



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
MANILA, PHILIPPINES

DAVAO CITY BYPASS CONSTRUCTION PROJECT (DCBCP)

Package I-1

JICA L/A No. PH-P261 & JICA L/A No. PH-P273

ENVIRONMENTAL MONITORING REPORT No.2

(01 APRIL 2021 - 30 JUNE 2021)

July 2021

Joint Venture of:

 NIPPON KOEI CO.,LTD.



Katahira &
Engineers
International



Nippon Engineering
Consultants Co., Ltd

In Association with:



PHILKOEI INTERNATIONAL, INC.
CONSULTANTS • PLANNERS • ENGINEERS

Environmental Monitoring Report (April – June 2021)

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Abbreviations

CENRO	Community Environment and Natural Resources Office
CMR	Compliance Monitoring Report
DCBCP	Davao City Bypass Construction Project
DENR	Department of Environment and Natural Resources
DPWH	Department of Public Works and Highways
ECC	Environmental Compliance Certificate
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMB	Environmental Management Bureau
EMP	Environmental Management Plan
EMS	Environmental Management System
ERP	Emergency Response Plan
EWMS	Environmental Work Method Statement
GRM	Grievance Redress Mechanism
GRC	Grievance Redress Committee
HS	Hazardous Substance
LGU	Local Government Unit
MMT	Multi-Partite Monitoring Team
MSDS	Material Safety Data Sheet
NK	Nippon Koei
PAP	Project Affected Person
PKII	Philkoei International, Inc.
PPE	Personnel Protective Equipment
ROW	Road Right of Way
SCP	Spill Contingency Plan
SMR	Self-Monitoring Report
SUTJV	Shimizu-Ulticon-Takenaka JV

1 Introduction

This document is the Second Quarterly Environmental Monitoring Report for Davao City Bypass Construction Project (DCBCP) Package I-1 that covers the period of 01 April to 30 June 2021. It was crafted based on the updates presented in the Monthly Progress Reports of the Engineer, findings documented in the Contractor's Environmental Monitoring Reports, remarks during site visits and outcome of meetings.

In the overall, this report narrates the status of project performance in terms of ECC compliance and implementation of commitments in the Environmental Management and Monitoring Plans. Effectiveness of managing the negative impacts are measured by testing the air quality, noise, water quality; determination of waste generation and management; ocular inspection of terrestrial flora and fauna, permits obtained and compliance, risks and social impacts alleviated.

Construction activities during this reporting period include the development of pilot roads going to tunnel portals, improvements of existing and development of new roads to be utilized as access roads, development of the contractor's camps and yards, and as-staked survey. These ongoing components are enumerated as follows:

Access Road	Contractor's Camps and Yards	Earthworks along main alignment
AR-1	Campsite 1 (South)	Sta. 18+900 – Sta. 19+200
AR-2	Barangay Tacunan	Sta. 21+450 – Sta. 22+100
AR-4	Campsite 2 (South)	
AR-5D	Barangay Matina Biao	
ARN	Campsite 3 (North)	
AR-6	Barangay Waan	
AR-7	Campsite 4 (North)	
AR-8	Barangay Tigatto	

Key project compliances during the period are summarized below:

- Conduct of baseline survey by the Contractor under the supervision of DPWH and Consultant;
- Preparation and submission of Self-Monitoring Reports and Compliance Monitoring Report No.1 to EMB;
- Continuous dialogue with stakeholders;
- Hiring of locals;
- Revision of MOA on the Creation of Multipartite Monitoring Team (MMT) and preparation of supporting documents required by EMB;
- Provision of assistance in preparing the requirements for securing Permit to Cut Trees;
- Reviewed the revised Contractor's Environmental Management Plan and their monthly monitoring reports;
- Continuous assistance on ROW acquisition.

2 General Background

2.1 Project Background and Objectives

Davao City Bypass Construction Project is composed of the following components: Single-stage four (4)-lane route alignment will enclose an easement or road right-of-way (RROW) average of 60 meters across and will have a total length of 45.50 km. The new alignment of the project is specified as follows:

Alignment	Name	Length
Mintal Road to Mandug Road	Package I-1	10.7 km with 2.3 km tunnel
Davao-General Santos Road (Maharlika Highway)	Package I-2	12.8 km
Malagmot Road	Package I-3	6.1 kilometer with 0.45 km cut and cover tunnel
Davao Panabo Road	Package II	15.9 km

The objectives of the project are:

- To divert the traffic to the Bypass, instead of passing through the Urban Center relieving its present chronic traffic congestion;
- To expand urban areas towards the inland areas which will be orderly guided by a new road network which is the Bypass;
- To strongly support economic activities, particularly for the manufacturing and agri-business industries, by providing easier transport access to seaports and airports

2.2 Project Profile

Package I-1 is a 10.7 km dual carriageway road divided by a median from Mintal Road Intersection at Sta. 12+800 to Mandug Road Intersection at Sta. 23+500. Package I-1 is composed of roads, bridges and tunnel sub-sections. There are three (3) river bridges for a total 0.5 km length, two (2) overpasses, two (2) underpasses and two tunnels (2 lanes x 2) of 2.3 km long.

The roadway consists of a 6.7m wide carriageways + 2.50 m wide shoulders. Roadside drains and future utility spaces are provided. There are several high cuts and embankments sections of more than 10.0m height since the bypass is passing through rolling and mountainous terrain.

There are eight (8) intersections to be developed and traffic signals and lighting facilities will be installed at three (3) major intersections (Mintal Road, Catalunan Grande Road and Mandug Road). Two (2) overpasses will be constructed to for barangay roads and two (2) underpasses to access Waan High School and a new housing development area.

There are three (3) of the main road (bypass) bridges, 2 nos. overpass bridges and 2 nos. underpasses (2-lane box-culverts at Sta. 17+385 and Sta. 18+890). Two types of cast-in-place foundation piles will be used; bored piles and "Shinso (open caisson with steel plate liners)". Overpass bridges will be constructed for 2 barangay roads mostly used by tricycles and motorcycles.

In line with four-lane roadway divided by the median, dual tunnels of 2 lanes at approximately 30m apart from each other (center to center) will be constructed for 2.249km

(south bound) and 2.240km (north bound) directions. The tunnels will be concrete-lined and interior-finished and provided with emergency alcoves and cross passage tunnels (one vehicular and two pedestrian) for emergency escapes.

Table 1. General Information Sheet

Contract Data	
Project Component:	Road, Bridge and Tunnel Construction
Province:	Davao Del Sur
Region:	XI
Funding Source:	JICA Loan No. PH-P261 & PH-P273
Consultant:	Joint Venture of Nippon Koei Co., Ltd, Katahira & Engineers International and Nippon Engineering Consultants Co., Ltd in Association with Philkoei International Inc.
Contract Amount:	
Civil Works Amount:	
Total Length of Project	10.7 km
Road Length	7.9 km
Total Length of Bridges	0.5 km
Total Length of Tunnel	2.3 km
EMP Approval date	04 Feb 2021: Temporary Approval (SUTJV/G-0008)
	22 Feb 2021: Consultant Comments (SUTJV/G-0009)
Contract Date Start:	21 December 2020
Contract Duration	37 months (1,110 Calendar Days)
Contract Completion Date:	4 January 2024

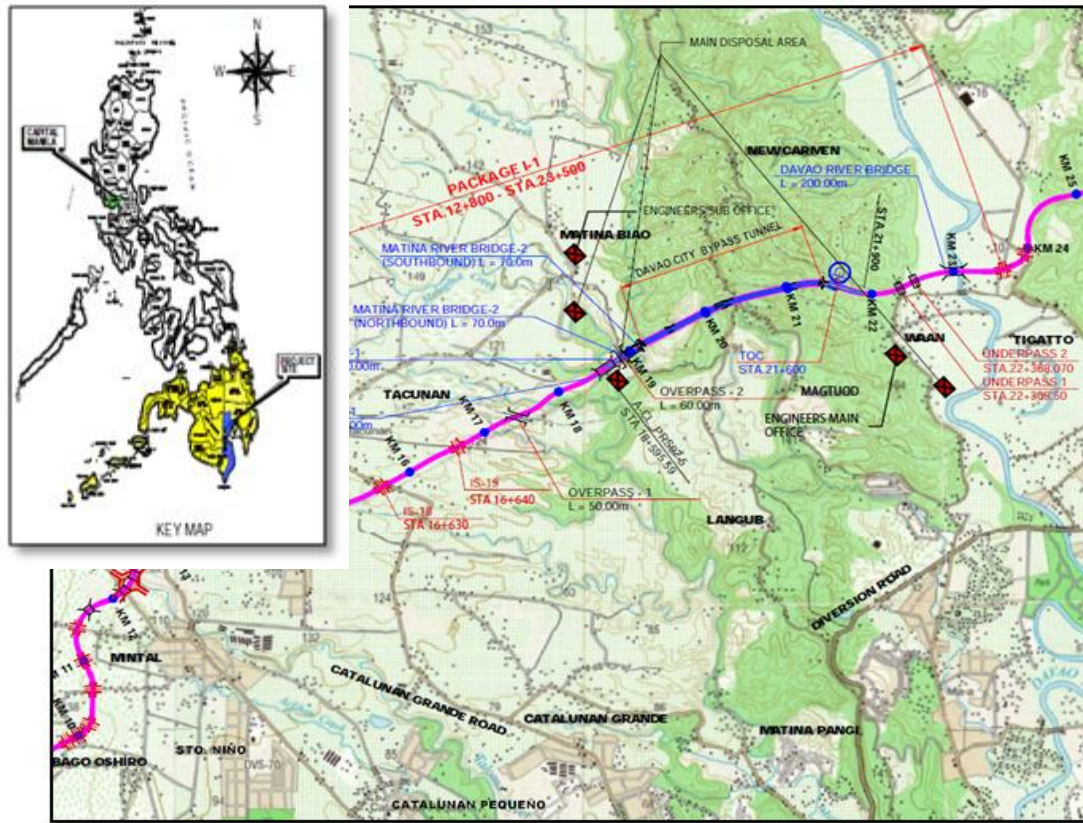


Figure 1 Project Location Map

2.3 Status of Project Activities

Status of each project component is presented as follows:

- Access Roads**

Road ID	Description	Location	Status
AR-1	Existing Private Road	Matina Biao	Ongoing Base Preparation and PCCP
AR-2	Existing Barangay Road	Matina Biao	On-going Earthworks
AR-4	New Access Road connecting to South Tunnel Portal	Matina Biao	On-going Earthworks and River Crossing
AR-5D	New Access Road connecting to South Tunnel Portal	Matina Biao	On-going Earthworks and River Crossing
ARN	Existing National Road connecting to Sta. 22+000	Waan	On-going PCCP
AR-6	Existing Catalunan Grande Road	Tacunan	No Activity
AR-7	Existing Barangay Road	Tacunan	Subgrade Level
AR-8	Existing Barangay Road	Tacunan	Subgrade level

- Contractor's Camps and Yards**

The Contractor is developing four (4) camps and yards at the following locations:

Location	Area	Area
Campsite 1 (South): Barangay Tacunan	0.62 has	Partially used
Campsite 2 (South): Barangay Matina Biao	1.2 has	Ongoing site development
Campsite 3 (North): Barangay Waan	1.1 has	Ongoing site development
Campsite 4 (North): Barangay Tigatto	0.3 has	Partially used

- **Earthworks along Main Alignment**

Location	Status
Sta. 18+900 – Sta. 19+200	Lowering of slopes for pilot road to tunnel portal
Sta. 21+450 – Sta. 22+100	

3 Environmental Monitoring

The primary purpose of monitoring is to ensure the judicious implementation of sound environmental management within a company/corporation and its areas of operation. Specifically, it aims to ensure the following:

- Project Compliance with the conditions set in the ECC;
- Project Compliance with the Environmental Management Plan (EMP);
- Effectiveness of environmental measures on prevention or mitigation of actual project impacts vis a vis the predicted impacts used as basis for the EMP design; and
- Continual updating of the EMP for sustained responsiveness to project operations and project impacts (DENR AO 2003-30)

The environmental monitoring plan is part of the DCBCP Environmental Management Plan (EMP) as detailed in the EIS of 2014. Implementation of the EMP started during the pre-construction phase and continued during the construction period and operation phase.

3.1 Environmental Baseline Monitoring

Baseline environmental monitoring activities are conducted prior to any construction activities. Using the sampling locations and parameters in the EIS' baseline survey performed in 2014 (Table 2), the sampling activities were planned and started in the first quarter of 2021.

Table 2. Items and Sampling Locations

Item	As per EIS (Quarterly Tests)	
	Locations	No. of Tests
1. Pollution		
Air Quality	Beginning of Project	1
	End of Project	1
Water Quality (Surface Water)	Davao River	3
	Matina 1	2
	Matina 2	2
	Tunnel Upstream	1
	Sta. 22+200	1
Water Quality (Ground Water), Volume & level	Sta 20+350 (existing well)	1
	Sta 20+350 (existing water tank)	1
Waste	volume & type	per disposal of waste
Noise	Beginning of Project	1
	End of Project	1
Ground Subsidence	Groundwater seepage at tunnel	daily
2. Natural Environment		
Terrestrial Flora & fauna	visual check of vegetation	daily
	quarterly at specific locations	5
Aquatic flora & fauna	same as surface water tests	quarterly
3. Social Environment		
Land use	site conditions	as necessary
Water use	records	based on complaints
Existing social infrastructure & service	records	based on complaints
4. Health & Safety		
Infectious diseases	records	as necessary
Occupational health	records	as necessary
Community health & safety	records	as necessary
5. Emergency Risk		
Flood	Davao River banks	2
Fire	site conditions	as necessary

Water sampling and analysis had been completed in April 2021 as supervised by DPWH and the Engineer. No major activities were undertaken during the conduct of these activities.

Other environmental components that may change due to the project were also characterized and covered in the Environment Baseline Report prepared by the Contractor.

Remaining task on baseline survey is the measurement of groundwater level on top of the tunnel. New borehole will be excavated for use as observation well.

3.2 Environmental Compliance Monitoring

The hierarchy of environmental monitoring and measurements shall be carried out by the contractor under the supervision of the RMC 1 (B) Unit, Consultant and JICA. Following the Contract's Technical Specifications, the contractor shall submit environmental monitoring reports to DPWH through the Engineer on a monthly basis. A separate compliance monitoring report shall be prepared by DPWH with the assistance of the Engineer for submission to DENR-EMB on a semi-annual basis. Self-monitoring reports are also prepared on a quarterly basis.

