## **A1-M1 LINK ROAD PROJECT**

# **ENVIRONMENTAL IMPACT ASSESSMENT REPORT**

### **CONTENTS**

Chapter	Description			
	EXECUTIVE SUMMARY			
1	INTRODUCTION			
	1.1	The Project Owner	1-1	
	1.2 1.2.1	The Road Decongestion Programme The Project	1-1 1-2	
	1.3 1.3.1 1.3.2 1.3.3 1.3.4	Kyongdong Engineering Co. Ltd.	1-2 1-3 1-3 1-4 1-4	
	1.4 1.4.1 1.4.2	History of Assignment Aim of Project Initial Project Description	1-4 1-4 1-5	
	1.5	Scope and Methodology of the EIA	1-5	
	1.6	Report Structure	1-6	
2	FRAM	NEWORK FOR EIA	2-1	
	2.1.2 2.1.3	Legal Framework Environment Protection Act, 2002 Other Applicable Legislation The Forest and Reserves Act, 1983 The Rivers and Canals Act, 1863 The Rivers (Control of Vegetation) Act, 1946 Central Water Authority Act, 1991 Wastewater Authority Act, 2000 Regulations	2-1 2-1 2-2 2-2 2-2 2-3 2-3 2-3 2-4	
	2.2 2.2.1 2.2.2 2.2.3 2.2.4	Policies, Panning Schemes and Guidelines National Environment Policy National Development Strategy Environmentally Sensitive Areas National Forest Policy	2-5 2-5 2-5 2-5 2-7	
	2.3 2.3.1 2.3.2	International Treaties The Convention on Biological Diversity. International Convention and Protocol Signed/Ratified by Mauritius	2-7 2-7 2-8	

3	THE F	PROPOSED PROJECT	3-1
	3.1	Introduction	3-1
	3.2	Project Description	3-2
		Geometric Design of the Proposed Road Design Standard Road Classification Design Speed Design Surveys	3-2 3-2 3-3 3-3 3-3
		Grade Separations and Interchanges General Auxiliary Lanes Intersections	3-4 3-4 3-4 3-5
	3.5.3	Typical Cross Sections Review of Cross Section Elements Width of Shoulder Median Strip Sidewalks Applied Cross Sections (a) Typical Cross Section for A1-M1 Link Road (STA.0+000 to STA.0+496) (b) Typical Cross Section for A1-M1 Link Road (STA.0+496 to STA.0+728) (c) Typical Cross Section for A1 Road from STH 0+728 to STA 0+1068 (d) Typical Cross Section for A1 Road from STH 0+000 to STA 0+390 (e) Typical cross Section for A1 Road from STA.0+390 to STA.0+600 (f) Typical Cross Section for A1 Road from STA.0+600 to STA.0+725 (g) Typical Cross Section for One-way Connector Road (Ramp-A, B, C, D, E) (h) Typical Cross Section for One-way Connector Road (Ramp-A, D)	3-5 3-5 3-5 3-6 3-6 3-6 3-6 3-7 3-8 3-8 3-8 3-9
	3.6 3.6.1 3.6.2 3.6.3	Pavement Design Design Standards Design Life Pavement Type A1-M1 Link Road (a) A1 Road Section (b) A1-M1 Link Road section (c) Soreze Interchange Ramps Section (d) Pavement design for Bridges on A1-M1 Link Road	3-9 3-9 3-10 3-10 3-10 3-11 3-11
	3.7 3.7.1 3.7.2 3.7.3	Bridge Design Chebel Viaduct Grand River North West Valley Bridge Sorèze Ramp Bridge	3-11 3-12 3-13 3-14
	3.8	Pedestrian Footpath	3-15

