (distance from Orugodawatta Junction 150^{m})	6.944415	79.879661	
	8.Custom Office (distance from Orugodawatta Junction to Custom Main	6.943595	79.880449	
	9.Sri Sambuddaloka Buddhist Temple			
	10. United Motor Service Centre			Affected
	11.State Timber Corporation Sales Dept.			Affected
	12. Vocational Skills Development Centre & National Trade Testing Institute			Affected

No.	Infrastructure in GN divisions	Latitude	Longitude	Affected infrastructure
08	**Peliyagoda – Gangabada (East)**			
	1.Kandy Road (A1)			
	2.Neegrodharama Road			
	3.Srawasthika Garden Road			
	4.Nuge school	6.957291	79.887321	
	5.Hindu Temple			
	6.RDA premises			Affected
	7.Government land			Affected

Source: Google Map

Note: *Some important infrastructure close to the project area, but outside the road influential area also included.

Table 4.35 Availability of infrastructure - direct impact area

Type of infrastructure	Kolonnawa DSD			Colombo DSD			Kelaniya DSD	Total
	Sedawatta	Wadullawatta	Orugodawatta	Bloemendhal	Grandpass (South)	Nawagampura	Peliyagoda Gangabada East 174B	
1. Telephone Posts	09	10	03	03	04	11	03	
2. Electricity Transmission Posts	07	22	02			05	04	
3. Lamp Posts	16	64	01	10	05	30	06	
4. Manhole (Telecom)		04	01		07	13	01	
5. High Tension Electric Post	03	07	03			01	03	
6. Name Boards		13		2	02	29	02	
7. Sign Boards		10			04	04	04	
8. Electric Cable Box						01		
9. Manhole (Water)		02				07		
10. Manholes		04		3	10	09		
11. Traffic Signal Posts		13		4	04	16		
12. Telecom Cable Box				2	01	04		
13. Manhole (Sewer)					05			
14. Oil Pump Line	01							
Other common facilities								
15. Play Grounds/Children' parks	01	01			01	01		
16. Public Hall						01		
17. Common Toilets	01	01		4				
18. Bathing places/common Tap	02	01		2				

Type of infrastructure	Kolonnawa DSD			Colombo DSD			Kelaniya DSD	Total
	Sedawatta	Wadullawatta	Orugodawatta	Bloemendhal	Grandpass (South)	Nawagampura	Peliyagoda Gangabada East 174B	
19. Three Wheeler parks	01							
20. Bus halts	01	03		2				
Total	42	156	10	32	43	132	23	

Source: Socioeconomic field survey April/May 2013

Table 4.37 Sanitary facilities attached to housing units - direct impact area

DS division	GN division	Total Housing units in GN Division	Availability of sanitary facilities			
			Yes		No	
			No.	%	No.	%
Colombo	1 Bloemendhal	33	12	7%	21	9%
	3 Grandpass (North)	0				
	3 Nawagampura	14	14	8%	0	0
Kolonnawa	1 Sedawatta	93	46	26%	47	22%
	2 Wadullawatta	240	99	56%	142	65%
	3 Orugodawatta	09	0	0	9	4%
Kelaniya	1 Peliyagoda – Gangabada East 174B	06	6	3%	0	0
	Total	395	177 (45%	100%	219 (55%)	100%

Source : Socioeconomic field survey April/May 2013

Land Use

In addition to the land use maps prepared using standard land use feature another land use map was prepared during the social survey by physically identifying most essential land use categories to the project. The main land use themes considered are;

(1) residential
(2) commercial
(3) religious
(4) public institutions
(5) open areas
(6) industries
(7) water bodied

These information was marked in a project area drawing which shows house boundaries and other land features. Details are provided in Annex 4.2

Annex 4.4
Clearance Letter from Department of Archeology

Fax:- 2796815.

ர்வ ஜனரால்
பாளர் நாயகம்
:tor-General

தொலைபேசி இல. 011-2695255
Telephone Nos.
ෆැක්ස් 011-2696250
பெக்ஸ்
Fax

ail : arch@diamond.lanka.net
site : www.archaeology.gov.lk

පණිවුඩ
grams
පුරාවිද්
புராவித்
Puravid.

எனது இல. H/ENP/ATA/UP/201
My No.

ඔබේ අංකය
உமது இல.
Your No.

ශ්‍රීමත් මාර්කස් ප්‍රනාන්දු මාවත, කොළඹ 7.
சேர் மாக்கஸ் பர்ணாந்து மாவத்தை,
கொழும்பு 7.
Sir Marcus Fernando Mawatha,
Colombo 7.

දිනය
திகதி
Date 2013-05-14

පුරාවිද්‍යා දෙපාර්තමේන්තුව
தொல்லியல் திணைக்களம்
DEPARTMENT OF ARCHAEOLOGY

ශ්‍රී ලංකා ප්‍රජාතාන්ත්‍රික සමාජවාදී ජනරජය
இலங்கை சனநாயக சோசலிசக் குடியரசு
Government of the Democratic Socialist Republic of Sri Lanka

අධ්‍යක්ෂ ජනරාල්,
මාර්ග සංවර්ධන අධිකාරිය,
සෙත්සිරිපාය,
බත්තරමුල්ල.

පුරාවිද්‍යා හානි ඇගයුම් වාර්තාවක් ලබා ගැනීම සම්බන්ධයි.

ඉහත කරුණ සම්බන්ධයෙන් මා වෙත යොමු කරන ලද ඔබගේ 2013.05.08 දිනැති අයැදුම්පත හා බැඳේ.

එම අයදුම්පතට අනුව කොළොන්නාව, කොළඹ කැළණිය ප්‍රාදේශීය ලේකම් කොට්ඨාසයන්හි නව මාර්ග ඉදිකිරීමට යෝජිත ප්‍රදේශ අපගේ නිලධාරී විසින් පරීක්ෂා කර වාර්තාව ලබා දී ඇත. එම වාර්තාවට අනුව පහත සඳහන් කොන්දේසි යටතේ අදාල ව්‍යාපෘතිය සඳහා අනුමැතිය ලබා දෙන බව කාරුණිකව දන්වා සිටිමි.

කොන්දේසි :-

I. ක්ෂේත්‍ර පරීක්ෂාවේ දී පෙන්වන ලද යෝජිත ස්ථානයේ හැර වෙනත් ස්ථානයක ව්‍යාපෘතිය ක්‍රියාත්මක නොකළ යුතුය.

II. ව්‍යාපෘතිය ක්‍රියාත්මක කිරීමේ දී පුරාවිද්‍යාත්මක වශයෙන් වැදගත් සාධක හමුවුවහොත් වහාම පුරාවිද්‍යා අධ්‍යක්ෂ ජනරාල් වෙත දැනුම් දිය යුතුය.

III. මෙම දෙපාර්තමේන්තුවේ නිලධාරීන්ට ඕනෑම අවස්ථාවක ස්ථානය පරීක්ෂා කිරීමේ අයිතිය තිබිය යුතුය.

ජී.ඊ.එල්. තිලකවර්ධන
වැ. බ. සහකාර අධ්‍යක්ෂ (වංචල හා නිශ්චල දේපළ)
පුරාවිද්‍යා අධ්‍යක්ෂ ජනරාල් වෙනුවට.

පිටපත් :-
01. ප්‍රාදේශීය ලේකම්, ප්‍රාදේශීය මහ ලේකම් කාර්යාලය, කොළඹ - දැන ගැනීම සඳහා
02. ප්‍රාදේශීය ලේකම්, ප්‍රාදේශීය මහ ලේකම් කාර්යාලය, කැළණිය - දැන ගැනීම සඳහා
03. ප්‍රාදේශීය ලේකම්, ප්‍රාදේශීය මහ ලේකම් කාර්යාලය, කොළොන්නාව - දැන ගැනීම සඳහා
04. සහකාර අධ්‍යක්ෂ (බටහිර) - දැන ගැනීම සඳහා

11th July 2013

Director General,

Road Development Authority,

'Sethsiripaya',

Battaramulla

Assessment Report on Archaeological Destruction

This is in response to your application dated 08th May 2013, submitted to me on the above subject.

As per your application our officers inspected the area proposed for the construction of new road within the Divisional Secretary areas of Kolonnawa, Colombo and Kelaniya and submitted a report. According to that report we kindly inform you that we give permission for the above project subject to the following conditions;

I) Project should not be executed in any area other than the proposed area pointed out at the field investigation.

II) If any evidences of archaeological importance are found during project execution, Director General of Archaeology should be informed immediately.

III) Officers of this department should have the right to inspect the site at any time.

Sgd/

A.E.L. Thilakawardhana
Acting Assistant Director (Movable & Immovable Property)
for Director General of Archaeology

Cc: 01. Divisional secretary, Divisional Secretary office, Colombo for information
02. Divisional secretary, Divisional Secretary office, Kelaniya for information
03. Divisional secretary, Divisional Secretary office, Kolonnawa for information

Annex 5.1
Details of Air quality, Noise & Vibration Predictions

Annex 5.1A Formula for Green House Gases Prediction

Estimation of CO2 emissions from Vehicles

Formula of CO2 emission factor of vehicle type

Standard-sized car : EF=1864.3/v-2.3201v+0.020070v2+166.85

Small-sized cargo : EF=528.18/v-4.98621v+0.03926v2+308.57

Standard-sized cargo : EF=50.285/v-27.312v+0.20875v2+1592.7

Bus : EF=2784.6/v-12.752v+0.10590v2+854.18

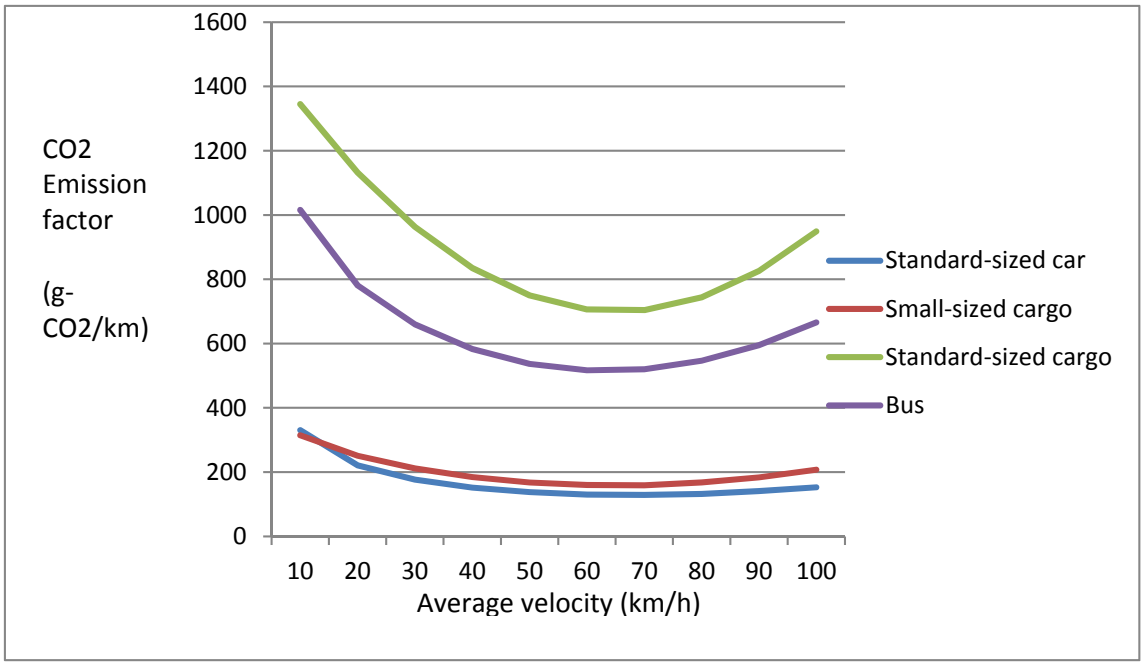
EF : CO2 emission factor (g-CO2/Km·car)

v : Velocity

CO2 emission Factor

(UINT : g-CO2/km)

Average velocity (km/h)	Standard-sized car	Small-sized cargo	Standard-sized cargo	Bus
10	331	315	1345	1016
20	221	251	1132	781
30	177	212	963	660
40	152	185	835	583
50	138	168	750	537
60	130	160	706	517
70	129	159	704	520
80	132	168	744	547
90	141	184	826	595
100	153	208	949	666



Annex 5.1B- Air Pollution Prediction

(1) Air pollution from traffic during operation

・Plume model formula (Constant wind speed, wind speed>1.0m/s)

$$C(x,y,z)=\frac{Q}{2\pi\times u\times\sigma_y\times\sigma_z}\times\exp(-\frac{y^2}{2\sigma_y^2})\times\left[\exp\left\{-\frac{(z-H)^2}{2\sigma_z^2}\right\}+\exp\left\{-\frac{(z+H)^2}{2\sigma_z^2}\right\}\right]$$

C(x,y,z) Concentration in NOx (ppm), SPM (mg/m3) at (x,y,z)

Q Strength of emission of NOx (ml/s), SPM (mg/s) from the point source Emission

u Wind velocity (m/s)

H Effective height of emission (m)

δy Horizontal dispersion coefficient (m)

δz Vertical dispersion coefficient (m)

x Downwind distance along the wind direction (m)

Y crosswind distance (m)

z Vertical distance (m)

・Puff model formula (no wind shear, wind speed<1.0m/s)

$$C(x,y,z)=\frac{Q}{(2\pi)^{3/2}\times\alpha^2\times\gamma}\times\left\{-\frac{1-exp\left(-\frac{\ell}{t_o^2}\right)}{2\ell}+\frac{1-exp\left(-\frac{m}{t_o^2}\right)}{2m}\right\}$$

$$\ell=\frac{1}{2}\left\{\frac{x^2+y^2}{\alpha^2}+\frac{(z-H)^2}{\gamma^2}\right\}$$

$$m=\frac{1}{2}\left\{\frac{x^2+y^2}{\alpha^2}+\frac{(z+H)^2}{\gamma^2}\right\}$$

t_0 Time corresponding to the initial diffusion width (s)

α, r The coefficient on the diffusion width

Emission factor of two type vehicle classification

Average travelling speed (Km/h)	NOx		SPM		CO		SO_2	
	Small-car g/km・car	Large-car g/km・car	Small-car g/km・car	Large-car g/km・car	Small-car g/km・car	Large-car g/km・car	Small-car g/km・car	Large-car g/km・car
20	0.107	2.775	0.002109	0.025550	1.231	1.497	0.006509	0.006482
30	0.085	2.101	0.001542	0.020655	0.936	1.274	0.005336	0.005428
40	0.068	1.652	0.001116	0.016588	0.661	1.037	0.004630	0.005699
50	0.056	1.393	0.000884	0.013666	0.502	0.873	0.004198	0.004232
60	0.051	1.293	0.000839	0.012027	0.493	0.791	0.003975	0.004012
70	0.052	1.360	0.000952	0.011716	0.648	0.808	0.003935	0.004039
80	0.058	1.596	0.001289	0.012747	0.973	0.925	0.004063	0.004311

source : Calculation of automobile emission factor to be used in the road environment impact assessment

(2) Air pollution during construction (applicable to N02 and SPM only)

Calculations in the diffusion width of horizontal direction, wind direction and distance, refer to the "Techinique of the Road Environmental Impact Assessment.

・Plume model formula (Constant wind speed, wind speed>1.0m/s)
Horizontal dispersion coefficient (δy)

$$\delta y=\delta y_0+1.82*\delta yp$$

$$\delta y_0=Wc/2$$

δy_0 Width of Horizontal initial diffusion (m)

δyp Horizontal diffusion width by Pasquill-Gifford (m)

Wc Emission source arrangement interval (m)

Vertical dispersion coefficient (δz)

$\delta z=\delta z_0+\delta z_p$

$\delta z_0+\delta z_p$

δz_0 Width of Vertical initial diffusion (m)

δz_p Vertical diffusion width by Pasquill-Gifford (m)

Puff model formula (no wind shear, wind speed<1.0m/s)

Time corresponding to the initial diffusion width (t_0)

$t_0=Wc/2\alpha$

Wc Emission source arrangement interval (m)

α The coefficient on the diffusion width by Turner ‘s parameter

Emission strength for construction work

Item	Unit	Strength of emmission of air polutants (g/unit/day)		Height of exhaust nozle (m)
		Nox	SPM	
Earth work				
	Embankment construction(Road body, Subgrade)	8,600	260	3.0
	Slope shaping	4,400	140	2.4
Soil Improvement work				
	Sand compaction pile driving	34,000	100*	2.3
Pile work				
	Cast-in-place pile	18,000	100*	2.3
Bridge construction woork				
	Steel bridge	15,000	100*	2.1
	PC bridge	15,000	100*	2.1
Pavement woork				
	Asphalt pavement (Surface layer, Base layer)	11,000	100*	1.7

source : Technique of the Road Environmental Impact Assessment , Road environment Institute 2007. *=Assumptions

Annex 5.1C-Noise Level Prediction

The formula used for numerical analysis

Numerical analyses were made based on the formula proposed by:
"Technique of the Road Environmental Impact Assessment", National Institute for Land and Infrastructure management, Ministry of Land, Infrastructure and Tourism、Japan, 2013

Noise

(1) Traffic noise

LAqe=LAE+10logN-35.6 ASJ CN-Model 2007

LAeq : Equivalent noise level, d(B(A)

Noise increment ration in case of concrete pavement

LAE=10log(1/T- ∑(10LAi/lo-⊿T)

LAE : Power level in average from a vehicle, dB(A)

LA j = Lw-8-20logri

Power level from I'th vehicle, dB(A)

ri : Distance from I'th source to the location of prediction

LWA=46+6*a2+30logV (high gear driving)

LwA=90;logV (low gear driving)

a1 Ratio of smaller vehicle = 0.9

a2 Ratio of larger vehicle = 0.1

ℓ Distance from source to the location of prediction (m)

H Effective emission height, 0.3m

d Average car head spaces, d = 1000V/N

V Average driving speed km/h

N Average hourly number of vehicle num/h

αd Reduction by diffraction [dB(A)] in case:

αd= -9log105-14.3	0.5<δ
-2.7(log10δ)2-10.5log10 <5-14.5	0.07<δ<0.5
-3log10δ-9.5	0.01<δ<0.7
-10log10 δ (0.2+2.5 5)-10	-0.001<δ<0.01
0.24δlog10 I δ I -2.2	-0.015<δ<-0.01
0.2δlog10 I δ I +1	-0.3<δ<-0.015

δ : difference of transmission distance

Power level of the travel noise

	Steady travels	Unsteady travels
Two-wheeled vehicle	L_w=49.6 + 30log$_{10}$V	Lw=85.2 + 10log10V
Small car class	Lw=46.7 + 30log10V	Lw=82.3 + 10log10V
Large car class	Lw=53.2 + 30log10V	Lw=88.8 + 10log10V

V= travelling speed (Km/h)

(2) Noise level by construction work

LAeq.T,con = 10log (1/T (∑ Ti- 10LAeff i/10))

LAeffi =LwAeff,i-8-20·log(r/r0)+⊿Ld,i+⊿Lg,i+⊿L

LAeqT.con : Total noise by construction work

T : Working time

Noise level by i-th construction work unit

LwAeffi Power level by construction work unit at the reference point

⊿L Correction

r Distance to the location of prediction

r0 Distance to the reference point

⊿Ld,I Reduction by diffraction, neglected for safety side

⊿Lg,I Reduction by the ground surface condition, neglected for safety side

Construction work power level at the reference point

Item	Unit	Power level (L_{WAeff})	⊿L (dB)
Earth work			
	Embankment construction(Road body, Subgrade)	108	5
	Slope shaping	100	5
Soil Improvement work			
	Sand compaction pile driving	111	5
Retaining wall work			
	Cast-in-place retaining wall construction	108	5
Pile work			
	Cast-in-place pile	85	3
Bridge construction woork			
	Steel bridge	111	3
	PC bridge	108	5
Pavement woork			
	Asphalt pavement (Surface layer, Base layer)	101	6
source : Technique of the Road Environmental Impact Assessment , Road environment Institute 2007			

Annex 5.1D- Vibration Level Prediction

(1) Vibration by Traffic during operation

Traffic vibration levels during operation were forecasted by the calculation methodology in the Environmental Impact assessment Guideline, Ministry of Land, Infrastructure, Transport and Tourism in Japan 2012. In detail, traffic vibration levels were calculated on a pro-rata basis by using baseline (2013) and forecasted (2035) values of traffic volume and driving speed on the roads adjacent to measuring locations.

(2) Vibration during construction

L_{Total} = Total vibrations by construction works

$=10Log\ (10LogL_{(r1)}/10+10LogL_{(r2)/}10)$

$L_{(r1)}$ Vibration by construction unit

$L_{(r1)}$ Vibration by construction unit

a. Vibration by construction work

$L_{(r)} = L(r0)-15 *log(r/r0)-8.68\ a\ (r-r0)$

L(r) Vibration level

L(r0) Vibration level at the reference point

R Distance to predict

r0 Distance to the reference point

α Internal damping factor =0.01 (given by the work type)

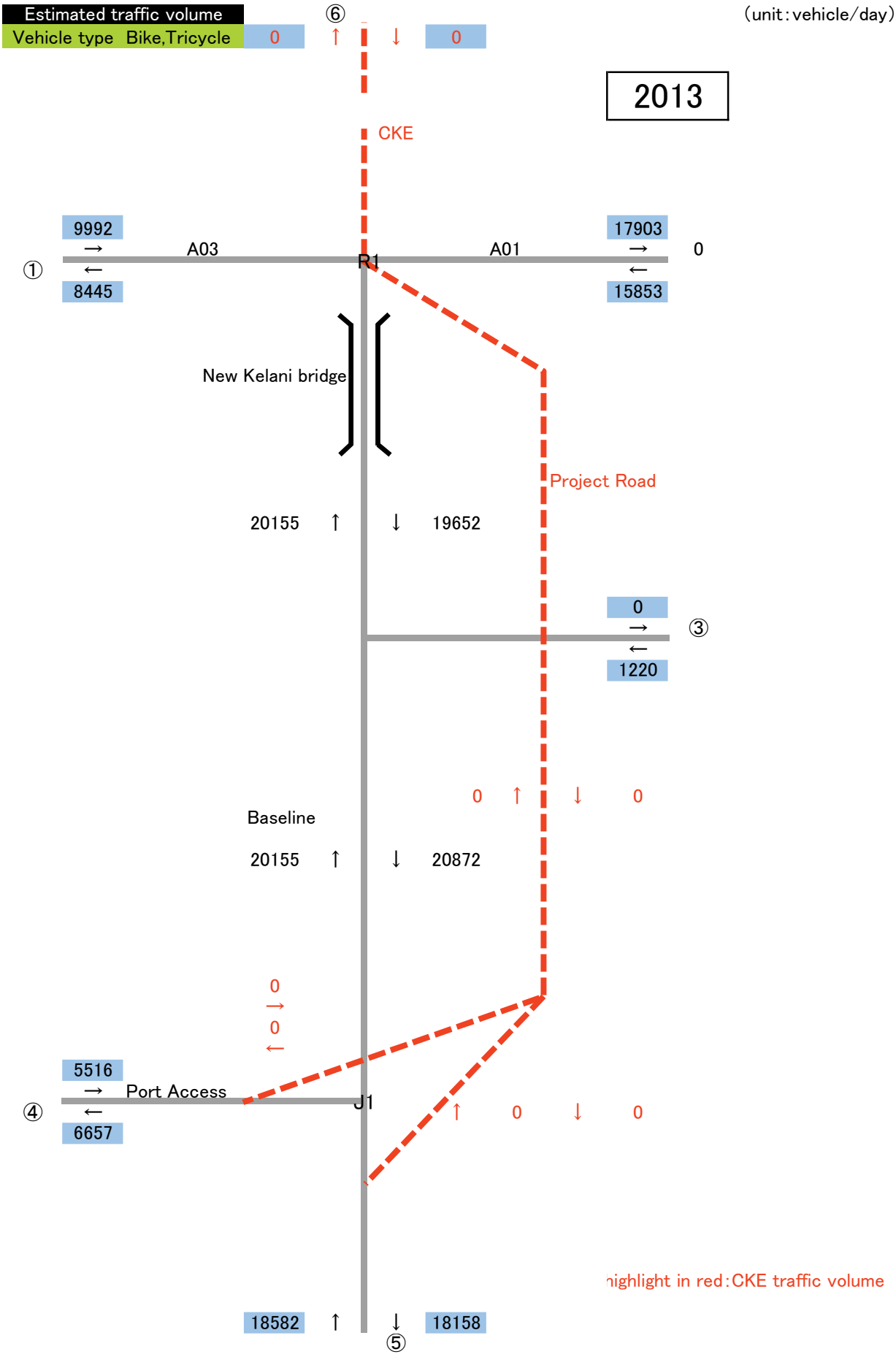
Construction work vibration level

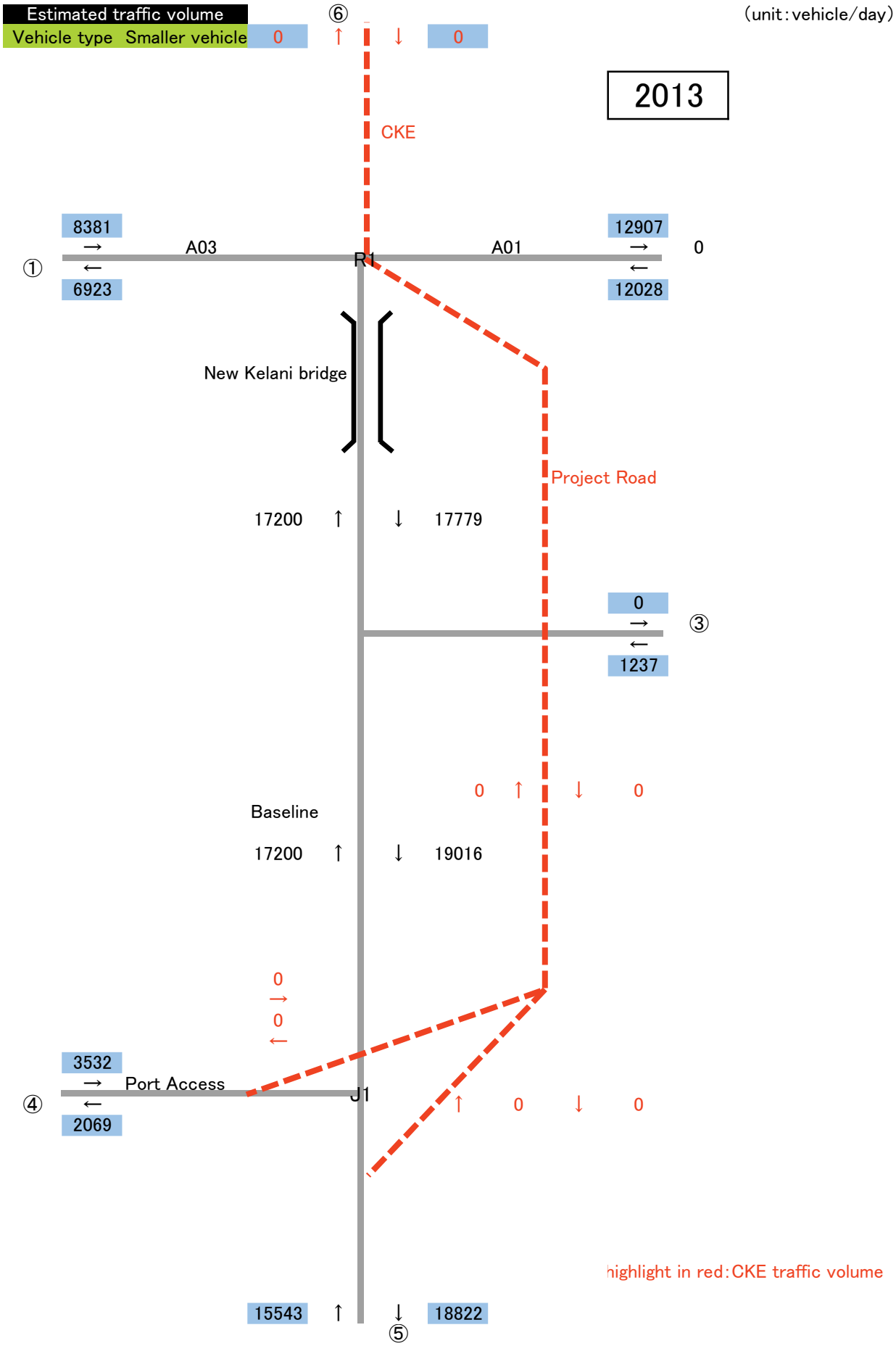
Item	Unit	Type of the ground	Vibration level
Earth work			
	Embankment construction(Road body, Subgrade)	Unconsolidated	63
Soil Improvement work			
	Sand compaction pile driving	Unconsolidated	81
Retaining wall work			
	Cast-in-place retaining wall construction	Consolidated	63
Pile work			
	Cast-in-place pile	Consolidated	55
Bridge construction woork			
	Steel bridge	Unconsolidated	Minor Impact
	PC bridge	Unconsolidated	55
Pavement woork			
	Asphalt pavement (Surface layer, Base layer)	Unconsolidated	56
source : Technique of the Road Environmental Impact Assessment , Road environment Institute 2007			

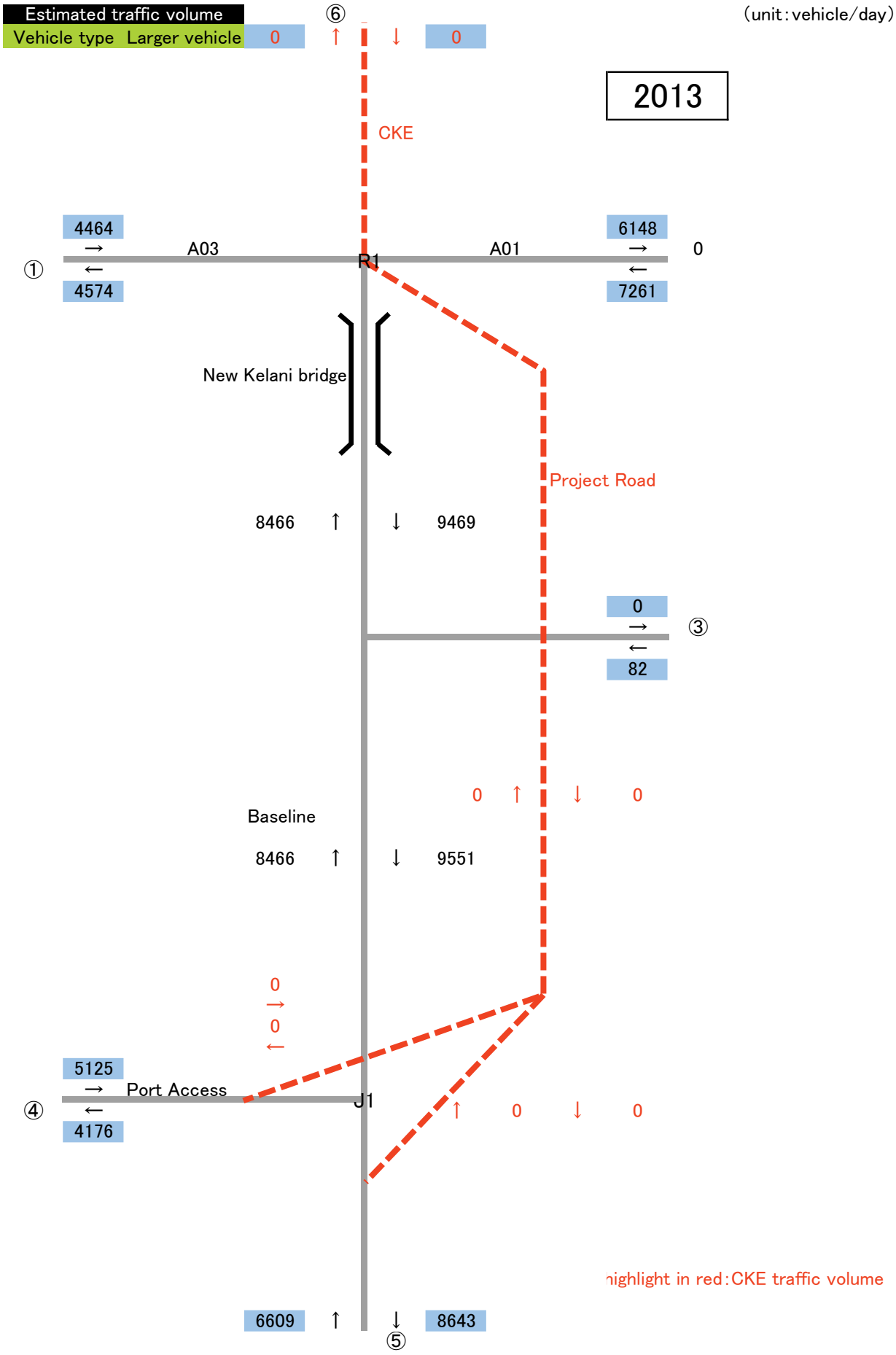
Annex 5.2
Estimate Traffic Volume

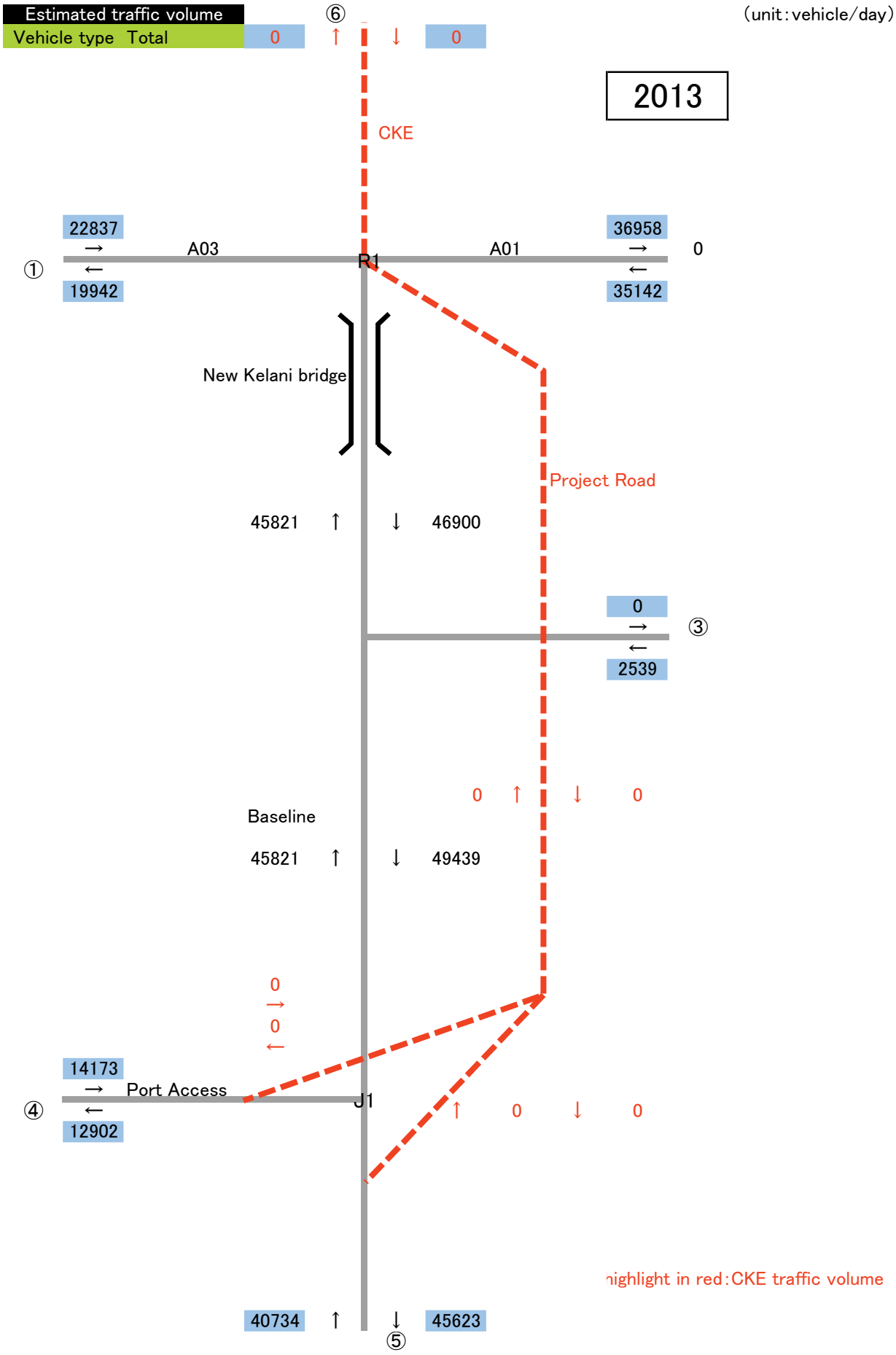
Annex 5.2- Estimate Traffic Volume

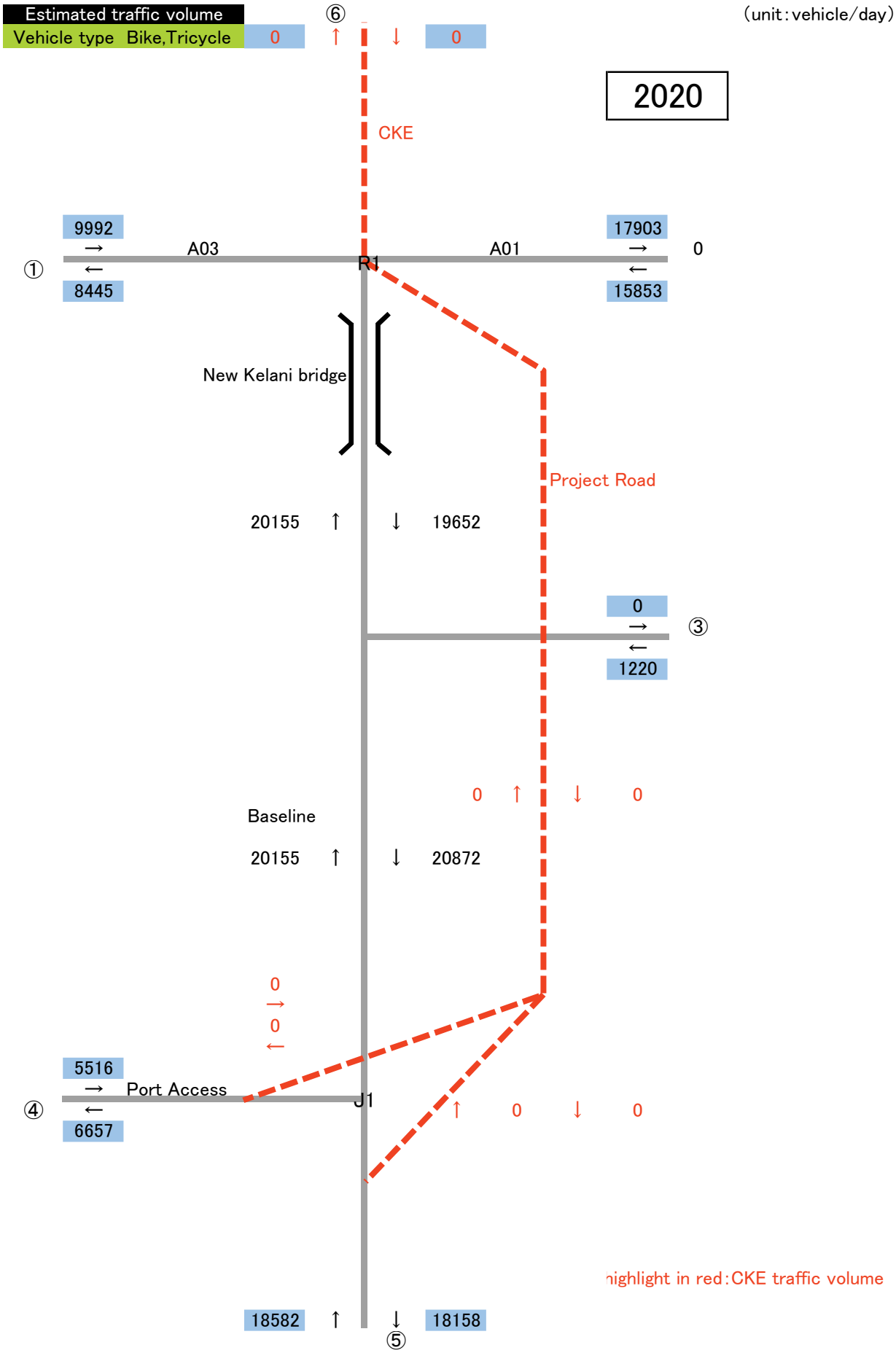
(unit:vehicle/day)