3.2.1 Monitoring Activities

Monitoring of the state of environmental components had been carried out for the second quarter. DPWH with the Joint Venture of Nippon Koei Co. Ltd., Nippon Engineering Consultants Co., Ltd., Katahira & Engineers International in association with Philkoei International, Inc. conducted field visits and at the same time supervised the monitoring works performed by the Contractor. Combined findings were integrated in the **Compliance Monitoring Report No.1, Self-Monitoring Report No.1 and Self-Monitoring Report No.2**. Observed non-compliances were also documented and site instructions were issued to the contractor.

The Environmental and Social Services Office (ESSD) under D.O. 58 of the DPWH shall also conduct the supervision and in-house monitoring of implementation of the RAP.

3.2.2 Contractor's Environmental Monitoring Activities

The contractor established its own Environmental Management System (EMS) that includes the Environmental Management Plan (EMP) (**Annex 1 - Environment Management Plan**). The environmental objectives, actions and targets outlined in the EMP are regularly monitored which aims to protect the environment during the construction of tunnels and facilities, bridges and underpass, roads, culverts and buildings, Project Core Offices, contractors' camps and access roads.

4 Results of Environmental Monitoring

4.1 Baseline Monitoring

The environmental baseline monitoring prepared by the Contractor as reviewed by the Consultant is attached as **Annex 2 – Environment Baseline Report**. Excerpts from the report are presented below:

4.1.1 Ambient Air Quality

Baseline information for ambient air quality such as TSP, NO₂, SO₂ and CO are within the Philippine Standards. This indicates that there are no major sources of air pollutants around the sampling points. During the survey, construction works have not yet started along the main project alignment.

4.1.2 Noise

As surveyed, the noise levels at sensitive areas generally decreased slightly compared to the values in the EIS prepared in 2014. This could be attributed to pandemic prevention

protocols where there is restriction in the movement of the people, social gatherings and face to face meetings or classes.

Parameters	Ambient Noise			
	Morning	Daytime	Evening	Nighttime
Philippine Standards C at AA (schools)	45	50	45	40
EIS	64	64	57	53
Waan Elem School (flagpole)				
	56			
		57		
			53	
				52
Philippine Standards Cat B	60	65	60	55
EIS	-	74	-	-
Elenita Heights				
	63			
		63		
			63	
				63
Batching Plants				
Matina Biao		76		
Waan		53		

4.1.3 Surface Water Quality

The parameters included in the EIS include Dissolved Oxygen (DO), pH, Total Suspended Solids (TSS), Biochemical Oxygen Demand (BOD), Oil and Grease, Total Coliforms and Fecal Coliforms. Baseline data show exceedances on Total Coliforms and Fecal Coliforms, signifying concerns on sanitation and potential sources of organic wastes around Matina 1 River, Matina 2 River and Davao River.

Table 3 Summary of Baseline Surface Water Quality Conditions

Particulars	Parameters						
	Dissolved Oxygen (DO), mg/L	pH @ 26.3oC	Total Suspended Solids (TSS), mg/L	Biochemical Oxygen Demand (BOD), mg/L	Oil & Grease, MPN/100 ml	Total Coliforms, MPN/100 ml	Fecal Coliforms, MPN/100 ml
DAO 34, Class C	5 (min)	6.5 - 8.5	(g)	7(10)	2.0	1,000	1,000
Matina 1 River							
EIS	7.3	7.73	2	2	ND	9.2x103	1.3x103
Baseline 29 April 2021							
Upstream	7.2	8.28	3	1.8	0.86	16,000	1,100
Downstream	6.9	8.09	<3.0	2	1.1	16,000	230
Matina 2 River							
EIS	7.3	7.73	2	2	ND	9.2x103	1.3x103
Baseline 18 March 2021							
Upstream	5.7	8.01	<3.0	12.3	2.5	160,000	54,000
Downstream	6.000	7.97	<3.0	7.7	3.4	160,000	17,000
Sta. 22+200							
Baseline 29 April	7.4	8.42	9	3.2	<0.5	16,000	9,200

Particulars	Parameters						
	Dissolved Oxygen (DO), mg/L	pH @ 26.3oC	Total Suspended Solids (TSS), mg/L	Biochemical Oxygen Demand (BOD), mg/L	Oil & Grease, MPN/100 ml	Total Coliforms, MPN/100 ml	Fecal Coliforms, MPN/100 ml
2021							
Davao River							
Baseline 18 March 2021							
Upstream	7.3	8.27	61	5.5	<0.5	35,000	24,000
Downstream 1	7.4	8.29	168	2.8	2.6	160,000	13,000
Downstream 2	7.3	8.37	6	5.9	7.2	92,000	3,800

4.1.4 Summary of Observed Flora

SUMMARY OF OBSERVED FLORA									
OFFICIAL COMMON NAME	FAMILY	SCIENTIFIC NAME	HABIT	DAO 2007-01	IUCN Redlist 2013	ENDEMICITY	LOCATIONS		
							BEGINNING (S9)	Sta 22+000 (S11)	END (S12)
							26-Mar	23-Apr	26-Mar
							Fair / 1030H	Fair / 0930H	Fair / 1100H
Aglaonema	Araceae	Aglaonema spp.	Herb	-	Least Concern	Not Endemic	yes		
Amorsoco	Poaceae	Andropogon aciculatus	grass	-	-	Not Endemic	yes	yes	
Anabiong	Canabaceae	Trema orientalis (L.) Blume	tree	-	Least Concern	Not Endemic		yes	
Anahaw							yes		
Arat	Cyperaceae	Scleria scrobiculata Nees	sedge	-	-	Not Endemic	yes	yes	
Ayo	Vitaceae	Terrastigma harmandii	vine	-	-			yes	
Banana								yes	
Bulakan	Convolvulaceae	Merremia peltata L.	vine	-	-	Not Endemic		yes	
Cacao	Malvaceae	Theobroma cacao	tree	-	Least Concern	Not Endemic		yes	
Carabao Grass	Poaceae	Paspalum conjugatum Berg.	grass	-	Least Concern	Not Endemic	yes	yes	yes
Carpet Grass	Poaceae	Axonopus fissifolius	grass	-	-	Not Endemic	yes	yes	
Centrosema	Fabaceae	Centrosema plumeiri	vine	-	-	Not Endemic		yes	
Christella Fern	Thelypteridaceae	Christella dentata	fern	-	-	Not Endemic		yes	
Crab Grass	Poaceae	Digitaria sanguinalis	grass	-	-	Not Endemic	yes	yes	
Dilang Baka	Lamiaceae	Hyptis capitata Jacq.	Herb	-	-	Not Endemic	yes		
Dulalug	Moraceae	Ficus variegata Blume var. sycomoroides (Miq.)	tree	-	-	Not Endemic		yes	
Fishing Rod Bamboo	Poaceae	Schizostachyum lima (Blanco) Merr.	grass	-	-	Not Endemic	yes	yes	
Gmelina	Lamiaceae	Gmelina arborea	tree	-	-	Not Endemic	yes		
Hairy-leaved centrosema	Fabaceae	Centrosema pubescens L.	vine	-	-	Not Endemic		yes	
Ipil-Ipil	Fabaceae	Leucaena leucocephala	tree	-	-	Not Endemic	yes	yes	
Kamkamote	Convolvulaceae	Ipomoea triloba L.	vine	-	-	Not Endemic	yes	yes	
Kandikandilaan	Verbenaceae	Stachytarpheta jamaicensis	Herb	-	-	Not Endemic	yes	yes	
Kilob	Gleicheniaceae	Dicranopteris linearis	fern	-	-	Not Endemic		yes	
Makahiya	Fabaceae	Mimosa pudica L.	Herb	-	Least Concern	Not Endemic		yes	
Malakamote	Convolvulaceae	Ipomoea obscura L.	vine	-	-	Not Endemic		yes	
Mangga	Anarcardiaceae	Mangifera indica	tree	-	-	Not Endemic		yes	yes
Name Tree							yes		
Nito	Lygodaceae	Lygodium flexuosum (L.) Sm.	vine	-	-	Endemic		yes	
Niyog	Arecaceae	Cocos nucifera L.	palm	-	-	Not Endemic	yes	yes	yes
Osmunda / Royal Fern	Osmundaceae	Osmunda banksiiifolia (C.Prosl.) Kuhn.	fern	-	-	Not Endemic		yes	
Rami	Urticaceae	Boehmeria nivea	Herb	-	-	Not Endemic		yes	
Sticherous Fern	Gleicheniaceae	Sticherus truncatus (Willd.) Nakaii	fern	-	-	Not Endemic		yes	
Tawa-Tawa	Euphorbiaceae	Euphorbia hirta	Herb	-	-	Not Endemic	yes	yes	

4.1.5 Summary of birds observed at site

There were few birds observed at site as shown below :

Summary of Observed Birds

Common Name	Scientific Name	Locations		
		Beginning	Sta. 22+000	End
		March 26, 2021	April 23, 2021	March 26, 2021
		Fair / 1030H	Fair / 0930H	Fair 1100H
Yellow-vented Bulbul	Pycnonotus goiavier		yes	
Olive-backed Sunbird	Nectarinia jugularis	yes	yes	yes
Pied Buschat	Saxicola caprata	yes	yes	yes

4.2 Compliance Monitoring

Progress of compliance with the ECC together with the EMP are summarized below.

4.2.1 ECC conditions

Conditions	Status of Compliance/Comments/Activities Taken/ Recommendation
Environmental Management	
1. Conduct an effective Information, Education and Communication (IEC) Program to inform and educate all stakeholders about the mitigating measures embodied in its EIS, the conditions stipulated in this Certificate and the environmental and human safety features of the project for greater awareness, understanding and sustained acceptance of the project. The program shall be submitted to EMB Central Office and EMB Regional Office No. XI on an annual basis;	During this period, IEC is being done through billboards, meetings and one on one discussions. Annex 3 -Documentation reflect the aforementioned activities
2. Implement a Comprehensive Social Development Program (SDP) and submit a semi-annual basis a separate report together with the Compliance Monitoring Report (CMR) to the EMB Regional Office, a copy furnished EMB Regional Office No. XI.	<p>Department Order 130 Series of 2016 is being complied. As mandated, a minimum of 50% of the unskilled labor and 30% of the skilled labor requirement shall be recruited and be equally accessible to both women and men.</p> <p>To date, there are 294 workers in the project, including support staff. There are 211 skilled workers, or 72% of the total and 83 non-skilled workers, or 28% of the total workforce. A total of 1,050 workers are projected to be mobilized when construction work is at full blast. Hiring of workers is continuing with those from the affected barangays as priorities.</p> <p>The combined skilled workforce from the directly affected barangays and Davao City is 135 or 60% of the total 226 skilled workers. 65% of unskilled workers are from the directly affected barangays. Details are provided in Annex 4 – Unskilled and Skilled labor.</p> <p>A Social Development Program (SDP) for the project is also being established where local</p>

Conditions	Status of Compliance/Comments/Activities Taken/ Recommendation
	hiring is one of the components.
General Conditions	
3. The operations shall conform to any relevant provisions of RA 69696 (Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990, RA 8749 (Philippine Clean Air Act of 1999, RA 9003 (Ecological Solid Waste Management Act), and RA 9275 (Philippine Clean Water Act of 2004) and applicable provisions of P.D. 705, R.A. 9147 (Wildlife Resources Conservation and Protection Act); and R.A. 9072 (National Caves & Cave Resources Management & Protection Act, 2001);	<p>Mitigation measures are being implemented to comply the provisions of environmental laws relevant to the project.</p> <p>RA 9003 (Solid Waste Management System) Wastes generated from Project Offices: Garbage bins are provided and wastes are collected by the City Garbage Collectors on a daily basis.</p> <p>ii) Construction wastes generated for the period were insignificant.</p> <p>RA 6969 (Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990) There were no hazardous wastes generated during this period.</p> <p>RA 8749 (Philippine Clean Air Act of 1999) Dust pollution and greenhouse gas emissions from access road improvement and construction of camps were insignificant. There were no construction activities along the main project alignment. Air sampling was conducted on June 15-16, 2021 at designated locations with the result of analysis to be reported in the next quarter. Annex 5 shows the photo of air sampling activity.</p> <p>RA 9275 (Philippine Clean Water Act of 2004) Baseline monitoring for water was continued in April 2021 with the first quarterly monitoring partially conducted in June 10, 2021. Results are presented in Annex 6 - Results of Water Analysis</p> <p>Health & Safety There were no reported accidents onsite as to date, however, some minor to moderate landslides occurred where slope protection works are being applied. Additional information is presented in Annex 7 – Record of Site Incidents.</p> <p>Peace and Order Peace and order is maintained onsite. Security personnel were deployed both at the north and south portal area.</p>
4. The DPWH shall ensure that: a) Contractor's All Risk Insurance (CARI) is provided to cover expenses for the following: i. Indemnification/compensation of damage to life and property that maybe caused by the project; ii. Abandonment/decommissioning of the project facilities related to the prevention of possible negative impact.	Complied
b. A Quick Response Fund (QRF) to supplement the CARI, shall also be set up. QRF will be used for	Complied

Conditions	Status of Compliance/Comments/Activities Taken/ Recommendation
emergency repairs/restoration of the critically damaged infrastructure facilities after calamity to restore mobility and ensure safety in the affected areas;	
<p>c. Multipartite Monitoring Team (MMT) shall be established, composed of representatives (s) from the DPWH, EMB, a local environmental Non-Government Organization (NGO), primary impact area/barangays, the concerned LGUs, other Governmental agencies and stakeholders to include the University of the Philippines, HOLCIM-Davao Plant, Davao Light and Power Corporation (DLPC) , Davao City Water District (DCWD) and National Grid Corporation of the Philippines (NGCP).</p> <p>The MMT shall primarily oversee the compliance of the proponent with the condition of the ECC, Environmental Management Plan and Monitoring Plan and other commitments contained in the EIS documents.</p>	Ongoing preparation of MOA. MOA will be executed between DPWH and DENR- EMB.
d. A replenishable Environmental Monitoring Fund (EMF) as per DENR-DPWH MOA dated May 27, 1999 and DPWH Order 245 Series of 2003, attendant to the operation and monitoring activities of the MMT including, but not limited to, capacity building, training, actual sampling and laboratory analysis. Said provisions must be considered with the DAO 2003-30;	Being considered in the MOA.
<p>e. The Environmental Unit (EU) to competently handle the environment related aspects of the project. In addition to the monitoring requirements as specified in the Environmental Management Plan (EMP), the Environmental Monitoring Plan (EMoP).</p> <p>It shall:</p> <ul style="list-style-type: none"> i.) Monitor actual impacts vis-a-vis the predicted impacts and management measures in the EIS; ii) Submit quarterly (SMR) and semi-annually (CMR and CMVR) all environmental reports to EMP Region XI and the EMB Central Office respectively; and iii) Ensure that monitoring and reporting area carried out as required. 	<p>For compliance</p> <p>For compliance</p>
5. The proponent shall submit to EMB Central Office a Resettlement and Compensation Action Plan prior to project implementation. Moreover, the said plan should be implemented and status thereof reported to EMB semi-annually;	Being complied with the updates provided in Annex 8 - Status of ROW.
6. The proponent shall consider results of the feasibility stage Road Safety Audit (RSA) and Road Design (including those components considering geological condition/features) in the preparation of the DED and during implementation / construction	Being complied. Safety signs and barricades are installed where necessary.
7. The proponent shall ensure that its contractors and sub-contractors strictly comply with the relevant conditions of this Certificate:	Compliance with ECC conditions by contractors and sub-contractors are being monitored.
8. No cutting and/or clearing of trees and other woody vegetation within the affected areas of the project	DENR - Region IX CENRO Davao City issued Permit to Cut Trees to DPWH and Contractor.