	3.9	Installation of Footpath on the Extra dosed bridge	3-15
	3.10	Bridge Safety	3-16
	3.11	Land Acquisition	3-17
4	<b>CONS</b> 4.1.1	SIDERATION OF ALTERNATIVES  No-Go Alternative	<b>4-1</b> 4-1
	4.2	Description of Proposed Works	4-1
	4.3 4.3.1 4.3.2 4.3.3 4.3.4 4.3.5	Considerations of A1 Alignment Study of the Traffic System for Industrial Area Entry and Exit Study of the Access Point to the Industrial Area Design of Typical Cross Sections Proposal of Typical Cross Section Review of Horizontal Alignments (a) Review of obstacles on A1 road. (b) Alternative 1 (c) Alternative 2 (d) Recommendation of Alternatives	4-1 4-2 4-3 4-4 4-5 4-6 4-7 4-9
		Review on Connection with M1 Motorway Review of existing M1 Motorway (a) Composition of Existing Lanes Emergency Lanes Plan and Profile of each Alternative Evaluation of Alternatives (a) Alternative 1: Overpass of M1 Motorway + No change of loop direction (b) Alternative 2: Underpass of M1 Motorway + No change of loop direction (c) Alternative 3: Overpass of M1 Motorway + change of Loop direction Conclusion	4-9 4-9 4-9 4-10 4-12 4-13 4-13
5	BASELINE ENVIRONMENT CONDITIONS		5-1
	5.1 5.1.1 5.1.2	Introduction Study Area Features in the Project Area	5-1 5-1 5-2
	5.2	Junction with A1 Road	5-4
	5.3	Topography	5-4
	5.4	The General Traffic Situation	5-5
	5.5	Climate	5-6
	5.6	Wind Climate	5-6
	5.7	Geology, Topography and Drainage/Hydrology	5-8
	5.8	Water Quality	5-9

	5.9	Canals	5-10	
	5.10	Air Quality	5-11	
	5.11	Flora and Fauna	5-12	
	5.12	Noise	5-12	
	5.13	Aesthetics/Landscape Value	5-13	
	5.14.2	Consultations/Public Participation Consultation with Authorities Key Issues Raised Public Participation	5-14 5-14 5-15 5-15	
6	BASE	BASELINE TRAFFIC SITUATION		
	6.1	Introduction	6-1	
	6.2	Bus Transport System	6-2	
	6.3.4 6.3.5 6.3.6	Review of transit route and number of operations in project area Review of Bus Routes passing A1-M1 area School Bus System Road Network Status Traffic Safety Facility Status Traffic Volume Status in Access Roads and Intersections Analysis of Level of Service in Arterial Section Result of Level of Service Analysis at Unsignalised Intersections Road Safety Audit of Project Area Information on Underground Utilities from Relevant Institutes	6-2 6-2 6-2 6-3 6-4 6-4 6-5 6-5	
7	IMPAG	CT ASSESSMENT	7-1	
	7.1	Methodology	7-1	
	7.2	Issues Raised during Consultations	7-2	
	7.3 7.3.1	Socio Economic and Social Issues Economic Impacts	7-3 7-3	
		Cultural Impacts Construction Stage Operational Stage	7-4 7-4 7-4	
	7.5 7.5.1 7.5.2 7.5.3	Local Ecology and Water Quality Direct Impacts Indirect Impacts Impacts on Biodiversity (a) Loss of Terrestrial Biodiversity (b) Loss of Riverine Biodiversity (c) Loss of Species of Special Concern (d) Fragmentation of Habitat (e) Loss of Trees (f) Loss of Carbon Sequestration Capacity	7-4 7-5 7-6 7-7 7-7 7-7 7-7 7-7	