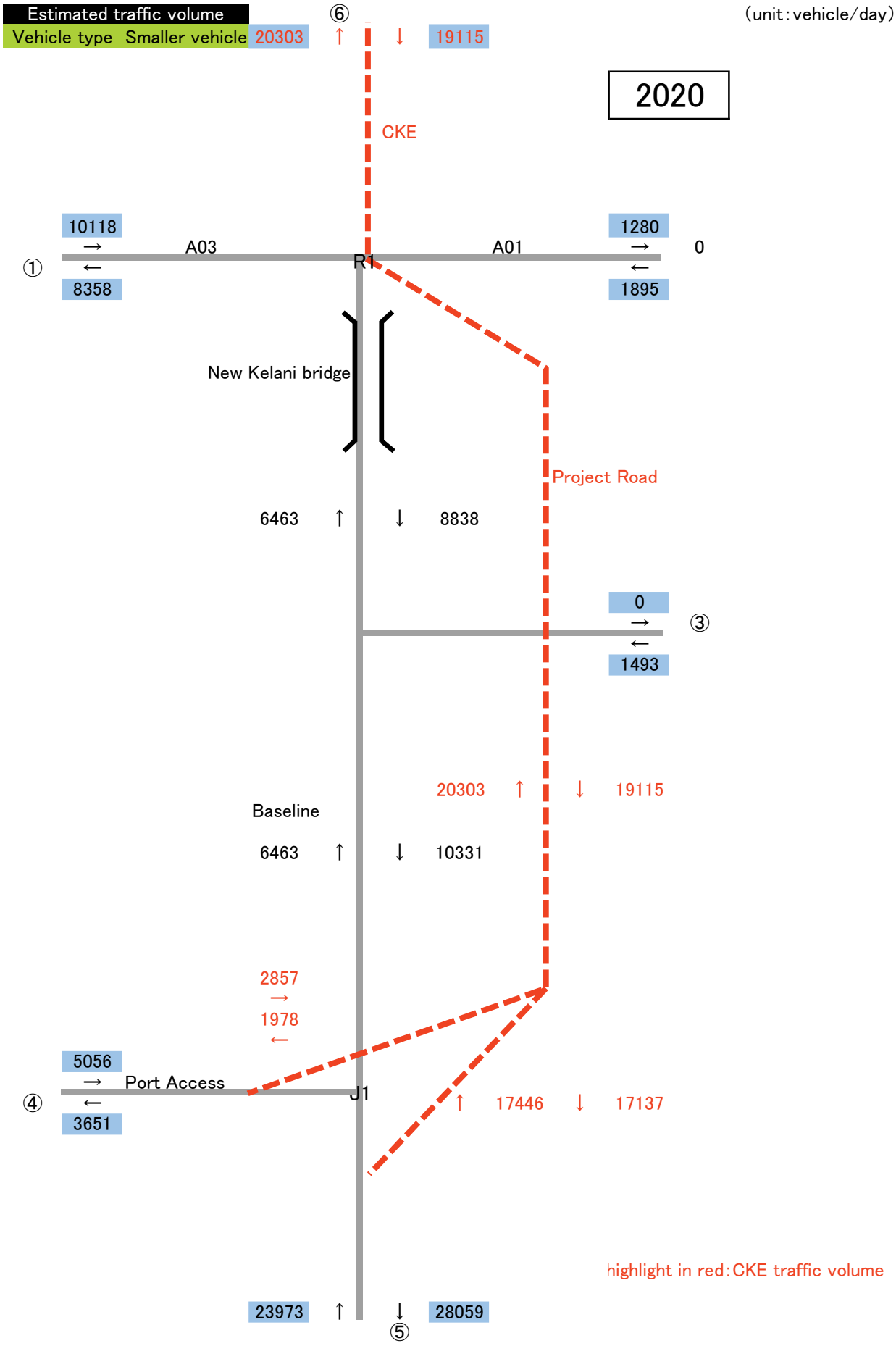


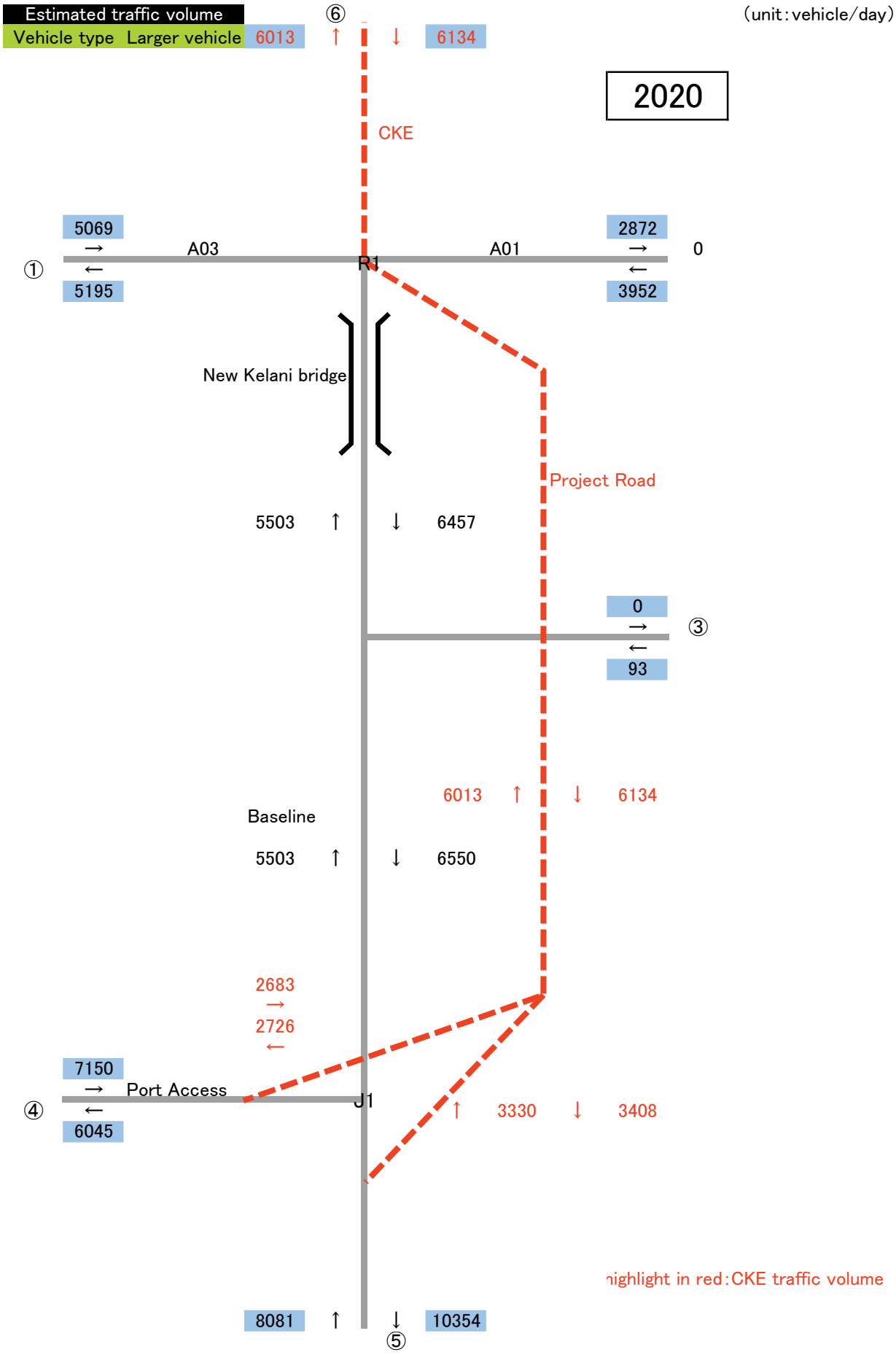

Estimated traffic volume
Vehicle type Smaller vehicle
(unit:vehicle/day)
2013
⑥
0
0
CKE
8381
12907
0
A03
A01
R1
①
6923
12028
New Kelani bridge
Project Road
17200
17779
0
③
1237
0
0
Baseline
17200
19016
0
0
3532
Port Access
J1
④
2069
0
0
0
15543
18822
⑤
highlight in red:CKE traffic volume

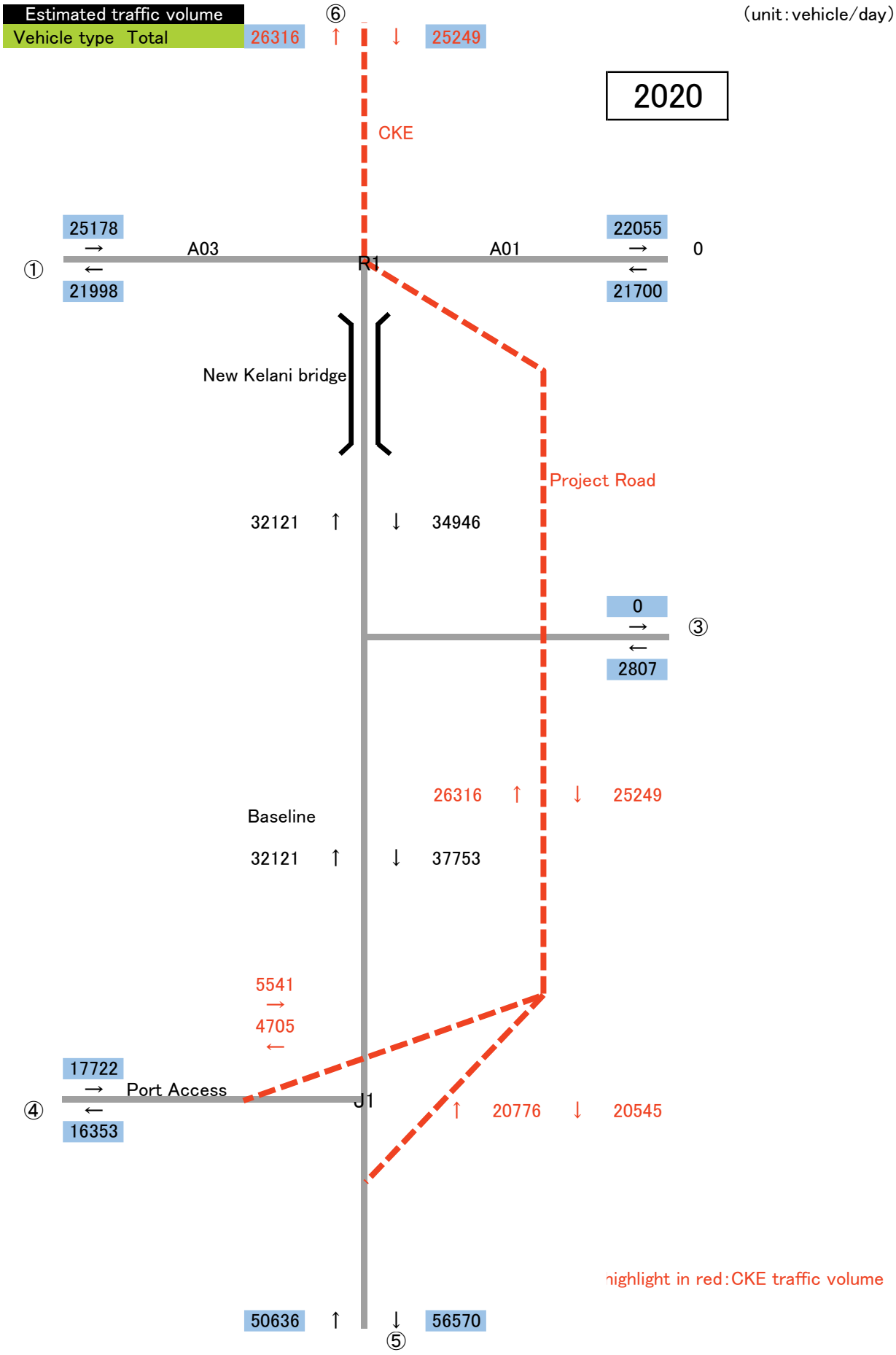

Estimated traffic volume
Vehicle type Larger vehicle
(unit:vehicle/day)
2013
⑥
0
0
CKE
4464
A03
R1
A01
6148
0
①
4574
7261
New Kelani bridge
Project Road
8466
9469
0
③
82
0
0
Baseline
8466
9551
0
0
0
0
5125
Port Access
J1
④
4176
0
0
6609
8643
⑤
highlight in red:CKE traffic volume


Estimated traffic volume
Vehicle type Total
(unit:vehicle/day)
2013
⑥
0
0
CKE
22837
19942
A03
R1
A01
36958
35142
0
①
New Kelani bridge
Project Road
45821
46900
0
2539
③
0
0
Baseline
45821
49439
0
0
14173
12902
Port Access
J1
0
0
0
0
④
highlight in red:CKE traffic volume
40734
45623
⑤


Estimated traffic volume
Vehicle type Bike,Tricycle
0
⑥
↑
↓
0
(unit:vehicle/day)
2020
CKE
9992
→
←
8445
A03
①
R1
A01
17903
→
←
15853
0
New Kelani bridge
Project Road
20155
↑
↓
19652
0
→
←
1220
③
0
↑
↓
0
Baseline
20155
↑
↓
20872
0
→
0
←
5516
→
Port Access
←
6657
④
J1
↑
0
↓
0
highlight in red:CKE traffic volume
18582
↑
↓
18158
⑤


Estimated traffic volume
Vehicle type Smaller vehicle
(unit:vehicle/day)
2020
⑥
20303
19115
CKE
10118
1280
A03
A01
0
①
R1
8358
1895
New Kelani bridge
Project Road
6463
8838
0
③
1493
20303
19115
Baseline
6463
10331
2857
1978
5056
Port Access
④
J1
17446
17137
3651
highlight in red:CKE traffic volume
23973
28059
⑤


Estimated traffic volume
Vehicle type Larger vehicle
(unit:vehicle/day)
2020
⑥
6013 ↑ ↓ 6134
CKE
5069
→
A03
←
5195
①
R1
A01
2872
→
0
←
3952
New Kelani bridge
Project Road
5503 ↑ ↓ 6457
0
→
③
←
93
6013 ↑ ↓ 6134
Baseline
5503 ↑ ↓ 6550
2683
→
2726
←
7150
→
Port Access
←
6045
④
J1
↑ 3330 ↓ 3408
highlight in red:CKE traffic volume
8081 ↑ ↓ 10354
⑤


Estimated traffic volume
Vehicle type Total
(unit:vehicle/day)
2020
⑥
26316 ↑ ↓ 25249
CKE
25178 → ← 21998
A03
①
R1
A01
22055 → ← 21700
0
New Kelani bridge
Project Road
32121 ↑ ↓ 34946
0 → ← 2807
③
26316 ↑ ↓ 25249
Baseline
32121 ↑ ↓ 37753
5541 → 4705 ←
17722 → ← 16353
Port Access
④
J1
↑ 20776 ↓ 20545
highlight in red:CKE traffic volume
50636 ↑ ↓ 56570
⑤

Annex 5.3
Photos of the Landscape of the Project Area

Annex 5.3 Photos of the Landscape of Project Area



Sanchi temple, at Wadullawatta



S W R D Bandaranayaka Statue



Left bank of New Kelani Bridge



High tension power line



One of the Buddhist shrines, Wadullawatta



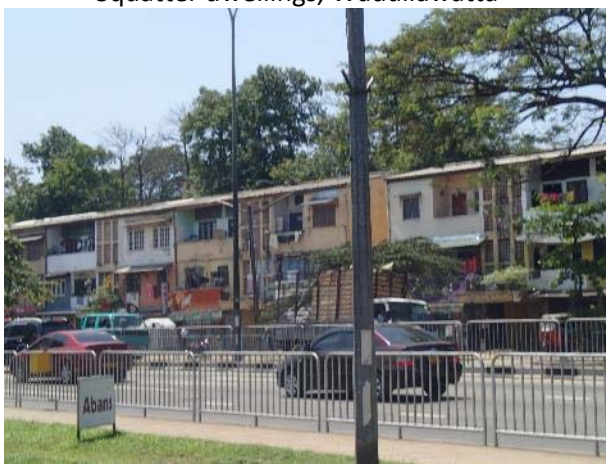
Baseline road (Orugodawatta Junction)



Squatter dwellings, Wadullawatta



Trees on the sides of Base line road



Kamkarupura Near Orugodawatta junction



View of Shanties from New Kelani Bridge



Condition of Kittampahuwa canal, near Port access road



Condition of St. Sebasthian canal, Nawagampura



Condition of canal, near Port access road



Condition of canal, near Port access road



High tension power line



View houses from New Kelani bridge



Buddhist shrine and Bo tree, Orugodawatta JCT



South flood bund Kelani River

Annex 6.1
Project Entitlement Matrix

Annex 6.1 Project Entitlement Matrix for "Preparatory Survey on Traffic Improvement Project around New Kelani Bridge"

	Type of Loss	Entitled Persons	Entitlements	Application Guidelines	Remarks
A. Residential Land and Structures					
A1	Loss of residential land	Land Owner with title deed or registration certificate	All (cash) payments for land will be made at replacement costs (provisions under LAA and Regulation 2008).	Chief Valuer (CV), related Divisional Secretariat Division(DS), Urban Development Authority(UDA) and Road Development Authority(RDA) are responsible agencies for the entitlement.	
A2	Loss of rental accommodation	Tenant, user with lease	In case of partial loss of rental accommodation; AP has the option to stay with the owners agreement OR; 1. to move out with following cash assistance - 6 months rental allowance AND; - Assistance in finding new affordable rental accommodation AND; - Materials transport allowance (item F1.1) In case of complete loss of rental accommodation; 1. AP has the option of cash for the value of the remaining lease OR cash assistance to cover rental arrangements for minimum period of 6 months of equivalent standard and advance payments as determined by the Chief Valuer to owner on a case to case basis whichever is higher. AND 2. Assistance in finding new affordable rental accommodation AND 3. Material transport (F1.2) AND 4. Transition subsistence allowance (F2.1) . 5. Livelihood restoration assistance(F3.1) RDA will assist in recovering advance payments made by the tenant to the owner, if there is a complete loss of rental accommodation.	CV, DS, RDA are responsible agencies for the entitlement.	

	Type of Loss	Entitled Persons	Entitlements	Application Guidelines	Remarks
A3	Loss of residential structure	Owner of the residential structure with/without title deed/registration certificate for land	The owner of the residential structure on state land or private land without title deed/registration certificate are eligible for the compensation if they are considered as socially recognized owner. For structures having sufficient land to rebuild upon (in case the residential structure is affected partially and being rebuild on site); 1. All payments for structure based on full replacement cost (for materials and labour), WITHOUT deduction for depreciation or salvageable materials, in material, cash or a combination of both, according to the actual loss to repair or rebuild the structure to original or better condition. AND; 2. Materials transport assistance F1.1; AND 3. Transition subsistence allowance F2.1 AND 4. Cost of re-fixing of Fixtures and fittings G3 For structures not having sufficient land to rebuild upon (in case the residential structure needs to be relocated): 1. All payments for structure at full replacement cost (for materials and labour), WITHOUT deduction for depreciation or salvageable materials, in material, cash, or a combination of both; 2. Assistance from RDA to locate alternative plot for relocation; OR relocation to a resettlement site if developed by the project and opted by AP; 3. Transition subsistence allowance F2.1 AND; 4. Materials Transport Allowance (item F1.2) AND; 5. Livelihood restoration assistance(F3.1) AND; 6. Cost of re-fixing of Fixtures and fittings G3 will be paid.	CV, DS, RDA are responsible agencies for the entitlement.	RDA (basically CE office) after consultation with DS finds that there is a land available in Kolonnawa DS area. So RDA can advise the APs of Wadullawatta and Sedawatta to purchase this land using the compensation they got.

	Type of Loss	Entitled Persons	Entitlements	Application Guidelines	Remarks
			In case of encroachments on state lands; AP would be paid the reinstatement value with the written concurrence of the Divisional Secretory, In case of encroachment on private land where the owner has not contested the encumbrances in a Court of Law; AP who carried out the improvements will qualify to receive the value upon adequate proof of the improvements which has been made on the land by such person.		
B. Commercial Land and Structures					
B1	Loss of commercial land	Owner/s and/ or Operator/s of the commercial land	All (cash) payments for land lost at full replacement cost;	CV, DS, RDA are responsible agencies for the entitlement.	
B2	Loss of Commercial Structure	Owner of the affected commercial structure with/without registration for the business	In case of partial loss of commercial structure; if it is located on a state land, AP may rebuild on the remaining land, and if it is located on a private land, the project will encourage AP to relocate For structures having sufficient land to rebuild upon (in case the residential structure is affected partially and being rebuild on site): 1. Payment at replacement cost in material, cash, or a combination of both according to the actual loss to repair or rebuild the structure to original or better condition when remaining land sufficient to rebuild upon; 2. Materials transport assistance F1.1; AND 3. Transition subsistence allowance F2.1 AND 4. Cost of re-fixing of Fixtures and fittings G3 For structures not having sufficient land to rebuild upon:	CV,DS,RDA are responsible agencies for the entitlement RDA shall give reasonable time for owner/s or operator/s to continue their business operation while rebuilding their structures.	RDA (basically CE office) after consultation with DS finds that there is a land available in Kolonnawa DS area. So RDA can advise the APs of Wadullawatta and Sedawatta to purchase this land using the compensation they got.

	Type of Loss	Entitled Persons	Entitlements	Application Guidelines	Remarks
			1. All payments for structure lost at full replacement cost (for materials and labour) in material, cash, or a combination of both, WITHOUT deduction for depreciation or salvageable materials; 2. Assistance from RDA to locate alternative plot for relocation if opted by owner/s on recovery of the value of land; 3. Materials transport assistance F1.2; AND 4. Transition subsistence allowance F2.1 AND 5. Livelihood restoration assistance(F3.1) AND; 6. Cost of re-fixing of Fixtures and fittings G3 will be paid.		
B3	Loss of business	Affected business owners with registration for business (regardless of the ownership of land)	For temporary loss of business (in case the commercial structure is affected partially or temporary, and being rebuilt on site): 1. Payment for any associated loss of income while commercial structure is being rebuilt based on the accounts and tax returns pertaining to preceding three (3) years. 2. A payment for increased overhead expenses would be recommended by CV as per the circumstances. (Regulations 2008) For permanent loss of business (in case the commercial structure needs to be relocated): 1. Cash payment not exceeding three times the average annual net profits from business, as shown by the books of accounts, for three calendar years immediately preceding acquisition or livelihood restoration grant, whichever is higher; 2. For businesses who do not maintain books of accounts cash payment equivalent to 6 months	CV, DS, RDA are responsible agencies for the entitlement.	

	Type of Loss	Entitled Persons	Entitlements	Application Guidelines	Remarks
			income OR Livelihood assistance grant, whichever is the higher; 3. Materials transport allowance F1.2 AND 4. Transition subsistence allowance F2.1 AND 5. Livelihood restoration allowance F3.1 6. An allowance in the amount of Rs. 15,000 will be paid for advertising the new premises, printing of notice boards		
B4	Loss of business	Affected business owners without registration for business (regardless of the ownership of land)	1. Cash payment equivalent to 6 months income OR Livelihood assistance grant, whichever is the higher 2. Materials transport allowance F1.1 or F1.2 AND 3. Transition subsistence allowance F2.1 AND 4. Livelihood restoration allowance F3.2 5. An allowance in the amount of Rs. 2,500 to 15,000 will be paid for advertising the new premises, printing of notice boards	CV, DS, RDA are responsible agencies for the entitlement.	
B5	Loss of business	Tenant of the affected commercial structure with registration for business	For temporary loss of business (in case the commercial structure is affected partially or temporary, and being rebuilt on site): 1. AP has the option to stay with the owners agreement OR to move out with compensation described below (See the description under “for permanent loss of business”) 2. A Payment up to a maximum of Rs. 15,000 would be paid for any associated loss of income while commercial structure is being rebuilt. 3. A payment for increased overhead expenses would also be recommended by CV as per the circumstances. 4. Material transport allowance F1.1 AND 5. Transition subsistence allowance F2.1 AND 6. Livelihood restoration allowance F3.2	CV, DS, RDA are responsible agencies for the entitlement.	

	Type of Loss	Entitled Persons	Entitlements	Application Guidelines	Remarks
			For permanent loss of business (in case the commercial structure needs to be relocated): 1. Cash for the value of the remaining lease OR cash assistance to cover rental arrangements for minimum period of 6 months of equivalent standard and advance payments as determined by the CV to owner on a case to case basis whichever is higher AND; 2. Assistance in finding new affordable rental premises to operate business; 3. For losses of income a cash payment not exceeding three times the average annual net profits from business, as shown by the books of accounts, for three calendar years immediately preceding acquisition or livelihood restoration grant, whichever is higher; 4. For businesses who do not maintain books of accounts cash payment equivalent to 6 months income OR Livelihood assistance grant, whichever is the higher; 5. Material transport allowance F1.2 AND 6. Transition subsistence allowance F2.1 AND 7. Livelihood restoration assistance F3.1 8. Livelihood restoration allowance F3.2 9. Project will also assist in recovering any advance payments made by the tenant to the owner, if there is a complete loss of the structure.		
C. Other Private Properties or Secondary Structures					
C1	Partial or complete loss of other property or secondary structure (i.e. shed, outdoor latrine,	Owners of structures (regardless of the ownership of land)	All payments for affected structure at replacement cost (market value of the structure plus cost for transporting building materials, any labor, contractors' fee and any registration taxes)	CV, DS, RDA are responsible agencies for the entitlement.	

	Type of Loss	Entitled Persons	Entitlements	Application Guidelines	Remarks
	warehouse, storage facility, cold storage facility, animal pen etc)				
C2	Loss of statues, tombs or graves	All owners	A cash payment between Rs. 5000 and Rs. 15,000 would be paid to cover the cost of exhumation (including any religious ceremonies if required) and relocation.	CV, DS, RDA are responsible agencies for the entitlement.	The value something between Rs. 5,000 and Rs. 15,000 which will be decided during the valuation process.
D. Loss of Income of Employees or Hired Labourers					
D1	Temporary loss of income	All affected employees, wage or daily labourers in private or government businesses	1. Cash payment for lost salary/wages for each month AP cannot work OR assistance in securing new employment including relevant skills training if required; AND 2. Transition subsistence allowance F2.1 AND 3. Livelihood restoration allowance F3.2	CV, DS, RDA are responsible agencies for the entitlement.	
D2	Permanent loss of income	All affected employees, wage or daily labourers in private or government businesses	1. Cash payment equivalent to 6 months salary/wages 2. RDA will encourage employers to provide severance pay for employees; 3. Preferential access to project construction employment opportunities; 4. Transition subsistence allowance F2.1 AND; 5. Livelihood restoration assistance F3.1 AND; 6. Livelihood restoration allowance F3.2 will be paid where applicable.	CV, DS, RDA are responsible agencies for the entitlement.	
E. Trees with Timber Value and Standing Crops					
E1	Loss of crops and trees with timber value	Person who cultivates crops and/or owns trees	1. An advance notice to harvest crop shall be displayed at GN office and informed to AP by	RDA, CV, DS, Grama Niladhari Division (GN) and State Timber	

	Type of Loss	Entitled Persons	Entitlements	Application Guidelines	Remarks
		(regardless of the ownership of land)	GN in advance; 2. Where harvesting is not possible the market value for lost cash crops will be paid; For owner, payment for crops will be paid to the owner.; For landless tenant farmer, payment for crops will be paid to the tenant; For sharecropper, payment for crops shall be shared between owner and sharecropper according to the sharecropping agreement;	Corporation (where applicable) are responsible agencies for the entitlement.	
F. Livelihood Restoration and Rehabilitation Assistance					
F1. Materials Transport Allowance					
F1.1	Materials Transport Allowance	APs reorganizing or rebuilding residential / commercial structures on site	Cash assistance up to Rs. 7500 would be paid for each affected household.	CV, DS, RDA are responsible agencies for the entitlement.	
F1.2	Materials Transport Allowance	Households or business owners who will be relocated (regardless of the ownership of land)	Cash assistance (relocation allowance) would be paid to household based on floor area of the house in occupation before relocation; • Rs. 10,000 for houses where floor area is less than 1000 sq.ft • Rs. 15,000 for houses where floor area is between 1000-2000 sq.ft. • Rs. 25,000 for houses where floor area is more than 2000 sq.ft. If there are subfamilies, above payment should be divided proportionately. For other properties, maximum amount of Rs. 25,000	CV, DS, RDA are responsible agencies for the entitlement.	

	Type of Loss	Entitled Persons	Entitlements	Application Guidelines	Remarks
			would be paid depending on the nature of occupation.		
F2. Transition Subsistence Allowance					
F2	Transition Subsistence Allowance	Each member of severely affected household	Subsistence allowance for the transition period for EACH member of severely affected household of Rs. 600/month for a period of 3 months. However this assistance could be further extended (up to a maximum of 6 months) as assessed on a case to case basis, with a written concurrence from Divisional Secretary.	CV, DS, RDA are responsible agencies for the entitlement.	"Severely affected household" is the family at least food security, especially for families with low income (2009/2010 food poverty level being at Rs. 2071)
F3. Livelihood Restoration (Grant and Training)					
F3.1	Livelihood restoration assistance	Household having permanent effect on livelihood (those who are resettled, loose job, etc.)	A cash assistance of Rs. 20,000 per household would be paid as Livelihood restoration grant, with written concurrence of Divisional Secretary. If requested by household, RDA will assist in obtaining professional assistance and advice, to invest funds or to set up a business at a commercially viable location. RDA would assist the household to obtain Micro Credit facilities to obtain productive assets. Training for up to two members of AP households to receive skills and vocational training, to an amount of Rs 5,000 per member.	CV, DS, RDA are responsible agencies for the entitlement. RDA will hire a NGO or a consultant to conduct a livelihood restoration assistance for the project. RDA will provide money for the training.	

	Type of Loss	Entitled Persons	Entitlements	Application Guidelines	Remarks
G. Special Assistance/ Allowances					
G1	Special Assistance / Allowances for Vulnerable APs	Households having vulnerable APs (poor, elderly APs, ethnic minority households, female-headed households, and disabled)	A special grant of Rs 20,000 per household to improve living standards of vulnerable APs and households; Assistance to vulnerable households in finding suitable land for relocation and shifting OR provision of resettlement sites if developed by the project and opted by AP.	CV, DS, RDA are responsible agencies for the entitlement.	
G2	Cost of re-fixing of Fixtures and fittings	For households and owner/s or operator/s of businesses and institutions that will be permanently displaced	An allowance of Rs. 5,000 maximum will be paid for a household. In case of a business premises or any other construction of specified nature the amount will be based on actual computations. Steps will be taken to avoid any double counting.	CV, DS, RDA are responsible agencies for the entitlement.	"Double counting" means that valuation officer counts doubly for a sum of money for shifting and re-fixing.
G3	Expenses incurred during acquisition process	All APs who appear for section 9 inquiry	An allowance not exceeding Rs. 10,000 would be paid to each AP who appears for section 9 inquiry.	CV, DS, RDA are responsible agencies for the entitlement.	
H. Community Assets					
H1	Loss of small scale community buildings and other structures such as shrines, temples, Kovils etc.	Divisional Secretary division, urban ward, local community or	Restoration in existing location of affected community buildings, structures, infrastructure and common property resources to original or better condition; OR replacement in alternative location identified in	CV, DS, RDA and Local Authority are responsible agencies for the entitlement.	The access to the Kovil for the devotees will be secured through consideration of

	Type of Loss	Entitled Persons	Entitlements	Application Guidelines	Remarks
		local authority owning or benefiting from community property. Chief priest of the religious place.	consultation with affected communities and relevant authorities; OR cash payment at full replacement cost; AND Restoration of access to community resources.		the new location of the temple.
H2	Loss of local infrastructure such as local roads, play grounds, footpaths, bridges, irrigation, water points or communal hand pumps etc.	Divisional Secretary division, urban ward, local community or local authority owning or benefiting from community property.	Restoration in existing location of affected local infrastructure and common property resources to original or better condition; OR replacement in alternative location identified in consultation with affected communities and relevant authorities; OR Cash payment at full replacement cost; AND Restoration of access to community resources.	CV, DS, RDA and Local Authority are responsible agencies for the entitlement.	
H3	Shifting of common resources such as High tension and distribution electricity power lines, water supply lines, telecommunication lines.	Utility agency who owns the facility	Relocation in alternative location identified in consultation with relevant authorities; OR Cash payment at full replacement cost.	RDA, CV, DS, Respective Utility Service Agency (e.g. CEB, NWS&DB, SLT) are responsible agencies for the entitlement.	
I. Unanticipated Adverse Impacts					
I1	Any unanticipated adverse impact due to project intervention	Any unanticipated consequence of the project will be documented and mitigated based on the spirit of the principles agreed upon in this RAP			

Annex 6.2
Traffic Diversion Plan

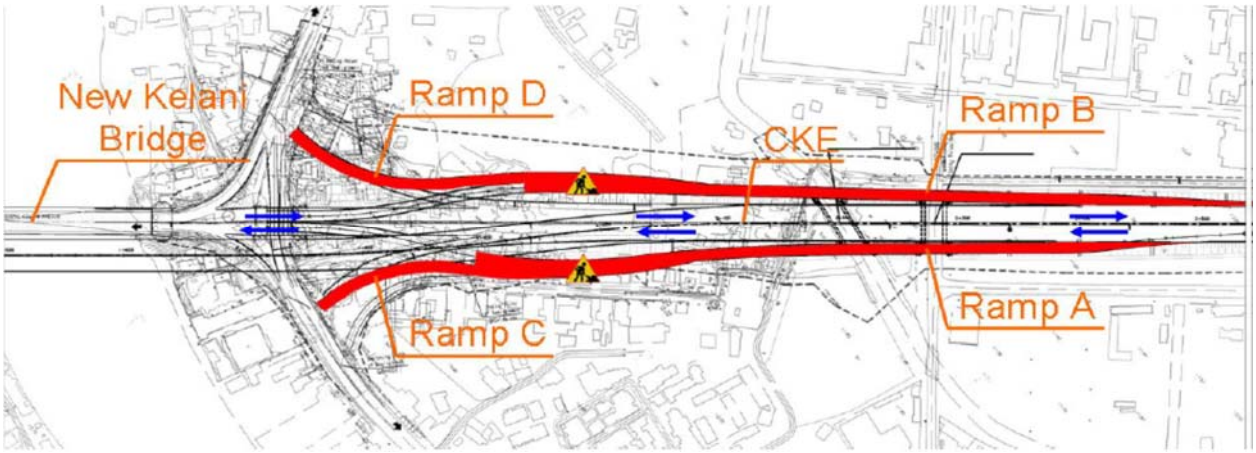
Traffic Diversion Plan for the Proposed Project

1. Traffic diversion plan at New Kelani Bridge interchange

The Colombo – Katunayake Expressway (CKE) will be operational when this project commence it's construction work. Therefore a reconstruction will be required to the interchange at new Kelani bridge. The traffic diversion plan proposed at New Kelani Bridge Interchange is as follows.
The reconstruction of the New Kelani Bridge Interchange will be carried out in 3 phases as shown below:

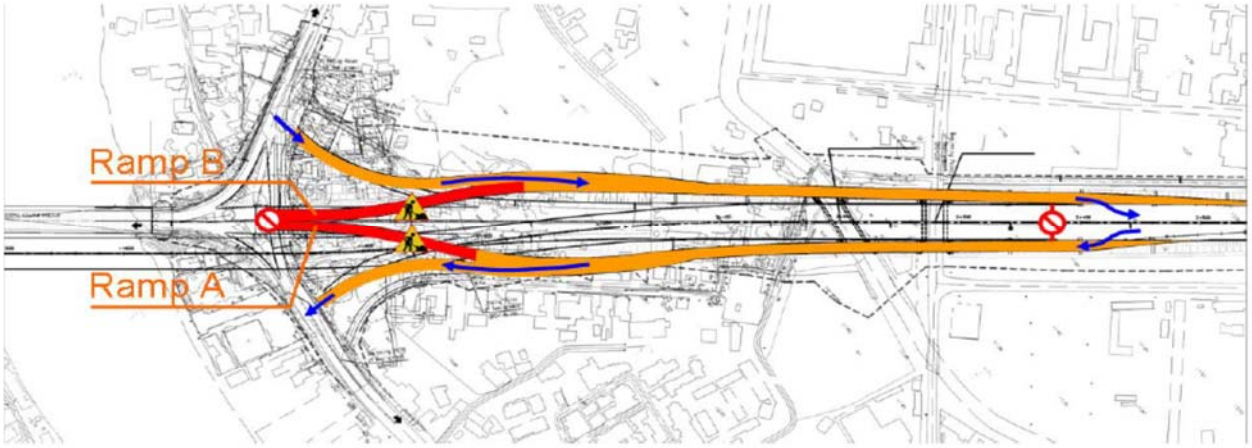
Phase 1:

1. Construction of Ramp A and Ramp B on both side of the CKE up to the diverging noses.
2. Construction of Ramp C and Ramp D as temporary 3-lane ramps in order to have enough capacity during CKE Main Line closure and traffic diversion.
3. Construction of all the sub-structure of the approach bridge located in the vicinity of the ramp A alignment.