Conditions	Status of Compliance/Comments/Activities Taken/ Recommendation
shall be undertaken without the necessary special tree cutting and/or tree earth balling permit. The affected areas shall be rehabilitated in accordance with the approved rehabilitation/restoration plan of the project.	Five (5) Permit to Cut Trees were issued to DPWH as of June 15, 2021 Six (6) Permit to Cut Trees were issued to Contractor as of May 6, 2021 Conditions are being complied.
9. In the event that the results of the Detailed Engineering Design showed a need for the adjustment on the Project's alignment, the corresponding centerline of the adjustment shall not exceed 20meter distance both sides from the centerline of the previous alignment.	Complied per ECC amendments.
10. No activities shall be undertaken other than what were stipulated in the final EIS. Should there be any expansion of the project beyond the project description or any change in the activity or transfer of location or realignment, shall be subject to a new Environmental Impact Assessment; and	ECC was amended in 2018 and 2019.
11. In case of transfer of ownership of this project, these same conditions and restrictions shall apply and the transferee shall be required to notify the EMB Central Office within fifteen (15) days from the transfer of ownership to allow the necessary changes brought about by such transfer.	Not applicable

4.2.2 Recommendations to Government Agencies Concerned

Recommendations to Government Agencies Concerned	Responsible agency	Remarks
1. Compliance with the occupational health and safety and Sanitation Code of the Philippines;	DOH, DOLE, Barangay/ Municipal Health Offices	Occupation Health and Safety Plan is being implemented.
2. Compliance with the Labor Code of the Philippines;	DOLE, BWC DPWH	Being complied by the contractor; progress will be monitored and reported on the next reporting period. OSH Trainings were provided to contractor's staff including DPWH and Consultant (Annex 9 - Personnel Trainings). DWPH D.O. 130 Series of 2016 is being complied.
3. Ensure conformance with the Ecological Solid Waste Management Act	LGU	There are 2 identified disposal sites at the south side. South Disposal Area 1 is at Barangay Matina Biao. The barangay has issued a Resolution requesting for dumping of excess earth materials at Purok 5. Cutting of trees and Clearing & Grubbing are ongoing at this location. This will mainly be for excavated materials from the tunnel. Possession of South Disposal area 2 is under negotiations.
4. Secure appropriate zoning clearance	LGU	Use of areas within the project alignment have been approved by the City Government. Related documents are being compiled.
5. Prior to cutting and/or clearing of trees & other woody vegetations within the project area, the proponent shall	DENR Central Office	Complied.

Recommendations to Government Agencies Concerned	Responsible agency	Remarks
secure a Tree Cutting and /or Tree Earth Balling Permit supported with tree inventory report that should originate from DENR/ CENRO/ PENRO/Region who has jurisdiction over the project area.		
5 The proponent shall consider the inclusion of walkable - bikeable lane in the projects' Detailed Engineering Design.	DPWH	Considered for compliance
6 Priority of employment shall be given to qualified local residents. Adequate public information for jobs available to local residents in the affected areas needs to be provided.		Coordination with Barangay Officials is being undertaken for additional job referrals per DPWH D.O. 130 Series of 2016.
7 Conduct regular dialogue, consultations, and FGDs with the project's stakeholders in order to settle any conflicts and address identified valid concerns for a substantive and satisfactory public acceptance of the project. Likewise, submit process documentation of the said activities to EMB.		Discussion of concerns with stakeholders are being conducted as part of the regular activities of DPWH, Consultant and Contractor. Necessary permits and clearances are being secured for the following. <ul style="list-style-type: none"> • Batching Plant • Disposal Site • Road Widening • Temporary Road Closure
8 Design and undertake an effective continuing Information, Education and Communication (IEC) Program throughout the pre-construction, construction and operational phases of the project especially on the Traffic Management Plan to be implemented.		IEC is being done continuously. Coordination with barangay officials and lot owners is being conducted by DPWH, Consultant and Contractor.
9 First aid facilities and services for staff and employees shall be made available onsite during construction and operation of the project.		Company nurses were hired and clinic will be set up.

4.2.3 Environmental Management Plan/Program

Enhancement/Mitigation Measures	Status of Implementation		Actions Taken
	Yes	No	
Air Quality			
<ul style="list-style-type: none"> - Use construction machineries and vehicles in good conditions, - Limit speed for construction machineries at construction sites adjacent to residential areas - Regular water sprinkling 	✓		For compliance.
Water Quality			
<ul style="list-style-type: none"> - Proper treatment of water pollutants generated from construction works in accordance with Philippine Regulations - Arrange silt traps or sedimentation pond, as necessary, not to discharge wastewater from construction sites to public water channels directly, - Shelter scattered river mud from dredging works by using silt fence, as necessary - Install effective portable toilets for workers 			For compliance .
Waste			
<ul style="list-style-type: none"> - Dispose wastes at the designated places after considering a possibility of re-use - Rolling compaction of soil waste at disposal site - Provide education on Waste Management to construction workers - All disposal sites should be approved by the concerned agencies 			For compliance.
Noise			
<p>Avoiding works of heavy equipment at night time around the sensitive areas such as residential area</p> <ul style="list-style-type: none"> - Install soundproof walls/acoustic enclosures as necessary - Disseminate the construction schedule to surrounding communities to obtain their consensus 			For compliance
Natural Environment			
<p>Terrestrial Flora and Fauna</p> <ul style="list-style-type: none"> - Cutting of trees only at designated areas according to issued Permits from concerned authorities - Plant trees at sites designated by DENR 		✓	Cutting of trees only at designated areas according to issued Permits from concerned authorities is being complied. This is being coordinated with CENRo.
<p>Aquatic flora and Fauna</p> <ul style="list-style-type: none"> - Same as mitigation measures explained in Water Quality 			For compliance
Social Environment			

Enhancement/Mitigation Measures	Status of Implementation		Actions Taken
	Yes	No	
Land use - Cutting of trees only at designated areas according to issued Permits from concerned authorities			For compliance
Water use - Inform construction schedule and contents to the downstream communities in advance - Provide alternative water sources in case ground water is affected due to construction works			For compliance Water volume and water level at two (2) measuring points in Sta. 20+350 (above tunnel) will be conducted prior to start of tunnel works. An inspection was conducted on 15 April 2021 to locate the measuring points at Sta. 20+350 (above the tunnel). The (previously) vacant lot where an observation well was driven was already backfilled and occupied while the existing water tank had been rehabilitated in 2020. DPWH/Consultant will issue Instruction on the next course of action and coordinate access, respectively.
Existing social infrastructures and services - Preparation of appropriate Resettlement Plan - Informing resettlement works in the communities in a timely manner.		✓	RAP is being implemented.
- Control traffic volume.			For compliance.
Health and Safety			
Infectious Disease such as HIV/AIDS - Prepare and implement HIV/AIDS Prevention Plan			For compliance
Occupational health and safety - Prepare and implement a Safety Plan - Provide education to construction workers on Health and Safety at the construction site			For compliance
Community health and safety - Prepare and implement Health and Safety			For compliance.
Emergency Risk			
Flood - Prepare and implement Safety Plan and Risk Reduction Management Plan.			For compliance.
Fire - Prepare and implement Fire Prevention/Safety Plan and Risk Reduction Management Plan.			For compliance

5 Corrective Action Plan

The Contractor has implemented some mitigation measures based on EIS' Environmental Management Plan- Continuous validation is being carried out by DPHW with the assistance of the Consultant- Site instructions are issued to the contractor for issues that requires their immediate action. As of this reporting period, the key issues identified are presented in below:

Table 3. Key Issues and Required Actions

Issues	Required Action	Responsibility and Timing
<p>April 6, 2021</p> <p>Billboards reflecting Permit to Cut trees are not found in conspicuous locations where tree cutting is being undertaken; Billboards reflecting the ECC of the project are not found in conspicuous locations or where necessary.</p>	<p>In compliance with ECC and requirements of Permit to Cut Trees' for DCBCP Package I-1, billboards reflecting the ECC of the project and notice on Permit to Cut Trees should be displayed in conspicuous areas or as specified in the permit.</p>	<p>Contractor</p> <p>Immediate</p>
<p>May 26, 2021</p> <p>Excavated materials for Access Road No. 4 were placed at riverbanks of Matina River. Turbidity observed.</p>	<p>The contractor was instructed to follow provisions in the Technical Specifications/EMP or Earthworks.</p>	<p>Contractor</p> <p>Immediate</p>

6 Complaints

6.1 Details of Complaint/s

During the reporting period, there were minor complaints raised by the local population and other stakeholders. Complaints received will be properly recorded.

6.2 Action Taken

Corresponding actions for the complaints will be recorded. These will be classified as short term or long term.

7 Conclusion

Environmental Monitoring Report No. 2 narrates the findings from the monitoring works conducted during the second quarter of 2021.

Environmental compliance during this period is progressing well. Implementation of the conditions of the ECC, the commitments in the Environmental Management Plan and adherence to site instructions issued to the contractor will be checked continuously. Accomplishments during the period are as follows:

1. Supervised the environmental monitoring works performed by the contractor;
2. Prepared the Self-Monitoring Reports, Compliance Monitoring Report No.1, Environmental Monitoring Report No. 2 (this document), and inputs for the Monthly Progress Reports of the Engineer;
3. Issued site instructions;
4. Supervised the tree inventory of affected areas;
5. Continuous coordination with EMB, DENR-CENRO, NHA and other stakeholders
6. Revised the MOA on the Creation of MMT and prepared the required attachment;
7. Prepared the list of MMT Members and drafted letter for the distribution of copies of MMT MOA;
8. Reviewed the environmental reports submitted by the Contractor;
9. Monitored the progress of land acquisition and compensation to PAPS; provided assistance to affected landowners regarding the submission of required documents

ANNEXES

Annex 1

Environment Management Plan

Annex 2

Environment Baseline Report

Annex 3

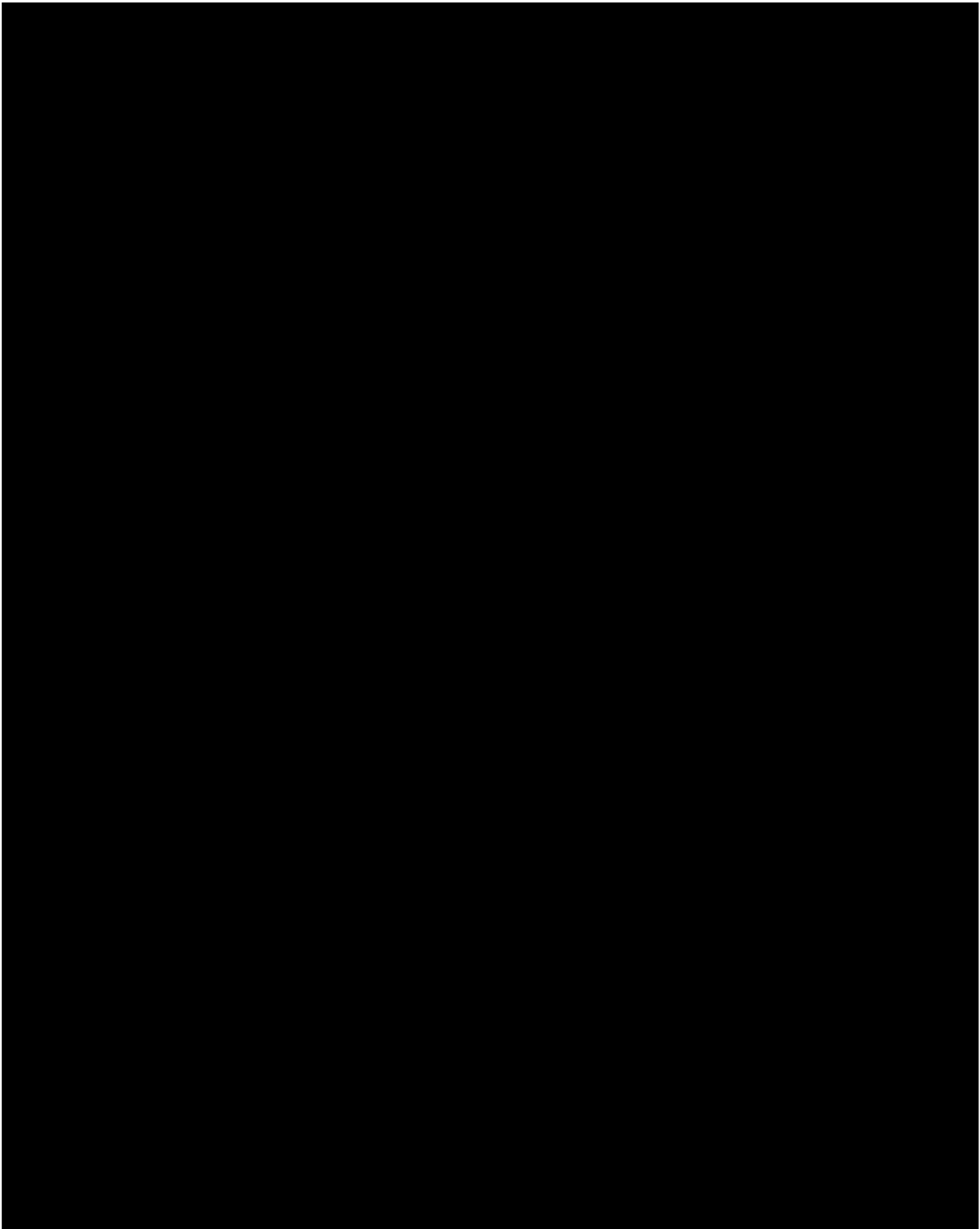
Documentation IEC Activities



Earthworks, and clearing and grubbing activities at STA. 22+080;
Installation of billboards is used as form of Information, Education and Communication (IEC) activities