		(g)	Invasion by Alien Plants	7-7	
	7.6	Hydro	ology and Drainage	7-7	
	7.7	Healt	h and Safety and Access	7-9	
	7.8 7.8.1 7.8.2	Noise Cons Opera	7-10 7-10 7-10		
	7.9 7.9.1 7.9.2		uality truction Stage ation Stage	7-10 7-10 7-11	
	7.10	Aesth	netics	7-11	
	7.11	Existi	ing Utilities	7-11	
	7.12	Resid	dual Impacts	7-11	
8	TRAF	FIC IM	IPACT ASSESSMENT	8-1	
	8.1	Introd	duction	8-1	
	8.2	Cons	truction Stage	8-1	
	8.3	Opera	ation Stage - Premise of Traffic Demand Forecast	8-2	
	8.4 8.4.1		e of Assessment ration of Metro Express	8-2 8-3	
	8.5 8.5.1	Level Defin	l of Service ition	8-3 8-3	
		Requ A1-M Resu	It of Assessment at Operation Stage lired Lanes for the A1-M1 Link Road I1 Link Road Operational Analysis Its of A1M1 Simulation outed LOS	8-4 8-4 8-5 8-6 8-7	
	8.7	Conc	lusion	8-9	
9	MITIGATION MEASURES AND MONITORING PLAN				
	9.1	Pollut	tion Prevention	9-1	
	9.2 9.2.1 9.2.2 9.2.3	Loss Invas	estrial Ecology of Vegetation and Loss of Trees along the Corridor sion by Alien Plants autionary and Prevention Measures	9-1 9-1 9-2 9-3	
	9.3	Aqua	tic Ecology	9-3	
	9.4	Plain	es Wilhems Canal	9-3	
	9.5		ral Impacts	9-3	
EIA Report A1-M M191/A1M1/3.1	/11 LInk Ro	ad		May 2017	

10	CONC	CLUSION	10-1
	9.9	Environmental Monitoring Plan	9-8
	9.8.3	The Landscape and Visual Environment	9-7
	9.8.2	Water Quality	9-7
	9.8.1	Accidents	9-7
	9.8	Mitigation for Impacts during the Operational Stage of the Road	9-7
	9.7.1	Measures suggested by Stakeholders in the SIA	9-6
	9.7	Mitigation during Construction	9-4
	9.6	Existing Utilities	9-4

## **List of Appendices**

Appendix A: Notes of Scoping Meeting with Ministry of Environment Appendix B: Water Quality and Ambient Air Quality Test Results

Appendix C: Geotechnical report, Ecological Report, Heritage Report and Social Impact

Assesment Report

Appendix D: Drawings

## **List of Drawings**

M191 / A1-M1 / EV / LA / 01 - Project location A1-M1 link road M191 / A1-M1 / S / 01 - Topographic Map A1 -M1 Link road Map A M191 / A1-M1 / S / 02 - Topographic Map A1 -M1 Link road Map B M191 / A1-M1 / EV / LA / 02 - Context Map at A1-M1 link road M191 / A1-M1 / EV / LA / 03 - Localities around the project at A1-M1 link road M191 / A1-M1 / EV / LA / 04 - Sampling Location for noise surveys air and water at link road	A1-M1
M191 / A1-M1 / EV / LA / 05 - Noise survey at A1-M1 link road	
List of Tables	
Table 3-1: Road Classification	3-3
Table 3-2: Design Speed of the Project	
Table 3-3: Typical Cross Section with Sidewalk (A1-M1) – Duel Carriageway with 2 Lanes in Each	h Direction
T.I. 0.4 0 0 0 % (A4.M4) D. I.O. :	
Table 3-4: Cross Section (A1-M1) - Dual Carriageway with 2 Lanes in each Direction	
Table 3-5 Typical Cross Section (A1-M1) – Dual Carriageway with 1 Lane in each E	nrection 3-
7 Table 3-6: Pavement Details for A1 Road Section	2 10
Table 3-7: Pavement Details for A1-M1 Link Road Section	
Table 3-7: Pavement Details for Ar-Wir Link Road Section	
Table 3-9: Pavement Details for Bridges on A1-M1 Link Road Section	
Table 3-9: Pavement Details for Bridges of A1-M1Table 3-10: Details of Bridges along A1-M1	
Table 4-1: Comparison between Alternatives 1 and 2 for Horizontal Alignments	
Table 4-1. Comparison between Alternatives 1 and 2 for Honzontal Alignments  Table 4-2: Evaluation of Alternative 1 for M1 Motorway	
Table 4-2: Evaluation of Alternative 1 for M1 Motorway	
Table 4-3. Evaluation of Alternative 2 for M1 Motorway	
Table 5-1: Principal Features in the Project Area	
Table 5-1: Fillicipal Features in the Froject Area  Table 5-2: Highest Gusts at Vacoas Station due to Intense Cyclones	
Table 5-2: Fighest Gusts at vaccas station due to intense Cyclones	
Table 5-3: Estimation of Extreme wind Speeds for the Return Feriods	
Table 5-4: Results of Ambient Air Quality Monitoring	
Table 5-6: Standards for Neighbourhood Noise	
Table 5-0. Standards for Neighbourhood Noise	
Table 6-1: Details of Considerations for the Traffic Surveys	
Table 6-2: Road Network Status	
Table 6-3: Result of Level of Service Analysis at Signalised Intersections	
Table 6-4: Result of level of service analysis at unsignalised intersection	
Table 7-1: Factors to be taken into account for impact estimation	
Table 7-2: Rating of Impact	
Table 7-3: Rating the probability of a risk	
Table 7-4: Determining the Significance of a Predicted Impacts	
Table 8-1: A1-M1 Link Road Required Lanes	
Table 8-2: Result of A1-M1 total classification analysis	
Table 9-1: Environmental Monitoring Plan	
List of Figures	
Figure 3-1: Location of Proposed Link Road	3-1
Figure 3-2: Typical Cross Section for A1-M1 Link Road (STA 0 to STA 496)	3-6
Figure 3-3: Cross Section A1-M1 Dual Carriageway	