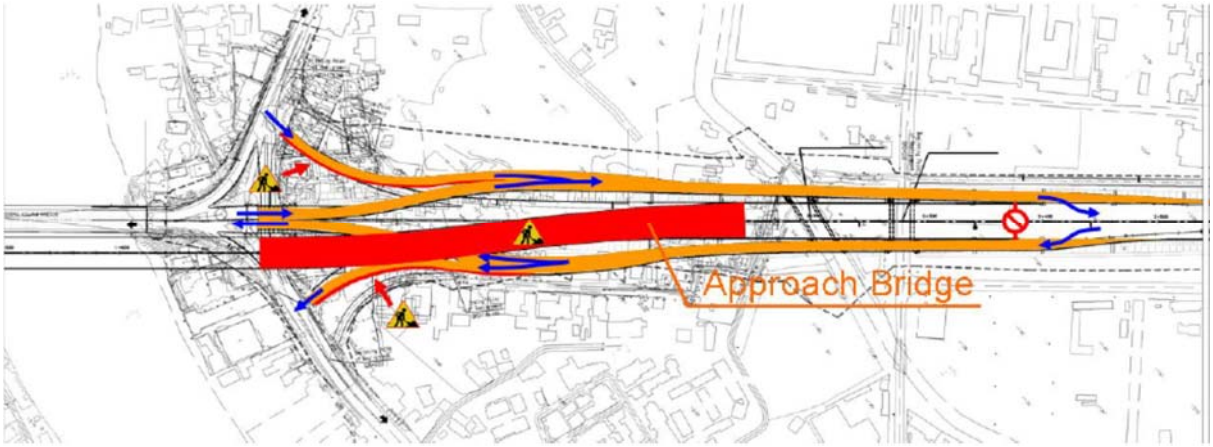
Phase 2:

1. Closure of the CKE Main Line. All the traffic of the CKE is diverted onto the ramps.
2. Construction of the remaining sections of Ramp A and Ramp B.
3. Construction of the remaining sub-structures.



Phase 3:

1. Removal of one of the 3 traffic lines of Ramp C and Ramp D to obtain their final cross section.
2. Construction of the super-structure of the approach bridges.



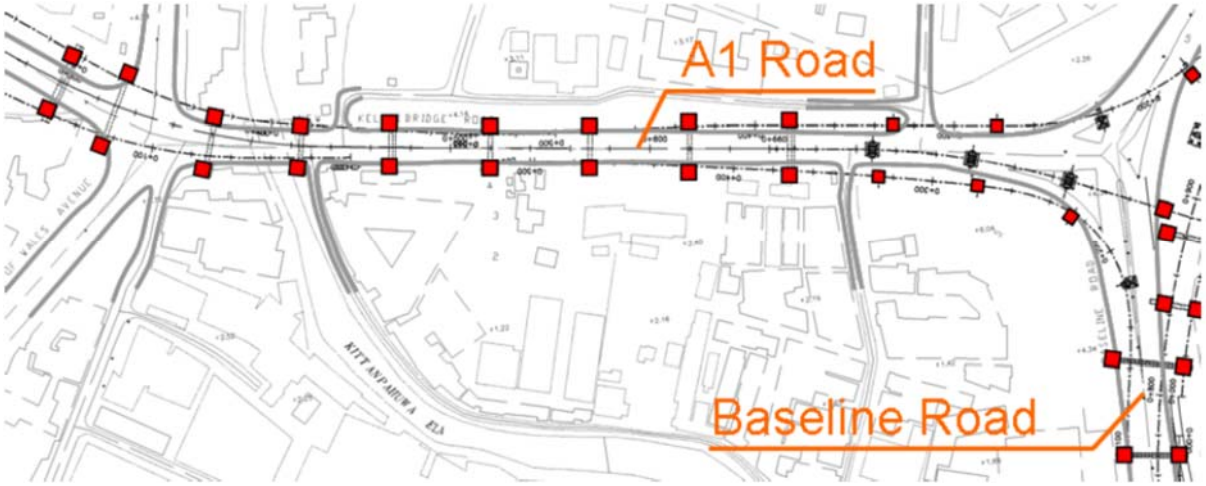
2. Traffic diversion plan at Kelanitissa intersection

At the intersection of A1 Road and Baseline Road, some of the piers of the approach bridge will have to be built in the median of the existing roads. As the intersection is already congested, it is important that traffic disruption is kept to a minimum during their construction.

A 4-phase traffic diversion plan has been prepared to minimize the impact of the works on the traffic flow, as shown below:

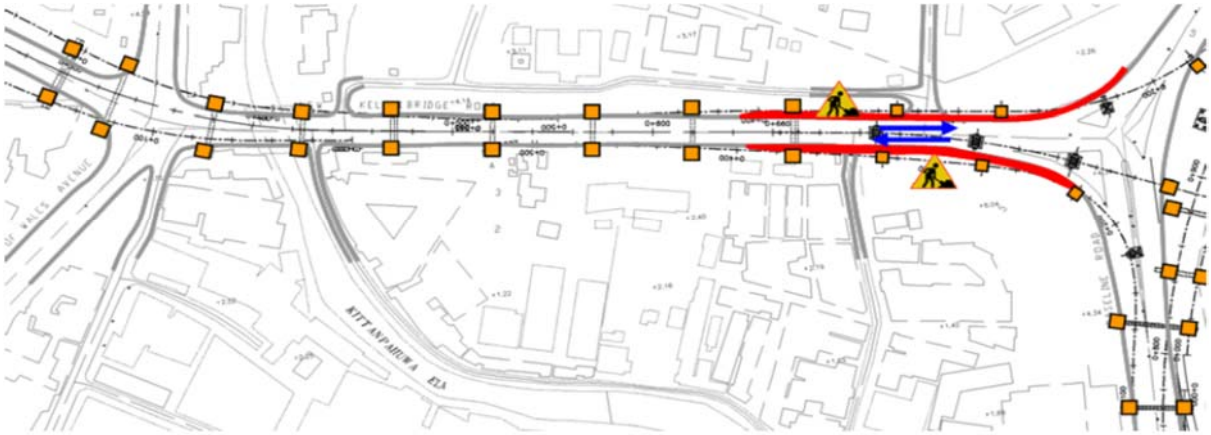
Phase 1:

1. Construction of piers foundation and sub-structure of located outside the existing roads with minor impact on the traffic flow.



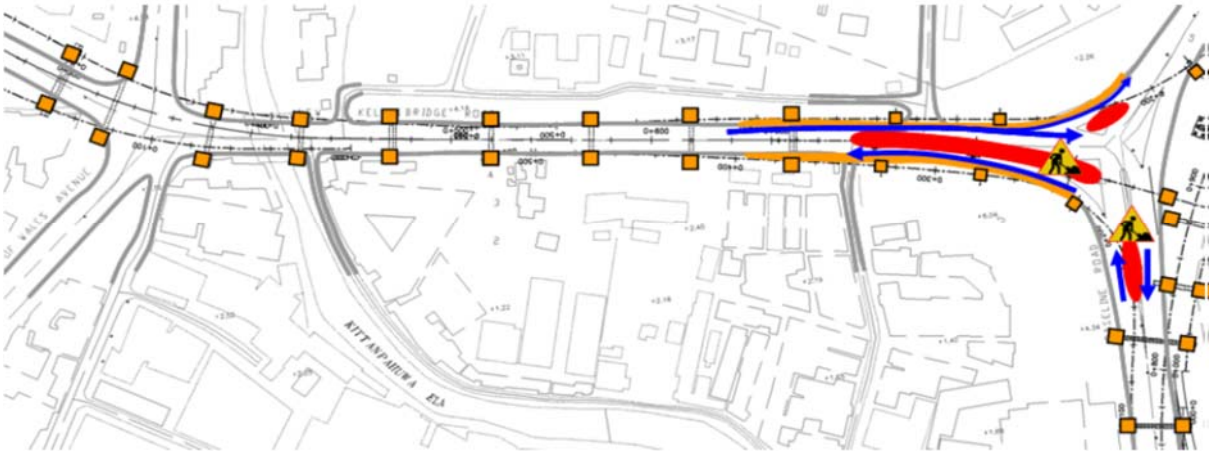
Phase 2:

1. Widening of the existing roads in the area where the piers will be built in the median.



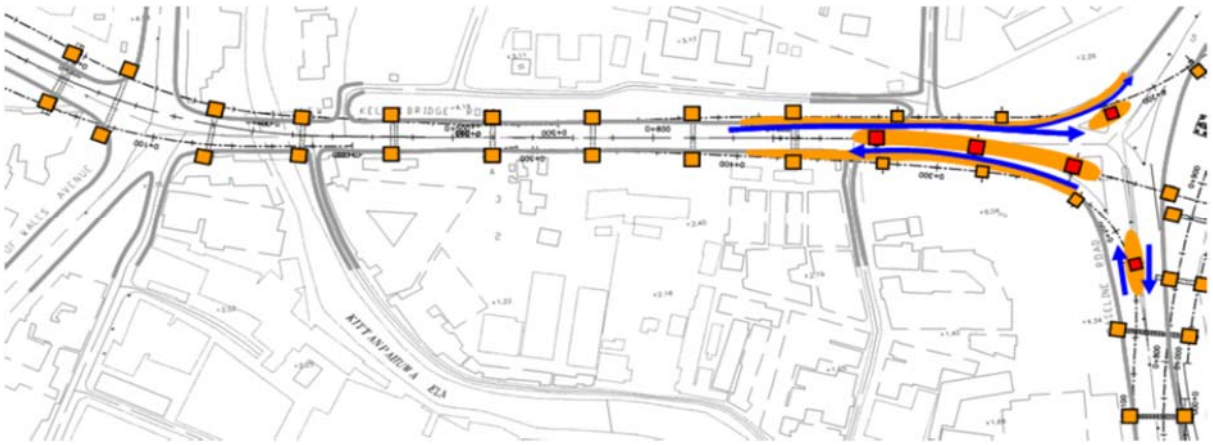
Phase 3:

1. Installation of construction yards where piers will be built in the middle of the road. The traffic flow is maintained with the subsequent widening of the road.



Phase 4:

1. Construction of the foundation and sub-structure of the piers located on the median with minor impact on the traffic flow.



3. Traffic diversion plan at Orugodawatta Interchange

The approach bridge heading towards the Baseline Road will be supported at its extremity by two piers located in the median of the existing roads. As the Baseline Road is a one of the main arterial road of the City, its capacity has to be maintain even during the construction works. A proper traffic diversion plan is thus required to ensure a smooth traffic flow during construction.

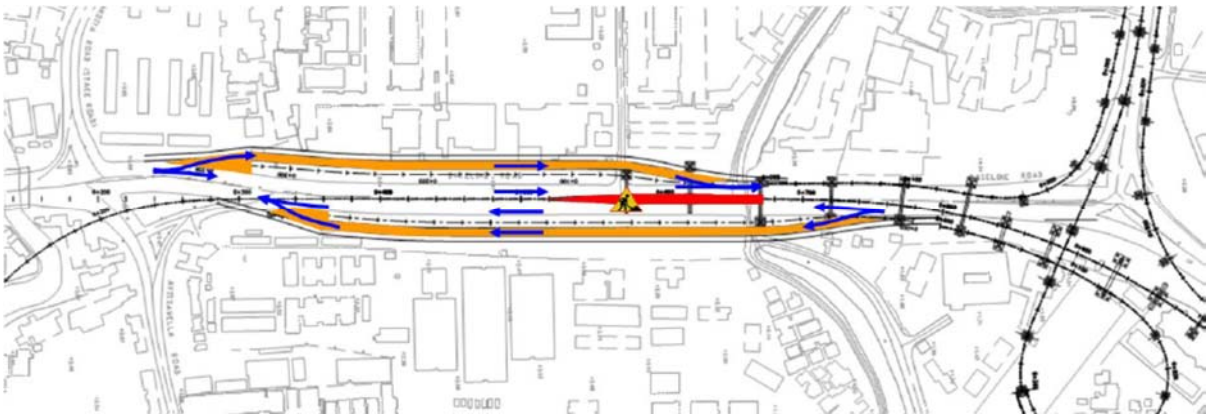
Phase 1:

1. Implementation of 4-meter wide service roads (one traffic lane each) on both side of the Baseline Road.



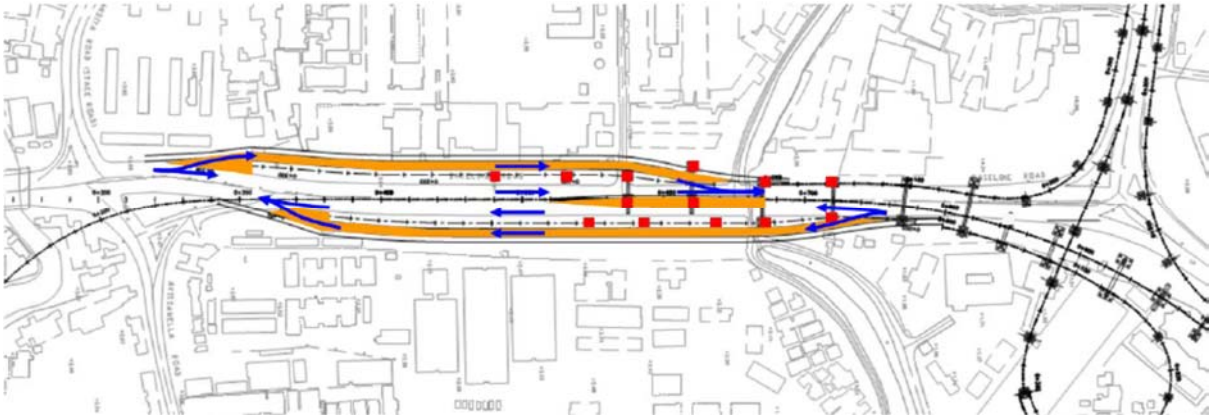
Phase 2:

1. Construction of a 5-meter wide median in the middle of the Baseline Road. The traffic capacity is maintain with 3 traffic lanes: 2 traffic lanes of the Baseline Road and one additional traffic lane of the service road.



Phase 3:

1. Construction of the piers foundation and sub-structure of the approach bridge located on the median.
2. Construction of the piers foundation and sub-structure of ramps, some located between the Baseline Road and the service road.



Phase 4:

1. Construction of the ramps of Orugodawatta Interchange.
2. Construction of the super-structure of the approach bridge.



Source: Final report of the preliminary design study for the 2nd New Kelani Bridge project.

Annex 6.3
Letter from CEB for Relocation of Transmission line

Annex 6.3 - Letter from CEB for Relocation of Transmission line

ලංකා විදුලිබල මණ්ඩලය
(1969 දෙසැම්බර් 17 දරන පාර්ලිමේන්තු පනතින් පිහිටුවන ලදී.)

இலங்கை மின்சாரச் சபை
(1969 ஆம் ஆண்டின் 17 ஆம் இல. பாராளுமன்ற அதிகாரச் சட்டத்தின் பிரகாரம் ஸ்தாபிக்கப்பட்டது)

CEYLON ELECTRICITY BOARD
(Established by Act of Parliament No. 17 of 1969)

50, திலெக் சின்னம்பலம் ஏ. காடினர் மாவத்தை,
பெ. பெ. 540, கொழும்பு 2, ஸ்ரீ லங்கா.

50, சேர் சிற்றம்பலம் ஏ. காடினர் மாவத்தை,
த. பெ. 540, கொழும்பு 2, ஸ்ரீ லங்கா.

50, Sir Chittampalam A. Gardiner Mawatha,
P. O. Box 540, Colombo 2, Sri Lanka.

Telephone +094112329544 Fax: +094112329544 Attentions. Chef Engineer Tr. Designs

TD/CE/G/18/01/10 08th July 2013

Chief Engineer (Colombo),
Road Development Authority,
No: 15,
Manthri Place,
Colombo 05.

PREPARATORY SURVRY ON TRAFFIC IMPROVEMENT PROJECT AROUND NEW KELANI BRIDGE

Requesting an estimate for shifting of affected pylon and laying cables underground

This refers to our letter RDA/CE/COL/BR-8/4 sent on 12th June 2013, with regard to the above subject.

The total estimated cost for, shifting two transmission lines as per your request is **One thousand two hundreds forty and eighty eight cents, million Sri Lankan rupees (MLKR 1240.88)**.

This is forwarded for your approval and arrangement of funds please.

Thank you,

Ceylon Electricity Board

Additional General Manager (Transmission)

Attachments:

Annex 01	:	Detailed BOQ and cost estimation
Annex 02	:	Proposed New line route
Annex 03	:	Special Terminal Tower 220kV
Annex 03	:	Special Terminal Tower 132kV

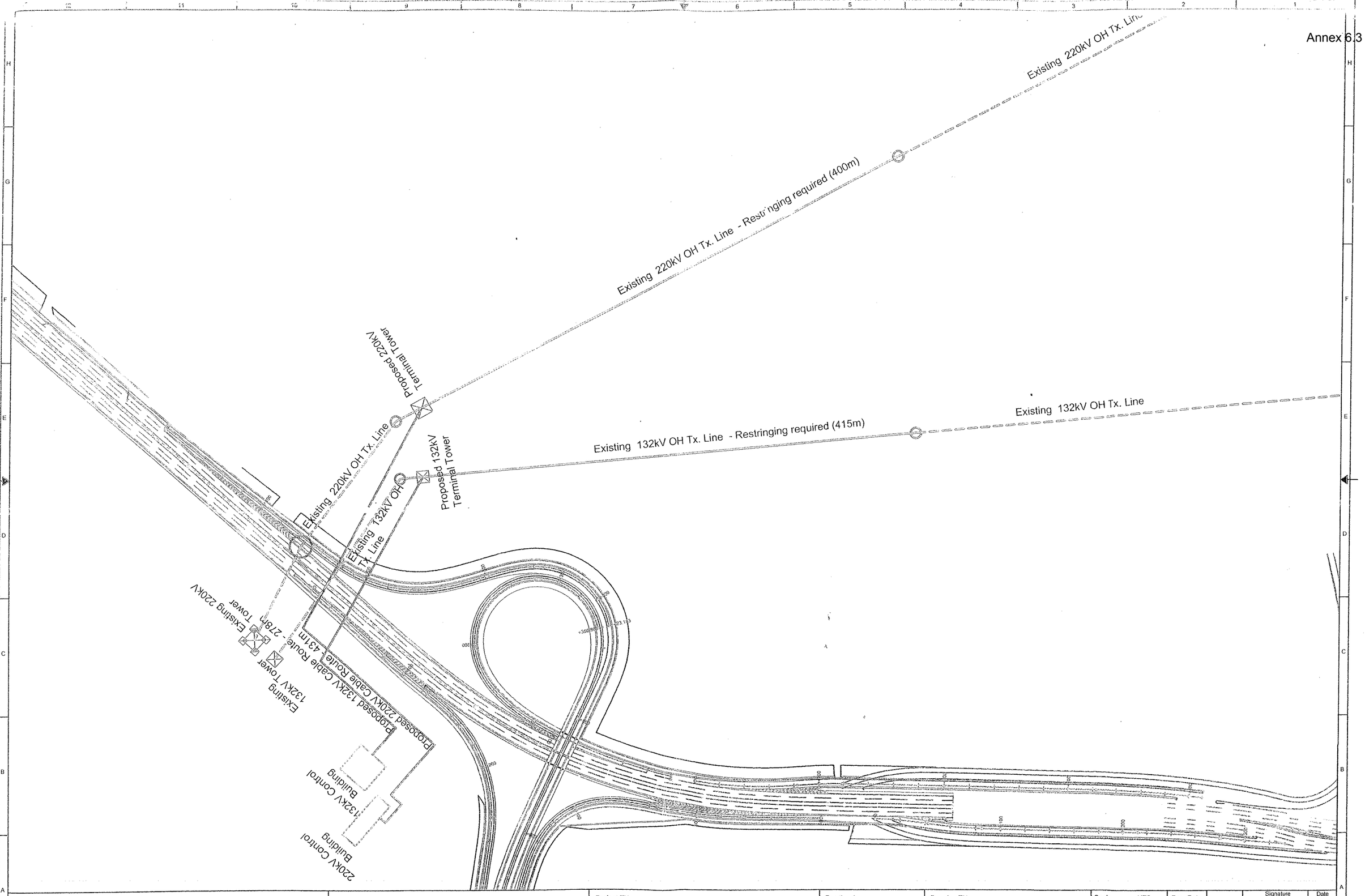
Price Proposal for 220kV Transmission line Shifting

Cable Cost	Rs865,094,993.20	
Over Head Transmission Line Cost	Rs6,098,400.00	Rs871,193,393.20

Proposal for 132kV Transmission line Shifting

Cable Cost	Rs361,259,541.65	
Over Head Transmission Line Cost	Rs8,430,305.00	Rs369,689,846.65
Total Cost (Sri Lankan Rupees)		Rs1,240,883,239.85
Total Cost (Million Sri Lankan Rupees)		**1,240.88**

Property of CEB Tr. Design Branch



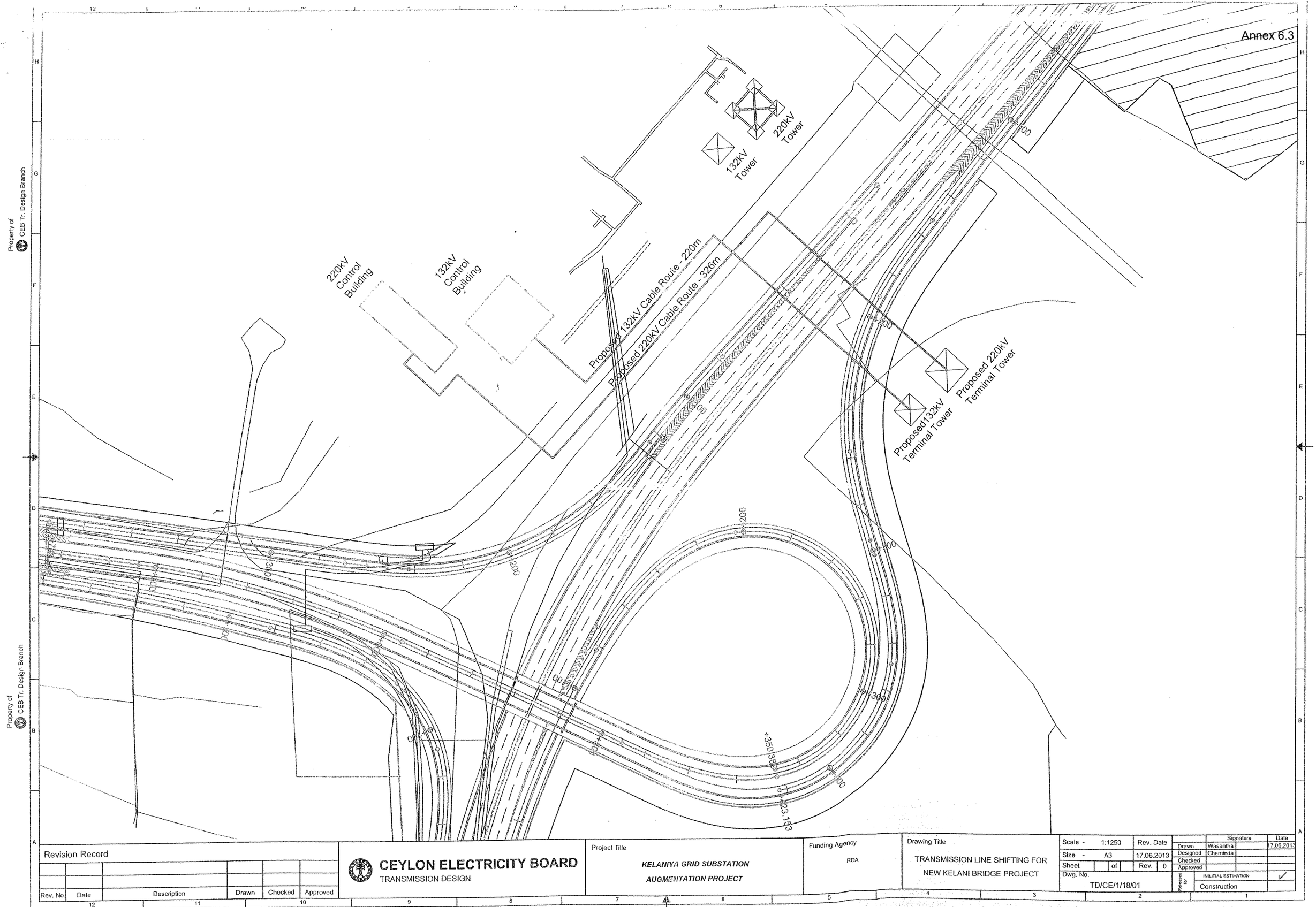
Revision Record					
Rev. No.	Date	Description	Drawn	Checked	Approved

CEYLON ELECTRICITY BOARD
TRANSMISSION DESIGN

Project Title	*KELANI GRID SUBSTATION AUGMENTATION PROJECT*
Funding Agency	CEB
Drawing Title	TRANSMISSION LINE SHIFTING FOR NEW KELANI BRIDGE PROJECT
Scale - NTS	Rev. Date
Size - A3	25.06.2013
Sheet of	Rev. 0
Dwg. No.	TD/CE/1/18/01

		Signature	Date
Drawn	Wasantha		25.06.2013
Designed	Chaminda		
Checked			
Approved			
Released for	Construction		✓

Property of CEB Tr. Design Branch



Revision Record					
Rev. No	Date	Description	Drawn	Checked	Approved

CEYLON ELECTRICITY BOARD
TRANSMISSION DESIGN

Project Title: *KELANIYA GRID SUBSTATION AUGMENTATION PROJECT*

Funding Agency: RDA

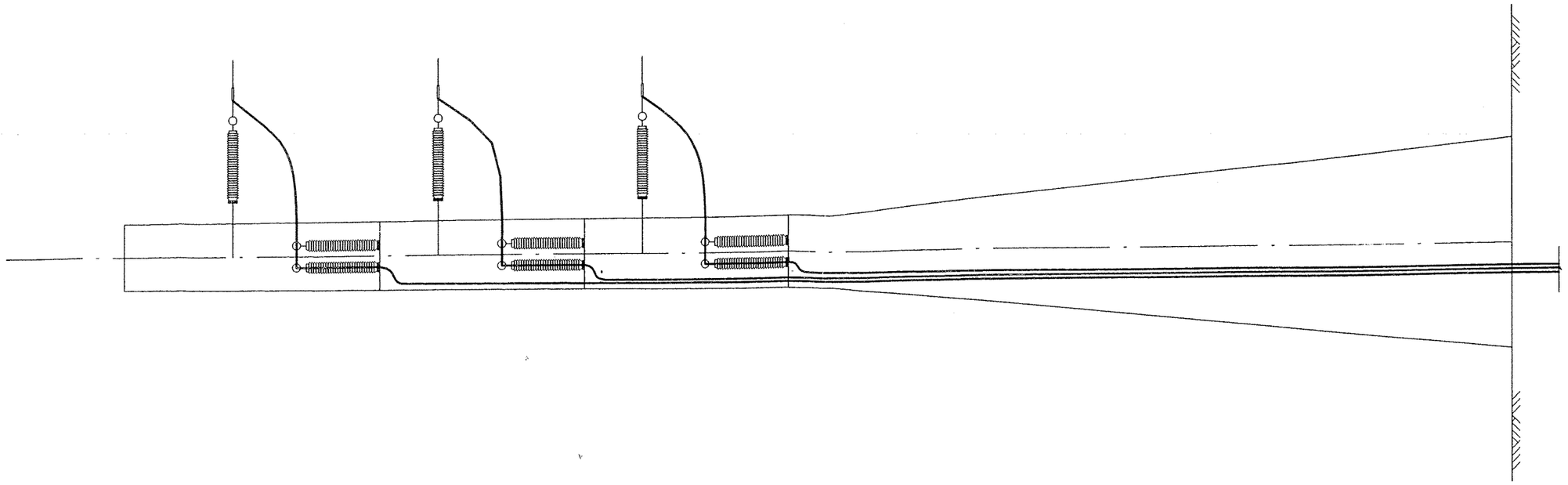
Drawing Title: TRANSMISSION LINE SHIFTING FOR NEW KELANI BRIDGE PROJECT

				Signature	Date
Scale - 1:1250	Rev. Date	Drawn	Wasantha		17.06.2013
Size - A3	17.06.2013	Designed	Charminda		
Sheet of	Rev. 0	Checked			
Dwg. No. TD/CE/1/18/01		Approved			

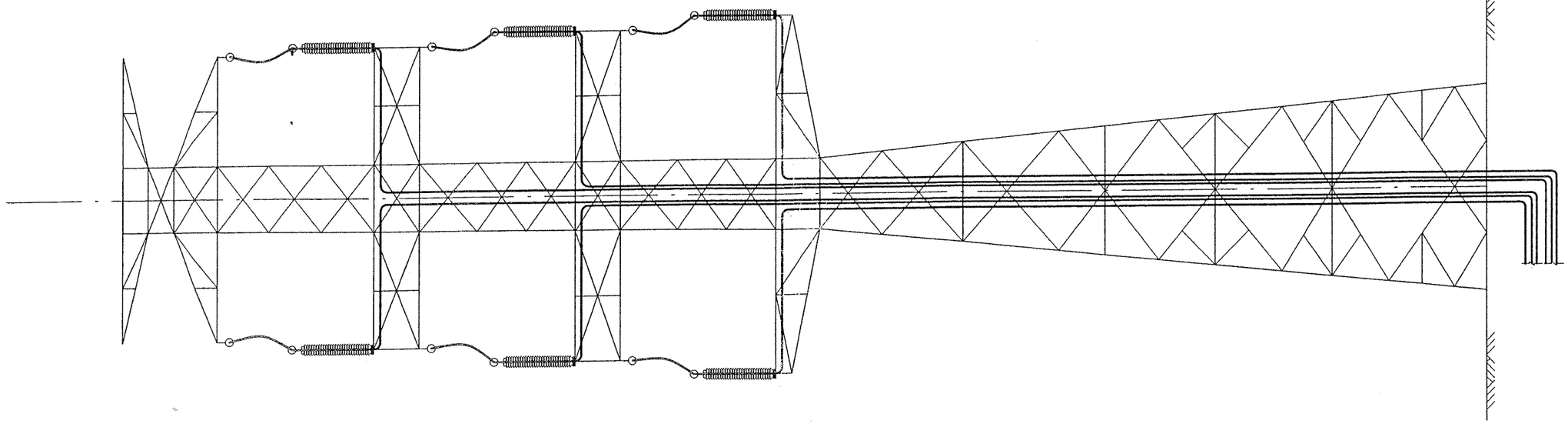
Released for: INILITIAL ESTIMATION ✓ ; Construction

Property of CEB Tr. Design Branch

Property of
CEB Tr. Design Branch



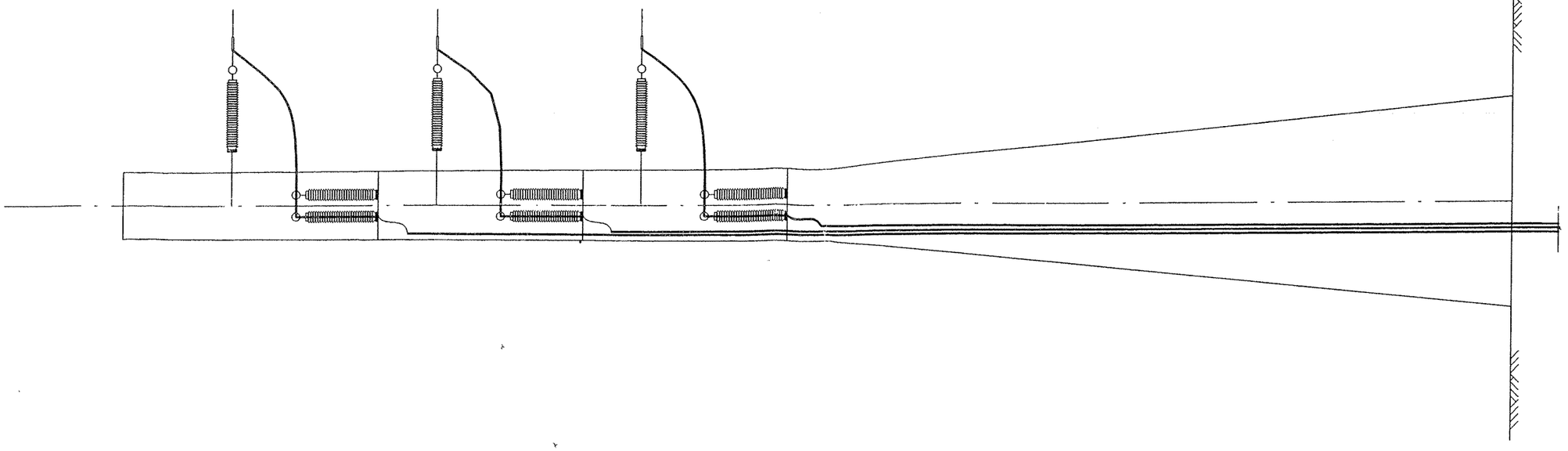
17m

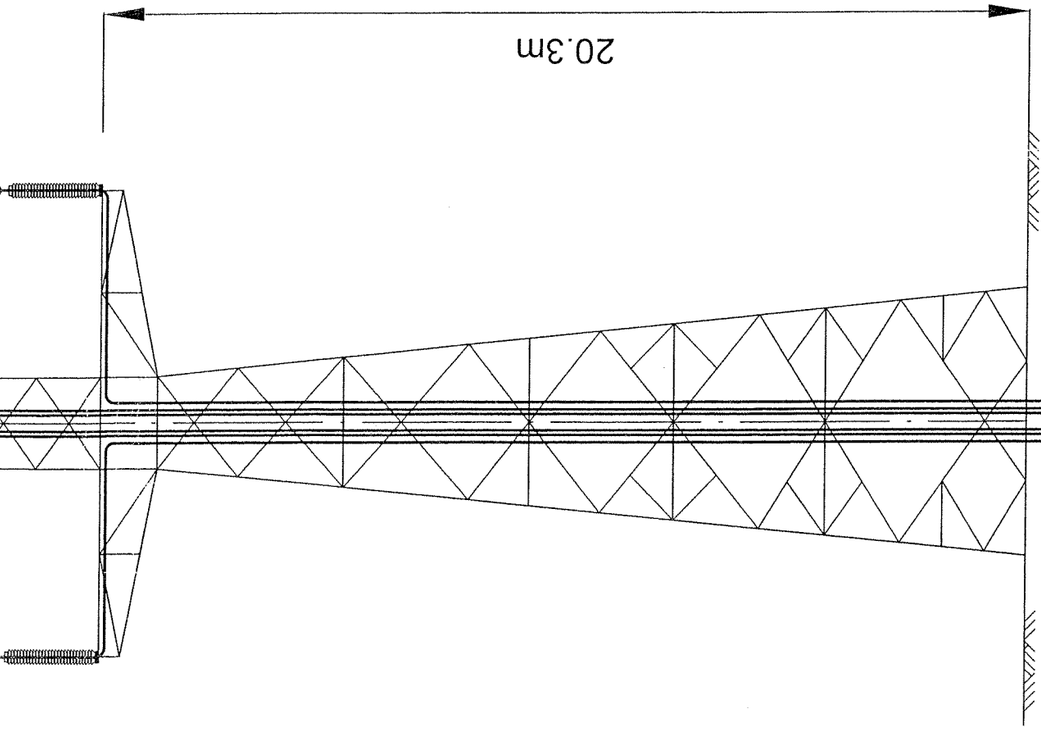


Property of
CEB Tr. Design Branch

Revision Record						CEYLON ELECTRICITY BOARD TRANSMISSION DESIGN	Project Title	Funding Agency	Drawing Title	Scale - NTS	Rev. Date		Signature	Date
Rev. No	Date	Description	Drawn	Checked	Approved		*KELANITISSA GRID SUBSTATION PROJECT*	CEB	132kV TERMINAL TOWER KELANITISSA GSS	Size - A3	29.05.2013	Drawn	Wasantha	29.05.2013
										Sheet of	Rev. 0	Designed	Chaminda	
										Dwg. No. TD/CE/1/		Checked		
												Approved		
												Released for	Tendering	✓
													Construction	

Property of CEB Tr. Design Branch





Property of CEB Tr. Design Branch

Revision Record					
Rev. No.	Date	Description	Drawn	Checked	Approved

CEYLON ELECTRICITY BOARD
TRANSMISSION DESIGN

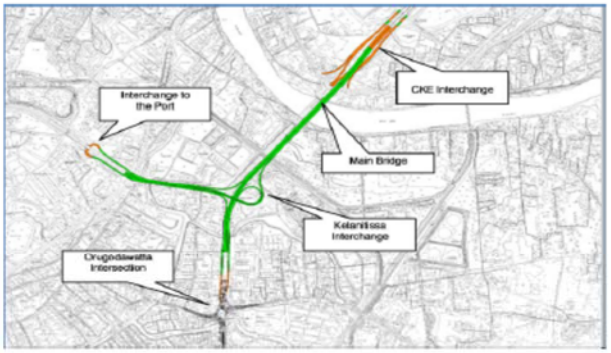
Project Title	*KELANITISSA GRID SUBSTATION PROJECT*
Funding Agency	CEB
Drawing Title	220kV TERMINAL TOWER KELANITISSA GSS
Scale - NTS	Rev. Date
Size - A3	29.05.2013
Sheet of	Rev. 0
Dwg. No.	TD/CE/1/

	Signature	Date
Drawn	Wasantha	29.05.2013
Designed	Chaminda	
Checked		
Approved		
Released for Tendering		✓
Released for Construction		

Annex 7.1
Details of Stakeholder Meetings

Annex 7.1 – Public Consultation and Information Disclosure

Information Flayer



Objectives of the project

Broad Objective of the project is to provide efficient and safe connectivity between CKE, Colombo port and Baseline road while preserving the nature and to assist the needs of the growing economy.

Specific Objectives:

- To construct a new bridge of six lanes to the upstream of the existing Kelani bridge to connect CKE, Colombo Port and Baseline road
- To avoid extra loading of the existing Kelani bridge and increase the durability of the bridge

To increase the transportation efficiency within Colombo city.