For IEC, billboards are installed in compliance with Permit to Cut Trees requirements (photo taken at Matina Bridge area on 07 June 2021)



Annex 4

**Labor Force by Nationality and
Gender, Unskilled and Skilled
Labor**

labor Force by Nationality and Gender

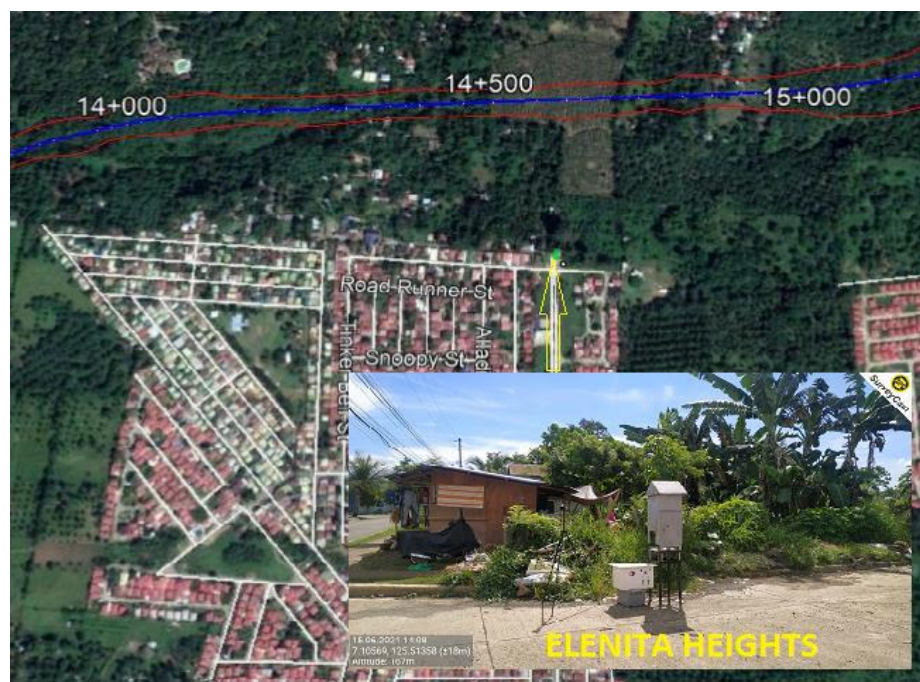
Nationality	Gender	
	Male	Female
Filipino	238	47
Japanese	8	1
Sub-Total	246	48
Total	294	
% of Total	84%	16%

Unskilled and Skilled labor

	From Affected Barangays	From Davao City	From Davao Sur	From Region XI	From Mindanao	From other areas in the Phil.	Foreign	Total
Total no. of workers	84	106	3	40	33	19	9	294
% of total	29%	36%	1%	14%	11%	6%	3%	100%
A. Skilled Workers								
No. of workers	40	95	3	30	31	18	9	226
% of total skilled	18%	42%	1%	13%	14%	8%	4%	100%
B. Unskilled Workers								
No. of workers	44	11	—	10	2	1	—	40
% of total unskilled	65%	16%	—	15%	3%	1%	—	100%

Annex 5

Air Sampling Activity



Air quality tests at Elenita Heights (Tacunan) and Waan Elementary School on 15 – 16 June 2021.

Annex 6

Results of Water Analysis and Documentation

SUMMARY OF SURFACE WATER QUALITY FOR SECND QUARTER

Particulars	Parameters						
	Dissolved Oxygen (DO), mg/L	pH @ 26.3oC	Total Suspended Solids (TSS), mg/L	Biochemical Oxygen Demand (BOD), mg/L	Oil & Grease, MPN/100ml	Total Coliforms, MPN/100 ml	Fecal Coliforms, MPN/100ml
DAO 34, Class C	5 (min)	6.5 - 8.5	(g)	7(10)	2.0	1,000	1,000
Matina 1 River							
EIS	7.3	7.73	2	2	ND	9.2x103	1.3x103
2021: Quarter 2: 10 June 2021							
Upstream	7.1	8.53	30	13.1	<0.5	920,000	240,000
Downstream	6.8	8.36	26	9.9	<0.5	1,600,000	540,000
Matina 2 River							
EIS	7.3	7.73	2	2	ND	9.2x103	1.3x103
2021: Quarter 2: 10 June 2021							
Upstream	Sampling scheduled on 01 July 2021 by DENR accredited laboratory						
Downstream							
Sta. 22+200							
2021: Quarter 2: 01 July 2021							
Davao River							
2021: Quarter 2: 10 June 2021							
Upstream	6.7	8.31	736	2.2	<0.5	92,000	11,000
Downstream 1	7.2	8.47	760	3	0.5	160,000	11,000
Downstream 2	6.9	8.55	645	1.7	<0.5	54,000	17,000

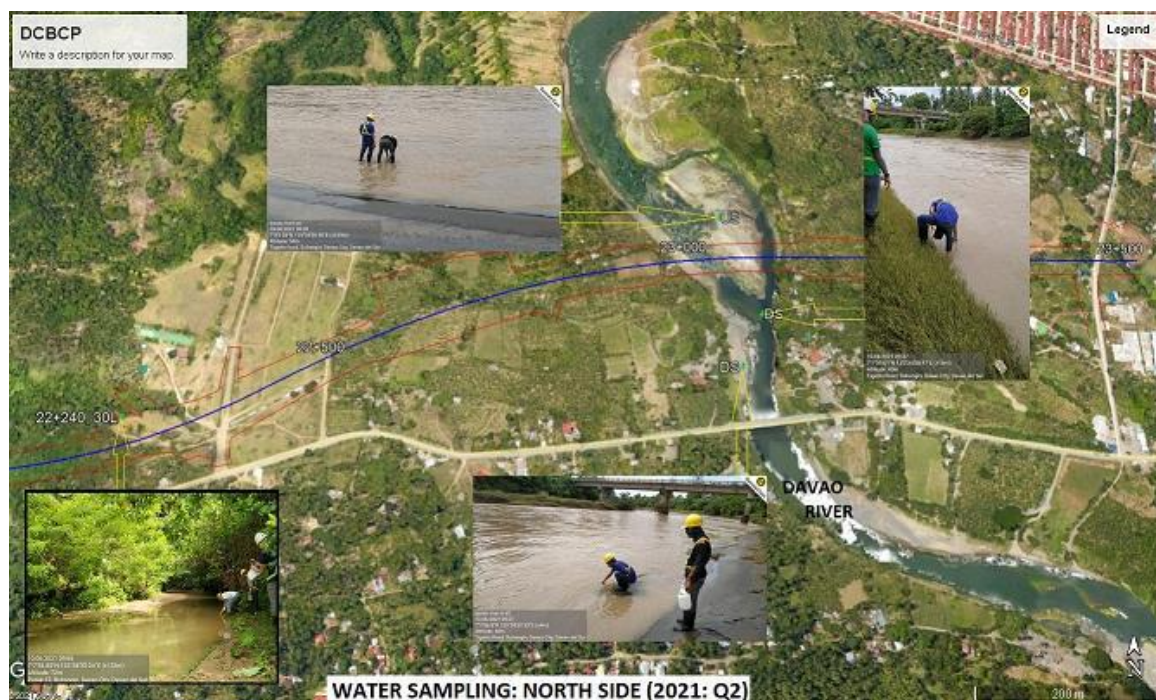
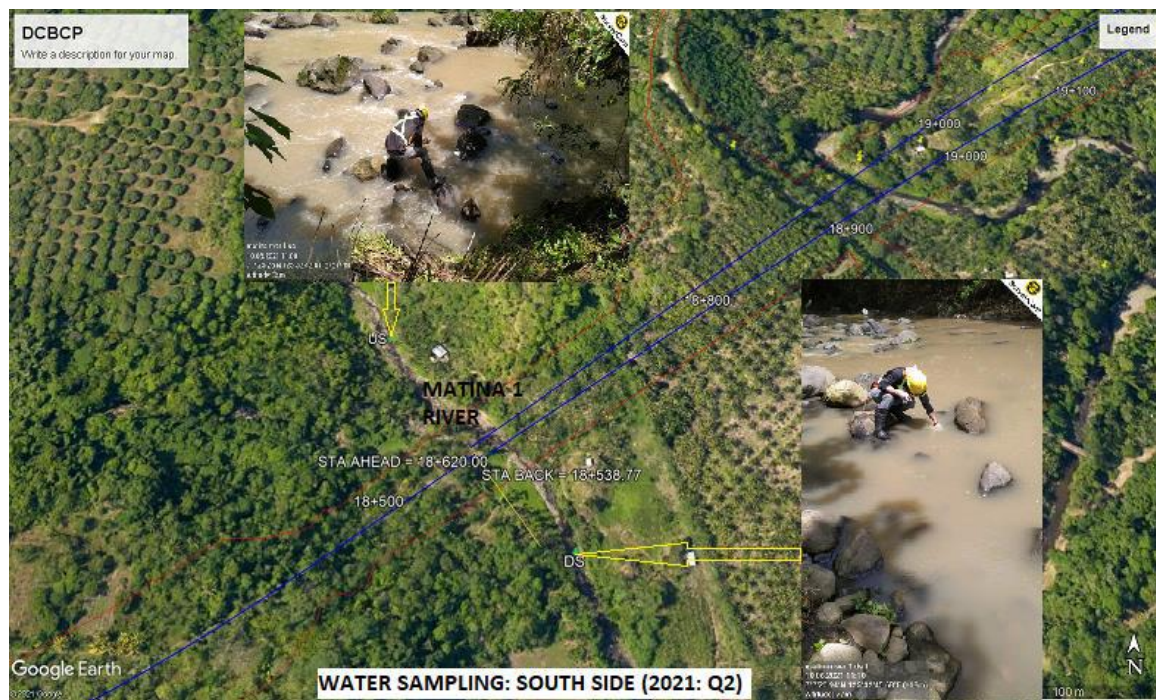




Photo taken on 18 June 2021 - Discoloration of water was observed. Based on the online research made by the contractor, it could be attributed to the leachate from the New Carmen landfill

Annex 7

Records of Site Incidents

Report No.	Date	Area/Location	Findings and Observation	Actions Taken	Remarks
IR-0001	23 April 2021 (1045H)	Waan: North Temporary Yard	Minor landslide due to slope erosion	Area barricaded; no activities allowed near the area	Temporary yard layout revised to suit actual site conditions
IR-0002	06 June 2021 (2300H)	Access Road AR-1	Landslide at Sta. 0+040 – Sta 0+060 blocked the road	Materials removed and, slope defined.	Slope protection by shotcrete

Annex 8

Status of Road Right-of-Way Acquisition

Status of Road Right-of-Way Acquisition

No.	Status	Number of Lots	%	Total Land Area	%
1	Workable	50	27.0	265.445	52.2
2	Not workable	63	34.1	105.096	20.7
3	For Evaluation	72	38.9	138.217	27.2
		185			

Annex 9

Personnel Training

Date Conducted	Course/Training Description	# of Personnel Trained
Contractor Side		
04 May 2021	Orientation	1
06 May 2021	Orientation	13
06 May 2021	Heat Stress / Heat Stroke	13
07 May 2021	Orientation	2
10 May 2021	Housekeeping	7
14 May 2021	Orientation	10
DWPH/Consultant		
May - June 2021	Safety Training on Occupational Safety and Health in Construction	19



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
OFFICE OF THE SECRETARY
MANILA, PHILIPPINES

**IMPLEMENTATION OF CIVIL WORKS FOR
DAVAO CITY BYPASS CONSTRUCTION PROJECT (DCBCP)
PACKAGE I-1, STA. 12+800 TO STA. 23+500**

Funded under JICA L/A No. PH-P261 & JICA L/A No. PH-P273

(CONTRACT ID NO. 18Z00004)

ENVIRONMENT BASELINE REPORT

(SUTJV-ENVI-BR-002.0)



Rev. No.	Prepared by: (Originator)	Checked by: (Environmental Protection Mgr.)	Confirmed by: (Project Manager)	Remarks
A1	Name: M. Lumontad Date: Jun 04, 2021	Name: L. Llido Date: Jun 04, 2021	Name: H. Tashiro Date: Jun 04, 2021	Approved with Comments (SUTJV-DT-ENG-0083)
A1.1	Name: RF Ceynas Date: June 11, 2021	Name: L. Llido Date: June 11, 2021	Name: H. Tashiro Date: June 11, 2021	Approved with Comments (SUTJV-DT-ENG-0086)
A1.2	Name: RF Ceynas Date: June 11, 2021	Name: L. Llido Date: June 11, 2021	Name: H. Tashiro Date: June 11, 2021	Approved (SUTJV-DT-ENG-00106)
A.1.3	Name: RF Ceynas Date: July 16, 2021	Name: L. Llido Date: July 16, 2021	Name: H. Tashiro Date: July 16, 2021	Approved