Figure 3-4: Typical Cross Section A1-M1 – Dual Carriageway with 1 Lane in each Dire 7	ction 3-
Figure 3-5: Cross Section for A1 road and Frontage Road	3-8
Figure 3-6: Cross Section for A1 road STA 0 to STA 725	3-8
Figure 3-7: Cross Section for A1 Road from STA 0+600 to STA 0+725	3-8
Figure 3-8: Cross Section for One Way Connector Road Ramp A,B,C,D,E	
Figure 3-9: Cross Section for One Way Connector Road (Ramp A, D)	3-9
Figure 3-10: Location of Bridges along A1M1	
Figure 3-11: Design of Chebel Viaduct	3-13
Figure 3-12: Situation of Grand River North West Valley	3-13
Figure 3-13: Location of Pedestrian Footpath	3-15
Figure 3-14: Location of Bridge Footpaths	3-16
Figure 3-15: View Points from the Observation Deck	3-16
Figure 4-1: Alternatives for Access point to Industrial Area	4-3
Figure 4-2: Cross Sections of Existing A1 Road	4-4
Figure 4-3: Comparison of Alternatives for the Typical Cross Sections	4-4
Figure 4-4: Considerations for Horizontal Alignments	4-6
Figure 4-5: Alternative 1 for Horizontal Alignments	
Figure 4-6: Cross Sections for Alternative 1 Horizontal Alignment	
Figure 4-7: Alternative 2 for Horizontal Alignments and Cross Sections	4-8
Figure 4-8: Existing Lanes on M1 Motorway	
Figure 4-9: Existing Emergency Lanes	
Figure 4-10: Proposed Cross Section across the Emergency Lane	
Figure 4-11: Alternative 1 Overpass of M1 Motorway + No change of Loop Direction	
Figure 4-12: Alternative 2: Underpass of M1 Motorway + No change of Loop Direction	
Figure 4-13: Alternative 3: Overpass of M1 Motorway + change of Loop Direction	
Figure 5-1: View across the GRNW valley at the approximate Project Location	
Figure 5-2: Pictures of the Project Area	
Figure 5-3: Pictures from Grand River North West Valley	
Figure 5-4: Pictures of M1 Motorway at Sorèze	
Figure 5-5: Junction with A1 Road	
Figure 5-6: Location of Selected Weather Station	
Figure 5-7: Location of Geotechnical Investigations	
Figure 5-8: View of the Municipal Dyke in the GRNW Valley	
Figure 6-1: Road Network Status	
Figure 6-2: Current status of Travel Speed (A1-M1 Link Road, am peak)	
Figure 6-3: Location of Utilities in Project Area	6-6
Figure 7-1: Drainage Plan for the A1-M1 Link Road	
Figure 8-1: Result of calculation of Required Lanes for A1M1	
Figure 8-2: Result of A1-M1 total classification analysis	
Figure 8-3: Results of Simulation Analysis A1M1	
Figure 8-4: Locations of Assessments for Level of Service	8-8