2

Key features of the project

Description	Details
Starting point	Peliyagoda Palama Junction (Starting point of the Colombo – Katunayaka Expressway/ CKE)
End point	Orugodawatta Junction
Total length of bridge	Approximate length of the main bridge is 185m.
Number of lanes	The number of lanes of the main line from CKE to Kelanithissa interchange is 6 lanes, from Kelanitissa interchange to Orugodawatta interchange is 4 lanes.
Affected Divisional Secretariat Divisions	Colombo Divisional Secretariat Division, Kollonnawa Divisional Secretariat Division and Kelaniya Divisional Secretariat Division.

Mitigation of adverse environmental and social impacts

Project related land acquisition may cause adverse environmental and social impacts, and it is necessary to address them with adequate mitigation measures mainly in line with Land Acquisition Act, National Involuntary Resettlement Policy and National Environment Act. The aim of this approach is to assure that affected people of the project will be protected from ill effects of this development.



3

Paper advertisement

GOVERNMENT OF THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF PORTS & HIGHWAYS
ROAD DEVELOPMENT AUTHORITY

NOTICE

PREPARATORY SURVEY ON
TRAFFIC IMPROVEMENT PROJECT AROUND NEW KELANI BRIDGE

Road Development Authority (RDA) has proposed a construction of a new Bridge across Kelani river close to the existing Kelani Bridge to cater the increased traffic demand due to the proposed development projects around the existing Kelani Bridge, such as Colombo - Katunayake Expressway (CKE) project, which will create a new connection between the international airport and the central area of Colombo, and with completion of Colombo Port Expansion project will introduce significant load of traffic to the existing road network of the project area especially around Peliyagoda Junction. And this will further deteriorate the transportation efficiency at intersections such as Peliyagoda, Ingurukade junctions which are already congested at most of time of the day. This has raised concerns that the new Kelani Bridge may become a major bottleneck for traffic for years to come if nothing is done.

Moreover, no major repair work has been done on the New Kelani Bridge since it was fully renovated in 2001, and further maintenance is an issue. In addition, heavier trucks generated from the port expansion project are expected to transit through the existing bridge, further shortening its lifespan and increasing the risk of its failure.

Therefore RDA is planning to construct an additional bridge across Kelani River.

- This project is construct a new bridge of six lanes to the upstream of the existing Kelani Bridge to connect CKE, Colombo Port and Baseline road

The main objective of this project is,

- To increase the transportation efficiency within Colombo city.
- To avoid extra loading of the existing Kelani bridge and increase the durability of the bridge

In order to discuss the issues regarding this project RDA has organized a meeting at 9.30 am on 25th March 2019.

The venue is at Sri Lanka Foundation Institute, No 100, Sri Lanka Padanama Mawatha, Independence Square, Colombo 07.

Saturday, March 23 2019

1st SHM Meeting – jointly organized with CEA & RDA

on 25.03 2013

Mr. W.A.S. Weerasinghe	Director General (RDA)	Mr. Weerasinghe expressed his views in first stakeholder meeting and highlighted that, two major projects i.e. Colombo – Katunayake Expressway Project and Outer Circular Project are now underway and these two projects will increase the traffic flow towards Colombo and this project has been formulated to increase the capacity of the existing New Kelani Bridge by building an additional bridge with six lane facility parallel to the New Kelani Bridge. RDA has sought the help of JICA to accrue funds and to conduct feasibility studies. He specially stated that the objective of this meeting is to inform the contents of the proposed development to all relevant line agencies and obtain their support and feedback which will contribute to the project's success. He welcomed all the participants at the first stakeholder meeting held on 25.03. 2013
Mr. Bandara	Director (Planning), RDA	Mr. Bandara explained more details about the project at first stakeholder meeting on 25.03.2013. He has mentioned that, only limited entry routes to enter Colombo from the North direction, namely Victoria Bridge and New Kelani Bridge. Traffic volumes have got increased and after the completion of CKE there will be additional traffic congestion expected. Therefore the capacity of New Kelani Bridge should be increased by the proposed project. The completion of the OCH Project, Colombo Harbor Development Project and Port City Project in future will increase the traffic volume in this area further. He further stressed that, during preliminary studies four (4) route alternatives were found and these four alternatives will be further studied.
Mr. Hadson Silva	Director, ESD - RDA	Mr. Hadson explained about the objective of the project and his views about the socioeconomic and environmental impact of the project. He explained that, 98% of the country's land transport is based on the road net work. He highlighted that the need for the project starting that Colombo North is a very important place in the transport network and there is severe traffic congestion in the environs of New Kelani Bridge exerting a burden on the economy as the road net work is used for passenger transport as well as good transport. He has further indicated that, the objective of the project is to increase the transport efficiency in the environs of New Kelani Bridge and to establish the appropriate transport network. He mentioned that, three DS Divisions namely Colombo, Kolonnawa and Kelaniya including several GN Divisions will be involved in this project. According to him, the feasibility studies consist of three stages namely the present status and review of the rough plan, basic plan and project review and preparation of the final report. He explained detailed alternative layouts and viewed that alternative B where the proposed bridge runs parallel and contiguous to New Kelani Bridge has been selected for preliminary design based on the multy criteria comparison. The criteria consist of distance, road network plan, traffic congestion impacts, construction cost time and feasibility and number of buildings to be demolished. According to

		him, the project is classified as category "A" project which is based on the JICA environmental guidelines and National Environmental Act (NEA). He has mentioned that, Basic information to prepare questionnaires for socioeconomic survey has already been submitte to CEA and ToR has been obtained. Further he has stressed that, social impact assessment is a very important part of the EIA. As the number of affected households will be more than 20, it is mandatory to prepare a Resettlement Action Plan (RAP) JICA guideline also requested to prepare the RAP. Accordingly, household surveys, Focus Group Discussions with affected parties and discussions with the officials of the relevant line agencies will be held. Compensation will be provided according to the National Involuntary Resettlement Policy of May 2001. He stated that, all social information will be obtained in collaboration with all line agencies and political authorities concerned. He said that leaflets in main three languages by explaining the project objectives will be distributed to all stakeholders. If there is any grievance or query after distributing of leaflet, it would be absorb by the RDA. Contact details of the RDA is included into the leaflet (See leaflet in the annex -3 in Social section)

Key Views Expressed by participants during the discussion time on 25th March 2013. Following key views were expressed by various participants such as members from public, Grama Niladaris of affected GNDs, Municipal Council Members of Urban Councils etc. and the views/questions expressed and the replies by RDA have been listed in following table

Person who expressed views	Explanations and Views Expressed	Replies by RDA Officials
Grama Niladari Wadullawatta, Kolonnawa	I am often asked by local people about the compensation package for land acquisition applying to this project Most of the people living in Wadullawatta are working in Pettah of Colombo, so they hesitate to move to remote places from the original location. Further I wanted to know about what type of survey is going to be held to collect socioeconomic data and what short of support has to be extended as GN's in the area? How and when affected people will be resettled? According to my experience, there should be some action to be taken to preserve the acquired land for the project. If not people will encroach the acquired land. People in Wadullawatta ask about the width of the affected areas for the road project in terms of land acquisition?	Feasibility studies have just been started and exact widths of the roadway has not been decided as yet. Survey will be conducted to obtain information to arrive at decisions. Access is needed for surveys as generally people oppose to surveys. Socio-economic data will be collected with the help of GS Resettlement method for affected parties will be decided after socio economic surveys which will be done house to house Further discussions will be held with the affected parties after socioeconomic data collection.
Mr. Ravi Nissanka, (Road user daily) T.No. 0712421421	I use the bridge daily I think that the reason of traffic congestion from Dematagoda to Kiribathgoda is due to poor road condition which induces the decreasing vehicle speed. Given that the project will be completed at least 2 years ahead, short term mitigation measures for the traffic jam	RDA has been already conducting study on solutions for traffic congestion under JICA's assistance to formulate short, medium and long term plans Land acquisition for widening of Mattakkuliya bridge is underway At present any container truck that goes to the ports have to move along this road section twice as the weigh

	should be proposed, for example the introduction of passage control by "one way operation"	bridge is located on Orugodawatta-Ambatale road. This is greatly affecting the traffic movement along this road A plan ia discussed to shift this weigh bridge to a location close to Colombo ports The road condition at the Peliyagoda side will be improved immediately
Mr. Sumedha Jayalath, a representative from Independent Self-Employed Persons Organization, Dematagoda	It is very important to consider loss of employment as there is lot of pavement hawkers at Dematagoda area. Further it is important to consider the construction of the lake line road which will connect with the project road ahead in order to avoid additional traffic congestion	The survey and initial work for constructing the "Lakeline" road being done and the project will be implemented according to the finance available
Mr. Rukmal Alwis, Representative from Kolonnawa Municipal Council	The some affected people are renting their shops or bearing a load of debt for their small business. The project should consider the restoration of the livelihood of those people. As an example Sedawatte timber mill operators should be especially considered. The local transportation of surround are of the project road is in very dangerous condition presently, especially for pedestrians. So, the safty of pedestrians should be considered, for example, the establishment of pedestrian way at the side of the road. Municipality Counselors could help to implement the project, but trust should be established. Many people are squatters and many not have formal land rights. There are also number of people who reside on payment of rent and they will be severely affected	Resettlement will be done based on JICA and Government Policy. Registered Voter's list will be examined to ascertain the nature of residents. Help from GNs is needed in this regard. Loss of business etc. will be studied case by case. The necessity of having pedestrian crossings was noted and will be included in to the designs. A series of pocket group meetings will be held within the project influence area with the assistance from local politicians and community leaders to socialize the project.
Mr. Renuka Perera, Member of Provincial Council, Western Province	According to the notions of the President of the country, all resettlers will have better living condition after resettlement than before as was done in past projects. Discussions with APs' and line agencies before finalizing the project are excellent measures on the part of RDA. Better to resettle people at closer location to the original site in a flat etc. or provide money to resettle at a place on their own choice. A market complex a new city is needed in parallel with the proposed project. It is appropriate to do social consultations in a place closer to their residences. I would like to propose that the RDA coordinates closely with DSs and GNs when the socioeconomic field survey will be carried out to avoid unnecessary social friction with local people	No party will be let down in the process of resettlement. RDA will take all steps towards ensuring better living conditions to all affected communities Resettlement options will be discussed with affected communities, local politicians and community leaders.

1st Stakeholder Meeting on 25th March 2013 at Sri Lanka Foundation Institute jointly organized by RDA and CEA













නව කැළණි පාලම

දිනය - 2013 මාර්තු 25

ස්ථානය- ශ්‍රී ලංකා පදනම් ආයතනය-කොළඹ 07

වේලාව- පෙ. ව. 9.30

පැමිණීමේ ලේඛණය

අංකය	නම	තනතුර	සංවිධානය	දුරකථන අංකය-විද්‍යුත් තැපෑල	අත්සන
01	K.A.D.S. [illegible]	[illegible]	[illegible]	0773298[illegible]	
02	W. H. V. Gidvaseela.	[illegible]		071 [illegible]	
03	[illegible]	[illegible]		0729825767	
04.	[illegible]	[illegible]		077 2548405	
05.	U. S. Pilanawithana	Engineer	R2ACPLANNING	0715317756	
06.	P.S.P Perera.	[illegible]		0773615827	
07.	A. A. L. Chathuranga	[illegible]		0776170613	
08	G. B Dodanwala.	[illegible]		0777720066	
09	M. W. Perera.	[illegible]		0718788866	
10	S. B. Munidasa.	[illegible]		0777255507	
11	[illegible]	[illegible]		0776729611	
12	Nanthini V	Engineer	NBRO	0779851309	
13	[illegible]	[illegible]	[illegible]	0714330567	

2/2

නව කැළණි පාලම

දිනය :- 2013 මාර්තු 25

ස්ථානය:- ශ්‍රී ලංකා පදනම් ආයතනය-කොළඹ 07

වේලාව- පෙ. ව. 9.30

පැමිණීමේ ලේඛණය

අංකය	නම	තනතුර	සංවිධායක	දුරකථන අංකය-විදුලි තැපෑල	අත්සන
01	මහාචාර්ය	අධ්‍යක්ෂ ඩී.සෙ.සී	ජාතික ජල සැපයුම්	0731970703	
02	D.P. ADIKARI	RP Consultant	CEA	0714446069	
03	D A J Ranwala	Team Leader	CEA	0760264179	
04	Mrs. S. Arangala	Socio-Economist	CEA.	2748672	
05	S.K.K. Janasinghe	CE A -	CE A	0720129068	
06	N. K. Thanh	Eng.	Oriental Consultants	0773030481	
07	Masaaki TATSUMI	Team Leader	JICA Study Team		
08	SHUDE SILVA	D/ESD	RDA	077-7318536	
09	J.A.K.S. Jayakody	DD I ESD	RDA.	0773623507	
10	W. Thaj Nuvoshan	සහකාර ඉංජිනේරු	ගල්කරුවන්නාව	0721452774	
11	S. Kalaivanichi	DD (H&D)			S. K.
12	M.H. Rizan.	S.D.O	පාවහන්කුඩ.	0755910282	

නව කැළණි පාලම

දිනය - 2013 මාර්තු 25

ස්ථානය- ශ්‍රී ලංකා පදනම් ආයතනය-කොළඹ 07

වේලාව- පෙ. ව. 9.30

පැමිණීමේ ලේඛණය

අංකය	නම	තනතුර	සංවිධායක	දුරකථන අංකය-විද්‍යුත් තැපෑල	අත්සන
	H. වික්ටර් පතිරණ	ඉංජිනේරු අතිරේක	කොළඹ නා.ස.		
	[illegible]	[illegible]	[illegible]	0723762962	[illegible]

Annex 7.1

නව කැළණි පාලම

දිනය - 2013 මාර්තු 25

ස්ථානය- ශ්‍රී ලංකා පදනම් ආයතනය-කොළඹ 07

වේලාව- පෙ. ව. 9.30

පැමිණීමේ ලේඛණය

අංකය	නම	තනතුර	සංවිධානය	දුරකථන අංකය-විද්‍යුත් තැපෑල	අත්සන
01	[illegible]	[illegible]		0723344599	
02	[illegible]	[illegible]		0714-493788	
03	Y. Piyasiri	Grama Niladari		0718213255	
04	Mahela Wijesinghe	Hydrologist	RSD/RDA	0714464103	
05	S. S. Colombage	Computer Operator	RSD/RDA	031-2222529	
06.	Lalanthi Liyanage	Routine Office	RSD/RDA	077-9702836	
07	Ravi Nissanka.	M/Director	Millenium Consult	0712481461	
09.	[illegible]	[illegible]	[illegible]	0757397279	
10	[illegible]	[illegible]	[illegible]	0714837563	
11	[illegible]	[illegible]	[illegible]	[illegible]	
12	[illegible]	[illegible]	[illegible]	0716178396	
13	T R S B Bokalamulla	Engr.	Consultancy project	0725972508	
14	P. H. K. De Silva	Head / CEO NBRO	NBRO	0718287775	

NEW KELANI BRIDGE

Date :- 25th March 2013

Venue :- At the Auditorium of Sri Lanka Foundation Institute ,Colombo 07

Time :- 9.30 a.m.

ATTENDENCE

NO	NAME	DESIGNATION	ORGANIZATION	CONTACT DETAILS (TEL:/E-MAIL)	SIGNATURE
13	[illegible]			0777755869	
14	T.S.M. Abenickeram	PD OCH2	RDA	011 - 2873576	
15	A. Kamalrajh	Proj. Eng.	RDA/OCH-No1	0770104810	
16	R.V.S. Perrera	Comm. Dev. Officer	A.I. office	0714421425	
17	T. SOMADASA	[illegible]		0724188620	
18	CHANDANA HERATH			0778375375	
19	K.B. Jayantha	Pensioner		0714129205	
20	J.G. Piyasena			0224824554	
21	P.N. Dilrukshi	Graduate trainee.	[illegible]	071-4731922	
22	M. Rizwan	S.D.O.		-	

NEW KELANI BRIDGE

Date :- 25th March 2013

Venue :- At the Auditorium of Sri Lanka Foundation Institute ,Colombo 07

Time :- 9.30 a.m.

ATTENDENCE

NO	NAME	DESIGNATION	ORGANIZATION	CONTACT DETAILS (TEL:/E-MAIL)	SIGNATURE
01	G.M.S.W.B. Gajasinghe	Safeguards Con.	CEA	077.3884898	
02	Bernard Perera		CEA	0773742516	
03	S. SAI	Environmentalist	Oriental Consultants		
04	Takuma OGUNI	Highway Eng	Oriental Consultants		
05	EIJI YONEZAWA	Bridge Eng.	Oriental Consultants		
06	Shin HISADA	Construction Planner	Oriental Consultants		
07	HARUO YANAGAWA	Bridge Engineer	KAJIMA Eng.		
08	Hisanori Tashima	Environmentalist	Oriental Cons.		
09	Yukitomo TATSUMI	Bridge Engineer	Oriental Consultants		
10	T.S.C. Pairis	Asst Director	Central Environmental Authority (CEA)	0714440290	
11	Namal Ralapanawe	Project Specialist	JICA		
12	Hiroaki Adachi	Representative	JICA		

නව කැළණි පාලම

දිනය - 2013 මාර්තු 25

ස්ථානය- ශ්‍රී ලංකා පදනම් ආයතනය-කොළඹ 07

වේලාව- පෙ. ව. 9.30

පැමිණීමේ ලේඛණය

අංකය	නම	තනතුර	සංවිධායක	දුරකථන අංකය-විදුලි තැපෑල	අත්සන
14	කුසුම් ලියනගේ	නායක කාර්ය මණ්ඩල නිලධාරී		0722115781	
15	[illegible]	[illegible]		[illegible]	
16	[illegible]	[illegible]		071-8953414	
17	[illegible]	[illegible]		0722736661	
18	[illegible]	[illegible]		0776170519	
	[illegible]	ECL.			

SHM meetings held on 08th 09th and 10th of April for Kolonnawa, Colombo and Kelaniya respectively

DS Level Awareness Creation Meeting for Preparatory Survey on Traffic Improvement Project Around New Kelani Bridge (Kolonnawa Divisional Secretary Division)

Date : 8 April 2013

Venue: Auditorium (Kolonnawa DS Office)

Time: 2.00 p.m. to 4.00 p.m.

List of Participants:

Name	**Designation**	Office
Mr. Y. W. Senaratne	Divisional Secretary (Kolonnawa)	Kolonnawa DS Office
Mr.D.A.H.Piyathilaka	Asst Divisional Secretary (Kolonnawa)	Kolonnawa DS Office
Mr.J.A.V.S.Jayakody	Deputy Director	ESD Division, RDA
Mrs. D. A. S. Jayasekara	Chief Engineer	CE Office, Colombo, RDA
Mr.Saman Samarakoon	Engineer	CE Office, Colombo, RDA
Mr. M.D. Senadeera	Senior Technical Officer	CE Office, Colombo, RDA
Mr. C.W Abeysuriya	Consultant (Land acquisition)	SLLRDC
Mrs. M.B.M.Gunaratna	Survey Superintendent	Department of Surveyor General
Ms. Lakmali Liyanage	Resettlement Officer	ESD Division, RDA
Mr. D. P. Adikari	Resettlement Consultant	CEAA
Mr. G.M.S.W.B.Gajasinghe	Safeguard Consultant	-Do-
Mrs. S . K . K . Ranasinghe	Coordinator- Social Projects	-Do-
Mr. Bernard Perera	Supervisor	-Do-
Mr.S.P.Senarath	Asst Director (Planning)	Kolonnawa DS Office
Ms. Chamila Priyadarshani	Disaster Management Officer	Kolonnawa DS Office
Ms. Amila Wittachchi	Director	
Dr. P.U.Handugala	AMOH	MOH Office (Kolonnawa)
Dr. T.D.Abeywicrama	AMOH	MOH Office (Kolonnawa)
Ms. Gayani Kumarasinghe	Social Service Officer	Kolonnawa DS Office
Miss M.W.D.Sriyani	Social Service Officer	Kolonnawa DS Office
Miss. J.K.K. Ruwanmalee	Land Use -Planning Asst.	Kolonnawa DS Office
Mr. P.H.A.C.P. Hettiarachchi	Public Management Asst.	Kolonnawa DS Office
Mr.M.K.C.Muthukumarana	Samurdhi Development Officer	Kolonnawa DS Office
Miss.W.T.Niroshani	Samurdhi Development Officer	Kolonnawa DS Office
Mr.R.Vinod Sameera	Samurdhi Development Officer	Kolonnawa DS Office
Mr.Y.D.Tenison	Administrative Grama Niladari	Kolonnawa DS Office
Ms.D.K.D.Jayantha	Development Asst.	Kolonnawa DS Office
Ms.K.D.A.M.K. Priyadevi	Development Asst.	Kolonnawa DS Office
Ms. K.M.D.Prasani	Management Asst.	Kolonnawa DS Office
Mr.M.C.D.Coasta	Field Officer	Kolonnawa DS Office
Mr.P.A.J.Perera	Field Officer	Kolonnawa DS Office
Mr. P.T.Wijenasana	Grama Niladari	Wadulla
Mr.Y.Piyasiri	Grama Niladari	

Name	Designation	Office
Mr.K.A.D.S Jayawardana	Grama Niladari	
Ms. N.D.J.Sepalika	PH M	Orugodawatta
Mr.B.Roiston	Grama Sanwardana Samithiya	

Mr. Y. W. Senaratne (DS Kolonnawa) welcomed all participants for the DS level awareness creation meeting jointly organized by CEAA & RDA for Kolonnawa DSD.

Mrs. D. A. S. Jayasekara (CE, Colombo/RDA) presented the details of the proposed project & it's importance for improvement of traffic around Kelani bridge area.

Ms. J. A. V. S. Jayakody (DD, ESDD/ RDA) presented the need of environmental and social considerations in national development projects and how RDA is addressing such issues, focusing experience the past. He also requested the GN's, Samurdi officers and other officers to assist the study team to carry out the environment and social assessment which needs to completed without any delays.

A presentation on land acquisition was done by Mr. C. W. Abeysuriya, Land Acquisition Consultant of the Land Reclamation and Development Board. He also discussed the clauses in the Land acquisition act pertaining to payment of compensation and Regulations 2009 which nullifies the practice of LARC and Super LARC.

Mrs. M. B. M. Gunaratna, Superintendent of. Surveys explained about the survey procedures for national development projects & requested the support from all parties to carry out the survey without delay, especially at field level making property owners' awareness on their presence and showing boundaries and necessary documents.

Then the DS opened the meeting for discussion and questions.

Grama Niladari of Wadulla, Mr. R.T..Wijenayaka said that the people in his GN division are now asking about how much of land area will be affected by the project and how they will be compensated.

Responding to this issue, Mr. Jayakody DD, ESDD explained that a 100 m corridor has been selected for this study but that does not mean that all the areas within this corridor will be acquired and structures within this corridor will be affected.

Mr. Adikari (Consultant/CEAA) explained that this RP study is being carried out to minimize any adverse impacts to people due to the project, making remedial steps to overcome hardships caused by the project. He stated the importance of developing the entitlement matrix and requested the DS & GN's to consider this date (Date of the meeting) as cut-off date for Kolonnawa DSD. Mr. Adikari also explained the need of such cut-off date to avoid any sudden influx of people in to the project area causing delays in executing the project.

Mr. Gajasinghe (consultant) stated that the final RP will be available in all three languages at the DS office.

DS Kolonnawa thanked all participants & required GN's to provide full support for the study and the meeting was adjourned.

Photographs taken at the meeting



Divisional Secretary Kolonnawa welcoming all participants



A section of the audience



Chief engineer, Colombo - RDA explaining about the project



Deputy Director, ESD Division of RDA explain about environmental and social issues during national projects

DS Level Awareness Creation Meeting for Preparatory Survey on Traffic Improvement Project Around New Kelani Bridge. (Colombo Divisional Secretary Division)

Date : 9 April 2013

Venue: Auditorium (Colombo DSD)

Time: 2.00 p.m. to 4.00 p.m.

List of Participants:

No	NAME	DESIGNATION	ORGANIZATION
1	Mr.K.G.Dharmathilaka	Divisional Secretary	Colombo
2	Mr.B.G.G.Malinda	Assistant Divisional Secretary	Colombo
3	Mr.J.A.V.S.Jayakody	Deputy Director	ESD Division, RDA
4	Mrs. D. A. S. Jayasekara	Chief Engineer	CE Office, Colombo, RDA
5	Mr.M.Sahathevan	Engineer/ P&D- RSCW	NWDB
6	Mr.A.Kalupahana	Electrical Superintendent	
7	Mr. C.W Abeysuriya	Consultant (Land acquisition)	SLLRDC
8	Mrs. M.B.M.Gunaratna	Survey Superintendent	Department of Surveyor General
9	Mr.M.D.Suranga	Scientist /Geo	NBRO
10	Mr D . P . Adikari	RP Consultant/CEA	CEAA
11	Mr G.M.S.W.B.Gajasinghe	Safeguard Consultant	-Do-
12	Mrs. S. Arangala	Social Economist	-Do-
13	Mrs S .K. K. Ranasinghe	Coordinator- Social Projects	-Do-
14	Mr Bernard Perera	Supervisor-CEAA	-Do-
15	Ms. Lakmali Liyanage	Resettlement Officer	ESD Division, RDA
16	Mr.A.P.C.T.Amarasingha	Science & Technology Officer	
17	Sister M.Mehhate	Sister in charge	Home of Compassion, Colombo14
18	Mrs. M.Kathirgamar	Principal/CN Kaleimagal School	
19	Mr.Nimal S Vithanage	Teacher	
20	Mr. D.M.Seneviratna	St.Anns Vidyalaya	Mahawatta -Colombo14
21	Mr.B.N.S.Perera	St.Joshaps Girls School	Grandpass
22	Mr.Asoka Muhandiramge	Rural Development Officer	Grandpass North
23	Mr.Gamini Heenkenda	Management Assistant	District Secretary's Office-Colombo
24	Mrs.I.K.Liyanage		-Do-
25	Mr.G.A.N.S.Mahindaratna	Development Assistant	-Do-
26	Mr. A.Surantith	Community Development Assistant	-Do-
27	Mrs. A.D.Sriya Kanthi		-Do-
28	Mrs. H.D.Presanthi		-Do-
29	Miss Shroni Priyadarshani.		-Do-
30	Miss M.N.F.Rinusha		-Do-
31	Miss Kavnika H.Gamage	S.S.S	-Do-
32	Miss M.J.Priyanka		-Do
33	Miss.Sureka Fernando	Chair person	Disaster Management Society
34	Miss.Shanthi Priyangani	Secretary	-Do
35	Mrs.Shanthini J Mohan	Grama Niladari	District Secretary's Office-Colombo
36	Mr.A.A.L.Chathuranga	Grama Niladari	-Do-
37	Mr.S.Urethiran	Grama Niladari	-Do

Mr. V. G. Dharmathilake (DS Colombo) welcomed all participants for the DS level awareness creation meeting on the proposed project jointly organized by CEAA & RDA for Colombo DSD.

Mrs. D. A. S. Jayasekara (CE, Colombo/RDA) presented the details of the proposed project & its importance for improvement of traffic around Kelani bridge area.

Mr. J. A. S. Jayakody (DD, ESDD/ RDA) presented the need of environmental and social considerations in national development projects and how RDA is addressing such issues focusing to the experience in the past. He stated that ESD division of RDA is responsible to see that environmental and social issues related to road development

projects are addressed in an equitable manner. He stated that the environmental and social studies for this project is entrusted to a team of experts in the area of environmental and social impact assessment and requested all relevant officers of Colombo DSD to give their fullest support to completed the study.

A presentation on land acquisition and valuation of land and assets was done by Mr. C. W. Abeysuriya, Land Acquisition Consultant of the Land Reclamation and Development Board.

Mrs. M. B. M. Gunaratna, Superintendent of Surveys explained about the survey procedures for national development projects. She explained why most development projects get delayed due to slow progress of survey work which was attributed to deficiency in information. She requested the support from all parties, especially from field level staff to carry out the survey without delay, by making property owners aware the need for their presence during surveys and show boundaries and relevant documents for reference at field level. .

A presentation was done by Mr. M. D. Suranga of NBRO on soil investigation and borehole test.

Mr. Adikari (Consultant) explained that this RP study is to minimize any adverse impacts to people due to the project. He stated the importance of developing the entitlement matrix and requested the DS & GN's to consider this date (Date of the meeting) as cut-off date for Colombo DSD.

Mr. Jayakody explained that a 100 m corridor has been selected for this study. He also said that the land area needed for the project will be within this 100 m corridor but may be less than 100 m. This means that all within this boundary may not necessarily affected by the acquisition.

The meeting was then opened for questions and as there were no questions the meeting was adjourned by DS Colombo after the vote of thanks.

Photographs taken at the meeting



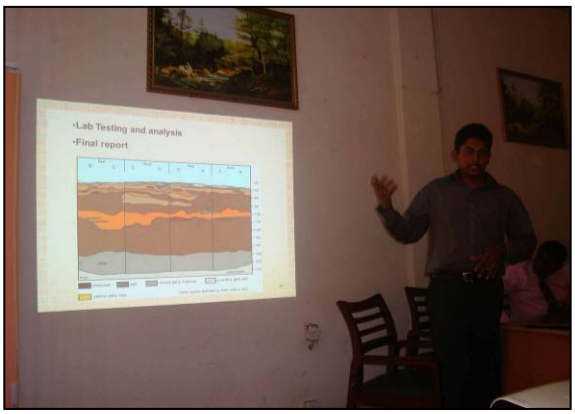
Panel of presenters with Divisional Secretary



A section of the audience



Mrs. Gunaratna presenting on the survey procedure



Mr. Suranga presenting on soil investigation

DS Level Awareness Creation Meeting for Preparatory Survey on Traffic Improvement Project Around New Kelani Bridge. (Kelaniya Divisional Secretary Division)

Date : 10 April 2013

Venue: Auditorium (Kelaniya DSD)

Time : 9.00 a.m. to 11.45 a.m.

List of Participants:

No	NAME	DESIGNATION	ORGANIZATION
1	Mrs.W.H.V.Pushpamala	Divisional Secretary	Kelaniya DS office
2	Mr.J.A.V.S.Jayakody	Deputy Director	ESD Division, RDA
3	Mrs. D. A. S. Jayasekara	Chief Engineer	CE Office, Colombo, RDA
4	Mr. C.W Abeysuriya	Consultant (Land acquisition)	SLLRDC
5	Mrs. M.B.M.Gunaratna	Survey Superintendent	Department of Surveyor General
6	Mr.M.D.Suranga	Scientist /Geo	NBRO
7	Mr. D. P. Adikari	RP Consultant	Consulting Engineers & Architects Associated(Pvt) Ltd
8	Mr G.M.S.W.B.Gajasinghe	Safeguard Consultant	-Do-
9	Mrs S . Arangala	Socio- Economist	-Do-
10	Mrs S .K. K. Ranasinghe	Coordinator- Social Projects	-Do-
11	Mr Bernard Perera	Supervisor	-Do-
12	Ms. Lakmali Liyanage	Resettlement Officer	ESD Division, RDA
13	Miss.K.W.Piyaseeli	Social Services Officer	District Secretary's Office-Kelaniya
14	Mr.M.B.A.N.Weerasiri	Land Use Admin Officer	-Do-
15	Mr.K.R.W.K.Kalthota	Admin Officer – Grama Niladari	-Do-
16	Miss Lakmali Niroshini	-Do-	-Do-
17	Mr.K.D.A.	-Do-	-Do-
18	Mr.P.D.P.D.Kalanipura	Development Officer	-Do-
19	Mr.S.N.C.Gunasekera	-Do-	-Do-
20	Mr. S.D.N.Hemachandra	-Do-	-Do-
21	Mr.H.A.Lalith Priyankara	-Do-	-Do-
22	Miss.S.K.P.N. Weerasingha	-Do-	-Do-
23	Miss.Roshini Hewage	-Do-	-Do-
24	Mr.P.S.Perera	-Do-	-Do-
25	Miss.M.A.N.Priyadarshini	-Do-	-Do-
26	Mr.G.M.T.Ariyathilaka	-Do-	-Do-
27	Mr.M.A.D.I.Premasiri	-Do-	-Do-
28	Mr.P.A.D.S Ponnamperuma	-Do-	-Do-
29	Mr.R.M.V.P.Karunathilaka	-Do-	-Do-
30	Miss.P.A.G.M.Darshani	-Do-	-Do-
31	Miss.S.S.de Alwis	-Do-	-Do-
32	Miss.S.G.Ratnadiwakara	-Do-	-Do-
33	Miss.D.H.D.Chamari	-Do-	-Do-
34	Miss.R.R.Ratnamali	-Do-	-Do-
35	Mr.M.P.C.T.Pathirana	-Do-	-Do-
36	Mr.P.H.D.P.Bandara	-Do-	-Do-
37	Mr.I.D.P.K.Ranasingha	-Do-	-Do-
38	Miss.Nadeeshani Balasuriya	-Do-	-Do-
39	Miss.J.V.Rajini	-Do-	-Do-
40	Miss.J.Chathurangika	-Do-	-Do-
41	Miss.A.G,P.Sandamali	-Do-	-Do-

No	NAME	DESIGNATION	ORGANIZATION
42	Miss.I.G.A.Krishanthi	-Do-	-Do-
43	Miss.Priyanka Samanmalee	Agriculture Research & Production Asst.	-Do-
44	Miss.Jayantha Padmini	-Do-	-Do-
45	Miss. Indrani Weerasingha	-Do-	-Do-
46	Mr.H.P.Pushpa Kumara	-Do-	-Do-
47	Mr.P.D.Samantha	-Do-	-Do-
48	Mr.G.D.Sunil Shantha	Grama Niladari	-Do-
49	Mr.Sugath Lal Fernando	Samurdi Niladari	-Do-
50	Mr.U.S.S.Karunaratna	Management Assistant	-Do-

Mrs. W. H. V. Pushpamala (DS Kelaniya) welcomed all participants for the DS level awareness creation meeting jointly organized by CEAA & RDA for Kelaniya DSD.

Mrs. D. A. S. Jayasekara (CE, Colombo/RDA) presented the details of the proposed project & it's importance for improvement of traffic around Kelani bridge area.

MR. J. A. V. S. Jayakody (DD, ESDD/ RDA) presented the need of environmental and social considerations in national development projects and how RDA is addressing these issues focusing to the experience in the past projects. He discussed the importance of GN's, Samurdi officers and other officers in assisting the study team to carry out the environmental and social assessments including the resettlement plan. He also stated that a 100 m corridor has been selected for this study.

Mr. C. W. Abeysuriya, Land Acquisition Consultant of Land Reclamation and Development Board discussed about the procedures to be followed when a land is considered suitable for a national development project and explained provisions of Land acquisition act on payment of compensation. He also described the new regulations to LAA that would consider payment of compensation on market price and how it relates to replacement cost.

Mrs. M. B. M. Gunaratna, Superintendent of Surveys explained about the survey procedures for national development projects & requested the support from all parties to carry out the survey without delay, especially supporting to field level arrangements.

A presentation on soil investigation and borehole test was done by Mr. M. D. Suranga of NBRO.

Mr. Adikari (Consultant) explained that this RP study is to minimize any adverse impacts to people due to the project. He stated the importance of developing the entitlement matrix and requested the DS & GN's to consider this date (Date of the meeting) as cutoff date for Kelaniya DSD.

The meeting was opened for discussions.

Mr. Sunil Shantha, Grama Niladari Peliyagoda (174B) asked whether the survey carried out about a month back was related to this project, how the encroachers will be compensated need of a simple questionnaire as the people in the area are mostly not educated.

Mrs Jayasekera (CE, RDA) explained that the survey carried out previously was for the traffic survey for this project.

Mr. Adikari stated that the entitlement matrix proposed for this project will be the base for compensation along with provisions of LAA.

Mr. Jayakody stated that RDA will not deprive the rights of any person due to the project.

Mr. Sunil Shantha, GN requested photographs of the project to be displayed in his office as a means of educating the public about the project, to which the RDA and consultant team agreed.

The meeting was adjourned after the vote of thanks by DS Kelaniya.

Photographs taken at the meeting



Divisional Secretary addressing the meeting



A section of the audience



Mr. Adikari explaining about the cut-off date



A question from the audience

Awareness creation & Focused Group Discussion on 25.04.2013

Venue : Community Hall at Wadullawatta (Gramaniladari Office) of Kollonnawa DS division.

Attendance :

No	Name	Position	Represent from
01	Mr. Sajith Colambage		ESDD of RDA
02	Mr. R.T. Wijenayake	GN, Wadullawatta	DS office, Kolonnawa
03	Dr. M. Tatsumi	Team leader	survey team –Oriental Consultants
04	Mr. S. Sai	Resettlement specialist	survey team –Oriental Consultants
05	Mr. Yonezawa	Road Engineer	survey team –Oriental Consultants
06	Mr. Kitazawa	Representative of Colombo office	survey team –Oriental Consultants
07	Mr. D.P. Adikari	Team Leader	Local survey team of CEA
08	Mr. C.A. Abesuriya	Resettlement Consultant	Local survey team of CEA
09	Mrs. S.K. Ranasinghe	Coordinator	Local survey team of CEA
10	Mr. L.S.P.B. Bernard	Supervisor	Local survey team of CEA
11	Mr. A.S. Gunarathna	Supervisor	Local survey team of CEA
12	Mr. R.P. Lokuratna	Managing Director	CEA

Note: Around 120 members from the affected community attended the meeting including religious leaders and 10 office bearers of various community organizations based in affected GN divisions. The attendance sheets which were signed by the participants is attached in annex- 02 (Social)

General : As per the agenda of the meeting, activities commenced with religious observances; Seenipelle Ariyadamma Thero administered for Buddhists while persons of other religions made their observances individually.

An informal self-introduction session was conducted so that the JICA Team Members, Local Survey Team and the members of the community could come to know each other prior to commencement of discussion sessions.

Session with Key speeches:

Mr. R.T. Wijenayake, GN Wadullawatta – Welcomed all participants at the meeting. Objective of the meeting was briefly explained. GN wished that this awareness session will enhance affected people understanding in this direction and invited audience for active participation at the meeting.

Mr. Sajith Colambage, who is supervising Census on Land Acquisition and Resettlement at field level, representing RDA, briefed about RDA's past experience in resettlement planning, and its considerations for mitigation adverse environmental and social impact in road development projects. As observed by Mr. Colambage, the collaboration extended by the affected people of the area and the field staff of DS office, Kolonnawa is very encouraging. He requested participants' views, observations and comments either as representing their organizations or as individuals and pointed out that this information will be very valuable to the resettlement planning process.

Dr. Tatsumi, head of Project Team briefed about the project explaining how it came to the present stage in detailed.