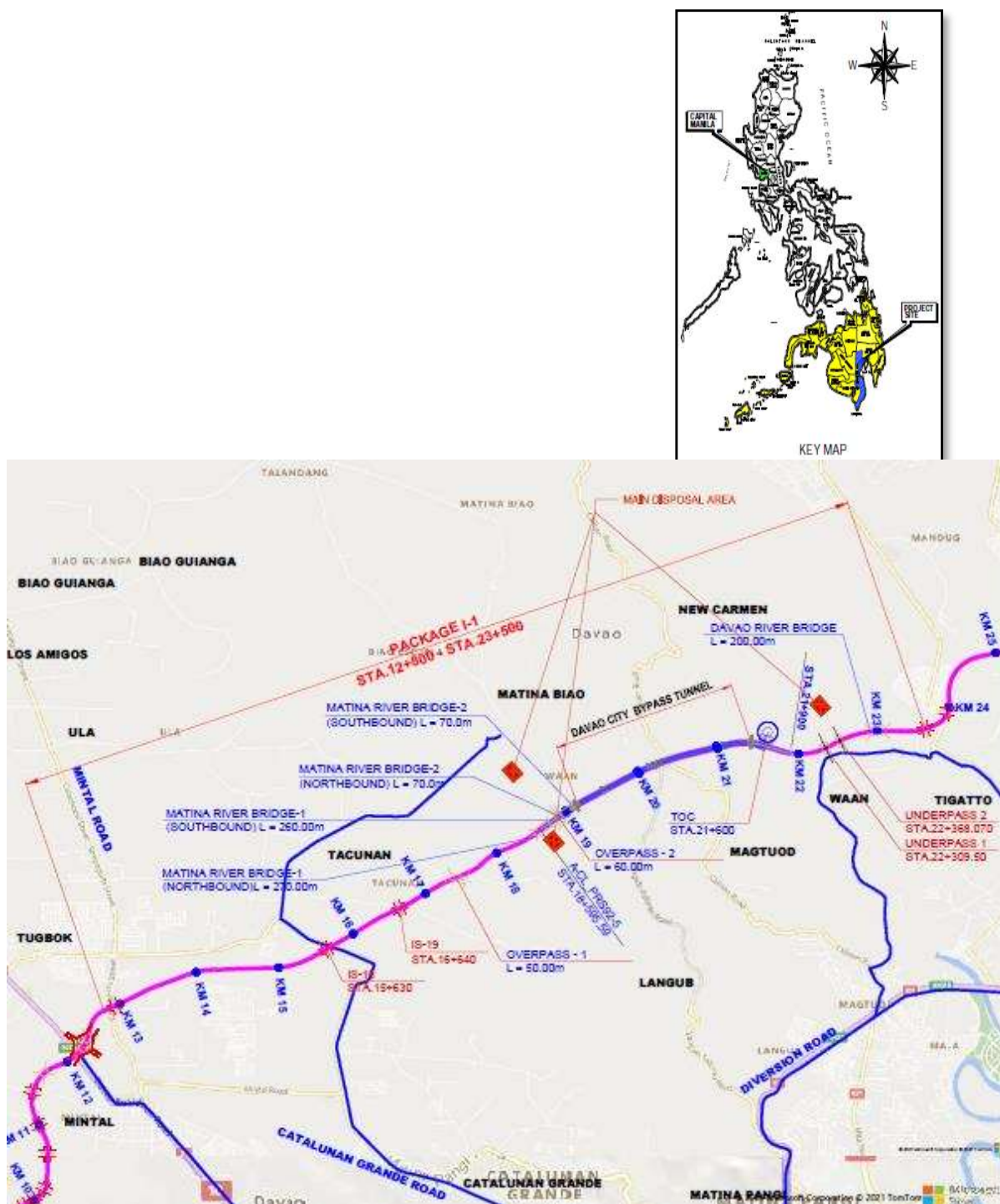
Rev. No.	Prepared by: (Originator)	Checked by: (Const. Manager)	Checked by: (D.P. Manager)	Confirmed by: (P. Manager)	Noted by: (P. Director)	Remarks
A2	 R. Nakpil Date: 14 March 2022	 Hideki Noda Date: 14 March 2022	 Makoto Kuwabara Date: 14 March 2022	 Hironobu Tashiro Date: 14 March 2022	 Akira Mito Date: 14 March 2022	for Approval

Approved:	Noted by:
 Yasuhiro Nozue Acting Project Manager	 Joselito B. Reyes Project Manager

ENVIRONMENT BASELINE REPORT

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2. PROJECT DATA

CONTRACT DATA	
Project Component	Road, Bridge and Tunnel Construction
Province:	Davao del Sur
Region:	XI
Funding Source:	JICA Loan No, PH-P261 & PH-P273
Consultant	Joint Venture of Nippon Koei Co.,Ltd, Katahira & Engineers International and Nippon Engineering Consultants Co.,Ltd in Association with Philkoei International Inc.
Contract Amount	
Civil Works Amount	
Total Length of Project	10.7 km
Road Length	7.9 km
Total Length of Bridges	0.5 km
Total Length of Tunnel	2.3 km
Contract Date Start	21 December, 2020
Contract Duration	37 months (1,110 Calendar Days)
Contract Completion Date:	04 January, 2024
Environmental Compliance Certificate ECC-CO-1503-0007	22 September 2015 (<i>Original</i>)
	20 June 2018 (<i>1st Amendment</i>)
	31 July 2019 (<i>2nd Amendment</i>)

3. BACKGROUND

Davao City Bypass Construction Project, Package I-1 includes the construction of two (2) lanes, two (2) direction highway comprising of tunnels, bridges, roads as well as Project Offices at Barangay Waan on the North Portal side and at Barangay Matina Biao on the South Portal side, access roads and contractors' camps for managing the potential environmental and social impacts of the proposed construction operation activities.

This Environmental Baseline Report is based on the Environmental Impact Statement (2014), and the Project Description for the ECC Amendment (2019) submitted to DENR through DPWH Request for ECC Amendment on 26 June 2019. These documents are key components of SUTJV's Environmental Management System (EMS). The environmental objectives, actions and targets outlined in the EMP will be regularly monitored to drive environmental protection and improvements for the construction of tunnels and facilities, bridges and underpass, roads, culverts and buildings, Project Core Offices, contractors' camps and access roads.

The EMS describes the environmental procedures by which SUTJV recognizes the need to manage the significant environmental aspects and related impacts throughout the construction period. SUTJV aims to accomplish the project in a manner that will provide assurance and a high level of concern for environment and minimize pollution and environmental related issues within and in the surrounding communities of the project site. The effective implementation of the EMP is an important key to achieving timely completion of the works as well as minimizing any fallouts and degradation to the environment.

4. RATIONALE

The 26 June request for ECC amendment submitted the Project Description together with the supplemental report showing the necessary modifications to improve the design plans. The following project activities were described:

Construction Phase:

- Mobilization;
- Clearing, stripping and grubbing;
- Relocation of affected basic social service facilities (i.e. power lines, water supply lines and telecommunication lines);
- Vegetation removal;
- Ground preparation;
- Construction of temporary facilities (i.e. workers' camp, field offices, and facilities yard);
- Access road establishment;
- Actual construction of the road, bridge and tunnel sections;
- Construction of the erosion control structures; and
- Landscaping

Demobilization / Decommissioning Phase:

- Complete closure and restoration of all temporary construction facilities / structures such as bunkhouses, field offices, and facilities yard;
- Complete dismantling of portable sanitation facilities, particularly portalets provided at the construction sites;
- All construction sites are cleared of residual solid and domestic wastes generated from the temporary sanitation facilities;
- All disconnected / disrupted basic social service facilities such as water and power supplies, and communication lines are fully restored to their normal functions
- Affected public structures are reconstructed / restored; and
- All construction sites are cleared of residual construction spoils and debris

To ensure compliance, a joint site inspection at the construction site must be undertaken involving the DPWH-UPMO-RMC 1, ESHO of the contractor, and the formed Multi-Partite Monitoring Team (MMT).

5. PURPOSE

This report presents baseline data based on the results of the tests performed at the adjusted locations and as required by Part B.14 of the Technical Specifications: Frequency and Locations of Environmental Monitoring during Construction Stage. Updated document is attached as Annex A.

The Impact Management Plan is attached as Annex B.

6. RESULTS AND FINDINGS

6.1 POLLUTION

6.1.1 AIR QUALITY

Air pollution is caused by the release of high concentration of gases and small fragments of human-made particles and chemicals into the air that can have adverse effects on humans and the ecosystem. Air pollution is, most often, caused by human activities, including construction.

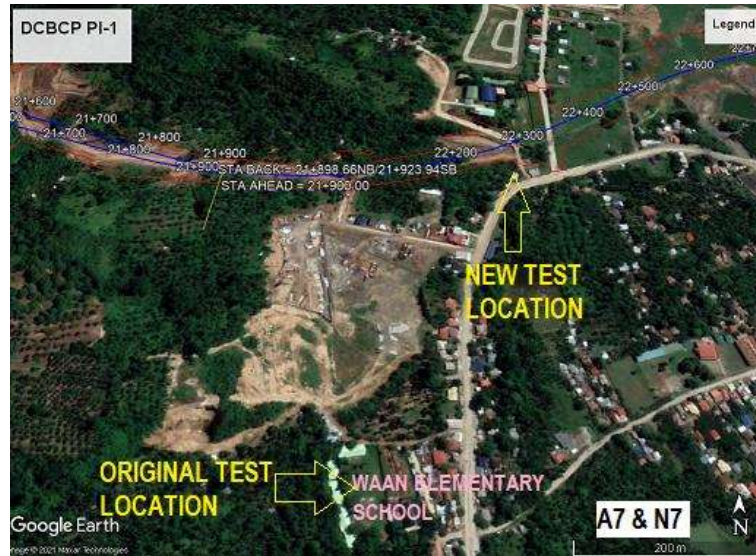
The tests parameters required and effects of air pollutants are as follows:

Parameter	Effects	Test Method
Total Suspended Solids, TSP	Mass concentration of particulate matter (PM) in community air. It is considered as primary contributor to air pollution, smog formation and environmental contamination.	Gravimetric Method
Nitrogen Dioxide, NO ₂	Has a pungent, acrid odor, reddish-brown as gas, yellowish-brown as liquid and colorless below -11°C. They are formed when fossil fuels are burned at high temperature	Griess Reaction Saltzman
Sulfur Dioxide, SO ₂	Is a colorless gas with characteristic, irritating and pungent odor that can cause eye, nose and throat irritation. They are formed from fossil fuel combustion.	Pararosaniline Method
Carbon Monoxide, CO	Is colorless, odorless, tasteless and toxic. It is flammable and predominantly produced by incomplete combustion of carbon-containing materials like gasoline, wood, propane, charcoal and other fuels.	Direct Reading (Gas Analyzer)

The original air quality tests data were taken in 2014 and much of the area tested have undergone different stages of development before the start of the project. The locations were also found to be too far from the final road alignment and were adjusted to make them closer and to better monitor the effects of the project on the environment: There were no construction activities at the sampling/testing locations.

Sta. No.	Original Location (EIS 2014)		Adjusted Locations	
	Location	Coordinates	Location	Coordinates
A6	Along Little Mermaid St, Elenita Heights, Brgy. Catalunan Grande, Davao City (Sta. 14+480, 250m RS)	N 07° 07' 42.5" E125° 34' 24.3"	Sta. 13+850, 150m RS	7.10608° 125.50764°
A7	Waan Elementary School Grounds, Brgy. Waan, Davao City (Sta. 22+100, 400m RS)	N 07° 08' 42.5" E125° 39' 34.6"	Sta. 22+280, 60m RS	7.13122° 125.57671°



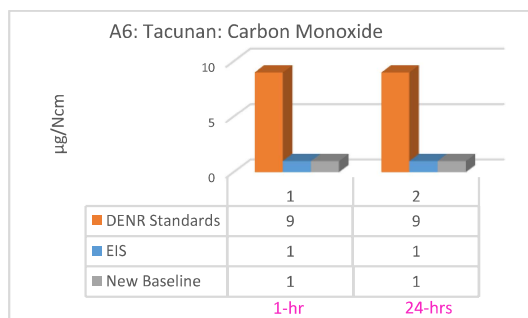
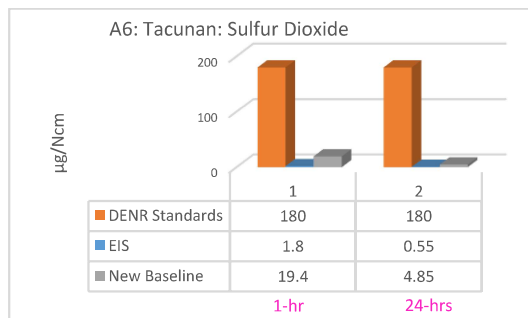
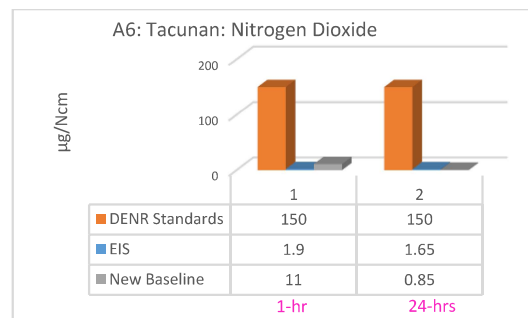
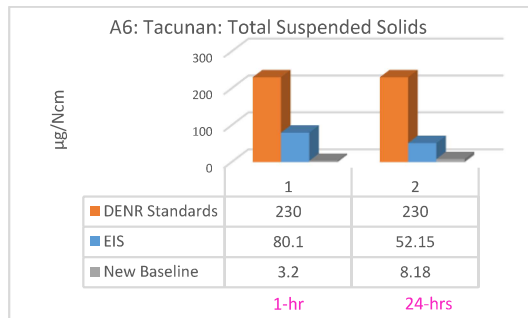


The (2014) EIS test (proposed) and the new baseline data (June 2021) are shown on the table for comparison. In addition to generate the new baseline data for air quality SUTJV conducted sampling last March 2021 at the old EIS sampling location before the commencement of work prior to shifting at the new location (June 2021).