Mr. Adkari, Resettlement Consultant of CEAA, drew attention to the ongoing Census on Land Acquestion and Resettlement. The government Policy regarding resettlement is to protect people from adverse impact caused by development projects, and ensure that no one fall below their previous socioeconomic situations as a result of

new projects. For preparation of resettlements plans to protect people from adverse impact, it is necessary to assess their present socioeconomic situation go through each and every person, and this is done through the present census carried out in the area. Mr. Adikari urged all participants to cooperate with the study team giving correct information and also their views, ideas and suggestions. This assessment is the information base for developing resettlement Action Plans. The people living in the area should support preventing of new comers to the areas for sake of receiving resettlement benefits. As can be foreseen, new comers will only result in reducing level of relief the people already living in the area will receive due the reason that the funds available for resettlement benefits are limited.

Mr. C.A. Abeysuriya, Land Acquisition and Resettlement Consultant, explained Land Acquisition procedure's of the Land Acquisition Act. He explained that, according to the act, only title holders are entitled to receive compensation following ownership inquiries and valuation process. According to Land Acquisition Act encroachers and unlawful occupants of government land are not eligible to receive government compensation. They have to be dealt in a different manner, outside to the Land Acquisition Act. This area comes under the responsibility of project implementing agency. The past experience shows that RDA has taken adequate steps through special aid packages to cover these circumstances. He expected similar arrangement for this project too.

Name of the person raising the question	**Question/issue**	**Team response**
Mr. Sugath Priyankara, a resident of the area	I see road congestion is due to the location of four container yards operating with Colombo port and also act as bonded warehouses for customs purposes in Orugodawatte. The large number of container trucks plying between the Colombo port and the Orugodawatta junction is the main culprit causing traffic congestion in the area. This problem can be easily solved by relocating these container yards to the large empty space in Bloemendhal area earlier used as a rubbish tip. Mr. Priyankara also requested that the facilities, such as access roads, for residents who lives outside the affected area should also be improved.	Consultant will include his suggestions in the report so that further investigations can be made by relevant authorities. People who lose access roads or other infrastructure as a result of the implementation will be provided with alternative facilities.
Mr. Ghanarathne, Paragahagoda – President of the Tax payer's association	There are people who pay taxes but do not live here. They also should be benefited.	GN Wadullawatte explained that, the survey is to take a census of people living and carrying out lively hoods in the affected area. The purpose is to identify those affected by the project.
Ms. Nayana Kumari Rajapaksa, Chairman, New Kelanipura Community Development Society	I wish to know, when physical resettlements are done, do we get permanent settlement in a single step or temporary settlements first, till permanent settlements are made later	This depends on many factors such as availability of new lands, need for urgent evacuation, availability of funds and construction requirements etc. Project planners prefer to support permanent resettlement, if physical resettlement is needed, If other conditions permit to do so. It is too early to give a definite answer.

Mr. M.S.H. Kais, Chairman, Mosque, New Kelanipura	Stated that, they support the development. When needed, we have no objection to demolishing our houses as a long as we are provided with better facilities.	The aim of the Resettlement Plan is to provide new and better facilities
Ms. M.P.P. Priyadarshani, a resident	I have a cleaning service and need a place, especially an office in addition to an alternative house.	The household questionnaire has specific questions related to self-employment and small business. If correct answers are given these issues can be considered when preparing the Resettlement Plans.
Ms. A. Sudarshani, a resident	Myself and a number of people make in cent stickers as a cottage industry. We need space for drying this product. If we are shifted to a flat, there will be no space to carry out our livelihood.	Pl. inform your requirements when the enumerators visit you and you answer the questionnaire. Suitable provisions can be made in the Resettlement Plan
Ms. M.D. Violet, Chairperson, Samurdhi beneficiary group, Wadullawatta	Same as above	See above
Rev. Seenipelle Ariyadamma Thero	The project is commendable and warrants every one's support. Today's meeting is successful and all present got a good idea of the project and had opportunity to state their views. Rev. Thero also wanted to know as the elevated road will be constructed on piers, whether the piers can be located in a way to avoid demolition of any features of the temple.	This can be considered in the detailed design stage and precautions taken to minimize effects on the temple structure when possible.
Mr. R.A.D.A. Antony Fernando, a neighbor of the affected project area	Will the building close to the site be affected by construction work, especially pile driving	Whether there will be any effects on close by structures due to construction activiyies will depend on a number of factors. The contractors will be taking insurance. There will be procedures in place to ensure any damages to building close to the site are identified properly compensated.
Ms. L. Amarawathie, a resident	We have a small shop in my premises. How can I continue my livelihood.	This will be taken in to notice in the ongoing Census and Resettlement Plan will include income restoration provisions.

After finishing of the above key speeches, the time was allocated for open discussion. During that time, participants of the meeting raised questions and the consultants of the meeting gave the answers.

Preparatory Survey on Traffic Improvement Project around 2nd New Kelani Bridge

[Impacted properties of public sector and religious organizations]

Meeting Minutes

Subject	Impact on public sector and religious organizations caused by the proposed second new Kelani Bridge
Venue	Ministry of Ports and Highways, 9th Floor, "Sethsiripaya", Battaramulla
Date & Time	10th May 2013, 11.00 AM

Following were present;

	Name	Designation	Organization
1.	Rev. Heenipelle Ariyadhamma	Chief Incumbent	Sanchi Viharaya, Nawagampura
2.	Rev. Shiwasri. K.L.M. Sarma	Chief Incumbent	Badraamman Kali Kovil,Nawagampura
3.	Mr.R.W.R.Pemasiri	Secretary	Ministry of Port and Highways
4.	Mr.W.A.S. Weerasinghe	Director General	RDA
5.	Mr.P.G.Kumarasinghe	General Manager	State Timber Corporation
6.	Mr.S.Wijayabandara	General Manager	State Development and Construction Corporation
7.	Mr.R.A.D.U. Rathnayake	Head of the Department of Electrical Engineering	Automobile Engineering Training Institute
1.	Mr.D.Ganesan	Director Highway Design	RDA
2.	Mr.S.Opanayaka	Director Land	RDA
3.	Ms.D.K.R. Swarna	Director Engineering Service	RDA
4.	Mr.G.M.P.A. Gallage	Director/administration and HR	NAITA
5.	Mr.N.S.D.Nawantha	Director	Vocational Training Authority
6.	Mr.D.L.L.Wickramanayake	Director	Atomic Energy Authority
7.	Mr.H.S.Kariyawasam	Director/principal	Automobile Engineering Training Institute
8.	Mr.G.Jayasinghe	Additional Director	Vocational Training Authority
9.	Mr.M.M.P. Wijesekara	SDD	Atomic Energy Authority
10.	Ms.D.N. Siyambalapitiya	Deputy Director Planning	RDA
11.	Ms.S.Kaluarachchi	Deputy Director - Highway Design	RDA
12.	Mr.J.A.V.S. Jayakodi	Deputy Director	RDA - ESD
13.	Mr.Anura Malagala	Deputy principal	Automobile Engineering Training Institute
14.	Mrs.D.A.S. Jayasekara	Chief Engineer – Colombo Office	RDA

15. Mr.U.S. Pilanavithan	Engineer	RDA (Planning)
16. Mr.J.A. Disanayake	Engineer	RDA (Planning)
17. Mr.S.M.S.K. Samarakoon	Engineer	CC's Office
18. Ms.Lakmali Liyanage	Resettlement Officer	RDA - ESD
19. Mr.C.Weerawardhana	T.O	RDA - CE's office
20. Mr.D.P. Adikari	Resettlement Consultant	CEAA
21. Mr.N.K. Thanh	Bridge Engineer	Oriental Consultant
22. Mr.Shin Hisaoa	Construction Planer	Oriental Consultant
23. Mr.S.Sai	Resettlement Expert	Oriental Consultant
24. Mr.H. Tashima	Environmentalist	Oriental Consultant

Mr.R.W.R.Pemasiri, Secretary/Ministry of Ports and Highways chaired the meeting.

01. Mr. Premasiri welcomed all participants attended for the meeting, and briefed about the need for a new bridge to ease unbearable traffic congestion of the area at presen, and also to meet future traffic requirements to avoid a traffic bottleneck just at the main entering point to Colombo city. The bridge will connect Colombo-Katunayka Expressway, Colombo-Kandy Road, Peliyagoda-Puttalam Road, Baseline Road and Colombo Port Access Road. The Ministry of Ports and Highways is well aware about the inconvenience and hardships causing to public organizations and religious organizations by the project, but still, it is not possible to stay away from the project as it would cause more problems by worsening traffic situation in the capital, as well as in the country.

As stated by S/MP&H, project needs collaborative support of all public sector organizations and others. The hardships and inconvenience encountered by individual organizations have to be managed to ease those situations collectively, helping to each other. One of the objectives of this meeting is to share information with everyone to have best possible solutions to overcome hardships caused by the project, based on reliable information, within the overall contest of the project. S/MP&H assured his support to public sector organizations and religious organizations for finding such solutions, in all possible manners.

02. Mr. Jayakpody, Deputy Director/ESD of RDA made a well prepared power point presentation with necessary maps and drawings, showing details of affected areas along proposed access roads leading to new bridge. His presentation drew attention to following;

1. Background
2. Project area
3. Surveys
4. Affected buildings
5. Environment
6. Resettlement planning

03. **Public sector organizations**

National Apprentice and Industrial Training Authority (NAITA)

(The Automobile Engineering Training Institute, located in Wadullawatta GND of Kolonnawa DS division)

This Automobile Engineering Training Institute located in Wadullawatta is one of the apprentice training centers administered by National Apprentice and Industrial Training Authority (NAITA), and it is the only apprentice training centre of NAITA in automobile engineering training. NAITA comes under Ministry of Youth Affairs and Skills Development.

This training institute has been established with a grant aid of the Government of Japan. This assistance included construction of buildings, installation of machinery and training of staff, costing of Rs. 500 million approximately. The institute commenced activities in November 1989. Institute's building area covers nearly 4 acres of land, and has 2.5 acre bare land for vehicle testing track and other training purposes. Training center has three training batches in a given time, 400 hundreds in each, of which one batch is trained inside the center for one year, and two batches are undergoing training at selected industrial sites.

The project impact will be severe for this location. Training centre will lose all most all land area it has now. Most appropriate solution for NAITA is to find an alternative site somewhere else. S/P&H wished to have a meeting with the Ministry of Youth Affairs and Skills Development separately to discuss matters related to NAITA training canter at Waddullawatta.

Atomic Energy Authority (AEA) Sri Lanka

Functions under the purview of Ministry of Science and Technology and implement regulatory programs conforming to international standards on radiation safety, to ensure protection of workers, public and the environment from potentially harmful effects of ionizing radiation. AEA Head office located in Urugodawatta will be affected severely, loosing around 50% of its land. The representatives of AEA wished to shift the premises to alternative site, even away from congested city limits, like Battaramulla or Malabe.

Ministry expects to take this matter in a separate meeting with the Ministry of Science and Technology and senior staff of AEA. EE/Colombo will take actions on this.

State Timber Corporation

The impact on State Timber Corporation Depot located in Orugodawatta is limited to access road. However, State Timber Corporation premises is in the verge of changing its location as its area is needed by UDA for a construction project. Representatives of State Timber Corporation suggested discussing this matter with UDA too. Ministry agreed with this and accordingly, a meeting will be arranged with UDA regarding these premises and the involvement of the access road.

SD&CC

The affected land is limited to a staff quarters. SD&CC wished to have an alternative land for this lost.

Sri BadraKali Amman Kovil, Nawagampura

As shown by maps and drawings, around 95% of the premises will be affected. Rev. Shiwasri. K.L.M. Sarma , the incumbent priest of the Kovil wished to know whether area of shrine stone in the center could be saved. This may need detail ground surveys to exactly know the position, but the remaining land may not sufficient to accommodate this shrine stone at the same place. He wished to know whether only the hall which is used for weddings and ceremonies can be taken, leaving shrine area to remain for the Kovil. This need further studies.

Alternatively, Rev Sharma requested to rebuild a Kovil in nearby premises where alternative accommodation is provided for the people who need relocation elsewhere. Further, Rev. Sharma requested to have a meeting with Kovil devotees too to share information in this regard. CE/Colombo will arrange this meeting with Rev. Sharma, the chief priest of the Kovil.

Buddhist temple, Sancvhi Viharaya, Nawagampura

The impact on the temple is not severe. It is limited to a smaller area and the boundary wall including the gate. In case of buildings, it will affect only the building under construction now. The chief incumbent, Rev. Heenipelle Ariyadhamma thero, the chief incumbent agreed with the situation and expects reasonable compensation to make necessary adjustments. The reverent thero will arrange a meeting with temple devotees (Members of Dayaka Sabawa).

Sample- Attendance of male female participation at FGD meeting on 25.04.2013

PREPARATORY SURVEY ON TRAFFIC IMPROVEMENT PROJECT AROUND NEW KELANI BRIDGE

(Focus Group Meeting)

For APs of Wadullawatte GN Division (509 D)

Venue : Community Hall at wadullawaththa G.N. Division (Participating of wadullawaththa G.N. Division)
ස්ථානය

Date : 25. 04. 2013
දිනය

Time : 10.30 am. to 12.00 P.m
වේලාව

Attendance පැමිණීම

No අංකය	Name නම	Designation තනතුර	Institution/Organization ආයතනය/ සංවිධානය	Signature අත්සන
1 M	R.A.D.J. [illegible]		[illegible]	
2 M	M.A.M Jamaldeen		"	
3 M	R SIVANESAN		"	RSiva
4 M	A. Rangana [illegible]		24/A	
5 M	P.U. Moorthy		A/5	
6 M	Paul [illegible]		A/3	
7 M	Nanda Manawasam		Convent Pre School	
8 F	K.K.P. Priyadarshani		"	
9 M	[illegible]		"	
10 F	L.P [illegible]			
11 F	[illegible]			
12 F	[illegible]			
13 M	[illegible]	[illegible]		
14 M	[illegible]			
15 M	[illegible]	[illegible]	[illegible]	
16 F	PRIYADARSHANI		[illegible]	
17 M	J.B. [illegible]	56/1	[illegible]	
18 M	S.Chandrasekar	C/15	NAWAM MAWATHA, NUWARAPITIYA	
19 M	H. L. [illegible]	[illegible]	E-11, [illegible]	
20 M	D.G. SARATH	NO. 2.C. 5	WADUCLA GAMPURA	
21 F	Aysha Jalaldeen		N-6 [illegible]	
22 M	Jalaldeen	NO-N-6		
23 F	K. G. Sunetha	7/2 D	WADUCLA WALLAM PITIYA	Sunetha
24 M	M.S.H. Kais	60/561 B	[illegible]	
25 F	W.K. [illegible]	60/586 A	[illegible]	
26 M	[illegible]	60/415	[illegible]	
27 M	[illegible]	60/585	[illegible]	
28 F	[illegible]	60/586 C	[illegible]	
29 M	[illegible]	60/586 A	[illegible]	
30 F	[illegible]	60/590 A	[illegible]	
31 M	[illegible]	60/593 [illegible]	[illegible]	

Page 8 of 5

PREPARATORY SURVEY ON TRAFFIC IMPROVEMENT PROJECT AROUND NEW KELANI BRIDGE

FOR EIA STUDY AND RESETTLEMENT ACTION PLAN

Minutes of 2nd Stakeholder Meeting

Date: **11 July 2013 from 9:30AM-12:00AM**

Venue: **Sri Lanka Foundation Institute – 100, Independent Square, Colombo 7.**

Organized by: **Road Development Authority**

Participants: Cabinet Ministers, Officials of RDA (Director General, Officials of Planning Division , Environment and Social Development Division , Chief Engineer's Office Colombo) , Officials from Central Environmental Authority, Sri Lanka Land Reclamation and Development Corporation, Atomic Energy Authority, UDA, Ministry of Defense, Sri Lanka Police, Colombo Municipal Council, Ceylon Petrolium Corporation, NWS&DB, Provincial Council MP's, Municipal Council MP's ,Divisional Secretaries, Grama Niladari's , Government MP's from Colombo Districts, Officials from JICA, Officials from Oriental Consultants (Design Consultant) , Clergy from Amman Kovil & Sanchi Temple, and Consultants from Consulting Engineers and Architects Associated Pvt. LTD .

Stakeholders from affected GN Divisions i.e. Wadullawatte/Sedawatte, Navagampura, Granspadss, Peliyagoda Gangabada and Bloemandhal with their representatives and affected business owners and media personnel.

(List of Participants given in Attachment- A)

Presentation Material: Two PowerPoint Presentations were made by Mr. H M K G G Bandara, Director Planning Division and Mr. Hudson Silva – Director ESD RDA is outlining the main features of the project**,** its objectives, project benefits, social impacts (resettlement issues) etc. Latest findings of the EIA and RAP in terms of social impacts were presented to the stakeholders.

(English Leaflet is given in Attachment- B)

Speeches & Presentations

Cabinet Minister A H M Fowzie addressed the stakeholders and stated that when a project such as these are implemented to develop and beautify Colombo there could be temporary impacts. Colombo District is a vast area with many ongoing and proposed projects. All Government development work should be implemented in collaboration with the stakeholders to achieve success. Traffic jams in Peliyagoda area are severe and this projects underway to ease that traffic jam. About 450 houses will be affected and alternative resettlement will provided to the affected parties through RDA with the help of the Minister Mr. Nirmla Kotalawala without any inconvenience to the stakeholders. He said that although there will be some dissatisfaction of stakeholders during the project implementation everybody will praise the outcome.

Secretary to the Ministry of Ports & Transport Mr. R W Ranjith Premasiri provided an introduction to the project and stated that RDA has invited the Japanese Government to carry out this study on the instructions of the President who is the Minister of Ports and Highways. JICA survey team who carried out initial studies have studied for alternative routes and selected one alternative route for implementation. A bridge will be constructed across the Kelani River. This process will cause temporary inconvenience to public. Government usually informs the public of the details of the project as their ideas are important. Before this meeting there were other official discussions with MP's, Government officials and representative of the clergy of

affected Buddhist Temple and Kovil. The concurrence of all the parties is expected to successfully implement the project.

Mr. Bandara Director Planning Division RDA- Said that providing an efficient transport system to public is a duty of the government such as construction of an expressway network is now underway. The Colombo Kandy expressway is one such project. This will be connected to New Kelani Bridge shortly. Roads are mainly used for good and commuter transportation against other media such as train or waterways. He showed that average traffic entry amounts to New Kelani Bridge increases gradually until 2030 horizon. After discussions with UDA , RDA and Ministry of National Planning Government with the help of Japanese Government started the Colombo Transport Study and this project is a sub project emanated through that study. He said that 4 alternative routes were studied and one was selected for implementation. The proposed bridge across the Kelani River is a special bridge which will serve as the northern gate to Colombo city, serves as the nexus between the Bandaranayaka International Airport and Colombo city. The bridge will have an iconic value in Colombo City.

Mr. Hudson Silva Director ESD-RDA made a presentation consisting Introduction, Selection of Routes and Environmental/Social Impacts and the social impacts identified from the EIA and RAP. Road transport usage amounts to 98% over other transport media, hence an efficient transport network is important.

A New Kelani Bridge will be constructed parallel to the existing New Kelani Bridge and the project's network will be connected to Colombo Road and Colombo Puttlam Road. He showed the traffic forecast for the project area and stated that the project is needed to cater to increased future traffic flow.

He briefly indicated the EIA process for the project and stated that the EIA study is being carried out to the Terms of Reference provided by CEA as this project is a "Prescribed Project" in terms of CEA regulations. He stated the RAP was carried out an entitlement matrix was prepared for the assessment of compensation. He said that totals 449 families and 54 business premises will be affected and 360 families will be affected in the GN Divisions of Sedawatte and Wadullawatte alone. Total number of affected people will be 1915. He said that Amman Kovil, Sanchi Temple, Atomic Energy Authority and Automobile Workshop of NAITA would be affected.

He indicated the proposed tentative resettlement plan as follows.

Affected people with land titles will be provided alternative places for resettlement and/or compensation according to the entitlements.

1. For persons without titles action will be taken to resettle them in close proximity.
2. The workshop of NAITA will be reestablished in a UDA land.
3. Atomic Energy Authority will be shifted to a UDA land at Malabe
4. Seventy percent (70%) of Amman Kovil will be affected and its rehabilitation or reestablishment is still being worked out.

Key Views Expressed by participants During the Discussion Time:

Following key views were expressed by various participants such as members from affected stakeholder groups, Grama Niladari's, public officials and the views/questions expressed and the replies by RDA officials Ministers and MP's have been listed in the following Table

Views Expressed by Line Agency and Public Participants	Replies by RDA Officials/MP's and Ministers
GN of Navagampura Stage 2 It is said that extra 25 houses will be affected because of the shifting of Amman Kovil. The shifting of Kovil's decision has been taken yet. People will be inconvenienced because of this latest development. In the affected area there are title holders, persons with no land titles, renters etc. and all of them should be suitably considered. Renters should be especially considered as they are very innocent people.	
Residents of Navagampura Stage 2 Do not demolish extra 25 houses to make room for the Kovil. The other kovil nearby could be used instead of Amman Kovil for worshipping.	No firm decision has been taken yet regarding the demolition of extra 25 houses.
Residents Kamkarupura We do not know exactly know how many houses will be affected in Kamkarupura. Resettlement should be in close proximity. If resettled at a far off place our livelihood will be affected. Please relocate us around Orugodawatte Junction.	None will be resettled at far off places. All will be resettled at close proximity according to the decision taken by the Ministry of Port and Highways.
Residents Wadullawatte We need resettlement at a nearby place. If we will be resettled at a far off place our livelihood would be affected our children's schooling will be affected as they go to nearby schools. Some houses are used as divided houses and several family units dwell in them. When compensation or resettlement is considered these subdivisions should be considered. We need resettlement in Kollonnawa electorate itself. We need facilities like electricity, toilet water supply etc.	None will be resettled at far off places. All will be resettled at close proximity according to the decision taken by the Ministry of Port and Highways. Title holders and non-title holders will be suitably considered.
Atomic Energy Authority We would like to be relocated in the land at Malabe only.	Please contact UDA to get further information
Affected Businessman They wanted to know approximately when the project starts. If the affected area could be marked it will help us identify the acquisition boundaries in advance.	Only preliminary designs are available now. Exact boundaries will be marked after the detailed designs.
Residents Sedawatte 3rd Stage Twenty one houses will be affected. For these houses land titles are available and they are not illegal constructions. We want to know the starting date of construction and compensation payment time.	No concrete answer could be provided as the project is still in feasibility stages. Address of RDA Environmental and Resettlement Division may provide to the participants for direct any grievance or a complaint regarding any issue affecting them.

Minister of Ports and Highwways Mr. Nirmala Kotelawala, MP Thilanga Sumathipala, MP Prabha Ganeshan and Mr. Duminda Siva also spoke.

MP Mr. Thilanga Sumathipala- We have very good relations with the Ministry of Ports and Highways and the ministry takes all actions to muster public views. He also said this development will help smooth container transport from Colombo Port and Bandaranayaka International Airport. There could be traffic, dust and vibration impacts from the project during construction. These impacts should be reduced with the help of all parties.

MP Mr. Duminda Silva- I work very closely with the public of Kollonnawa area and I will take the responsibility of providing alternative houses in a close by location.

MP Mr. Prabha Ganeshan- Sacrifices have to be made during development**.** People will be temporarily affected.

Minister Mr. Nirmala Kotelawala – As a responsible ministry we have considered public views. Dedication of people is needed to successfully implement the project. The willingness of people should be obtained from the project implementation without hindering their livelihood. Still the project is in the planning stage and time is available to resolve issues. Even transmission lines will be affected. Stakeholders should not have any suspicion to the effect that they will be resettled at a far off place affecting their livelihood and schooling of children. The final plan will be discussed with people.

Vote of Thanks was proposed by RDA Chief Engineer Colombo Ms. Darshika Jayakodi.

Photographs of various stages of the meeting are given below.

Attachment A- List of Participants

Attachment B- Leaflets in Different Languages

Photographs

















Attachment A- List of Participants

NO	NAME	DESIGNATION	ORGANIZATION
1	Miss. Namal Ralapanawa	Senior Project Specialist	JICA
2	Mr. H Tashima	Environmental Specialist	Oriental Consultants
3	Mr. Eiji Yonezawa	Bridge Engineer	Oriental Consultants
4	Mr. Thakuma Oguni	Highway Engineer	Oriental Consultants
5	Mr. Kumi Okayama	Environment Specialist	Oriental Consultants
6	Mr. Hiroko Sakai	Highway Engineer	Oriental Consultants
7	Mr. Shigeru Sai	Environment Specialist	Oriental Consultants
8	Mr.Ranjith Premasiri	Secretary	Ministry of Ports & Highways
9	Mr. D.D. Mathraarachchi	Director	Ministry of Ports & Highways
10	Mr.U W Senarathna	Divisional Secretary	Kolonnawa
11	Mrs. W H V Pushpamala	Divisional Secretary	Kelaniya
12	Mr. J.A.V.S. Jayakody	Dy Director –ESD	RDA
13	Mr. S.H.U.De Silva	Director -ESD	RDA
14	Mrs. D.A.S . Jayasekara	Chief Engineer (Colombo)-ESD	RDA
15	Mr. B.A.R. Premarathna	Project Director-WP	RDA
16	Mr. T.L.M. Fernando	Project Director D-OCH	RDA
17	Mr. M.P.K.L. Gunarathna	Project Director -OCH	RDA
18	Mr. V.G. Liyanagamage	EE-Colombo	RDA
19	Mr. D. Ganeshan	Director -Highway	RDA
20	Mr. T.S..H. Abewickrama	Project Director OCH2	RDA
21	Mr. M.D,Saman Samarakoon	Engineer –CE Office	RDA
22	Brig. N D S P Niwunnella	Brigadier	Ministry of Defense
23	Maj. A N S K Wijewardana	Major	Ministry of Defense
24	Mr.Budhika Ranawaka		Ministry of Defense
25	Mr.A Senarathna	D I G Traffic	S L Police
26	Mr.Jayantha A.Gamage	Director Engineer	L M C
27	Mr.D.A.J.Ranwala	Specialist(EIA)	Consulting Engineers & Architects Associated Pvt (Ltd)
28	Mr. D.P,Adhikari	Specialist(RP)	-do-
29	Mr.Saranga Gajasingha	Specialist(Environment)	-do-
30	Mrs. S.K.K.Ranasingha	Project Coordinator	-do-
31	Mr. W.L.S.B. Perera	Supervisor	-do-
32	Mr.P S L Gajanayaka	Sup. of Surveyors	Survey Department
33	Mr.E Dayasena	Deputy Chief Valuer	Valuation Dept.
34	Mr.K K D U Bandara	Deputy Chief Valuer	Valuation Dept.
35	Mr.N H N Madushanka	Engineer	Sri Lanka land reclamation development Corporation
36	Mr.P Wijerathna	A G M	-do-
37	Mr.S T D O Warapitiya	Engineer	National water supply & Drainage Board
38	Mr.K L Edirisingha	C E(CMB)	-do-
39	Mr.M T D Abewardana	CE (P&D)	-do-
40	Mr. H S Kariyawasam	Director	National Institute of Training Authority
41	Mr. G M P A Bellana	Director	-do-
42	Mr.Anura Malagala	Deputy Principal	-do-
43	Mr.P.L. Dahanayake	Project Engineer	Sri Lanka Ports Authority
44	Mr.A L M Noufer		-do-
45	Mr. D L L Wickramasingha	Director	Atomic Energy Authority
46	Mr.M M P Wijesekara	SDD (FSA)	-do-
47	Mr.Chamal Menaka	Environment Specialist	MCUDA / MODUI
48	Mrs.Swarna Kusumseeli	-	Urban Development Authority
49	Mr.B A R A Kumara	PO	-do-
50	Mr.Hemal Lakpathum	PA	-do-

51	Mr.K A N Kumara	Manager	National Housing Development Authority
52	Mr.H M K A Bandara	Manager	-do-
53	Mr.M.M.Iqbal	D. Manager	State Timber Corporation
54	Mr.M.K.Gunasingha	Manager (Dev)	Ceylon Petroleum Corporation
55	Mr.Nissanka Jayawardana	MS/MI	C P S T L
56	Mr.A R Jahan	AD/DP	
57	Mr.Sujeewa Godage	Asst. Secretary	
58	Mrs.Shanthini J Mohan	Grama Niladari	Bluemandal
59	Mr.S Uruthiran	Grama Niladari	Nawagampura
60	Mr.K.D.A.S. Jayawardana	Grama Niladari	Sedawatta
61	Mr.Ranjith karunadasa	Grama Niladari	Orugodawatta
62	Mr. M.D. Senadeera	Senior Technical Officer	RDA
63	Mr. C. Weerawardhana	Technical Officer	RDA
64	Mrs. K.D.D. Mihirani	Graduate Trainee	RDA
65	Mr. K.A.S.K. Gamage	Graduate Trainee	RDA
66	Mr. G.A.D. Gunasekara	Management Assistant	RDA
67	Mrs. H.G.M. Madushani	Management Assistant	RDA
68	Mrs. W.G.N. Dilushini	Management Assistant	RDA
69	Mrs. S. Suji	Management Assistant	RDA
70	Mr. K.M.A.S. Bandara	Management Assistant	RDA
71	Mr. C.K. Thotawatta	Technical Assistant	RDA
72	Mr. R.D.A.M.H.K. Niyangoda	Administrative Assistant	RDA
73	Mr. G.I. Ossman	Account Assistant	RDA

Priests

1	Ven. Seenipalle Ariyadamma Thero	Chief Priest -Sanchi Viharaya	Wadullawatta
2	Ven. Baragama Wimalathissa Thero	Priest –Somaloka Viharaya	Stace Road
3	Ven. Mohan Sharma	Priest- Badra Amman Kovil	Wadullawatta

APS of Wadullawatta Grama Niladari Division

1	Mrs.H.A.Lilani	AP	Wadullawatta
2	Mr.W.H.M Jafrenam	AP	Wadullawatta
3	Mr.K.Niwton	AP	Wadullawatta
4	Mr. D.P. Sanjeewa	AP	Wadullawatta
5	Mr. B.W Predeep Nishantha	AP	Wadullawatta
6	Mr. Predeep Sanjeewa	AP	Wadullawatta
7	Mrs. Kanagamma	AP	Wadullawatta
8	Mr.K.M. Laxman Weeraratna	AP	Wadullawatta
9	Mrs. Alijinna Fathima Ziyana	AP	Wadullawatta
10	Mrs. N.N. Samanmali	AP	Wadullawatta
11	Mrs. Nithyakalyani	AP	Wadullawatta
12	Mrs. Samanthi	AP	Wadullawatta
13	Mr. Moorthi	AP	Wadullawatta
14	Mrs. Sewanamma	AP	Wadullawatta
15	Mr. N. Dinesh	AP	Wadullawatta
16	Mrs. Mebel	AP	Wadullawatta
17	Mrs. K. Kanlee	AP	Wadullawatta
18	Mr. S.A. Chandrarathna	AP	Wadullawatta
19	Mr. Kangavan	AP	Wadullawatta
20	Mrs. Nimesha	AP	Wadullawatta
21	Mrs. I. Yogalechchami	AP	Wadullawatta
22	Mrs. Aysha	AP	Wadullawatta
23	Mrs. Chandrawathi	AP	Wadullawatta

24	Mr. Thowiththar	AP	Wadullawatta
25	Mrs. Wannamma	AP	Wadullawatta
26	Mr. A.G. Dhammika	AP	Wadullawatta
27	Mrs. V. Malarkodi	AP	Wadullawatta
28	Mr. Imam Meiza	AP	Wadullawatta
29	Mrs. Shanthi	AP	Wadullawatta
30	Mrs. Geethanjali	AP	Wadullawatta
31	Mrs. A. Prasitha	AP	Wadullawatta
32	Mrs. R. Jesintha	AP	Wadullawatta
33	Mrs. K.V. Silawathi	AP	Wadullawatta
34	Mr. M. Kamal	AP	Wadullawatta
35	Mr. P.Deya	AP	Wadullawatta
36	Mr. K. Shankar	AP	Wadullawatta
37	Mrs. S.H. Farida	AP	Wadullawatta
38	Mr. A.S. Pole	AP	Wadullawatta
39	Mr.B.Mulantha	AP	Wadullawatta
40	Mr. D.M. Priyantha Bandara	AP	Wadullawatta
41	Mr. D. Srikandan	AP	Wadullawatta
42	Mr. M.M. Yosh	AP	Wadullawatta
43	Mrs. T. Jeewakani	AP	Wadullawatta
44	Mrs. V. Priya	AP	Wadullawatta
45	Mrs. M.T.F. Janisa	AP	Wadullawatta
46	Mrs. P. Poornima	AP	Wadullawatta
47	Mrs. A.B. Chandrika	AP	Wadullawatta
48	Mr. A.F.M.M. Jayantha	AP	Wadullawatta
49	Mr. N.L. Premathilaka	AP	Wadullawatta
50	Mrs. K.D. Dilhani	AP	Wadullawatta
51	Mrs. R. Leesa	AP	Wadullawatta
52	Mr. M. Yaswaran	AP	Wadullawatta
53	Mr. M.H. Jasath	AP	Wadullawatta
54	Mrs. M. Sharmila	AP	Wadullawatta
55	Mr.J.B. Fernando	AP	Wadullawatta
56	Mr.N.M. Udayakumara	AP	Wadullawatta
57	Mr.K.C. Mogan	AP	Wadullawatta
58	Mr.A. Nadarajen	AP	Wadullawatta
59	Mr.Razi Gampola	AP	Wadullawatta
60	Mrs. D.P.G. Kalyani	AP	Wadullawatta
61	Mr.M. Priyantha	AP	Wadullawatta
62	Mr.M. Suren	AP	Wadullawatta
63	Mr.M.K. Musif	AP	Wadullawatta
64	Mr.M.V.A.S. Gunawardhana	AP	Wadullawatta

APS of Sedawatta Grama Niladari Division

1	S.Suresh	AP	Sedawatta
2	M.Rajasegar	AP	Sedawatta
3	Mrs. P.Lechchumee	AP	Sedawatta
4	K.Ratnakumara	AP	Sedawatta
5	Mrs. S.P Mariya Pushpa	AP	Sedawatta
6	Mr. M.T.Motdai	AP	Sedawatta
7	Mrs. Padmini	AP	Sedawatta
8	Mrs. Theresa	AP	Sedawatta
9	Mrs. Pandimei	AP	Sedawatta
10	Mrs. M.Prasawathi	AP	Sedawatta
11	Mr. Najeebdeeen	AP	Sedawatta
12	Mr. M.Rausdees	AP	Sedawatta
13	Mr. Selvaraja	AP	Sedawatta

14	Mr. Rathnakumar	AP	Sedawatta
15	Mr. Noorullreyya	AP	Sedawatta
16	Mrs. Uwamma	AP	Sedawatta
17	Mrs. Pathima Sara	AP	Sedawatta
18	Mrs. S.Danalechchami	AP	Sedawatta
19	Mrs. Meenambi	AP	Sedawatta
20	Mrs. S.A. Chandrika	AP	Sedawatta
21	Mrs. R.A Sujeewa	AP	Sedawatta
22	Mrs.Ramzan Beebee	AP	Sedawatta
23	Mrs. Chandrika Priyangani	AP	Sedawatta
24	Mrs. K.Sellamma	AP	Sedawatta
25	Mrs.S.A.G.Indrani	AP	Sedawatta
26	Mrs. Saroja	AP	Sedawatta
27	Mrs. Nirajani	AP	Sedawatta
28	Mrs. Helan	AP	Sedawatta
29	Mrs. Lelida Dewi	AP	Sedawatta
30	Mrs. Salvi	AP	Sedawatta
31	Mrs. N.S.Beebi	AP	Sedawatta
32	Mrs. L.kamalawathi	AP	Sedawatta
33	Mrs. D.G.Mapinona	AP	Sedawatta
34	Mrs. Priyanthi Deepika	AP	Sedawatta
35	Mrs. S.A,Mangalika	AP	Sedawatta
36	Mrs. S.A.Saroja	AP	Sedawatta
37	Mrs. Udayangani	AP	Sedawatta
38	Mr. K.L.Wimalasena	AP	Sedawatta
39	Mrs. R.Rajini	AP	Sedawatta
40	Mrs. J.Pathmini	AP	Sedawatta
41	Mr. T.Udayakumara	AP	Sedawatta
42	Mr. Darshana Perera	AP	Sedawatta
43	Mr. Wijitha Rohan	AP	Sedawatta
44	Mr. Suranga Sanjeewa	AP	Sedawatta
45	Mrs. M.A.D.Kamalawathi	AP	Sedawatta
46	Mr. Dayananda Kaluarachchi	AP	Sedawatta
47	Mrs. Rohini	AP	Sedawatta
48	Mrs. Geetha	AP	Sedawatta
49	Mrs. Asha Dulanjali	AP	Sedawatta
50	Mrs. Vijitha Swarnalatha	AP	Sedawatta
51	Mr. Premarathne	AP	Sedawatta
52	Mrs. Airangani	AP	Sedawatta
53	Mr. F.A.Farsi	AP	Sedawatta
54	Mrs. Nansi Perera	AP	Sedawatta
55	Mrs. Wimalawathi	AP	Sedawatta
56	Mrs. Priyanthi	AP	Sedawatta
57	Mrs. Kusumawathi	AP	Sedawatta
58	Mrs. Niluka	AP	Sedawatta
59	Mrs. Nilmini	AP	Sedawatta
60	Mr. Nimal	AP	Sedawatta
61	Mrs. Wimalawathi	AP	Sedawatta
62	Mr. L.A.Ayirin	AP	Sedawatta
63	Mrs. Nandani	AP	Sedawatta
64	Mrs. Sasi Mapawita	AP	Sedawatta
65	Mrs. Pushparaja	AP	Sedawatta
66	Mrs. Renuka Ranasinghe	AP	Sedawatta
67	Mr. M.K.Albert	AP	Sedawatta
68	Mr. T.Somadasa	AP	Sedawatta
69	Mr. Balakrishnan	AP	Sedawatta
70	Mr. N.P.Silva	AP	Sedawatta

71	Mrs. Uyathani	AP	Sedawatta
72	Mrs. Gayesh	AP	Sedawatta
73	Mrs. Rihaya	AP	Sedawatta
74	Mrs. Sindirika	AP	Sedawatta
75	Mr. R.M.Wimala	AP	Sedawatta
76	Mr. Silwam	AP	Sedawatta
77	Mr. Wiprem	AP	Sedawatta
78	Mrs. Dinusha	AP	Sedawatta
79	Mrs. N.P.Pearl	AP	Sedawatta
80	Mr. Ewlin	AP	Sedawatta
81	Mrs. Muditha Dilhani	AP	Sedawatta
82	Mrs. Pathum Sugandi	AP	Sedawatta
83	Mr. A.H.J.Muhawara	AP	Sedawatta
84	Mr. Subasiri	AP	Sedawatta
85	Mrs. A.A.Wasanthi	AP	Sedawatta
86	Mr. Mosst	AP	Sedawatta
87	Mrs. Padmini	AP	Sedawatta
88	Mrs. T.Mery	AP	Sedawatta
89	Mrs. Saraswathi	AP	Sedawatta
90	Mr. Jayantha Perera	AP	Sedawatta
91	Mrs. T.Vanaja	AP	Sedawatta
92	Mr. P.Janasekaran	AP	Sedawatta
93	Mrs. A.R.Nabeesa	AP	Sedawatta
94	Mrs. K.K.S.Winifrida	AP	Sedawatta
95	Mrs. Salena	AP	Sedawatta
96	Mrs. Chandralatha Silva	AP	Sedawatta
97	Mr. Siwalokanathan	AP	Sedawatta
98	Mrs.R.G. Lalitha	AP	Sedawatta

APS of Nawagampura Grama Niladari Division

1	Mr. G.W.B.Pushpakumara	AP	Nawagampura
2	Mr. E. Premasiri Silva	AP	Nawagampura
3	Mrs. L.A.D.P. Sriyalatha	AP	Nawagampura
4	Mr. A.Y.P. Rajasooriya	AP	Nawagampura
5	Mr. Jayantha Kumara	AP	Nawagampura
6	Mrs. Nalika Nalani	AP	Nawagampura
7	Mr. Daya Ranasingha	AP	Nawagampura
8	Mrs. Nilanthi Roshani	AP	Nawagampura
9	Mrs. S. Nalinidevy	AP	Nawagampura
10	Mrs. S. Amirthagowry	AP	Nawagampura
11	Mr. H.A. Sudesh	AP	Nawagampura
12	Mr. K.A. Priyarathna	AP	Nawagampura
13	Mr. Hari Thamas	AP	Nawagampura
14	Mr. M.F.M. Faiz	AP	Nawagampura
15	Mr. L.R. Rathnayaka	AP	Nawagampura
16	Mrs. N.Damayanthi Fernando	AP	Nawagampura
17	Mrs. T.H. Sunitha	AP	Nawagampura
18	Mrs. A.K. Sunitha	AP	Nawagampura
19	Mr. M.D. Perera	AP	Nawagampura
20	Mr. Sivali Lokusooriya	AP	Nawagampura
21	Mrs. Asoka Kanthilatha	AP	Nawagampura
22	Mr. K. Raveyan	AP	Nawagampura
23	Mrs. S. Premakanthi	AP	Nawagampura
24	Mr. R. Anandakumara	AP	Nawagampura
25	Mr. S. Nadaraja	AP	Nawagampura
26	Mr. P.G.N. Jayasingha	AP	Nawagampura

27	Mr. M.S.M. Nalim	AP	Nawagampura
28	Mr. C. Dalugodhawaththa	AP	Nawagampura
29	Mr. Thusitha Perera	AP	Nawagampura
30	Mr. M.S.m. Iqbal	AP	Nawagampura
31	Mr. W.S. Dayan	AP	Nawagampura
32	Mr. W. A. Priyanthi	AP	Nawagampura
33	Mr. K.W. Perera	AP	Nawagampura

APS of Grandpass (North)Grama Niladari Division

1	Mr.G.N Hameed	Osaka Car Sale	Grandpass
2	Mr S.Hmirthegory		Grandpass
3	Mr J.L. Ariyaratna	Technician	Grandpass
4	Mr R.P.A.Perera		Grandpass
5	Mr. K.Pathmanadan		Grandpass
6	Mr J.Kalaywanam		Grandpass

APS of Bluemandhal Grama Niladari Division

1	Mr.M.A.J.Nihal Prabath		
2	Mr.P.A.S.D.P.Jayawardena	Group Finance Manager	K.Duwin & Company
3	Mr.M.Dilun Maclarans		K.Duwin & Company

APS Peliyagoda – Gangabada Niladari Division

1	Mr.S.A.U.Dias		Peliyagoda – Gangabada
2	Mr.Maheepala Hewabatege		Peliyagoda – Gangabada
3	Mr.E.N.Wijeratna		Peliyagoda – Gangabada
4	Mr.M.A.Ranasingha		Peliyagoda – Gangabada
5	Mr.R.A.Chandrasena		Peliyagoda – Gangabada
6	Mr.M.D.R.B.Munasingha		Peliyagoda – Gangabada
7	Mr.Anthony Aruchas		Peliyagoda – Gangabada
8	Mr.Somasundarm Gobihasan		Peliyagoda – Gangabada
9	Mr.Mahinda Jayaratna		Peliyagoda – Gangabada
10	Mr.H.A.L.Jayampathi		Peliyagoda – Gangabada
11	Mr.Quntin Kronemberg		Peliyagoda – Gangabada

Others

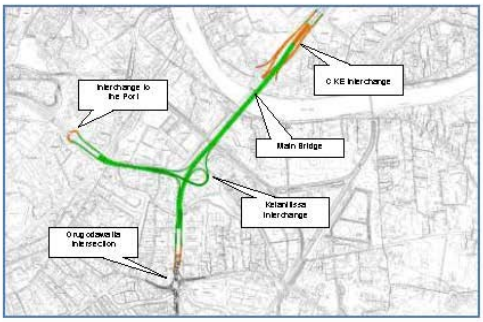
1	Mr.Mirundula Thambaiah	Journalist	''Sunday Times''
2	Mrs.Nishani Karunaratna	Executive Director	Sena Mils
3	Mr.Niel A Perera	Managing Partner	Suravi International
4	Mr. Pregeeth Fernando	Manager	Wijaya Graphics
5	Mr. Tharindu Malinga	Manager	Piyachan work
6	Representative		SOS Motors
7	Mr.Amila Gamage		
8	Mr. Sansdlc	Manager	Ston Logistics
9	Mr. Hasitha		Smart Logistics
10	Mr.C.U.Wicramapala		Ganis Motors
11	Mr. K.A.Saranapala		Pala Auto Electricals
12	Mr. D.Madawan	General Manager	Ganis Motors
13	Mr.C.Sangakumaran	Consultant	
14	Mr.V. Pakyanathan	Salesman	

15	Mr.Rajesh Kanna	Businessman	
16	Mr.Nihal Ratnayaka	Businessman	
17	Mr.K.Bowella	Executive	J L Morrison's Company
18	Mr.Gayan Wijethunga	Program Manager	Green Movement
19	Mr.S.A.Upul Kaldera	Civil Engineer	Univision Lanka
20	Mrs.S.A.M.Priyadarshani	Businesswoman	

Politicians- Ministers - Parliament Ministers - 02
Members of Parliament - 03
Members of Provincial Council (WP) - 02
Media 10 Persons

Annex 9.1
Environmental Management Plan & Monitoring Plan

Attachment B- Leaflets in Different Languages



Objectives of the project

Broad Objective of the project is to provide efficient and safe connectivity between Colombo Katunayake Expressway (CKE), Colombo Kandy Road, Peliyagoda Puttalam road, Colombo port and Baseline road while preserving the nature and to assist the needs of the growing economy.

Specific Objectives:

- To construct a new bridge of six lanes on the upstream of the existing Kelani bridge, elevated viaducts and interchanges to connect CKE, Colombo Port and Baseline road.
- To avoid extra loading on the existing new Kelani bridge and increase the durability of the bridge.
- To increase the transportation efficiency within Colombo city.

2

Key features of the project

Description	Details
Starting point	Peliyagoda Palama Junction (Starting point of the Colombo – Katunayaka Expressway)
End points	Orugodawatta Junction and Ingurukade Junction
Total length of bridge	Approximate length of the main bridge is 415 m.
Number of lanes	The number of lanes of the main line from CKE to Kelanithissa interchange is 6 lanes, from Kelanitissa interchange to Orugodawatta interchange is 4 lanes and Port access road (Ingurukade Junction) is 4 lanes.
Affected Divisional Secretariat Divisions (D S Divisions)	Colombo D S Division, Kollonnawa D S Division and Kelaniya D S Division.

Mitigation of adverse environmental and social impacts

Project related land acquisition may cause adverse environmental and social impacts, and it is necessary to address them with adequate mitigation measures mainly in line with Land Acquisition Act, National Involuntary Resettlement Policy and National Environment Act. The aim of this approach is to assure that affected people of the project will be protected from ill effects of this development.

Identifying the affected persons (APs)

- Socio Economic Survey and an Inventory of Loss (IOL) Survey will be conducted to identify the socio-economic profiles of APs including whether they hold titles to the lands they occupy.
- A Resettlement Plan will be prepared based on above information.

3



Compensation for the affected persons

All affected persons will be compensated based on Land acquisition act, its regulations and policies of the government in this regard.

For any assistance or clarification please contact:

For further information on the proposed development project you could contact Director, Deputy Directors or Resettlement Officer of Environmental and Social Development Division of RDA and the Chief Engineer, Colombo Region of the RDA

Address:	
Director, Environment and Social Development Division, Road Development Authority "Sethsiripaya", Battaramulla. T.P. No: 011-2862443, E. Mail: esd.rda@gmail.com	Chief Engineer, Colombo Region, No 05, Manthree Place, Park Road, Colombo 05 T.P. No: 011- 2590744

Date: 8/4/2013

4

PREPARATORY SURVEY ON TRAFFIC IMPROVEMENT PROJECT AROUND NEW KELANI BRIDGE



The 2nd New Kelani Bridge is proposed to be built as an elevated bridge to the existing New Kelani bridge. This bridge will cross the Kelani River upstream of the present bridge, and connect the Colombo – Katunayake Expressway (E02), Colombo – Kandy road (A001), Peliyagoda – Puttalam road (A003), Baseline road and Colombo Port Access road.

Present situation

The existing 'New Kelani bridge' is located at the cross roads of Colombo – Kandy (A001) road, Peliyagoda – Puttalam (A003) road, Colombo – Katunayake Expressway (E02) and the Baseline Road. This bridge is one of main North South links across the Kelani River.

- Currently there is severe traffic congestion at Peliyagoda and Ingurukade Junctions at peak periods of the day.
- Colombo – Katunayaka Expressway Project and Colombo Port Expansion Project are major development projects around the existing New Kelani bridge. After completion of these projects, traffic will significantly increase and New Kelani bridge will become a bottleneck for traffic.
- Therefore, a new bridge is urgently needed to relieve traffic loading on the existing bridge ensuring reliability and the safety of road users. Road Development Authority (RDA) has proposed to build a 'Second New Kelani Bridge' as an elevated bridge to the existing New Kelani Bridge upstream of the river. This bridge will reduce the traffic congestion at the city entrance providing a fast and reliable access while extending the lifespan of the existing New Kelani Bridge as well.

1



බලපෑමට ලක් වන පුද්ගලයන්ට වන්දි ලබා දීම

බලපෑමට ලක් වන සියලුම අයට ඉඩම් අත්පත් කර ගැනීමේ පනත (1950), ඒ යටතේ ඇති නිර්දිෂ්ට සහ මේ සම්බන්ධ රජයේ ප්‍රතිපත්ති අනුව වන්දි ලබා දෙනු ඇත.

වැඩි විස්තර සහ පැහැදිලි කිරීම් පනත සඳහන් නිලධාරීන්ගෙන් ලබා ගත හැකිය.

ලිපිනය අධ්‍යක්ෂ (ESD) පාරිසරික හා සමාජීය සංවර්ධන අංශය මාර්ග සංවර්ධන අධිකාරිය 3 වන මහල "සෙත්සිරිපාය", බත්තරමුල්ල.	ප්‍රධාන ඉංජිනේරු කොළඹ කොට්ඨාශය නො 05, මන්ත්‍රී පෙදෙස, උදයන මාවත, කොළඹ 05.
දුරකතන - 011-2862443 විද්‍යුත් තැපෑල : esd.rad@gmail.com	දුරකතන - 011-2590744

දිනය :8/4/2013

නව කැලණි පාලම අවට රථවාහන ගමනාගමනය කාර්යක්ෂම කිරීම සඳහා වන මූලික සමීක්ෂණය.

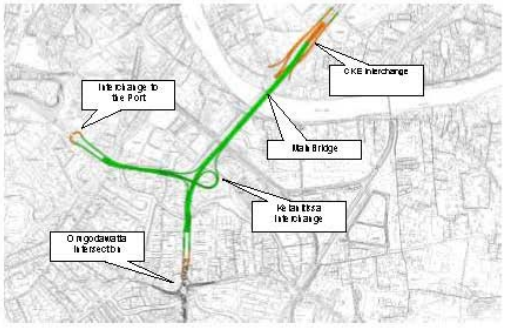


දැනට තිබෙන නව කැලණි පාලමට අමතරව දෙවන නව කැලණි පාලමක් ඉදිකිරීමට යෝජනා වී ඇත. මෙම පාලම කැලණි ගඟ හරහා දැනට ඇති පාලමට සමාන්තරව ගඟ ඉස්මත්තේ ඉදිකෙරෙන අතර මෙම පාලම සහ මාර්ග පද්ධතිය කොළඹ - කටුනායක අධිවේගී මාර්ගය (E 02) කොළඹ - නුවර පාර (A 001), පෑදියගොඩ - පුත්තලම මාර්ගය (A 003), බේස්ලයින් පාර සහ කොළඹ වරාය ප්‍රවේශ මාර්ගය යා කරනු ඇත.

වර්තමාන තත්ත්වය

දැනට පවතින නව කැලණි පාලම කොළඹ - නුවර (A 001) මාර්ගය, පෑදියගොඩ - පුත්තලම (A 003) මාර්ගය, කොළඹ - කටුනායක අධිවේගී මාර්ගය (E 02), බේස්ලයින් යන මාර්ග එක්වන සන්ධිස්ථානයක පිහිටා ඇත. එනිසාම මෙම පාලම කොළඹ නගරයට ඇතුළුවන උතුර දකුණ යා කරන ප්‍රධාන පිවිසුම් දොරටුවක් ලෙස හැඳින්විය හැකිය.

- දැනට පැළියගොඩ හන්දියේත්, ඉඳුරංකඩේ හන්දියේත් අධික රථවාහන තදබදයක් දවසේ බොහෝ වේලාවන්හි දී පවතී.
- ඉදිවෙමින් පවතින කොළඹ - කටුනායක අධිවේගී මාර්ගයේ සහ කොළඹ වරාය පුළුල් කිරීම යන වැදගත් සංවර්ධන ව්‍යාපෘතීන්හි වැඩ නිම වීමෙන් පසුව ගමන් ගන්නා රථ වාහන ප්‍රමාණය වැඩි වීමෙන් මෙම ප්‍රදේශයේ (නව කැලණි පාලම අවට) රථවාහන තදබදය තවත් වැඩිවිය හැකිය
- මෙම කරුණු නිසා පවතින නව කැලණි පාලමේහි වාහන තදබදය අඩු කිරීමටත්, එහි කල්පැවැත්මටත්, මෙම මාර්ගය භාවිත කරන්නන්ගේ ආරක්ෂාව වැඩිකිරීම සහ ඔවුන්ට වඩා හොඳ සේවයක් ලබා දීමටත් ඉතා ඉක්මණින් අලුතින් පාලමක් ඉදිකිරීම අත්‍යවශ්‍ය වී ඇත. මේ නිසා මාර්ග සංවර්ධන අධිකාරිය දෙවන නව කැලණි පාලමක් දැනට ඇති පාලමට ඉහළ මට්ටමකින් සහ ගඟ ඉස්මත්තෙන් ඉදිකිරීමට යෝජනා කර ඇත. යෝජිත පාලම මෙම ප්‍රධාන නගර පිවිසුම් ස්ථානයේ මාර්ග තදබදය අඩුකර ඉක්මන් හා වඩා විශ්වාසනීය සේවයක් සපයනු ඇත. තව ද මෙම ඉදිකිරීම දැනට ඇති මාර්ගයේ දිගැස කාලීන පැවැත්ම තහවුරු වීමට ද හේතුවනු ඇත.



ව්‍යාපෘතියේ අරමුණු

ආර්ථික සංවර්ධනයේ අවශ්‍යතාවයක් සපුරාමින්, ස්වභාව ධර්මය ද සංරක්ෂණය කරමින් කොළඹ - කටුනායක අධිවේගී මාර්ගය (CKE), කොළඹ - මහනුවර මාර්ගය, පැළියගොඩ - පුත්තලම මාර්ගය, කොළඹ වරාය හා බේස්ලයින් මාර්ගයන් සුලභ කාර්යක්ෂම වූත්, ආරක්ෂිත වූත් මාර්ග සම්බන්ධතාවයක් සලසා දීම මෙම ව්‍යාපෘතියේ මූලික අරමුණ වේ.

විශේෂිත අරමුණු

- කැලණි ගඟ හරහා දැනට ඇති පාලමට වඩා ගඟ ඉස්මත්තෙන් මංතීරු 6 ක පාලමක් ද කොළඹ - කටුනායක අධිවේගී මාර්ගය, කොළඹ වරාය ප්‍රවේශය හා බේස්ලයින් මාර්ගය සම්බන්ධ කරමින් හුවමාරු ස්ථාන සහ ගුවන් පාලම් ද ඉදි කිරීම.
- පාලම ඉදිකිරීමෙන් දැනට ඇති නව කැලණි පාලමට වාහන ගමනාගමනයෙන් වන භාණ්ඩ අඩුවීම නිසා වැයි දිරිසෑ කාලීන පැවැත්ම ද තහවුරු කිරීම.
- මෙම ව්‍යාපෘතියෙන් කොළඹ නගරයේ ගමනාගමන කාර්යක්ෂමතාවය වැඩි කිරීම.

ව්‍යාපෘතියේ ප්‍රධාන අංග

කොටස	විස්තරය
ආරම්භ වන ස්ථානය	පැළියගොඩ පාලම හන්දිය (කොළඹ - කටුනායක අධිවේගී මාර්ගය පටන් ගන්නා ස්ථානය)
අවසන් වන ස්ථාන	මිරුගොඩවත්ත හන්දිය සහ ඉඳුරංකඩේ හන්දිය
පාලමේ මුළු දිග	ප්‍රධාන පාලමේහි දිග මීටර් 415 පමණ වේ
මංතීරු සංඛ්‍යාව	➢ කොළඹ කටුනායක අධිවේගී මාර්ගය අවසන් වන තැන සිට කැලණිතිස්ස හුවමාරුවට මංතීරු 6කි. ➢ කැලණිතිස්ස හුවමාරුවේ සිට මිරුගොඩවත්ත මංසන්ධියටත් ඉඳුරංකඩේ හන්දියටත් මංතීරු 4 බැගින්.
බලපෑමට ලක්වන ප්‍රාදේශීය ලේකම් කොට්ඨාස	➢ කොළඹ ප්‍රාදේශීය ලේකම් කොට්ඨාශය ➢ කොළොන්නාව ප්‍රාදේශීය ලේකම් කොට්ඨාශය ➢ කැලණිය ප්‍රාදේශීය ලේකම් කොට්ඨාශය

අහිතකර පාරිසරික හා සමාජීය බලපෑම් සන්සිඳුවීම

ව්‍යාපෘතියට අවශ්‍ය ඉඩම් ලබා ගැනීමේ දී අහිතකර පාරිසරික හා සමාජීය බලපෑම් අනිවාර්යවම ඉඳ ඇත. මේ නිසා මෙම කටයුතු වල බලපෑම් සන්සිඳුවීමට ක්‍රියාකළ යුතුය. මේ සම්බන්ධ ක්‍රියාවන් ඉඩම් අත්පත් කර ගැනීමේ පනත (1950), ජාතික අනිවිඡාගුහණ ප්‍රතිපත්තිය (2001) සහ ජාතික පාරිසරික පනත (1980) ට අනුකූල විනු ඇත. ප්‍රධාන පරමාර්ථය වන්නේ බලපෑමට ලක්වන ජනයා විසාපෘතියෙන් වන අහිතකර බලපෑම් වලින් ආරක්ෂා කිරීමයි.

බලපෑමට ලක් වන පුද්ගලයන් හඳුනා ගැනීම

- සමාජීය ආර්ථික සම්ක්ෂණය සහ පාඩු ලේඛනගත කිරීම හැලින් මෙම ව්‍යාපෘතිය නිසා බලපෑමට ලක් වන අයගේ සමාජීය ආර්ථික පැතිකඩක් (විස්තරයක්) හඳුනා ගැනීම ද බලපෑමට ලක් වන පුද්ගලයන්ගේ ඉඩම්වලට ඇති අයිතියේ ස්වභාවය තහවුරු කිරීම ද බලාපොරොත්තු වේ.
- ඉහත තොරතුරු වලට අනුව ප්‍රතිස්ථාපන ක්‍රියාකාරී සැලැස්මක් සකස් කරනු ඇත.

தாக்கங்களுக்கு உள்ளாகும் நபர்களை அறிந்து கொள்ளல்

- சமூக பொருளாதார ஆய்வு மற்றும் நட்ட அறிக்கையின் மூலம் இந்த திட்டத்தினால் தாக்கங்களுக்கு உள்ளாகும் நபர்களின் சமூக பொருளாதார விபரத்தினை அறிந்து கொள்ளலும் தாக்கங்களுக்கு உள்ளாகும் நபர்களின் காணியில் உள்ள உரிமத்தின் தன்மையினை உறுதிப்படுத்துதல் எதிர்பார்க்கப்படுகின்றது.
- மேற் குறிப்பிட்ட விபரங்களுக்கிணங்க மீள்குடியேற்றச் செயல்முறைத் திட்டம் தயாரிக்கப்படும்.

தாக்கங்களுக்கு உள்ளாகும் நபர்களுக்கு நட்டயீடு பெற்றுக் கொடுத்தல்.

தாக்கங்களுக்கு உள்ளாகும் காணிகளுக்கும் காணி கையகப்படுத்தல் சட்டம் (1950), அதன் கீழ் உள்ள சட்டவிதிமுறைகள் மற்றும் அது சம்பந்தமாக அரச கொள்கைகளிற்கிணங்க நட்டயீடு வழங்கப்படும்.

மேலதிக விபரம் மற்றும் தெளிவு படுத்துதல் கீழ் குறிப்பிடும் அலுவலர்களிடம் பெற்றுக்கொள்ளலாம்.

முகவரி பணிப்பாளர் (ESD) சுற்றாடல் மற்றும் சமூக அபிவிருத்தி பிரிவு, நெடுஞ்சாலை அபிவிருத்தி அதிகார சபை 5வது மாடி, செத்சிரிபாய, பத்தரமுல்ல. தொலைபேசி இலக்கம் - 011-2862443 மின்அஞ்சல் : esdrd@gmail.com	பிரதான பொறியியலாளர், கொழும்பு பிரிவு, இலக்கம் 5, மந்திரி பிரதேசம், காடன் மாவத்தை, கொழும்பு -05 தொலைபேசி இலக்கம் - 011 2590744

புதிய களனிப் பாலம் மற்றவட்டாரத்தில் வாகனப் போக்குவரத்தை செயற்திறன்மிக்கதாக்குவதற்கான அபிவிருத்தி ஆய்வு

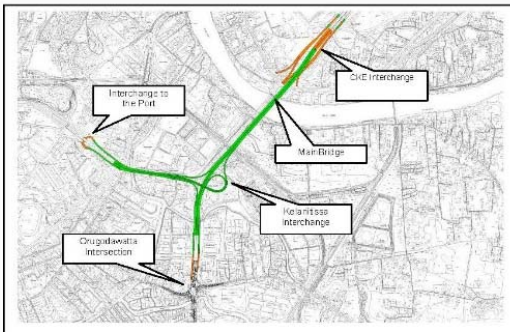


தற்போது இருக்கும் புதிய களனி பாலத்திற்கு மேலதிகமாக இரண்டாம் புதிய களனி பாலத்தினை நிர்மாணிப்பதற்கு பிரேரிக்கப்பட்டுள்ளது. இந்த பாலம் களனி கங்கை ஊடாக தற்போது உள்ள பாலத்திற்கு சமாந்தரமாக அமைக்கவும் மேலாக நிர்மாணிப்பதுடன் இந்த பாலம் மற்றும் தொகுதி கொழும்பு - கட்டுநாயக்கா அதிவேக நெடுஞ்சாலை (E 02) கொழும்பு – கண்டி வீதி (A 001), பேலியகொடை – புத்தளம் வீதி (A 003), பெல்லயின் வீதி மற்றும் கொழும்பு துறைமுகத்திற்கு பிரவேசிக்கும் பாதையுடன் இணைக்கப்படும்.

தற்போதய நிலை

தற்போது உள்ள புதிய களனி பாலம் கொழும்பு – கண்டி (A 001) வீதி, பேலியகொடை – புத்தளம் (A 003) வீதி, கொழும்பு – கட்டுநாயக்க அதிவேக நெடுஞ்சாலை (E 02), பெல்லயின் போன்ற வீதிகள் ஒன்றையும் சந்திப்பில் அமைந்துள்ளது எனவே இந்த பாலம் கொழும்பு நகரத்திற்கு உட்பிரவேசிக்கும் வடக்கு தெற்கும் இணையும் பிரதான உட்பிரவேசிக்கும் நுழைவாயில் என குறிப்பிடலாம்.

- தற்போது பேலியகொடை சந்தியிலும், இங்குருகடை சந்தியிலும் அதிக வாகன நெரிசல் நாளில் அதிக வேளை உள்ளது.
- நிர்மாணிக்கப்பட்டு வரும் கொழும்பு – கட்டுநாயக்க அதிவேக நெடுஞ்சாலை மற்றும் கொழும்பு துறைமுகம் விஸ்தரித்தல் போன்ற முக்கியமான அபிவிருத்தி வேலைத்திட்டங்களின் வேலைகள் பூர்தியானதன் பின்பு பிரயாணிக்கும் வாகனங்களின் எண்ணிக்கை அதிகரிப்பதினால் இந்த பிரதேசத்தின் (புதிய களனி பாலத்தினை சுற்றி) வாகனங்களின் நெரிசல் மேலும் அதிகரிக்கக்கூடும்.
- இக் காரணங்களினால் இருக்கும் புதிய பாலத்தின் வாகன நெரிசலை குறைப்பதற்கும், அதன் நீண்டகால பாவனைக்கும், இவ் வீதியினை பயன்படுத்துபவர்களின் பாதுகாப்பினை அதிகரித்தல் மற்றும் கலர்கலுக்கு சிறந்த சேவையினை பெற்றுக் கொடுப்பதற்கும் மிக விரைவில் புதிய பாலத்தினை நிர்மாணித்தல் அத்தியவசியமாக உள்ளது. இதனால் நெடுஞ்சாலை அபிவிருத்தி அதிகார சபை இரண்டாம் புதிய களனி பாலத்தை தற்போது உள்ள பாலத்திற்கு மேலாகவும் மற்றும் கப்பலுக்கு மேலாகவும் நிர்மாணிப்பதற்கு பிரேரித்துள்ளது பிரேரிக்கப்பட்ட பாலம் பிரதான நகர உட்பிரவேசிக்கு இடத்தில் பாதைகளில் உள்ள நெரிசலை குறைக்கு தீர்மானமாக மற்றும் அதிக நம்பிக்கையான சேவை வழங்கப்படும். மேலும் இதன் நிர்மாணிப்பு தற்போது உள்ள பாதையில் நீண்ட கால பாவனையினை உறுதிப்படுத்துவதற்கும் காரணமாகும்.



திட்டத்தின் நோக்கம்

பொருளாதார அபிவிருத்தி தேவைகளை பூர்தி செய்து இயற்கை நியதியையும் பாதுகாத்துக்கொண்டு கொழும்பு – கட்டுநாயக்க அதிவேக நெடுஞ்சாலை (CKE), கொழும்பு – கண்டி வீதி, பேலியகொடை – புத்தளம் வீதி, கொழும்பு துறைமுகம் மற்றும் பெல்லயின் வீதிக்காக செயற்திறன்மிக்கதுமானதும், பாதுகாப்பானதும்மான வீதிகளை இலைப்பை பெற்றுக்கொடுத்தல் இத் திட்டத்தின் முக்கிய நோக்கமாகும்.

விசேடமான நோக்கம்

- களனி கங்கை ஊடாக தற்போது உள்ள பாலத்தைவிட கங்கைக்கு மேலாக 6 வழிஓடுபாதை கொண்ட பாலமும் கொழும்பு – கட்டுநாயக்க அதிவேக நெடுஞ்சாலை, கொழும்பு துறைமுக உட்பிரவேசம் மற்றும் பெல்லயின் வீதி இணைத்துக்கொண்டு பரிமாற்று இடம் மற்றும் மேம்பாலத்தினை நிர்மாணித்தல்.
- பாலத்தினை நிர்மாணிப்பதன் மூலம் தற்போது உள்ள புதிய களனி பாலத்திற்கு வாகன போக்குவரத்தினால் ஏற்படும் பாதிப்பு குறைவதினால் அதன் நீண்டகால பாவனையினை உறுதிப்படுத்துதல்.
- இத் திட்டத்தினால் கொழும்பு நகரத்தின் போக்குவரத்து செயற்திறனை அதிகரித்தல்.

திட்டத்தின் முக்கிய பிரிவு

பிரிவு	விபரம்
ஆரம்பிக்கும் இடம்	பெலியகொட பாலம் சந்தி (கொழும்பு – கட்டுநாயக்க அதிவேக நெடுஞ்சாலை ஆரம்பிக்கப்படும் இடம்)
நிறைவுபெறும் இடம்	ஒறுகொடவத்தை சந்தி மற்றும் இங்குருகடை சந்தி
பாலத்தின் மொத்த நீளம்	பிரதான பாலத்தின் நீளம் சுமார் 415 மீட்டர் ஆகும்.
வழிப்பாதை எண்ணிக்கை	➢ கொழும்பு – கட்டுநாயக்க அதிவேக நெடுஞ்சாலை நிறைவு பெறும் இடத்திலிருந்து களனிதிஸ்ஸ பரிமாற்றத்திற்கு 6 வழிப்பாதைகள் ➢ களனிதிஸ்ஸயில் பரிமாற்றத்திலிருந்து ஒறுகொடவத்தை சந்திக்கும் இங்குருகடை சந்திக்கும் 4 வழிப்பாதை வீதம்.
தாக்கங்களுக்கு உள்ளாகும் பிரதேச செயலக பிரிவு	➢ கொழும்பு பிரதேச செயலகப் பிரிவு ➢ கொலன்னாவ பிரதேச செயலகப் பிரிவு ➢ களனி பிரதேச செயலகப் பிரிவு

பாதிக்கும் சுற்றாடல் மற்றும் சமூக தாக்கத்தினை தவிர்த்துக் கொள்ளல்

திட்டத்திற்கு தேவையான காணியினை பெற்றுக்கொள்ளும் போது பாதிக்கும் சுற்றாடல் மற்றும் சமூக தாக்கம் ஏற்படுவதற்கு சந்தர்ப்பம் உண்டு. இதனால் இவ் நடவடிக்கைகளில் தாக்கத்தினை தவிர்த்துக் கொள்வதற்கு செயற்பட வேண்டும். அது சம்பந்தமாக நடவடிக்கைகள் காணியினை கைப்பற்றும் சட்டம் (1950), தேசிய விருப்பற்ற கொள்கை (2001) மற்றும் தேசிய சுற்றாடல் சட்டம் (1980) க்கு இனங்கதாகும். தாக்கங்களுக்கு உள்ளாகும் மக்களுக்கு திட்டத்தினால் ஏற்படும் பாதிப்பு தாக்கங்களில் இருந்து பாதுகாத்தல் பிரதான நோக்கமாகும்.



Annex 9.1 Environmental Management Plan(EMP) and Environmental Monitoring Plan(EMoP)

Annex 9.1A- 1 Environmental Management Plan(EMP)

This Environmental Management Plan (EMP) is developed based on the information available at Feasibility Study stage of the project. This EMP to be updated during the Detail Design stage especially with location details before incorporating it to the tender documents of the project. Environmental and Social Development Division of RDA will assist the Detail design team to incorporate such information to update the EMP.

Item	Proposed Mitigation Measures			Monitoring Plan	Monitoring Agency/ Division
	Before construction	During construction	During operation		
Social Environment					
Involuntary Resettlement (impacts of relocation)	● Minimizing the affected area in the design. ● Developing awareness among the public about the project. ● Carry out census survey on all affected persons and developing a Resettlement Plan with a project specific "Entitlement Matrix". Acquiring land and paying compensation as per Land Acquisition act, Regulations 2008 and entitlement matrix of the project."	● Further assistance to affected persons as per guidelines of "entitlement matrix" (if required).	● Not required.	***Before construction*** Monitoring and evaluation of the implementation of resettlement plan (Refer to RAP)	RDA (ESD) ,PMU UDA
Local economy such as employment and livelihood etc.	● Payment of compensation as per the entitlement matrix. ● Assisting Affected persons to restore the livelihood activities through Income Restoration Programs.	● Providing adequate parking areas for private institutions which lose land from their parking lots.	● Providing adequate parking areas for private institutions which lose land from their parking lots.	***Beforeand during construction*** Monitoring andevaluation of resettlement plan (refer to RAP)	RDA (ESD) PMU

Item	Proposed Mitigation Measures			Monitoring Plan	Monitoring Agency/ Division
	Before construction	**During construction**	**During operation**		
Disruption of existing infrastructure facilities	● Relocation of Automobile Training Institute, Atomic Energy Authority Building, 132 KV power lines in consultation and satisfaction of relevant line agencies.	● Risks of accidental disruption can be reduced by ensuring that machinery such as excavators, cranes are operated by trained personnel and that operations are adequately supervised. ● A layout plan having location details of all utility lines should be given to the work supervisor/s.	● Not required.	***During construction*** Monitor the shifting of the facilities and other utility supply lines	RDA(ESD)P,PMU,Local Authorities
Possible nuisance to neighborhood	● Not required.	● Strict labor supervision will be implemented to avoid any conflicts arising due to migrant labor. ● Awareness programs will be conducted at worker camps on sanitation and diseases to avoid any worker camp waste being disposed near settlement areas. ● Providing temporary bypasses during construction, advance notice to the public will reduce the inconvenience caused to the public during the construction stage. ● To avoid nuisance to neighbors, will be study the traffic diversion plan	● Not required.	***During construction*** Monitoring of labor camp facilities at least once a month	RDA (ESD), PMU,CEA
Material transportation	● Not required.	● Use of covers over transported materials to guard against dust blow.	● Not required.	***During construction*** Monitor the compliance of contractor	RDA (ESD), PMU,CEA
Natural Environment					
Hydrological situation	● Planning of construction schedule coinciding with the dry flow period of Kelani river.	● Contractor to continually liaise with Irrigation Department and obtain their flood warnings for the use of evacuation and withdrawal from the site.	● Maintenance of all drainage structure such as canals, culverts so as to avoid any	***During construction and operation*** Monnitoring of the maintenance of drainage	RDA (ESD), PMU,Irrigation Department, Local Authorities, SLLRDC

Item	Proposed Mitigation Measures			Monitoring Plan	Monitoring Agency/ Division
	Before construction	During construction	During operation		
			blockage of drainage	structures	
Flora, Fauna and Biodiversity	● Not required	● Replant adequate number of trees based on recommendation from a landscape specialist.	● Study of recovery degree of the natural environment	***During construction/operation*** Site verification survey operation	RDA (ESD), PMU,CEA and DS
Landscape	● Not required	● Adoption of a design that matches the existing landscape	● Maintaining the green belt		
Pollution					
Water quality (surface/ground water)	● Not required.	● Contractor will make employees aware on water conservation and waste minimization in the construction process. ● The contractor shall protect sources of water (portable or otherwise) such as water sources used by the community so that continued use these water sources will not be disrupted by the work. ● Installation of oil and grease traps at vehicle service station and yard. ● Avoid any direct discharge of waste water from worker camps on to nearby water bodies. ● All cement, bitumen (barrels), oil and other chemicals will be stored and handled on an impervious surface (concrete slab) above ground level with roof and ridge around the structure to avoid any storm water flowing in to the facility.	● Not required.	***During construction*** Measuring selected water quality parameters as per the EMoP r.	RDA (ESD), PMU,CEA and Local Authority, WRB
Air quality	● Not required.	● Construction vehicles to be serviced and maintained on a regular basis.	● Regular cleaning of road surface to	***During construction*** Measure dust level at	RDA (ESD), PMU,CEA and Local Authority

Item	Proposed Mitigation Measures			Monitoring Plan	Monitoring Agency/ Division
	Before construction	During construction	During operation		
		● Regular sprinkling of water over construction surface. ● Transporting aggregate, gravel and other construction material with proper cover. ● Storage of cement and other chemicals in an enclosed environment with adequate ventilation ● Use of tarpaulin to separate construction area from residential areas and other sensitive areas such as temple, Hindu Kovil. ● All plants to be operated as per the stipulated guidelines in EPL.	remove dust.	locations where air quality was measured for baseline once a month. ***During Operation***Measuring air quality at same locations for confirmation of effects.	
Noise and vibration	● Not required.	● All machinery and equipment will be well maintained and fitted with noise reduction devices in accordance with manufacturer's instructions. ● Construction sites within 150 m of the nearest habitation, noisy construction work such as crushing, concrete mixing and batching, mechanical compaction, etc., will be stopped between 20.00 hours to 06.00 hours. In silence zone (areas up to 100 m around such premises as schools and religious places) no hot-mix, batching or aggregate crushing plant will be allowed. No construction shall take place within 100m around noise sensitive sites, such as educational institutional religious places, noisy equipment shall not be used during noise sensitive times of the day. ● Noise limits for construction equipment used in this project (measured at one meter from the edge of the equipment in free field) such as compactors, rollers, front loaders, concrete mixers,	● Not required.	***During construction*** To monitor any cracks appearing on the walls of structures. Measurement of noise levels at sensitive locations such as Sanchi Temple, Hindu Kovil on New Kelani bridge road ***During operation*** Measure noise level at same locations for confirmation of effects.	RDA (ESD), PMU,CEA and Local Authority

Item	Proposed Mitigation Measures			Monitoring Plan	Monitoring Agency/ Division
	Before construction	During construction	During operation		
		cranes (moveable), vibrators and saws shall not exceed 75 dB(A). ● All vehicles and equipment used in construction shall be fitted with exhaust silences. During routine servicing operations, the effectiveness of exhaust silencers shall be checked and if found to be defective shall be replaced. ● Workers in vicinity of strong noise, and workers working with or in crushing, compaction, batching or concrete mixing operations shall be provided with protective gear. ● Contractor shall take appropriate action to ensure that construction works do not result in damage to adjacent properties due to vibration. ● Contractor shall carry out monitoring at the nearest vibration sensitive receptor during blasting or when other equipment causing vibration are used. ● The contractor shall modify the method of construction until compliance with the criteria, if vibration levels exceed the relevant vibration criteria.			
Contamination of soil and ground subsidence	● A precondition survey of the properties within a 25 m corridor on either side to the proposed ROW to be carried out before the construction works.	● Vehicles/ machinery and equipment servicing and maintenance work shall be carried out only in designated locations/ service stations approved by the engineer. ● Bentonite used for pile operations will not be disposed on to nearby lands and surface water bodies. ● Waste oil, other petroleum products and untreated wastewater shall not be discharged to	● Not required	***During Construction*** Monitoring waste quantity and quality, such as excavated soil, waste soil and so on.	RDA (ESD), PMU,CEA and Local Authority, Contractor