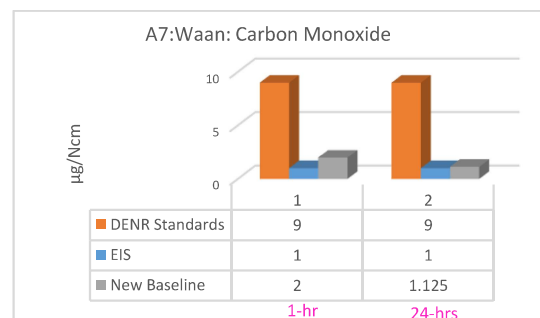
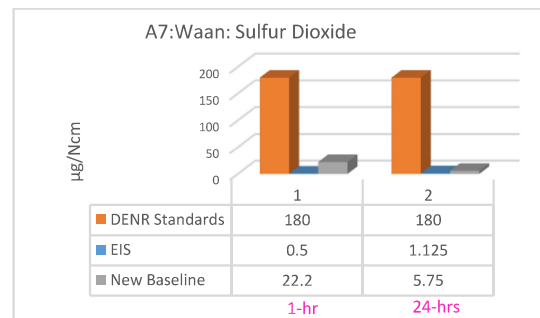
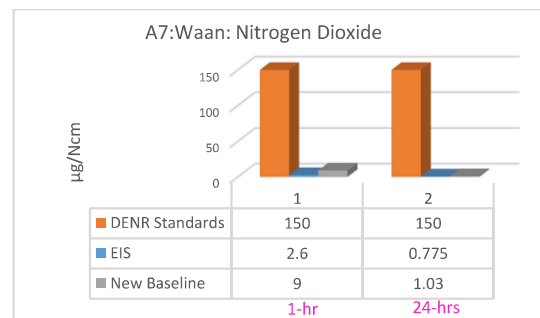
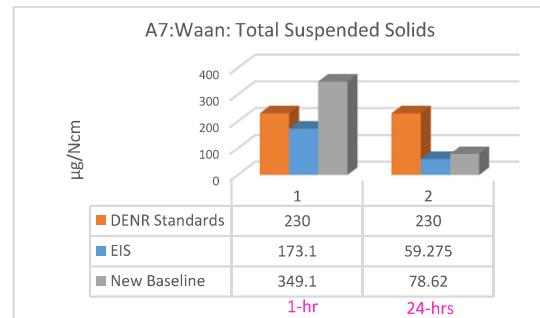
Summary of Air Quality Tests

Date	Total Suspended Solids (TSP), u/Ncm		Nitrogen Dioxide (NO ₂), u/Ncm		Sulfur Dioxide (SO ₂), u/Ncm		Carbon Monoxide (CO), ppm			
	1-hr	24 hrs	1-hr	24 hrs	1-hr	24 hrs	1-hr	24 hrs		
								1	2	3
A3: Enf of Project (Waan Elem School flag pole)										
Baseline (30-Mar-21)	<1.6	19.75	2.3	1.04	4.1	1.82	5	4.375	2	2
A6: Beginning of Project (Elenita Heights)										
Baseline (30-Mar-21)	<1.6	5.95	2.1	0.34	3	1.48	3	<1.0	<1.0	<1.0
A6: Sta 13 + 850, 150m RS (Elenita Heights: residential)										
Ambient Air Quality Standard	230	230	150	150	180	180	9	9	9	9
EIS (October 2014)	80.1	52.15	1.9	1.65	1.8	0.55	1	1	1	1
New Baseline (15-Jun-21)	3.2	8.18	11	0.85	19.4	4.85	1	1	1	1
A7: Sta 22+280, 60m RS (residential; opposite Waan National High School)										
Ambient Air Quality Standard	230	230	150	150	180	180	9	9	9	9
EIS (October 2014)	173.1	59.275	2.6	0.775	0.5	1.125	1	1	1	1
New Baseline (15-Jun-21)	349.1	78.62	9	1.03	22.2	5.75	2	1.125	1.25	2
Batching Plant at Matina Biao: South										
Ambient Air Quality Standard	230	230	150	150	180	180	9	9	9	9
Baseline (30-Mar-21)	<1.6		2.3		3.6		<1			
Batching Plant at Waan: North										
Ambient Air Quality Standard	230	230	150	150	180	180	9	9	9	9
Baseline (30-Mar-21)	<1.6		3.5		<2.9		4			

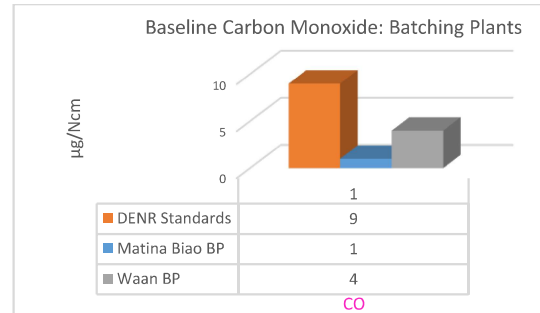
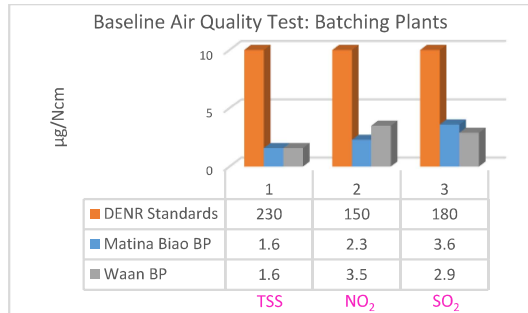
A6: Tacunan



A7: Waan



Batching Plants: Baseline Air Quality



Tests worksheets are shown in Annex C.

6.1.2 WATER QUALITY (SURFACE WATER)

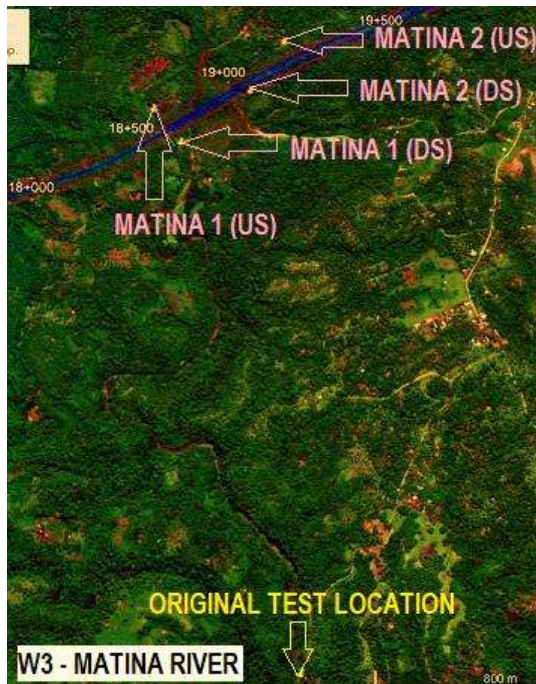
Below are the water quality parameters, effects on the environment and the specifications for Class C water bodies as per DAO 34.

Parameters	Effects	Specifications for Class C Water
Dissolved Oxygen (DO), mg/L	Concentration of oxygen dissolved in water (O ₂) from the atmosphere, algae and rooted plants. A DO below 5mg/L results in the dominance of anaerobic bacteria that generates hydrogen sulfide (H ₂ S) to produce rotten egg odor and black color of the water body. DO levels are said to fluctuate periodically and seasonally.	5 (min)
pH @ 26°C	Quantitative measure of the acidity or basicity of liquids through the concentration of hydrogen ions. A pH below 6.0 or above 9.0 will affect the survival of organic organisms. A changing pH is an indicator of increasing pollution or some other environmental factor.	6.5 – 8.5
Total Suspended Solids (TSS), mg/L	Include clay, silt, decaying plant, algae, sand, animal wastes, industrial wastes and sewage that cause water turbidity. Its high concentration in water decreases the passage of light and block light from reaching submerged vegetation which will subsequently slow down the photosynthetic activity.	Not more than 30 mg/L increase
Parameters	Effects	Specifications for Class C Water
Biochemical Oxygen Demand (BOD), mg/L	Amount of oxygen consumed by bacteria and other microorganisms while they decompose organic matter under aerobic conditions. It is an index of the degree of organic pollution in water.	7 (max)
Oil and Grease, MPN/100ml	Include fats, oils, waxes and other constituents from wastewater, which can interfere with biological life in surface waters and create unsightly films. They have very low biodegradability so that it can cause drowning of waterfowl and dish asphyxiation.	2 (max)
Total Coliforms, MPN/100ml	Coliforms are used as indicators to determine sanitary quality in water. Total coliforms are generally considered as harmless and appear as thick slimy colonies.	1,000
Fecal Coliforms, MPN/100ml	Fecal coliforms grow at higher temperatures and are only associated with the fecal matter of warm-blooded animals and appear in dark colored colonies with a soft luster of metallic green on the surface. This will affect humans by causing many lethal disease conditions like gastroenteritis.	1,000

The original (coordinated) locations of the water quality sampling stations given in the EIS, 2014 were plotted and found to be too far from the final project alignment so that they were moved closer to the road alignment to make the tests results more indicative of the actual effects the project will have on the ecosystem of Matina and Davao rivers.

The EIS, (proposed) baseline locations and water quality tests results are tabulated and plotted. There were no tests conducted at Sta. 22+200 (in 2014) but the location is included in the requirements of Part B.14 of the Technical Specifications.

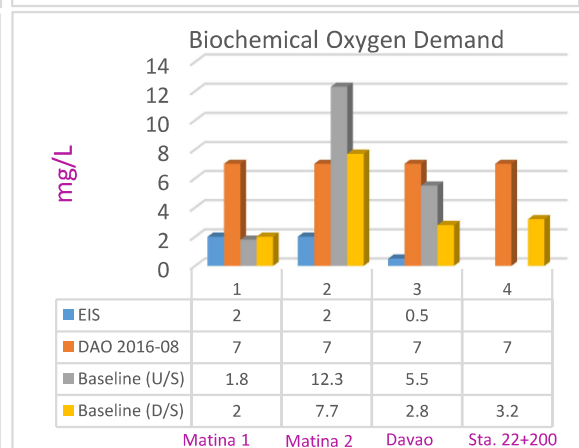
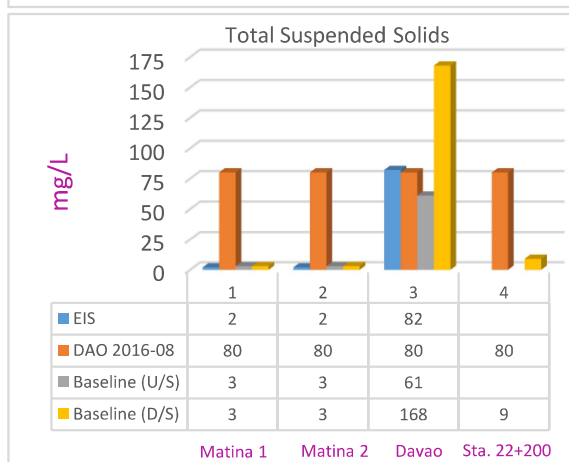
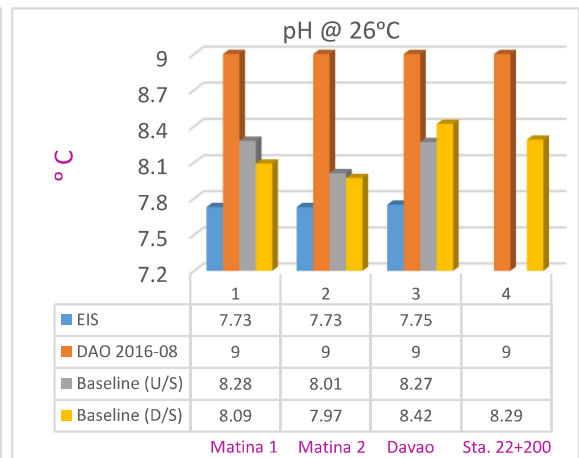
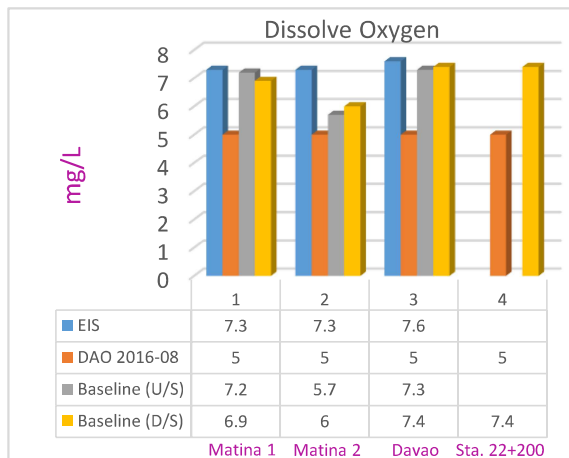
Original		Updated	
Location	Coordinates	Location	Coordinates
W3 - Matina River Brgy. Langub	7°06'21.7"N 125°33'02.2"E ~ 1.9km SE of Sta. 18+100	MATINA 1 (US)	7°7'25.26"N 125°32'42.01"E
		MATINA 1 (DS)	7°7'20.94"N 125°32'45.68"E
		MATINA 2 (US)	7°7'25.26"N 125°32'42.01"E
		MATINA 2 (DS)	7.12454° 125.54831°
W2 - Davao River Brgy. Tigatto	7°06'51.9"N 125°35'15.1"E ~ 2.1km SE of Sta. 23+500	DAVAO (US)	7°8'3.57"N 125°34'56.93"E
		DAVAO (DS)	7°7'59.01"N 125°34'58.47"E
		STA. 22+200	7°7'54.85"N 125°34'33.24"E