Item	Proposed Mitigation Measures			Monitoring Plan	Monitoring Agency/ Division
	Before construction	During construction	During operation		
		the ground so that to avoid soil pollution. Adequate measures shall be taken against pollution of soil by spillage of petroleum/oil products from storage tanks and containers.			
Accidents, worker health and safety	● Informing the public about the project.	● Awareness programmes for all worker groups on sanitation and diseases. ● At every workplace, first aid kit shall be provided as per the regulations. At every workplace an ambulance room containing the prescribed equipment and nursing staff shall be provided. ● Contractor shall comply with the provisions in Health and Safety regulations under the Factory Ordinance with regard to provision of health and safety measures and amenities at work place(s). ● All workers employed in hazardous activities shall be provided with the necessary protective gear. These activities include mixing asphalt material, cement, lime mortars, concrete etc., welding work, work at crushing plants, blasting work, operators of machinery and equipment such as power saws, etc. ● All electrical wiring and supply related work will confirm to British Standards (BS) or relevant Sri Lankan Standards. Adequate precautions will be taken to prevent danger of electrocuting from electrical equipment and power supply lines including distribution boards, transformers, etc. Measures such as danger signboards, danger/red lights, fencing and lights will be provided to protect the public and workers.	● Not required	***During construction stage*** Monitor and record the frequency of Accidents of workers and traffic accidents Construction site confirmation Complaints related to the environment	ESD RDA, PMU,Local Authority,(Public Health Inspector Chief's Engineer, and Police Department, Factory Inspection Egineer, Labour Department

Item	Proposed Mitigation Measures			Monitoring Plan	Monitoring Agency/ Division
	Before construction	During construction	During operation		
		Enforcement of traffic control plan.			
Waste	● Not reguired	● Contractor prior to the commencement of work shall provide lists of harmful, hazardous and risky chemicals/ material that will be used in the project work to the Engineer. ● Labor camps shall be provided with adequate and appropriate facilities for disposal of sewerage and solid waste. The sewage systems shall be properly designed, built and operated so that no pollution to ground or adjacent water bodies/watercourses takes place. ● Waste, oil and grease from service yards and workshop area should only be disposed at approved locations after treatment. ● Used cement bags should not be burned, they should be returned to the manufacturer. ● Contractor shall also provide the list of places where such chemicals/materials or their containers or other harmful materials have been dumped as waste at the end of the project. ● The contractor shall clean up any area including water-bodies affected/contaminated (if any) as directed by the engineer at his own cost.	● Not required	***During construction*** Periodical monitoring once a month	ESD RDA CEA and Local Authority, SLLRDC
Traffic congestion	● Not required	● Setup diversion for minimization of construction traffic congestion ● Setup of sidewalk along the construction area ● The contractor shall follow the relevant labor law	● Not required	***During construction stage*** Monitoring of traffic congestion	RDA (ESD), PMU,CEA and Local Authority, Police Department

RDA= Road Development Authority ESD= Environmetal and Social Division, WRB= Water Resources Board, PMU= Project Management Unit, CEA= Central Environmetal Authority SLLRDC= Sri Lanka Land Reclamation and Development Corporation

Annex 9.1B-Environmental Monitoring Plan(EMoP)

Environmental component	Project Stage	Parameters to be Monitored	Location	Frequency	Standards	Rate (Rs.)	Amount (Rs.)	Implementation and Supervision
Air Quality	Before construction stage	SPM, PM10, NO_2, CO, SO_2, Pb (including wind direction and velocity at time of measurement)	8 locations (Sri Bhoopala Vinayaker Kovil, Peliyagoda; Sri Lanka Cement Cooperation Outlet, Peliyagoda; Jayantha saw mills, Sedawatta road; Premises of Minimuthu Suppliers, Wellampitiya; Shanchi Viharaya, New Kanani Bridge Road; Near premises of Mr. H.A Piyasena, No.31/10, Orugodawatta; Near premises of Mr.M.J.M. Badurdeen, No 12, Baseline Road, Orugodawatha; Near premises of Sri Somaloka Viharaya, No. 150, States Road) **Note: Baseline monitoring of air quality parameters was done at the above locations.**	Once	NAAQS of Sri Lanka	Per sample 40,000	320,000	Contractor (to take measurement using an organization acceptable to CEA) RDA through Supervision consultant with close consultation with ESD Division
	During construction stage	SPM, PM10, NO_2, CO, SO_2, Pb (including wind direction and velocity at time of measurement)	8 locations (Sri Bhoopala Vinayaker Kovil, Peliyagoda; Sri Lanka Cement Cooperation Outlet, Peliyagoda; Jayantha saw mills, Sedawatta road; Premises of Minimuthu Suppliers, Wellampitiya; Shanchi Viharaya, New Kanani Bridge Road; Near premises of Mr. H.A Piyasena, No.31/10, Orugodawatta; Near premises of Mr.M.J.M. Badurdeen, No 12, Baseline Road, Orugodawatha; Near premises of Sri Somaloka Viharaya, No. 150, States Road)	Construction - 4 times/Yr for 3 Yrs (however, additional measurements may need to be taken in case there are complaints of deterioration of air quality)	NAAQS of Sri Lanka	Per sample 40,000	3,840,000	Contractor(to take measurement using an organization acceptable to CEA) RDA through Supervision consultant with close consultation with ESD Division
	During operation stage	SPM, PM10, NO_2, CO, SO_2, Pb (including wind direction and velocity at time of measurement)	3 locations (Should be decided during detail design stage)	On any complaint basis	NAAQS of Sri Lanka	Per sample 40,000	120,000	RDA through ESD Division CEA
Water Quality	Before construction stage	Temperature, pH, Electrical Conductivity, DO,	5 locations including 2 locations on Kelani river (upstream and downstream)	Once	CEA Water Quality Regulation	Per sample 10,000	50,000	Contractor(to take measurement using an organization acceptable to CEA

Environmental component	Project Stage	Parameters to be Monitored	Location	Frequency	Standards	Rate (Rs.)	Amount (Rs.)	Implementation and Supervision
		BOD, Total Suspended Solids, Oil and grease, Total Coliform count.						RDA through Supervision consultant with close consultation with ESD Division
	Before construction stage	Temperature, pH, Electrical Conductivity, DO, BOD, Total Suspended Solids, Oil and grease, Total Coliform count.	5 locations including 2 locations on Kelani river (upstream and downstream)	Construction – 4 times/Yr for 3 Yrs	CEA Water Quality Regulations	Per sample 10,000	600,000	Contractor(to take measurement using an organization acceptable to CEA RDA through Supervision consultant with close consultation with ESD Division
	During Operation stage	Temperature, pH, Electrical Conductivity, DO, BOD, Total Suspended Solids, Oil and grease, Total Coliform count.	5 locations including 2 locations on Kelani river (upstream and downstream) –Should be decided during detail design stage	On any complaint basis	CEA Water Quality Regulations	Per sample 10,000	50,000	RDA through ESD Division CEA
	Before construction stage	Leq 90 and Leq 50 values and ground vibration levels	8 locations (Sri Bhoopala Vinayaker Kovil, Peliyagoda; Sri Lanka Cement Cooperation Outlet, Peliyagoda; Jayantha saw mills, Sedawatta road; Premises of Minimuthu Suppliers, Wellampitiya; Shanchi Viharaya, New Kanani Bridge Road; Near premises of Mr. H.A Piyasena, No.31/10, Orugodawatta; Near premises of Mr.M.J.M. Badurdeen, No 12, Baseline Road, Orugodawatha; Near premises	Once	CEA Regulations on ambient noise levels and permissible ground vibration levels	Per sample 10,000	80,000	Contractor(to take measurement using an organization acceptable to CEA RDA through Supervision consultant with close consultation

Environmental component	Project Stage	Parameters to be Monitored	Location	Frequency	Standards	Rate (Rs.)	Amount (Rs.)	Implementation and Supervision
			of Sri Somaloka Viharaya, No. 150, States Road) **Note: Baseline monitoring of noise levels and vibration were done at above locations.**					with ESD Division
Noise and vibration	During construction atage	Leq 90 and Leq 50 values and ground vibration levels	8 locations (Sri Bhoopala Vinayaker Kovil, Peliyagoda; Sri Lanka Cement Cooperation Outlet, Peliyagoda; Jayantha saw mills, Sedawatta road; Premises of Minimuthu Suppliers, Wellampitiya; Shanchi Viharaya, New Kanani Bridge Road; Near premises of Mr. H.A Piyasena, No.31/10, Orugodawatta; Near premises of Mr.M.J.M. Badurdeen, No 12, Baseline Road, Orugodawatha; Near premises of Sri Somaloka Viharaya, No. 150, States Road)	Construction - 4 times/Yr for 3 Yrs (however, additional measurements may need to be taken in case there are complaints of high noise and vibration levels).	CEA Regulations on ambient noise levels and permissible ground vibration levels	Per sample 10,000	960,000	Contractor(to take measurement using an organization acceptable to CEA RDA through Supervision consultant with close consultation with ESD Division
	During operation stage	Leq 90 and Leq 50 values and ground vibration levels	3 locations (Should be decided during detail design stage)	On any complaint basis	CEA Regulations on ambient noise levels and permissible ground vibration levels	Per sample 10,000	30,000	RDA through ESD Division Central Environmental Authority
Flora, Fauna & Biodiversity	During construction stage	Diversity of species	50 m up and down stream of the new bridge construction location. Area within ROW for the new approach roads	2 visits/year for 3yrs		Per sample 30,000	180,000	Contractor(to take measurement using an organization acceptable to CEA RDA/ESD Division

Environmental component	Project Stage	Parameters to be Monitored	Location	Frequency	Standards	Rate (Rs.)	Amount (Rs.)	Implementation and Supervision
	During Operation stage	Survival of trees	Land available within interchange areas	2 visits/ year for 2 years	Percentage of survival	Per sample 30,000	120,000	Chief Engineer's office RDA (ESD)
Total Cost							**5,750,000**	

Note:
CO=carbon monoxide, HC=hydrocarbons,
LA= Local authority, NAAQS= National Air Quality Standards, NO_2= Nitrogen Dioxide, Pb=lead, PM10= Reparable particulate matter<10micrometers diameter, RDA=Road Development Authority, SO_2=Sulphur dioxide, SPM= suspended particulate matter, ESD – Environmetal and Social Division,CEA = Central Environmental Authority

Above Environmental Monitoring Plan should be updated during project detail design stage before including into tender documents. The update EMoP should include rates and total cost for the monitoring program during the construction period. The contractor should secure monitory budget to cover the expenses for carrying out the monitoring program during the construction period.

ROAD DEVELOPMENT AUTHORITY
MINISTRY OF PORTS AND HIGHWAYS
THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA

Preparatory Survey on Traffic Improvement Project around New Kelani Bridge

DRAFT FINAL REPORT VOLUME3: Environmental Impact Assessment

JULY 2013

JAPAN INTERNATIONAL COOPERATION AGENCY
ORIENTAL CONSULTANTS CO., LTD.
KATAHIRA & ENGINEERS INTERNATIONAL

Volume II B
NBRO Reports

REPORT ON
THE MONITORING OF BASELINE AIR QUALITY FOR THE EIA STUDY FOR TRAFFIC IMPROVEMENT PROJECT AROUND NEW KALANI BRIDGE

(For Consulting Engineering & Architects Association (Pvt) Ltd)

(April 2013)

ENVIRONMENTALSTUDIES & SERVICE DIVISION
NATIONAL BUILDING RESEARCH ORGANISATION
99/1, JAWATTA ROAD
COLOMBO - 05
SRI LANKA.

Tel: 011-2588946, 011-2501834, 011-2503826. Fax: 011-2502611, e-mail: nbro@sltnet.lk

REPORT ON THE MONITORING OF BASELINE AIR QUALITY FOR THE EIA STUDY FOR TRAFFIC IMPROVEMENT PROJECT AROUND NEW KALANI BRIDGE

(For Consulting Engineering & Architects Association (Pvt) Ltd)

(APRIL 2013)

Date of Issued : 28th April 2013
Report No : NBRO/ENV/26201/2013/084a
AQP/2013/084a

Issued To:

Senior Project Coordinator,
Consulting Engineering & Architects Association (Pvt) Ltd.,
No. 500/5, Thalapathpitiya Road,
Madiwela,
Kotte.

Issued By:

Environmental Studies & Service Division
National Building Research Organisation
99/1, Jawatta Road
Colombo - 05
Sri Lanka.

This report contain ten pages

ආපදා කළමනාකරණ අමාත්‍යාංශය
அனர்த்த முகாமைத்துவ அமைச்சு
Ministry of Disaster Management

දුරකථන / தொலைபேசி / Telephone: 011-2588946, 011-2503431, 011-2500354
අධ්‍යක්ෂ ජනරාල් / பணிப்பாளர் நாயகம் / Director General: 011-2505149
ෆැක්ස් / தொலைநகல் / Fax: 011-2502611
වෙබ්අඩවිය / இணையத்தளம் / Website: www.nbro.gov.lk
ඊමේල් / மின்னஞ்சல் / E-mail: nbro@sltnet.lk

ජාතික ගොඩනැගිලි පර්යේෂණ සංවිධානය
தேசிய கட்டிட ஆராய்ச்சி நிறுவனம்
NATIONAL BUILDING RESEARCH ORGANISATION

99/1, ජාවත්ත පාර, කොළඹ 5.
99/1, ஜாவத்தை வீதி, கொழும்பு 5.
99/1, Jawatta Road, Colombo 5.

මගේ අංකය / எனது இல. / Our Ref.: NBRO/ENV/26201/2013/084a AQP/2013/084a

ඔබේ අංකය / உமது இல. / Your Ref.:

දිනය / திகதி / Date: 26th April 2013

Client: Senior Project Coordinator
Consulting Engineering & Architects Association (Pvt) Ltd.
No. 500/5, Thalapathpitiya Road,
Madiwela,
Kotte.

REPORT ON THE MONITORING OF BASELINE AIR QUALITY FOR THE EIA STUDY FOR TRAFFIC IMPROVEMENT PROJECT AROUND NEW KALANI BRIDGE

(April 2013)

(For Consulting Engineering & Architects Association (Pvt) Ltd)

1. SCOPE

Request was made by the client, Senior Project Coordinator, Consulting Engineering & Architects Association (Pvt) Ltd. No. 500/5, Thalapathpitiya Road, Madiwela, Kotte to the Environmental Studies & Service Division (ESSD) of National Building Research Organisation (NBRO) to measure the baseline air quality levels with respect to Nitrogen Dioxide (NO_2), Sulphur Dioxide (SO_2), Carbon Monoxide (CO), Carbon Dioxide (CO_2), Total Suspended Particulate Matter (SPM) and Particulate Matter Aerodynamic Diameter is less than 10μm in size (PM10) at selected locations around the Project area of the Traffic Improvement Project Around New Kalani Bridge to assess the baseline environmental condition for the Environmental Impact Assessment Study of the Project.

In this regard, the following officers of Environmental Division of NBRO carried out the air sampling program on 5th– 6th and 22nd-23rd April 2013.

Staff Involved:

Mr. H.D.S Premasiri	*- Senior Scientist*	*- Air Quality Studies*
Mr. D.M.M.R.Dissanayaye	*- Scientist*	*- Air Quality Studies*
Mr. W.A.Weerasinghe	*- Field Assistant*	*- Air Quality Studies*
Mr. N.Krishnamoorthi	*- Field Assistant*	*- Air Quality Studies*
Mr. A.S.Premarathna	*- Field Assistant*	*- Air Quality Studies*
Mr. M Fasmil	*- Field Assistant*	*- Air Quality Studies*

Cont.....2

2. DESCRIPTION OF THE PROJECT

The project has been initiated by Road development authority of Ministry of Port and Highways to study a situation to relives the traffic loading and traffic congestion around the new Keleni bridge area. As a result it is proposed to construct another bridge parallel to the existing bridge. Since the project is prescribed project under the National environmental Act and category A project under JICA (the funding agency to the project) Environmental and Social Consideration, it is require to Environmental Impact Assessment Study report for the project. This monitoring programme is scheduled to monitor baseline air quality date to assess the existing air quality levels around the project area to assess the existing environmental condition.

The project study area is area around the New Kalani Bridge within the Colombo Municipal Council area and Kelaniya Pradesiya Shaba area. The area can be considered as an urban area which industrial, commercial, residential activities and commercial & residential buildings, shanties, state office buildings etc are seen in the vicinity. The main sources that contribute to air pollution levels are vehicular, industrial, commercial and domestic emissions in the area.

3. WEATHER CONDITION

The monitoring day was a sunny day with fair scattered wind. The prevailing wind direction and speeds are given in table 1.

Table 1. Wind speed and direction during the sampling time.

Time	05 April 2013		06 April 2013		22 April 2013		23 April 2013	
	Wind Direction	Wind Speed (km/hr)	Wind Direction	Wind Speed (km/hr)	Wind Direction	Wind Speed (km/hr)	Wind Direction	Wind Speed (km/hr)
02:30	Calm	0	Calm	0	Calm	0	Calm	0
05:30	Calm	0	S	3.8	Calm	0	E	3.0
08:30	SSE	1.8	SW	2.0	SE	4.6	NE	4.2
11:30	W	6.4	WNW	10.6	S	8.4	SW	4.4
14:30	SW	6.0	W	10.6	SW	10.6	W	5.2
17:30	W	5.0	W	10.8	SW	8.2	NW	4.2
20:30	W	5.6	SW	4	Calm	0	NE	3.6
23:30	Calm	0	SW	2.8	Calm	0	Calm	0

Cont...3

4. AMBIENT AIR QUALITY MONITORING

4.1 AIR QUALITY SAMPLING LOCATIONS

Eight locations were selected by the client by consultation with the consultant for the monitoring of air quality to represent project activities. Location description is given in Table 2 and attached area map (Figure 1 & 2).

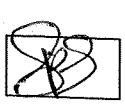
Table 2: Ambient air quality sampling location description

Location No.	GPS Coordinates	Location Description
Laq1	06^0 57' 20.01" N 079^0 53' 03.61" E	At the roadside of Kandy Road, in front of Sri Bhoopala Vinayaker Kovil, Peliyagoda
Laq2	06^0 57' 24.89" N 079^0 52' 57.38" E	At the roadside of Nigambo Road, Peliyagoda, in front of the Sir Lanka Cement Cooperation Outlet
Laq3	06^0 57' 13.21" N 079^0 52' 56.50" E	At the roadside of Seedawatha Road, Wellampitiya, close to the Jayantha saw mills
Laq4	06^0 57' 15.49" N 079^0 52' 52.02" E	At the Premises of Minimuthu Suppliers, No 43/1, Seedawatha Road, Wellampitiya
Laq5	06^0 57' 00.96" N 079^0 52' 39.74" E	At the premises of Shanchi Viharaya, New Kanani Bridge Road, Wellampitiya.
Laq6	06^0 56' 53.90" N 079^0 52' 44.60" E	At the roadside, close to the premises of Mr. H.A Piyasena, No.31/10, Orugodawatta, Wellampitiya.
Laq7	06^0 56' 41.17" N 079^0 52' 42.77" E	At the premises of Mr.M.J.M. Badurdeen, No 12, Baseline Road, Orugodawatha
Laq8	06^0 58' 36.66" N 079^0 52' 38.95" E	At the premises of Sri Somaloka Viharaya, No. 150, States Road, Colombo 14

- Refer attached layout map for further detail

4.2. SAMPLING AND ANALYTICAL CONDITIONS

Air samples were collected from selected locations as per the methods stipulated in National Ambient Air Quality Standards on eight (08) hour basis for the analysis of CO & CO_2 to cover 24 hours. Sampling duration for the analysis of SO_2, NO_2, SPM and PM10 were 24 hours. The sampling receiver height was about 3 m from the ground level and the sampling rates were 0.7 l/min for SO_2, NO_2 and 1 l/min for CO & CO_2. The sampling rate for SPM, PM10 & Pb sampling were 18 l/min. CO & CO_2 levels were measured at the site. After the sampling period, samples collected for the analysis of SO_2 and NO_2 were stored in a cooler box and SPM and PM10 samples were stored in filter cassettes and sent to the NBRO laboratory for the analysis.



Cont...4

Laboratory was received samples at 15:00 hrs on 05th April and 23rd April 2013 in satisfactory condition and they were analyzed on the same day for SO_2 and NO_2. SPM and PM10 samples were analysed on 10th April and 26rd April 2013 after drying to a constant weight in a dessicator. Sampling and analytical methods used for each parameter is given in table 3 below.

4.3 SAMPLING AND ANALYTICAL METHODS

Table 2: Description of the analytical methods for each parameter for ambient sampling

Parameter	Testing Method	Minimum Detection Limits of the Method	CEA Recommended method	Instrumentation
SO_2	ASTM D 2914 - 78, 1987 West-Gaek & Pararosaniline Spectrometric method	4 $\mu g/m^3$ (0.0015 ppm)	Pararosaniline method or equivalent (pulsed fluorescent method)	*Standard Personal Air Samplers * UV-Visible Spectrophotometer
NO_2	ASTM D 1607 - 76, 1987, Griess – Saltzman Reaction Method	4 $\mu g/m^3$ (0.002 ppm)	Colorimetric using Saltzman method or equivalent (gas phase Chemiluminescence)	*Standard Personal Air Samplers * UV – Visible Spectrophotometer
CO & CO_2	ASTM D 3162 – 78, 1987 Non - dispersive infrared Spectrometric method	1 ppm	Non - dispersive infrared(IR) spectroscopy	*REAIAQ analyser
SPM	ASTM D 4096 - 82, 1997 High - Volume Sampling and Gravimetric Analysis	2 $\mu g/m^3$	Hi - volume sampling, and Gravimetric	* High Volume Sampler * Sartorius analytical balance
PM10	ASTM D 4096 - 82, 1997 High - Volume Sampling and Gravimetric Analysis	2 $\mu g/m^3$	Hi - volume sampling, and Gravimetric	* High Volume Sampler with size selective sample inlet * Sartorius analytical balance

Cont...5

4.4 AMBIENT AIR QUALITY MONITORING RESULTS

Table 3: Concentration of each parameter at sampling location

Location	Sampling Date	Date of Analysis	Time average	Concentration (µg/ m^3)					
				SO_2 (µg/ m^3)	NO_2 (µg/ m^3)	CO (ppm)	CO_2 (ppm)	SPM (µg/ m^3)	PM_{10} (µg/ m^3)
Laq1	22.04.2013	22.04.2013	8 hrs	-	-	6.7	1120	-	-
		23.04.2013	24 hrs	24	28	4	670	-	-
		26.04.2013	24 hrs	-	-	-	-	72	43
Laq2	05.04.2013	06.04.2013	8 hrs	-	-	6.7	1080	-	-
		06.04.2013	24 hrs	274	25	4	650	-	-
		10.04.2013	24 hrs	-	-	-	-	157	68
Laq3	05.04.2013	06.04.2013	8 hrs	-	-	5	960	-	-
		06.04.2013	24 hrs	19	33	3	580	-	-
		10.04.2013	24 hrs	-	-	-	-	168	67
Laq4	05.04.2013	06.04.2013	8 hrs	-	-	3.3	970	-	-
		06.04.2013	24 hrs	12	18	2	580	-	-
		10.04.2013	24 hrs	-	-	-	-	91	55
Laq5	22.04.2013	22.04.2013	8 hrs	-	-	6.7	1030	-	-
		23.04.2013	24 hrs	31	33	4	620	-	-
		26.04.2013	24 hrs	-	-	-	-	66	39
Laq6	05.04.2013	06.04.2013	8 hrs	-	-	3.3	990	-	-
		06.04.2013	24 hrs	13	17	2	600	-	-
		10.04.2013	24 hrs	-	-	-	-	117	44
Laq6	22.04.2013	22.04.2013	8 hrs	-	-	5	940	-	-
		23.04.2013	24 hrs	17	16	3	560	-	-
		26.04.2013	24 hrs	-	-	-	-	52	31
Laq8	22.04.2013	22.04.2013	8 hrs	-	-	5	920	-	-
		23.04.2013	24 hrs	18	22	3	540	-	-
		26.04.2013	24 hrs	-	-	-	-	49	30

Cont...6

4.5 AMBIENT AIR QUALITY STANDARDS

Table 4a. The permissible Ambient Air Quality standards stipulated under the Extraordinary Gazette, No. 1562/22, August 15, 2008 by the Ministry of Environmental and Natural Resources of Sri Lanka.

POLLUTANT	TIME AVERAGE	CONCENTRATON ($\mu g/m^3$)
Sulfur Dioxide (SO_2)	24 hrs	80
Nitrogen Dioxide (NO_2)	24 hrs	100
Carbon Monoxide (CO)	8 hrs	10,000
Resparabale Particulate Matter (PM10)	24 hrs	100

Table 4b. As specified in ambient Air Quality Standards stipulated under the Extraordinary Gazette, No. 850/4, December 20, 1994, by the Central Environmental Authority of Sri Lanka.

POLLUTANT	TIME AVERAGE	CONCENTRATON ($\mu g/m^3$)
*Suspended Particulate Matter (SPM)	24 hrs	300

5. CONCLUTIONS

1. Measured existing ambient air quality levels with respect to SO_2, NO_2, CO and PM 10 were below the Ambient Air Quality Standards stipulated by the Ministry of Environment & Natural Resources of Sri Lanka (Extraordinary Gazette No. 1562/22, August 15, 2008).

2. Measured existing ambient air quality levels with respect to SPM was within the Ambient Air Quality Standards stipulated under the Extraordinary Gazette, No. 850/4, December 20, 1994, by the Central Environmental Authority of Sri Lanka.

.....
H.D.S.Premasiri
Coordinator/Air Quality
Environmental Division

.....
S.V.Dias
Head/Environmental Division
National Building Research Organisation

NBRO/ENV/26201/2013/084a
AQP/2013/084a

Figure I: Air quality monitoring locations map

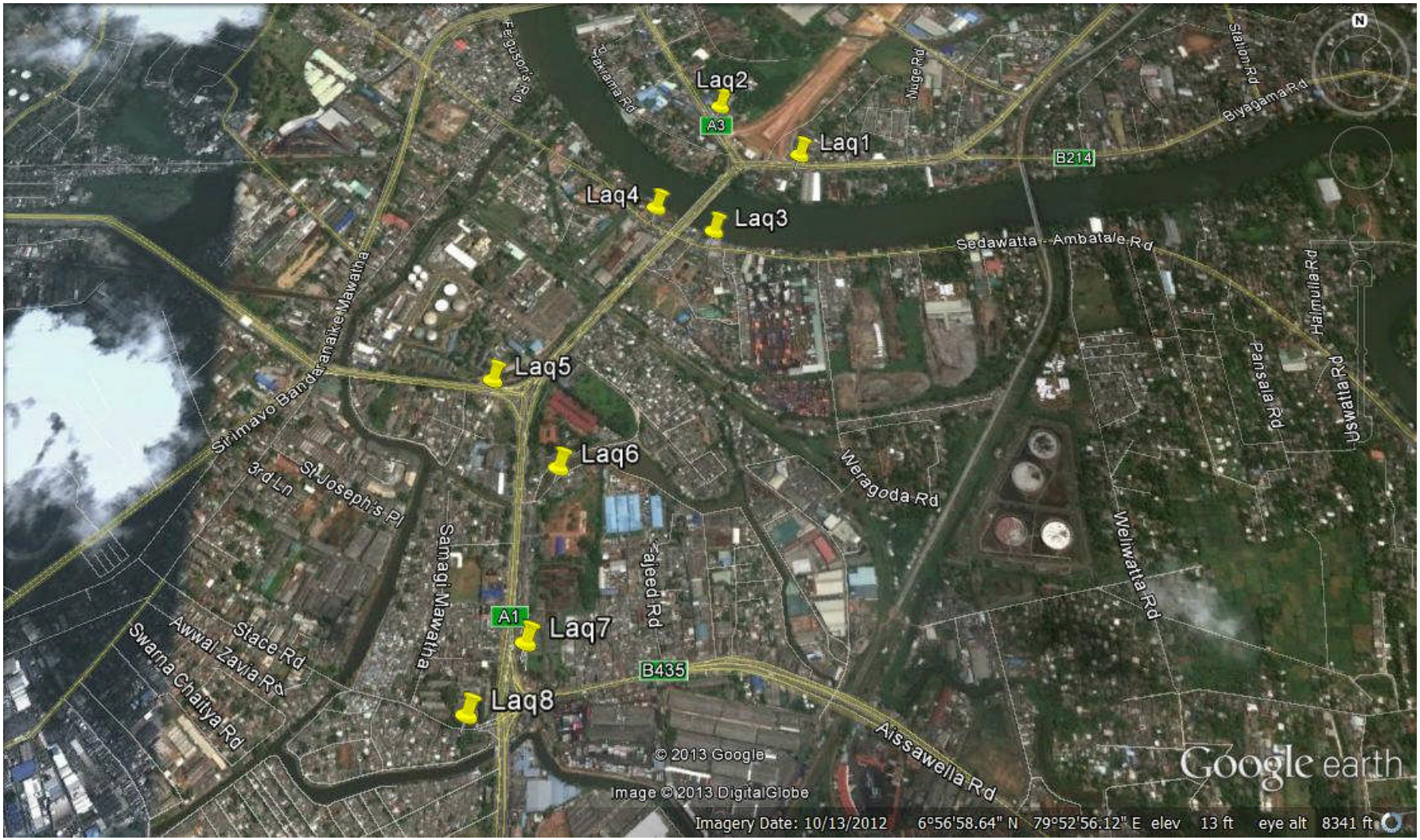


Figure 2; Air Quality monitoring locations images

		
Laq1	06^0 57' 20.01" N 079^0 53' 03.61" E	At the roadside of Kandy Road, in front of Sri Bhoopala Vinayaker Kovil, Peliyagoda

		
Laq2	06^0 57' 24.89" N 079^0 52' 57.38" E	At the roadside of Nigambo Road, Peliyagoda, in front of the Sir Lanka Cement Cooperation Outlet

		
Laq3	06^0 57' 13.21" N 079^0 52' 56.50" E	At the roadside of Seedawatha Road, Wellampitiya, close to the Jayantha saw mills

			
Laq4	06^0 57' 15.49" N 079^0 52' 52.02" E	At the Premises of Minimuthu Suppliers, No 43/1, Seedawatha Road, Wellampitiya	

			
Laq5	06^0 57' 00.96" N 079^0 52' 39.74" E	At the premises of Shanchi Viharaya, New Kanani Bridge Road, Wellampitiya.	

			
Laq6	06^0 56' 53.90" N 079^0 52' 44.60" E	At the roadside, close to the premises of Mr. H.A Piyasena, No.31/10, Orugodawatta, Wellampitiya.	

 		
Laq7	06^0 56' 41.17" N 079^0 52' 42.77" E	At the premises of Mr.M.J.M. Badurdeen, No 12, Baseline Road, Orugodawatha

		
Laq8	06^0 58' 36.66" N 079^0 52' 38.95" E	At the premises of Sri Somaloka Viharaya, No. 150, States Road, Colombo 14

REPORT ON
THE MONITORING OF BASELINE NOISE LEVELS FOR THE EIA STUDY FOR TRAFFIC IMPROVEMENT PROJECT AROUND NEW KALANI BRIDGE

(For Consulting Engineering & Architects Association (Pvt) Ltd)

(April 2013)

ENVIRONMENTALSTUDIES & SERVICE DIVISION
NATIONAL BUILDING RESEARCH ORGANISATION
99/1, JAWATTA ROAD
COLOMBO - 05
SRI LANKA.

Tel: 011-2588946, 011-2501834, 011-2503826. Fax: 011-2502611, e-mail: nbro@sltnet.lk

REPORT ON THE MONITORING OF BASELINE NOISE LEVELS FOR THE EIA STUDY FOR TRAFFIC IMPROVEMENT PROJECT AROUND NEW KALANI BRIDGE

(For Consulting Engineering & Architects Association (Pvt) Ltd)

(APRIL 2013)

Date of Issued : 28th April 2013
Report No : NBRO/ENV/26201/2013/084b
AQP/2013/084b

Issued To:

Senior Project Coordinator,
Consulting Engineering & Architects Association (Pvt) Ltd.,
No. 500/5, Thalapathpitiya Road,
Madiwela,
Kotte.

Issued By:

Environmental Studies & Service Division
National Building Research Organisation
99/1, Jawatta Road
Colombo - 05
Sri Lanka.

This report contain ten pages

ආපදා කළමනාකරණ අමාත්‍යාංශය
அனர்த்த முகாமைத்துவ அமைச்சு
Ministry of Disaster Management

දුරකථන
தொலைபேசி
Telephone
011-2588946
011-2503431
011-2500354

අධ්‍යක්ෂ ජනරාල්
பணிப்பாளர் நாயகம்
Director General
011-2505149

ජාතික ගොඩනැගිලි පර්යේෂණ සංවිධානය
தேசிய கட்டிட ஆராய்ச்சி நிறுவனம்
NATIONAL BUILDING RESEARCH ORGANISATION

ෆැක්ස්
தொலைநகல்
Fax
011-2502611

වෙබ්අඩවිය
இணையத்தளம்
Website
www.nbro.gov.lk

ඊමේල්
மின்னஞ்சல்
E-mail
nbro@sltnet.lk

99/1, ජාවත්ත පාර, කොළඹ 5.
99/1, ஜாவத்தை வீதி, கொழும்பு 5.
99/1, Jawatta Road, Colombo 5.

මගේ අංකය
எனது இல.
Our Ref.
NBRO/ENV/26201/2013/084b
AQP/2013/084b

ඔබේ අංකය
உமது இல.
Your Ref.

දිනය
திகதி
Date
26th April 2013

Client: Senior Project Coordinator
Consulting Engineering & Architects Association (Pvt) Ltd.
No. 500/5, Thalapathpitiya Road,
Madiwela,
Kotte.

REPORT ON THE MEASURMENT OF BASELINE NOISE LEVELS FOR THE EIA STUDY FOR TRAFFIC IMPROVEMENT PROJECT AROUND NEW KALANI BRIDGE

(April 2013)

(For Consulting Engineering & Architects Association (Pvt) Ltd)

1. SCOPE

Request was made by the client, Senior Project Coordinator, Consulting Engineering & Architects Association (Pvt) Ltd. to the Environmental Studies & Service Division (ESSD) of National Building Research Organisation (NBRO) to measure the baseline noise levels at selected locations around the Project area of the Traffic Improvement Project Around New Kalani Bridge to assess the baseline environmental condition for the Environmental Impact Assessment Study of the Project.

In this regard, the following officers of Environmental Division of NBRO carried out the air sampling program on 5th & 6th April 2013.

Staff Involved:

Mr. H.D.S Premasiri	*- Senior Scientist*	*- Air Quality Studies*
Mr. D.M.M.R.Dissanayaye	*- Scientist*	*- Air Quality Studies*
Mr. W.A.Weerasinghe	*- Field Assistant*	*- Air Quality Studies*
Mr. N.Krishnamoorthi	*- Field Assistant*	*- Air Quality Studies*
Mr. A.S.Premarathna	*- Field Assistant*	*- Air Quality Studies*
Mr. M Fasmil	*- Field Assistant*	*- Air Quality Studies*

Cont.....2

2. DESCRIPTION OF THE PROJECT

The project has been initiated by Road development authority of Ministry of Port and Highways to study a situation to relives the traffic loading and traffic congestion around the new Keleni bridge area. As a result it is proposed to construct another bridge parallel to the existing bridge. Since the project is prescribed project under the National environmental Act and category A project under JICA (the funding agency to the project) Environmental and Social Consideration, it is require to Environmental Impact Assessment Study report for the project. This monitoring programme is scheduled to monitor baseline noise levels to assess the existing noise levels around the project area to assess the existing environmental condition.

The project study area is area around the New Kalani Bridge within the Colombo Municipal Council area and Kelaniya Pradesiya Shaba area. The area can be considered as an urban area which industrial, commercial, residential activities and commercial & residential buildings, shanties, state office buildings etc are seen in the vicinity. The main sources that contribute to noise levels are vehicular, industrial, commercial and domestic activities in the area.

3. WEATHER CONDITION

The monitoring day was a sunny day with fair scattered wind. The prevailing wind direction and speeds are given in table 1.

Table 1. Wind speed and direction during the sampling time.

Time	05 April 2013		06 April 2013	
	Wind Direction	**Wind Speed (km/hr)**	**Wind Direction**	**Wind Speed (km/hr)**
02:30	Calm	0	Calm	0
05:30	Calm	0	S	3.8
08:30	SSE	1.8	SW	2.0
11:30	W	6.4	WNW	10.6
14:30	SW	6.0	W	10.6
17:30	W	5.0	W	10.8
20:30	W	5.6	SW	4
23:30	Calm	0	SW	2.8



Cont.....3

4. NOISE LEVEL MEASUREMENTS

4.1 NOISE MEASURING LOCATIONS

In this regard, ten (10) locations were identified for the baseline survey by the client and NBRO officers for the measurement of noise levels. Location description is given in Table 1 and attached area map (Figure 1 and 2).

Table 1: Ambient Noise Level Measuring Location Description

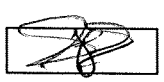
Location No.	GPS Coordinates	Location Description
N1	06^0 57' 20.01" N 079^0 53' 06.60" E	At the roadside of Kandy Road, Close to the Keleniya CTB Deport, Peliyagoda
N2	06^0 57' 24.89" N 079^0 52' 57.38" E	At the roadside of Nigambo Road, Peliyagoda, in front of the Sir Lanka Cement Cooperation Outlet
N3	06^0 57' 15.74" N 079^0 52' 51.48" E	At the Premises of Minimuthu Suppliers, No 43/1, Seedawatha Road, Wellampitiya
N4	06^0 57' 13.14" N 079^0 52' 56.60" E	At the roadside of Seedawatha Road, Wellampitiya, close to the Jayantha saw mills
N5	06^0 57' 08.05" N 079^0 52' 51.46" E	At the Nawaloka Ground, Wellampitiya, Close to the residential houses
N6	06^0 57' 09.46" N 079^0 52' 49.87" E	At the roadside, New Kalani bridge road, Wellampitiya, Close to the Nawaloka Ground
N7	06^0 57' 01.14" N 079^0 52' 40.02" E	At the roadside of the New Kanani Bridge Road, Close to the Shanchi Viharaya, Wellampitiya.
N8	06^0 56' 53.90" N 079^0 52' 44.60" E	At the roadside, close to the premises of Mr. H.A Piyasena, No.31/10, Orugodawatta, Wellampitiya.
N9	06^0 56' 41.17" N 079^0 52' 42.77" E	At the premises of Mr.M.J.M. Badurdeen, No 12, Baseline Road, Orugodawatha
N10	06^0 58' 36.66" N 079^0 52' 38.35" E	At the premises of Sri Somaloka Viharaya, No. 150, States Road, Colombo 14

- Refer attached layout map for further detail

4.2 MEASURING INSTRUMENTS

Sound level meter : RION NA 28
Calibrator : RION NC 74 – IEC 60942:2003, class1
Calibration due : November 2013

The sound level meter conforms to the requirements of both IEC 61672-12002 class 1 and JIS C 1509-1:2005 class 1.



Cont.....4

4.3 METHOD OF MEASUREMENTS

The sound level measurements were carried out in accordance with the methods laid down in International Organisation for Standardization (ISO) 1996 (part 1,2,3) and BS 4142; 1990, as stipulated in National Environmental Noise Control Regulations stipulated under the Extraordinary Gazette No. 924/12- Thursday, May 23, 1996 by the Central Environmental Authority (CEA) of Sri Lanka. The chosen method was the direct method, is that by measuring the equivalent continuous A weighted sound pressure level (Leq,T) was measured for a periods of T (5 minute) with the integrated time of one (1.0) second in the fast selection mode of the meter.

4.4 MEASURING CONDITIONS

A set of 5-minute continuous time integrated noise levels was taken at selected locations to cover morning, afternoon, evening and night time of a day. The measuring time was done during, for about:

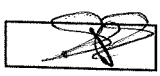
- taken at 08.00 represent 06.00 – 09.00 - Morning
- taken at 12.00 represent 11.00 – 13.00 - Afternoon
- taken at 19.00 represent 17.00 – 22.00 - Evening
- taken at 23.00 represent 22.00 – 24.00 - Night

It was noticed that localised noise sources such as vehicular movements, commercial, domestic & industrial activities etc. were contribute to measured noise levels.

4.5 NOISE MEASURING RESULTS

Table 2: Noise Levels at each monitoring location on 5th – 6th April 2013

Location	Measuring Date	Morning			Afternoon			Evening			Night		
		Leq	L_{50}	L_{90}	Leq	L_{50}	L_{90}	Leq	L_{50}	L_{90}	Leq	L_{50}	L_{90}
N1	6/04/2013	80	**76**	73	81	**76**	74	79	**75**	73	72	**68**	62
N2	6/04/2013	78	**74**	69	75	**71**	67	77	**74**	70	74	**71**	72
N3	6/04/2013	69	**63**	58	64	**59**	54	61	**57**	52	53	**47**	45
N4	6/04/2013	78	**71**	68	64	**57**	52	63	**56**	51	58	**53**	49
N5	6/04/2013	68	**65**	62	66	**62**	60	67	**64**	61	66	**59**	54
N6	5/4/2013	79	**74**	71	78	**74**	70	80	**72**	67	75	**71**	65
N7	5/4/2013	80	**75**	71	77	**74**	70	78	**70**	67	75	**71**	65
N8	5/4/2013	66	**64**	61	65	**61**	58	64	**61**	58	59	**58**	57
N9	5/4/2013	71	**69**	66	70	**68**	66	73	**71**	69	71	**69**	62
N10	5/4/2013	69	**66**	63	70	**67**	65	72	**67**	68	64	**59**	53



Cont.....5

Where;

- **Leq** :- The equivalent continuous noise level over the measuring period (Measured Residual Noise Level).
- **L90**:- The continuous noise level that exceed over the 90% of measuring period (Background Noise Level).
- **L50**:- The continuous noise level that exceed over the 50% of measuring period.

4.6 MAXIMUM PERMISSIBLE NOISE LEVELS

The monitoring locations are around the Project area of the Traffic Improvement Project Around New Kalani Bridge of where the proposed construction work to be undertaken. The maximum permissible noise levels stipulated under the Extraordinary Gazette No. 924/12- Thursday, May 23, 1996 by the Central Environmental Authority (CEA) of Sri Lanka for the construction activities are as follows.

- 75 dB Leq(A) during Day time
- 50 dB Leq(A) during Night time

However, the Schedule II (Regulation 3) of the Gazette No. 924/12, May 23 1996 provides that the addition of 3 dB (A) will be allowed to the measured levels when the background noise level exceeds or is marginal to the permissible levels given in Schedule I.

5.0 CONCLUSION

The baseline noise level at the project area is relatively high due to the noise contribution by the vehicles on the nearby roads and other commercial and residential activities. At almost all locations, measured baseline noise levels are marginal or above the day time as well as nighttimes maximum permissible noise levels stipulated under the Extraordinary Gazette No. 924/12- Thursday, May 23, 1996 by the Central Environmental Authority (CEA) of Sri Lanka for the construction activities without any construction activities of the project is started.

H.D.S.Premasiri
Senior Scientist, Coordinator/Air Quality

S.V. Dias
Director/Environmental Division

Figure I: Noise Measuring Locations Map



Figure 2. Noise Measuring Locations Images





N1	06^0 57' 20.01" N 079^0 53' 06.60" E	At the roadside of Kandy Road, Close to the Keleniya CTB Deport, Peliyagoda



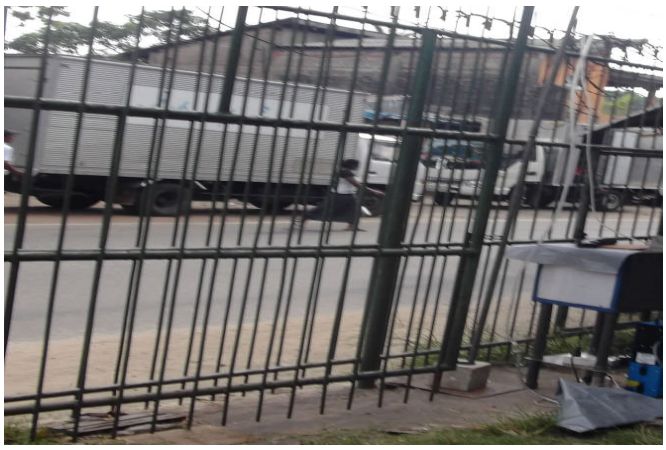


N2	06^0 57' 24.89" N 079^0 52' 57.38" E	At the roadside of Nigambo Road, Peliyagoda, in front of the Sir Lanka Cement Cooperation Outlet





N3	06^0 57' 15.74" N 079^0 52' 51.48" E	At the Premises of Minimuthu Suppliers, No 43/1, Seedawatha Road, Wellampitiya

 		
N4	06^0 57' 13.14" N 079^0 52' 56.60" E	At the roadside of Seedawatha Road, Wellampitiya, close to the Jayantha saw mills

 		
N5	06^0 57' 08.05" N 079^0 52' 51.46" E	At the Nawaloka Ground, Wellampitiya, Close to the residential houses

 		
N6	06^0 57' 09.46" N 079^0 52' 49.87" E	At the roadside, New Kalani bridge road, Wellampitiya, Close to the Nawaloka Ground





N7	06^0 57' 01.14" N 079^0 52' 40.02" E	At the roadside of the New Kanani Bridge Road, Close to the Shanchi Viharaya, Wellampitiya.





N8	06^0 56' 53.90" N 079^0 52' 44.60" E	At the roadside, close to the premises of Mr. H.A Piyasena, No.31/10, Orugodawatta, Wellampitiya.





N9	06^0 56' 41.17" N 079^0 52' 42.77" E	At the premises of Mr.M.J.M. Badurdeen, No 12, Baseline Road, Orugodawatha

			
N10	06^0 58' 36.66" N 079^0 52' 38.35" E	At the premises of Sri Somaloka Viharaya, No. 150, States Road, Colombo 14	

REPORT ON
THE MONITORING OF VIBRATION LEVEL FOR THE EIA STUDY FOR TRAFFIC IMPROVEMENT PROJECT AROUND NEW KALANI BRIDGE

(For Consulting Engineering & Architects Association (Pvt) Ltd)

(April 2013)

ENVIRONMENTALSTUDIES & SERVICES DIVISION
NATIONAL BUILDING RESEARCH ORGANISATION
99/1, JAWATTA ROAD
COLOMBO - 05
SRI LANKA.

Tel: 011-2588946, 011-2501834, 011-2503826. Fax: 011-2502611, e-mail: nbro@sltnet.lk

REPORT ON THE MONITORING OF VIBRATION LEVEL FOR THE EIA STUDY FOR TRAFFIC IMPROVEMENT PROJECT AROUND NEW KALANI BRIDGE

(For Consulting Engineering & Architects Association (Pvt) Ltd)

(APRIL 2013)

Date of Issued : 28th April 2013
Report No : NBRO/ENV/26201/2013/084c
AQP/2013/084c

Issued To:

Senior Project Coordinator,
Consulting Engineering & Architects Association (Pvt) Ltd.,
No. 500/5, Thalapathpitiya Road,
Madiwela,
Kotte.

Issued By:

Environmental Studies & Services Division
National Building Research Organisation
99/1, Jawatta Road
Colombo - 05
Sri Lanka.

This report contain four pages

ආපදා කළමනාකරණ අමාත්‍යාංශය
அனர்த்த முகாமைத்துவ அமைச்சு
Ministry of Disaster Management

දුරකථන
தொலைபேசி
Telephone
011-2588946
011-2503431
011-2500354

අධ්‍යක්ෂ ජනරාල්
பணிப்பாளர் நாயகம்
Director General
011-2505149

ජාතික ගොඩනැගිලි පර්යේෂණ සංවිධානය
தேசிய கட்டிட ஆராய்ச்சி நிறுவனம்
NATIONAL BUILDING RESEARCH ORGANISATION

ෆැක්ස්
தொலைநகல்
Fax
011-2502611

වෙබ්අඩවිය
இணையத்தளம்
Website
www.nbro.gov.lk

ඊමේල්
மின்னஞ்சல்
E-mail
nbro@sltnet.lk

99/1, ජාවත්ත පාර, කොළඹ 5.
99/1, ஜாவத்தை வீதி, கொழும்பு 5.
99/1, Jawatta Road, Colombo 5.

මගේ අංකය
எனது இல.
Our Ref.
NBRO/ENV/26201/2013/084c
AQP/2013/084c

ඔබේ අංකය
உமது இல.
Your Ref.

දිනය
திகதி
Date
26th April 2013

Client: Senior Project Coordinator
Consulting Engineering & Architects Association (Pvt) Ltd.
No. 500/5, Thalapathpitiya Road,
Madiwela,
Kotte.

REPORT ON THE MONITORING OF VIBRATION LEVEL FOR THE EIA STUDY FOR TRAFFIC IMPROVEMENT PROJECT AROUND NEW KALANI BRIDGE

(April 2013)

(For Consulting Engineering & Architects Association (Pvt) Ltd)

1. SCOPE

Request was made by the client, Senior Project Coordinator, Consulting Engineering & Architects Association (Pvt) Ltd. No. 500/5, Thalapathpitiya Road, Madiwela, Kotte to the Environmental Studies & Service Division (ESSD) of National Building Research Organisation (NBRO) to measure the baseline Vibration levels at selected locations around the Project area of the Traffic Improvement Project Around New Kalani Bridge to assess the baseline environmental condition for the Environmental Impact Assessment Study of the Project.

In this regard, the following officers of Environmental Division of NBRO carried out the vibration monitoring program on 5th– 6th April 2013

Staff Involved:

Mr. H.D.S Premasiri	*- Senior Scientist*	*- Air Quality Studies*
Mr. W.A.Weerasinghe	*- Field Assistant*	*- Air Quality Studies*
Mr. M Fasmil	*- Field Assistant*	*- Air Quality Studies*

2. DESCRIPTION OF THE PROJECT

The project has been initiated by Road development authority of Ministry of Port and Highways to study a situation to relives the traffic loading and traffic congestion around the new Keleni bridge area. As a result it is proposed to construct another bridge parallel to the existing bridge. Since the project is prescribed project under the National environmental Act and category A project under JICA (the funding agency to the project) Environmental and Social Consideration, it is require to Environmental Impact Assessment Study report for the project.

Cont.....2

This monitoring programme is scheduled to monitor baseline vibration date to assess the existing vibration condition around the project area to assess the existing environmental condition.

The project study area is area around the New Kalani Bridge within the Colombo Municipal Council area and Kelaniya Pradesiya Shaba area. The area can be considered as an urban area which industrial, commercial, residential activities and commercial & residential buildings, shanties, state office buildings etc are seen in the vicinity. The main sources that contribute to vibration levels are movement of heavy vehicles in the road network of the area

3. WEATHER CONDITION

Dry weather with fair scattered wind prevailed during the monitoring period.

4. VIBRATION MEASUREMENTS

4.1 DESCRIPTION OF MONITORING LOCATIONS

Six sensitive locations were selected as per the client's requirement within the study area of the project area of the Traffic Improvement Project Around New Kalani Bridge. The location description is given in Table 1 and refer attached figure 1 & 2 for more information.

Table 1: Vibration Monitoring Location Description

Location	Type of Measurement	Chain age	Distance from the Source (m)	Description of Locations
V1	Structural Vibration	K3. + 350	25m	At the premises of Mr. P.D. Thilakarathne, 226/1, Meegahawatta, Kelaniya
V2	Structural Vibration	K3. + 350	32	At the premises of Mr. R.A.Suranga Pradeep, 226, Meegahawatte, Wanawasala, Kelaniya.
V3	Structural Vibration	K3. + 355	40	At the premises of Mr. P.D.Lional Premarathne, 226, Meegahawatte.
V4	Structural Vibration	K3. + 350	47	At the premises of Mr. R. M. Bandara, 227/3, Meegahawatte (Ground floor)
V5	Structural Vibration	K3. + 350	47	At the premises of Mr. R. M. Bandara, 227/3, Meegahawatte (first floor)
V6	Structural Vibration	K3. + 332	37	At the premises of Mr.W.A.P.Jayantha, 223/3, Meegahawatte.
V7	Structural Vibration	K3. + 320	29	At the premises of Mr. U.H.D.Nirodarathne, 222, Meegahawatte.
V8	Structural Vibration	K3. + 305	20	At the premises of Mr. R.A.Desmond Rupasinghe, 220/2, Meegahawatte..
V9	Structural Vibration	K3. + 300	28	At the premises of Ms. M.D.Gnanawathi, 220, Meegahawatte.

Cont....3

4.2 METHOD OF MEASUREMENTS

Continuous vibration levels were recorded at selected locations in accordance with the methods laid down in International Organisation for Standardization - ISO - 4966: 1990E, as stipulated in the interim vibration standard stipulated by the Central Environmental Authority of Sri Lanka.

4.3 MEASURING INSTRUMENTS

Vibration meter : Instantel BlastMate III
Calibration due : November 2011
Minimum Detection Limit : PPV of 0.07 mm/s

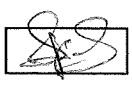
4.4 MEASURING CONDITIONS

Continuous vibration levels (peak particulate velocity levels) were recorded at selected location when the compaction activities are undertaken for the construction of Colombo-Katunayake Expressway. The recording time of the instrument is 5 sec. at 1024 sps in continuous mode and at geo range of 31.7 mm/s.

4.5 VIBRATION MOINTORING RESULTS :

Table 2: Vibration levels at each measuring location on 1st of February 2011

Location	Measuring Condition	Type of Vibration	Start Time	Run Time (min)	Frequency Range (Hz)	Vibration in ppv (mm/sec)
V1	compaction	Intermittent (Structural)	14:06	3	10 - 50	1.05
V2	compaction	Intermittent (Structural)	14:10	3	10 - 50	0.840
V3	compaction	Intermittent (Structural)	14:12	3	10 - 50	0.839
V4	compaction	Intermittent (Structural)	14:17	3	10 - 50	0.976
V5	compaction	Intermittent(Structural)	14:19	3	10 - 50	1.78
V6	compaction	Intermittent (Structural)	14:22	3	10 - 50	0.532
V7	compaction	Intermittent (Structural)	14:24	3	10 - 50	0.708
V8	compaction	Intermittent (Structural)	14:27	3	10 - 50	1.27
V9	compaction	Intermittent (Structural)	14:30	3	10 - 50	1.51



Cont.....4

4.6 MAXIMUM PERMISSIBLE VALUES

Table 3. The maximum permissible interim vibration levels stipulated by the Central Environmental Authority of Sri Lanka for different type of structures summaries below.

Structure Type	Type of Vibration	Frequency of Vibration (Hz)	Vibration in ppv (mm/sec)
Type 1 structures – Multi story buildings of reinforced concrete or structural steel, with filling panels of block work, brick work or precast units not designed to resist earthquakes	Continuous	0 - 10	5.0
		10 - 50	7.5
		Over 50	15.0
	Intermittent	0 - 10	10.0
		10 - 50	15.0
		Over 50	30.0
Type 2 structures – Two-storey domestic houses and buildings constructed of made of reinforced block work, precast units, and reinforced floor & roof construction, or wholly of reinforced concepts or similar, not designed to resist earthquakes.	Continuous	0 - 10	2.0
		10 - 50	4.0
		Over 50	8.0
	Intermittent	0 - 10	4.0
		10 - 50	8.0
		Over 50	16.0
Type 3 structures – Single and two storey houses and buildings made of lighter construction, using lightweight materials such as bricks, cement blocks etc, not designed to resist earthquakes.	Continuous	0 - 10	1.0
		10 - 50	2.0
		Over 50	4.0
	Intermittent	0 - 10	2.0
		10 - 50	4.0
		Over 50	8.0
Type 4 structures – Structures that, because of their sensitivity to vibration, do not correspond to those listed above 1,2 & 3, & declared as archeologically preserved structures by the Department of Archaeology	Continuous	0 - 10	0.25
		10 - 50	0.5
		Over 50	1.0
	Intermittent	0 - 10	0.5
		10 - 50	1.0
		Over 50	2.0

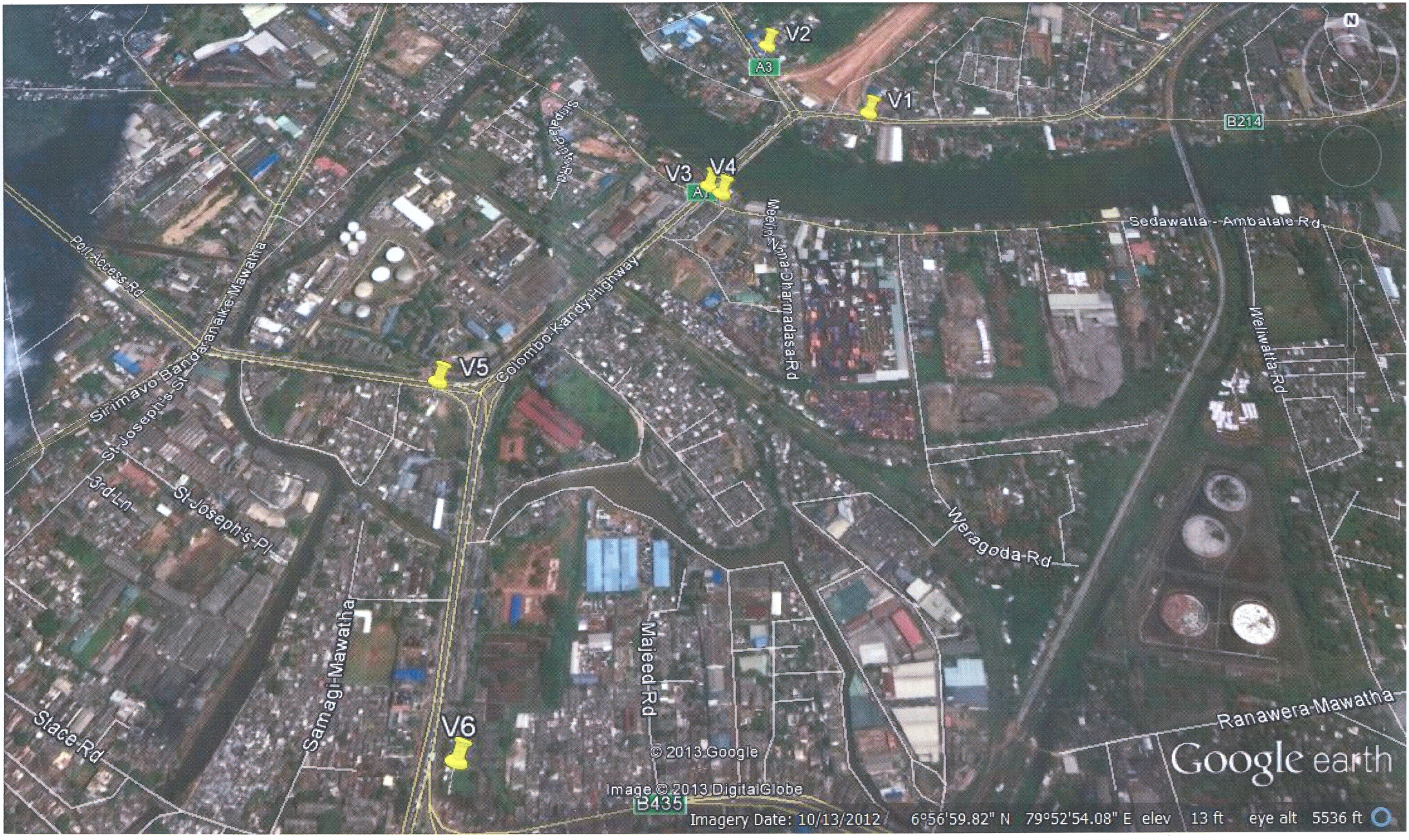
5. CONCLUSION:

Measured vibration levels at all locations during the compaction activities were well within the intermittent vibration levels stipulated for type 3 structures in the Interim Vibration Standard stipulated by the Central Environmental Authority of Sri Lanka.

.....
S V Dias
Director/Environmental Division
National Building Research Organisation

.....
H.D.S. Premasiri
Coordinator/ Scientist, Air Quality Studies
National Building Research Organisation

National Building Research Organisation
No. 99/1, Jawatta Road,
Colombo 05.


V1
V2
V3
V4
V5
V6
A3
B214
B435
Colombo-Kandy-Highway
Sedawatta - Ambatale-Rd
Weragoda-Rd
Ranawera-Mawatha
Samagi-Mawatha
Majeed-Rd
Stace-Rd
Weliwatta-Rd
Sirimavo-Bandaranaike-Mawatha
St-Joseph's-St
St-Joseph's-Pl
3rd-Ln
Por-Access-Rd
© 2013 Google
Image © 2013 DigitalGlobe
Imagery Date: 10/13/2012
6°56'59.82" N 79°52'54.08" E elev 13 ft eye alt 5536 ft
Google earth

Report on Assessment of water quality of EIA Survey for Traffic Improvement Project around New Kelani Bridge Project

May 2013

Environmental Division
National Building Research Organisation
99/1, Jawatte Road
Colobmo 05
Sri Lanka

Tel: 011 258 8946, 011 250 1834, 011 250 3826 Fax: 011 250 2611, e-mail: ed_nbro@yahoo.com

Report on Assessment of water quality of EIA Survey for Traffic Improvement Project around New Kalani Bridge

Report No: WQ/2013/66

Date of Issue: 09/05/2013

Issued By: **Environmental Division**
National Building Research Organization (NBRO)
99/1, Jawatta Rd, Colombo-05

Issued To: **Senior Project Coordinator**
Consulting Engineers & Architects Associated (Pvt) Ltd
No.500/5, Thalapathpitiya Rd
Madiwela, Kotte

Analyzed: .....
I A V P Iddamalgoda
Laboratory Manager

Checked: .....
S A M S Dissanayake
Coordinator/WQ

Certified: .....
SV Dias
Head/Environmental Division, NBRO

HEAD/ ENVIRONMENTAL DIVISION
National Building Research Organisation
No. 99/1, Jawatta Road,
Colombo 05.

This report shall not be reproduced except in full without written permission from Director General, NBRO

ආපදා කළමනාකරණ අමාත්‍යාංශය
அனர்த்த முகாமைத்துவ அமைச்சு
Ministry of Disaster Management

දුරකථන
தொலைபேசி
Telephone
011-2588946
011-2503431
011-2500354

අධ්‍යක්ෂ ජනරාල්
பணிப்பாளர் நாயகம்
Director General
011-2505149

ජාතික ගොඩනැගිලි පර්යේෂණ සංවිධානය
தேசிய கட்டிட ஆராய்ச்சி நிறுவனம்
NATIONAL BUILDING RESEARCH ORGANISATION

ෆැක්ස්
தொலைநகல்
Fax
011-2502611

වෙබ්අඩවිය
இணையத்தளம்
Website
www.nbro.gov.lk

ඊමේල්
மின்னஞ்சல்
E-mail
nbro@sltnet.lk

99/1, ජාවත්ත පාර, කොළඹ 5.
99/1, ஜாவத்தை வீதி, கொழும்பு 5.
99/1, Jawatta Road, Colombo 5.

මගේ අංකය
எனது இல.
Our Ref.
WQ/2013/066

ඔබේ අංකය
உமது இல.
Your Ref.

දිනය
திகதி
Date
05.05.2013

Client: **Senior Project Coordinator**
Consulting Engineers & Architects Associated (Pvt) Ltd
No.500/5, Thalapathpitiya Rd
Madiwela, Kotte

Report on Assessment of water quality of EIA Survey for Traffic Improvement Project around New Kelani Bridge

1.0 Introduction

A preparatory study has been initiated by Road Development Authority (RDA) of Ministry of Ports and Highways to study a solution to relieve the traffic loading and traffic congestion around the new Kelani bridge area. As a result, it is proposed to construct another bridge parallel to the road, Colombo - Kandy and Peliyagoda - Puttalam roads. This study is funded by Japan International Corperation Agency (JICA).

2.0 Scope of the work

The project is considered as a prescribed project under the National Environmental Act and Category A project under JICA Environmental and Social Considerations. Hence the Terms of Reference stipulated for the Environmental Impact Assessment (EIA) requires establishing a set of baseline values of selected environmental parameters of air, water quality and noise and vibration levels.

Consulting Engineers & Architects Associated – CEA (Pvt) Ltd, the EIA consultancy team involved in the study requested Environmental studies and service division of the National Building Research Organization (NBRO) to measure the baseline values of the selected environmental parameters.

The table below indicates the parameters and locations to be monitored for the baseline water quality assessment.

Table 1: Parameters and locations for water quality monitoring

Water quality survey	Parameters	Locations
Surface water	pH, Temperature, Turbidity, DO, BOD, SS,	Upstream and downstream from the New Kelani Bridge
Ground water	pH, Temperature, BOD, Total Coliform, Conductivity	Project site and 100m either side of the project side

The surface water quality to be carried out twice and the measurement interval to be one week.

3.0 The study area

The study belongs to Colombo District Western Province. Ongoing road construction activities were observed in the area. Commercial buildings, shanties, container yards and government buildings were seen in the vicinity. The study area can be considered as an urban area.

4.0 Sampling date, sample collection and analysis, sampling locations

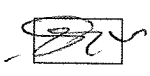
4.1 Sampling date

The 1st and 2nd water quality monitoring programme were carried out on 04th and 19th April 2013 respectively. Samples were collected from predetermined locations by the ToR as indicated in Table 1.

Following officers of the Environmental Division of NBRO involved in sampling programme

Mr. V. D. W. Sumanasekara	-	Scientist
Ms. P H D Silva	-	Technical Assistant
Mr. A.S. Premaratne	-	Field Assistant
Mr. W. A. Weerasinge	-	Field Assistant

The monitoring was witnessed by Mr Saranga Gajasinghe, Environment Safe Guard Officer, CEA



4.3 Method of analysis

Measurements on pH, Temperature, Turbidity and Electrical conductivity (EC) were determined on site. Other parameters specified in the table 2 were analysed in the laboratory of Environmental Studies and Services Division.

Table 2 : Methods followed in the analysis

Parameter	Principle of measurement	Test Method
pH	Electrometric	APHA 4500-H^+-B
Temperature	Electrometric	APHA 2550-B
Electrical Conductivity (EC)	Conductometry	APHA 2510-B
Turbidity	Nephelopmetric method	APHA 2130 B
Dissolved Oxygen (DO)	Azide modification	APHA-5210-B
Biological Oxygen Demand (BOD)	5 Day BOD Test	APHA-5210-B
Total Suspended Solids (TSS)	Gravimetry	APHA-2540-D
Total Coliforms	Membrane Filter Method	SLS 614: 1983 Part 2

APHA : Standard Methods for the Examination of water and wastewater APHA, AWWA, WEF-20th Edition-1998

SLS : Sri Lanka Standard Institute: Specification for potable water, Bacteriological requirements Part II 614: 1983

4.4 Sampling locations

Annexure I: Google map indicating sampling locations
Annexure III: Photographs of sampling locations

Location reference	Sample reference	Description of the location
Surface water		
Downstream Kelani Bridge	WQ1 - D	Water sample was taken from the Kelani river and is about 50m from the new Kelani bridge towards the right hand side of the Peliyagoda - Colombo road. The flow rate was moderate and the water level was about 2 to 4 m high. The water appeared clear. Unauthorized settlements (shanties) and a container yard were observed in the vicinity of the sampling location. Kottamba trees were dominating in the bank vegetation. A laundry was located about 200m downstream from the bridge. Water is used for fishing and bathing.
Upstream Kelani Bridge	WQ2 - U	Water sample was taken from the Kelani river and is about 50m from the new Kelani bridge towards the left hand side of the Peliyagoda - Colombo road. Saw dust disposal site could be seen in the close proximity into Kelani river from a saw mill. No bank vegetation was observed. Water level was approximately 2 to 4 m high.
Ground water		
D A C Sanjeewa Minimutu Suppliers 43/1, Sedawatte	WQ3	Water sample was collected from a open dug well located about 50m away from the Kelani river. No floating materials were observed. Water depth from the ground surface was about 3.5m and the water column was about 3.5m high. The well was bordered by a concrete wall. Appearance of water was clear. Water is used for the formation of concrete bricks.
Lafarde Ready mixed Cement Plant Orugodawatte	WQ4	Water sample was collected from a closed dug well and is boarded by a wall. Floating materials were observed. Water depth from the ground surface was 2.5m and the water column was 2m high. Appearance of water was clear. Water is used basically for washing purposes. Industrial buildings were observed in the vicinity.
Deccan Tire Service Avissawella road, Orugodawatte	WQ5	Water sample was collected from a 20m deep tube well. Well was constructed closer to the main road.

5. 0 Status of water quality

Sampling Date – 04.04.2013 – 1st monitoring								
		Parameter						
Sample reference	Time of collection	* pH and Temperature	* EC (dS/m)	* Turbidity (NTU)	DO DO, mg/l	BOD_5 at 20^0C,mg/l	TSS TSS, mg/l	Total Coliform (count/100ml)
WQ1- D	11.00 hrs	7.8 at 27.95 ^{0} C	2.10	9.8	7.8	2.6	3.5	NM
WQ2 -U	11.30 hrs	7.7 at 27.52 ^{0} C	1.41	8.6	7.0	2.8	7.1	NM
WQ3	11.45 hrs	7.7 at 26.46 ^{0} C	0.240	3.7	3.2	2.3	NM	3000
WQ4	12.15 hrs	8.4 at 26.04 ^{0} C	0.429	9.7	2.5	2.0	NM	4100
WQ5	12.40 hrs	7.4 at 28.7 ^{0} C	0.806	21.2	5.6	<1	NM	680

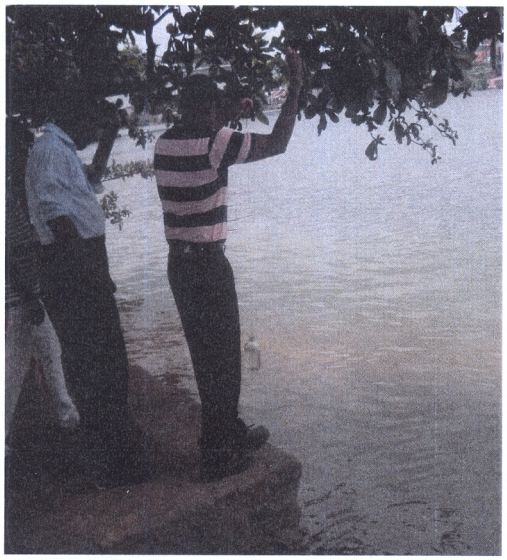
Sampling Date – 19.04.2013 – 2nd monitoring (Location description are similar to 1st monitoring event)							
		Parameter					
Sample reference	Time of collection	* pH and Temperature	* EC (dS/m)	* Turbidity (NTU)	DO, mg/l)	(BOD_5 at 20^0C,mg/l)	TSS,(mg/l)
WQ1- D	09.45 hrs	6.5 at 28.8 ^{0} C	1.24	6.0	7.7	2.2	3.5
WQ2 -U	10.00 hrs	6.3 at 29 ^{0} C	2.18	5.4	6.0	1.3	2.3

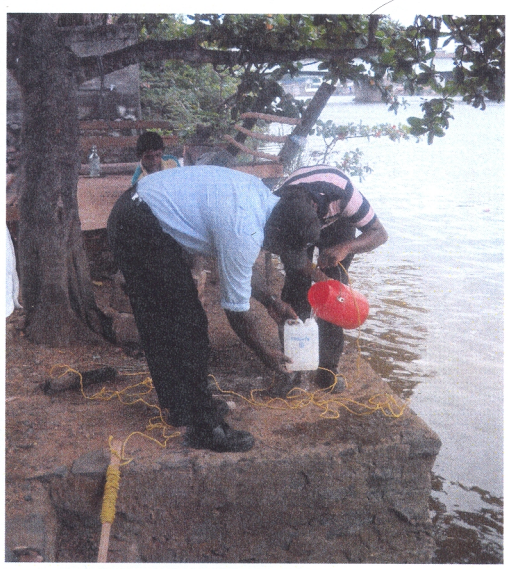
*Measured on site NM – Not Measured

Annex 1: Google map indicating sampling locations

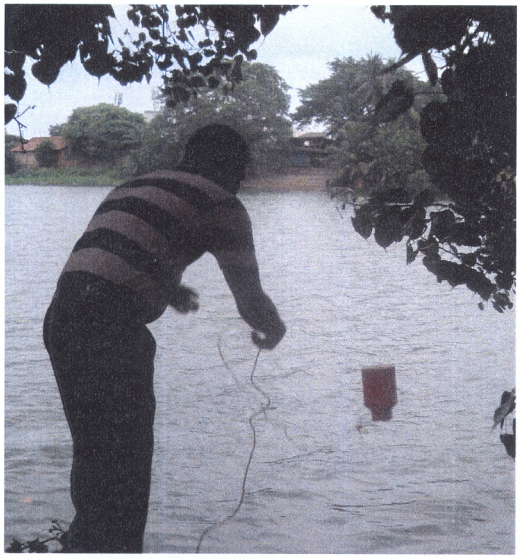


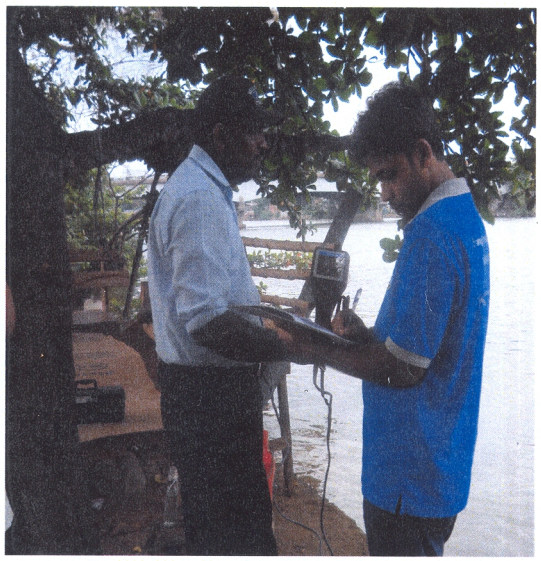
Annexure II: Photographs of the Sampling Locations of New Kelani Bridge Project



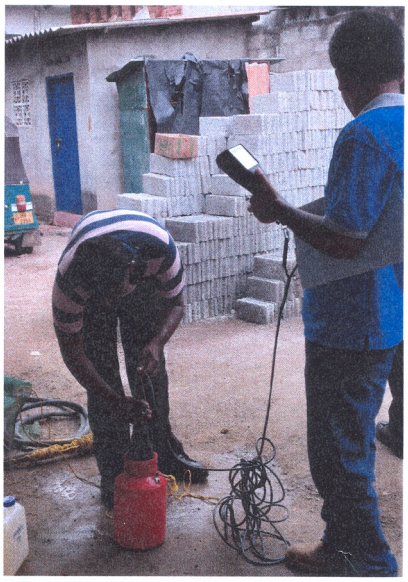


WQ 1- Downstream Kalani River



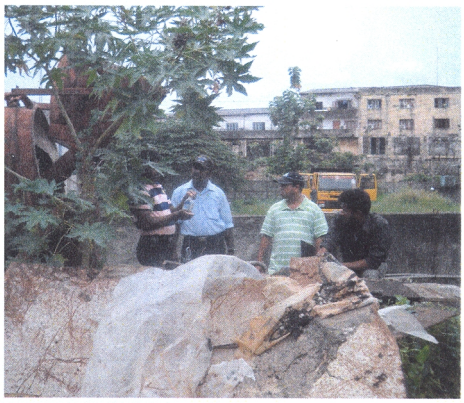


WQ 2- Upstream Kalani River



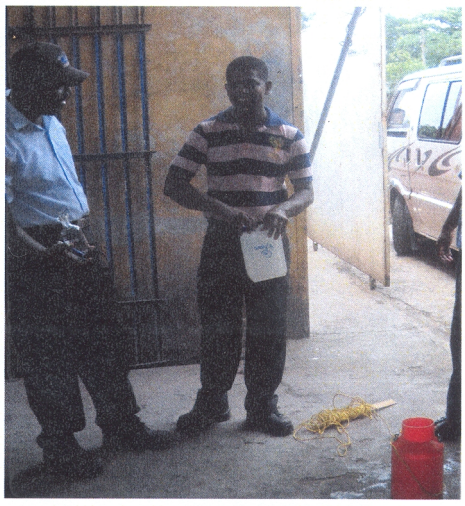
WQ 3- Minimuthu Supliers Dug Well





WQ 4- Cement ready Mixed Plant Dug Well





WQ 5- Decarn Tyre Service Tube Well