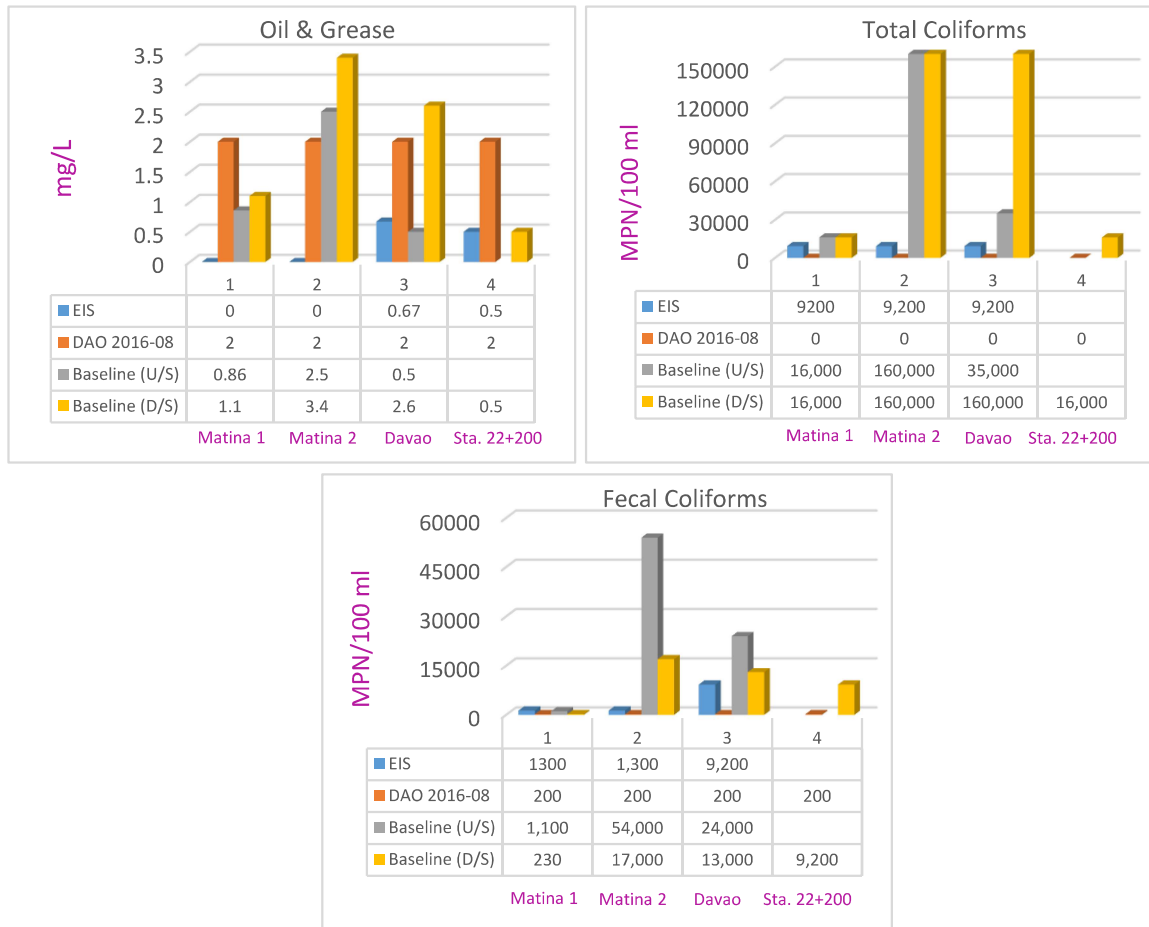


SUMMARY OF SURFACE WATER QUALITY CONDITIONS

Particulars	Parameters						
	Dissolved Oxygen (DO) mg/L	pH @ 26.3°C	Total Suspended Solids (TSS), mg/L	Biochemical Oxygen Demand (BOD), mg/L	Oil & Grease, MPN/100ml	Total Coliforms, MPN/100ml	Fecal Coliforms, MPN/100ml
DAO 34, Class C	5 (min)	6.5 - 8.5	(a)	7 (max)	2 (max)	1,000	1,000
DAO 2016 - 08, Class C	5 (min)	6.5 - 9.0	80	7	2 mg/L		200
Matina 1 River							
EIS	7.3	7.73	2	2	0	9200	1300
Baseline: Upstream (29-Apr-21)	7.2	8.28	3	1.8	0.86	16,000	1,100
Baseline: Downstream (29-Apr-21)	6.9	8.09	3	2	1.1	16,000	230
Matina 2 River							
EIS	7.3	7.73	2	2	ND	9,200	1,300
Baseline: Upstream (18-Mar-21)	5.7	8.01	3	12.3	2.5	160,000	54,000
Baseline: Downstream (18-Mar-21)	6	7.97	3	7.7	3.4	160,000	17,000
Creel @ Sta. 22+200 LS							
Baseline (29-Apr-21)	7.4	8.42	9	3.2	0.5	16,000	9,200
2021: Q2 (10-Jun-21)	6.78	8.58	133	1	0.6	5,400	5,400
Davao River							
EIS	7.6	7.75	82	0.5	0.67	9,200	9,200
Baseline: Upstream (18-Mar-21)	7.3	8.27	61	5.5	0.5	35,000	24,000
Baseline: Downstream (18-Mar-21)	7.4	8.29	168	2.8	2.6	160,000	13,000

(a) Not more than 30 mg/L increase





Water quality test worksheets are shown in Annex D

6.1.3 WATER QUALITY (GROUND WATER)

The hydrology data (in the EIS) showed no change in the ground water regime above the proposed tunnel area considering that the overlying rocks do not hold much groundwater. Based on this groundwater condition, the volume of seepage due to excavation of the tunnel will be small.

However, water volume and water level at two (2) measuring points in Sta. 20+350 (above tunnel) will be conducted prior to start of tunnel works.

An inspection was conducted on 15 April 2021 to locate the measuring points at Sta 20+350 (above the tunnel). The (previously) vacant lot where an observation well was driven was already backfilled and occupied while the existing water tank had been rehabilitated in 2020. DPWH/Consultant will issue Instruction on the next course of action and coordinate access, respectively.

6.1.4 WASTE

Soil, trees and vegetation wastes generated from excavations will be disposed in designated areas. Also to be properly disposed will be concrete and asphalt wastes (at plant and at site) and domestic wastes from workers camps. Regular hauling and disposal of generated solid and domestic wastes to sites duly approved by the City Government of Davao.

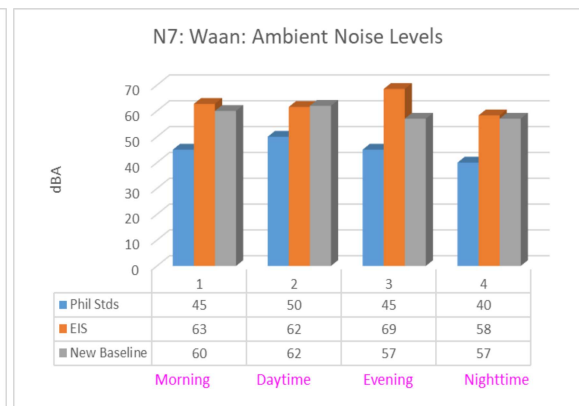
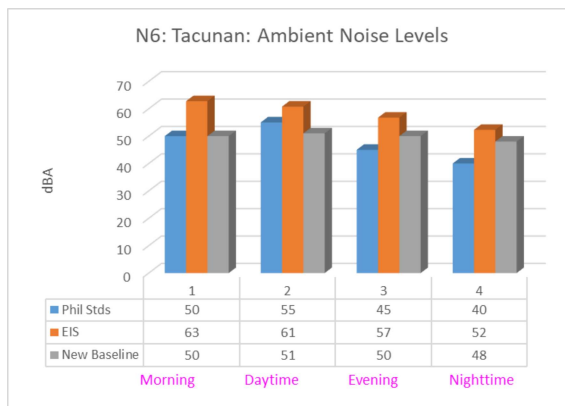
The Detailed Engineering Design identified 3 locations of the main disposal sites, 2 at the south and 1 at the north. The actual south disposal sites are on the same locations while the original disposal site at the north is relocated because the access to the original site has already been developed.

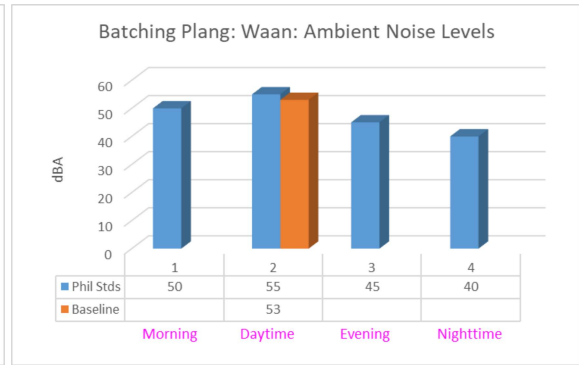
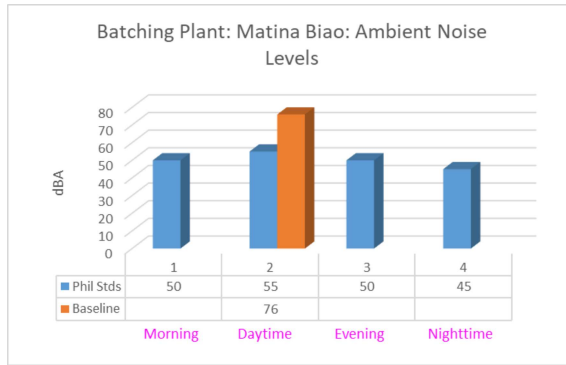
Soil investigations and laboratory tests are required for disposal planning, including slope stabilization and consolidation settlement analysis (Item B.19.2).

6.1.5 NOISE

The ambient noise monitoring locations were the same as the air quality tests. The test results for the EIS are included for comparison with the (proposed) new baseline data.

Ambient Noise Levels				
Parameters	Ambient Noise, dBA			
	Morning (0500H-0900H)	Daytime (0900H-1800H)	Evening (1800H-2200H)	Night time (2200H-0500H)
N6: Sta 13+850, 150m RS (Elenita Heights; residential area)				
<u>Philippine</u>				
Standards:	50	55	45	40
EIS (October 2014)	63	61	57	52
New Baseline (15-Jun-21)	50	51	50	48
N7: Sta 22+280, 60m RS (general area)				
<u>Philippine</u>				
Standards:	45	50	45	40
EIS (October 2014)	63	62	69	58
New Baseline (15-Jun-21)	60	62	57	57
Batching Plant (Matina Biao : general area)				
<u>Philippine</u>				
Standards:	50	55	50	45
Baseline (30-Mar-21)		76		
Batching Plant (Waan: general area)				
<u>Philippine</u>				
Standards:	50	55	45	40
Baseline (30-Mar-21)		53		





Ambient noise tests worksheets are included in Annex C.

6.1.6 GROUND SUBSIDENCE

Tunnel excavations may cause seepage of groundwater which may cause ground subsidence. Daily monitoring of the groundwater seepage will be done parallel to the tunnel excavation. Tunnel excavation will be stopped if large volume of groundwater seepage is observed.

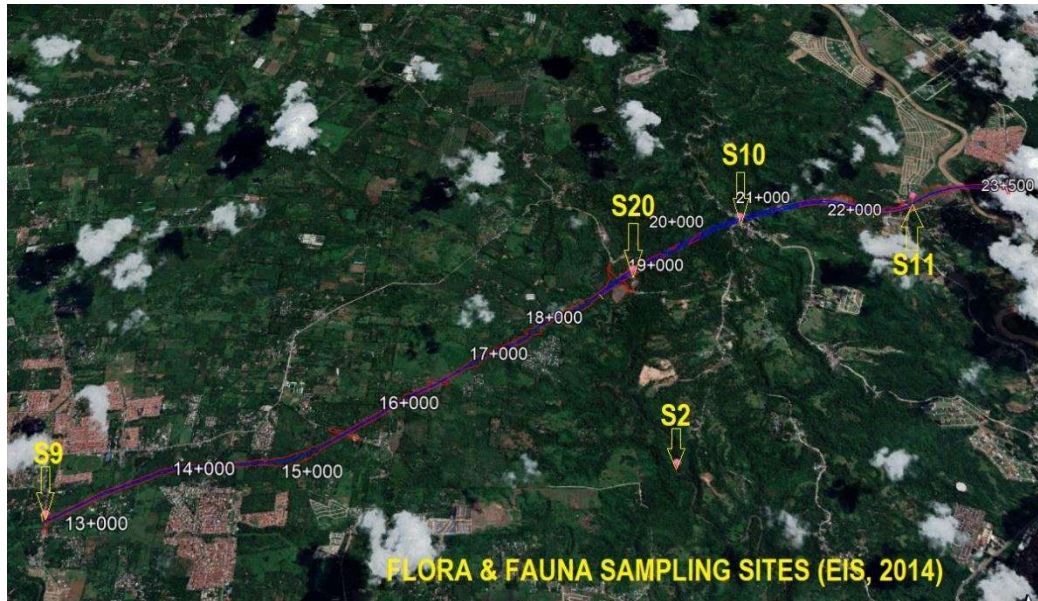
To date, the existing ground levels (EGL) of the tunnel portals (still) need to be lowered to attain the finished ground level (FGL) where the monitoring instruments will be installed.

6.2 NATURAL ENVIRONMENT

6.2.1 TERRESTRIAL FLORA AND FAUNA

The sampling locations of the flora and fauna during the EIS, 2014 are tabulated and shown in map below and next page:

Location No.	Coordinates	Station	description	Barangay	Type of survey
S2	N 07°06'21.70" E 125°33'02.2"	18+400, 1.9km R	Matina River	Brgy. Langub	Bird, vegetation, frogs & non-volant mammals
S9	N 07°06'12.40" E 125°29'54.90"	12+825, 20m R	Along National Road – residential area	Tacunan	Bird & vegetation
S10	N 07°07'48.76" E 125°33'35.21"	20+400, 60m R	Along National Road – residential area	Magtuod	Bird & vegetation
S11	N 07°07'55.40" E 125°34'37.26"	22+370, 03m R	Ranch: exemplified by open grass field / residential area	Waan	Bird & vegetation
S20	N 07°07'29.08" E 125°32'55.88"	19+040, 47m R	Matina River (tunnel site)	Matina Biao	Bird, frogs, non-volant mammals, mist netting for bats & birds, vegetation



There were 31 species recorded at S9 (Brgy. Tacunan), 34 species at S10 (Brgy. Magtuod), 39 species at S11 (Brgy. Waan), and 39 species at S20 (Matina Biao). The most dominant species are: whipping grass (at S9); crab grass (at S10); and nut grass (at S11) with importance values of 22.63%, 22.35%, 25% and 7.8% respectively. As shown above, S2 is too far from the project site (at 1.9km away) so further observations will not be pursued.

The top flora species at the different sampling locations are tabulated below. The presence of the same flora species in 2021 is also shown.

TOP FLORA SPECIES										
Common Name	Species Name	S2	S9	S10	S11	S20				
YEAR		2014	2014	2021	2014	2021	2014	2021	2014	2021
No. of species recorded		116	31		34		39		93	
Alulukdo	<i>Nephrolepis hirsutula</i>	✓								
Arat	<i>Selenia scrobiculata</i>	✓								
Carabao Grass	<i>Paspalum conjugatum</i>		✓	✓			✓		✓	
Carpet grass	<i>Axonopus fissifolius</i>								✓	
Cassava	<i>Manihot esculenta</i>				✓					
Cogon	<i>Imperata cylindrica</i> var. <i>koenigii</i>	✓	✓	✓			✓		✓	
Crab Grass	<i>Digitaria sanguinalis</i>	✓			✓		✓			
Hagonoy	<i>Chromolaena odorata</i>	✓	✓	✓						
Hairy Leaf Centrosema	<i>Centrosema pubescens</i>	✓					✓			
Kamay Kastila	<i>Syngonium podophyllum</i>	✓								
Kandi-kandilaan	<i>Stachytarpheta jamaicensis</i>	✓							✓	
Kulitis	<i>Amaranthus viridis</i>		✓							
Kulot-kulot			✓				✓			
Makahiya	<i>Mimosa pudica</i>						✓		✓	
Mani-manihan	<i>Desmodium capitatum</i>						✓			
Nami	<i>Dioscorea hispida</i>		✓	✓						
Nut Grass	<i>Cyperus rotundus</i>	✓			✓		✓		✓	
Pakong Kalabaw	<i>Nephrolepis biserrata</i>	✓							✓	
Palo Verde	<i>Piper arborescens</i>								✓	
Paragrass	<i>Eleusine indica</i>	✓	✓		✓					
Talahib	<i>Saacharum spontaneum</i>		✓		✓		✓		✓	
Walis-walisan	<i>Sida acuta burm</i>								✓	
Wedelia	<i>Wedelia chinensis</i>				✓				✓	
Whipping Grass	<i>Sporobolus idicus</i>		✓		✓		✓		✓	
Yellow Creeper	<i>Arachis duranensis</i>		✓							

As shown in the below table, the trees found at site that are in the IUCN Red list are considered of least concern and are not endemic.

SUMMARY OF OBSERVED FLORA									
OFFICIAL COMMON NAME	FAMILY	SCIENTIFIC NAME	HABIT	DAO 2007-01	IUCN Redlist 2013	ENDEMICITY	LOCATIONS		
							BEGINNING (S9)	Sta 22+000 (S11)	END (S12)
							26-Mar-21	23-Apr-21	26-Mar-21
							Fair / 1030H	Fair / 0930H	Fair / 1100H
Aglaonema	Araceae	Aglaonema spp.	Herb	-	Least Concern	Not Endemic	yes		
Amorseco	Poaceae	Andropogon aciculatos	grass	-	-	Not Endemic	yes	yes	
Anabiong	Canabaceae	Trema orientalis (L.) Blume	tree	-	Least Concern	Not Endemic		yes	
Anahaw							yes		
Arat	Cyperaceae	Scleria scrobiculata Nees	sedge	-	-	Not Endemic	yes	yes	
Ayo	Vitaceae	Terrastigma harmandii	vine	-	-			yes	
Banana								yes	
Bulakan	Convolvulaceae	Merremia peltata L.	vine	-	-	Not Endemic		yes	
Cacao	Malvaceae	Theobroma cacao	tree	-	Least Concern	Not Endemic		yes	
Carabao Grass	Poaceae	Paspalum conjugatum Berg.	grass	-	Least Concern	Not Endemic	yes	yes	yes
Carpet Grass	Poaceae	Axonopus fissifolius	grass	-	-	Not Endemic	yes	yes	
Centrosema	Fabaceae	Centrosema plumeiri	vine	-	-	Not Endemic		yes	
Christella Fern	Thelypteridaceae	Christella dentata	fern	-	-	Not Endemic		yes	
Crab Grass	Poaceae	Digitaria sanguinalis	grass	-	-	Not Endemic	yes	yes	
Dilang Baka	Lamiaceae	Hyptis capitata Jacq.	Herb	-	-	Not Endemic	yes		
Dulalug	Moraceae	Ficus variegata Blume var. sycomoroides (Miq.)	tree	-	-	Not Endemic		yes	
Fishing Rod Bamboo	Poaceae	Schizostachyum lima (Blanca) Merr.	grass	-	-	Not Endemic	yes	yes	
Gmelina	Lamiaceae	Gmelina arborea	tree	-	-	Not Endemic	yes		
Hairy-leafed cetrosema	Fabaceae	Centrosema pubescens L.	vine	-	-	Not Endemic		yes	
Ipil-Ipil	Fabaceae	Leucaena leucocephala	tree	-	-	Not Endemic	yes	yes	
Kamkamote	Convolvulaceae	Ipomoea triloba L.	vine	-	-	Not Endemic	yes	yes	
Kandikandilaan	Verbenaceae	Stachytarpheta jamaicensis	Herb	-	-	Not Endemic	yes	yes	
Kilob	Gleicheniaceae	Dicranopteris linearis	fern	-	-	Not Endemic		yes	
Makahiya	Fabaceae	Mimosa pudica L.	Herb	-	Least Concern	Not Endemic		yes	
Malakamote	Convolvulaceae	Ipomoea obscura L.	vine	-	-	Not Endemic		yes	
Mangga	Anacardiaceae	Mangifera indica	tree	-	-	Not Endemic		yes	yes
Name Tree							yes		
Nito	Lygodiaceae	Lygodium flexuosum (L.) Sm.	vine	-	-	Endemic		yes	
Niyog	Arecaceae	Cocos nucifera L.	palm	-	-	Not Endemic	yes	yes	yes
Osmunda / Royal Fern	Osmundaceae	Osmunda banksiifolia (C.Prasl.) Kuhn.	fern	-	-	Not Endemic		yes	
Rami	Urticaceae	Boehmeria nivea	Herb	-	-	Not Endemic		yes	
Sticherous Fern	Gleicheniaceae	Sticherus truncatus (Willd.) Nakaii	fern	-	-	Not Endemic		yes	
Tawa-Tawa	Euphorbiaceae	Euphorbia hirta	Herb	-	-	Not Endemic	yes	yes	

There were few birds observed at site (see below table) so that the cutting of trees will have minimal impact to their habitats.

SUMMARY OF OBSERVED BIRDS				
common name	scientific name	LOCATIONS		
		beginning	Sta 22+000	end
		26-Mar-21	23-Apr-21	26-Mar-21
		Fair / 1030H	Fair / 0930H	Fair / 1100H
Yellow-vented Bulbul	Pycnonotus goiavier		yes	
Olive-backed Sunbird	Nectarinia jugularis	yes	yes	yes
Pied Buschat	Saxicola caprata	yes	yes	yes

Additional observation stations will be established as the areas become accessible (near the tunnel portals).

6.2.2 AQUATIC FLORA AND FAUNA

Planned sufficient spaces between the piers of Matina 1 and 2 and Davao bridges will allow the aquatic organisms to freely move along the waterways.

However, river diversions and riverbank protections needed during construction may temporarily affect the habitation of aquatic flora and fauna. Degradation of water quality due to excavation works and wastewater from construction yards and workers camp may, also, temporarily affect flora and fauna.

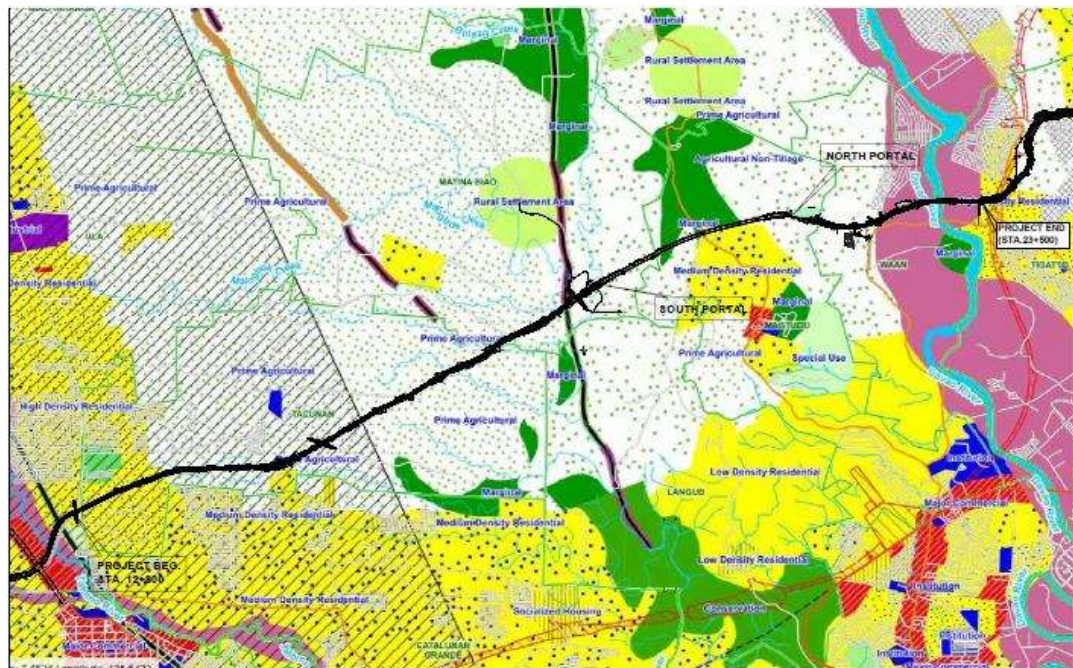
Below is a summary of the observed freshwater fishes during the baseline survey:

SUMMARY OF OBSERVED FRESHWATER FISH					
COMMON NAME	FAMILY	SPECIES NAME	LOCATIONS		
			Matina 1 (29Apr21)	Matina 2 (18Mar21)	Davao (18Mar21)
Striped snakehead	<i>Channidae</i>	<i>Channa striata</i>			yes
Suso (snail)	<i>Thiaridae</i>	<i>Melania sp</i>	yes	yes	yes
Tilapia	<i>Cichlidae</i>	<i>Oreochromis nilotica</i>			yes

6.3 SOCIAL ENVIRONMENT

6.3.1 LAND USE

Major land use of the project area is prime agricultural with pockets of agricultural non-tillage as shown in the (latest) Davao City zoning map below. The project also traverses medium and high density residential areas.



DAVAO CITY ZONING MAP

The EIS foresee temporary changes in the current land use due to construction works. These changes may become permanent after completion of the project.

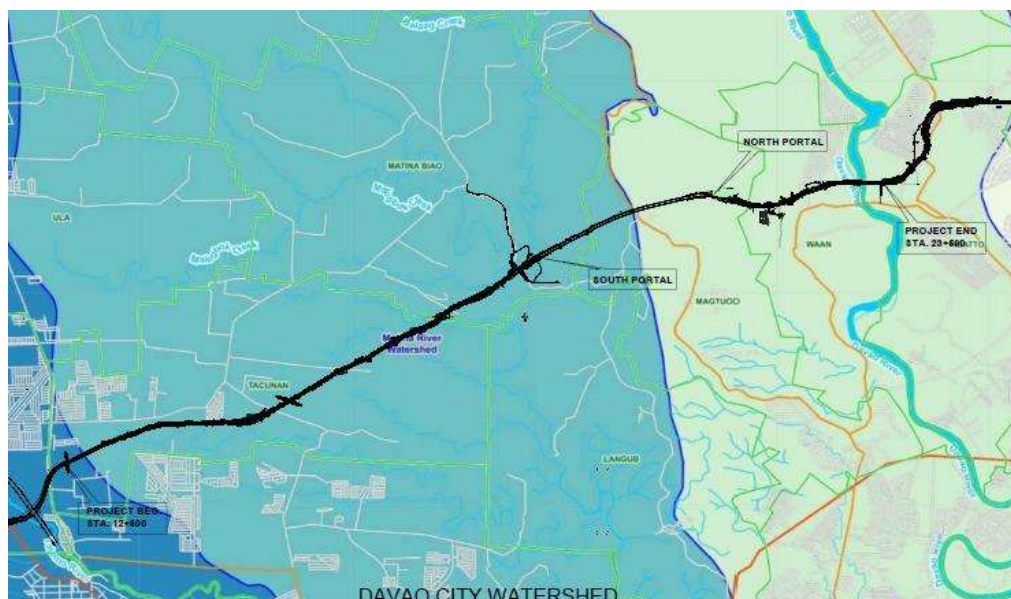
Tree Cutting Permits Issued to DPWH				
Permit No.	Date Issued	Location	Validity	Number of Trees with Permits
DENRXI-DC-0226-2021-001	26-Feb-21	Brgy Matina Biao	26-Aug-21	1,807
DENRXI-DC-1004-2021-001	05-Oct-21		04-Oct-22	1,184
DENRXI-DC-0226-2021-002	26-Feb-21	Brgy Waan	26-Aug-21	263
DENRXI-DC-1004-2021-002	05-Oct-21		04-Oct-22	100
DENRXI-DC-0312-2021-003	12-Mar-21	Brgy Magtuod	12-Sep-21	563
DENRXI-DC-1004-2021-003	05-Oct-21		04-Oct-22	103
DENRXI-DC-0415-2021-004	15-Apr-21	Brgy Tigatto	15-Aug-21	100
DENRXI-DC-0615-2021-005	15-Jun-21	Brgy Tacunan	15-Dec-21	3,888
Total				8,008
NOTE: Permits for Brgy Tigatto & Tacunan will be renewed in simultaneously				

Above table shows the Tree Cutting Permits issued to DPWH for the trees within the ROW, while below table shows the Tree Cutting Permits issued to the Contractor for trees outside the ROW (access roads and contractor's camps/yards).

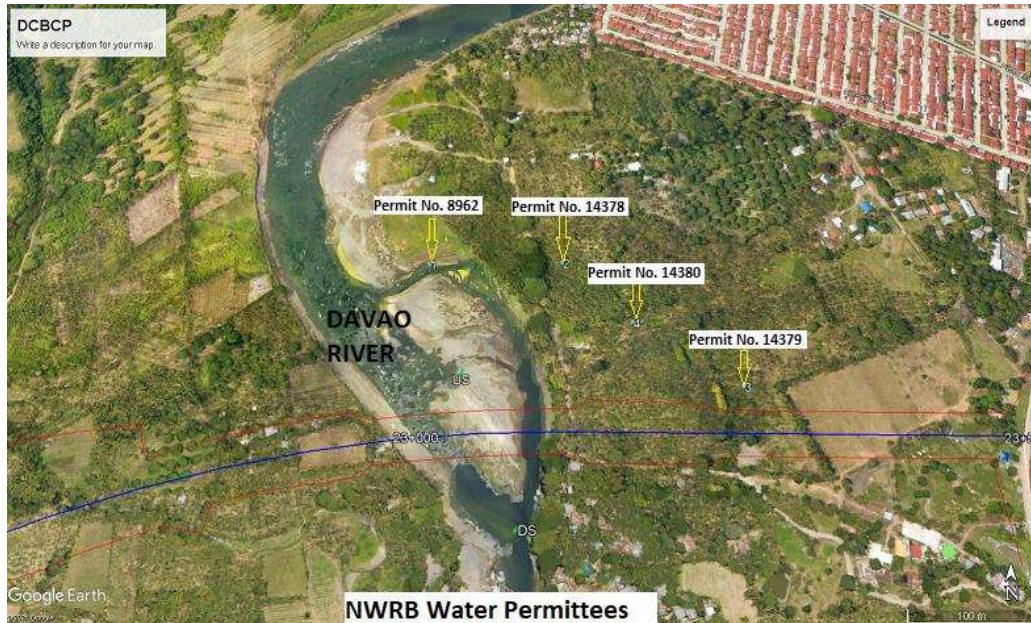
Tree Cutting Permits Issued to Contractor				
Permit No.	Date Issued	Location	Validity	Number of Trees with Permits
DENRXI-DC-0126-2021-002	26-Jan-21	South Yard: Matina Biao	26-Apr-21	106
DENRXI-DC-0211-2021-005	11-Jan-21	AR-5: Matina Biao	26-May-21	25
DENRXI-DC-0318-2021-001	18-Mar-21	AR-1: Matina Biao	31-Mar-21	7
DENRXI-DC-0415-2021-001	15-Apr-21	AR-5: Matina Biao	15-Jul-21	88
DENRXI-DC-0506-2021-001	06-May-21	South Disposal Area 1: Matina Biao	06-Aug-21	164
DENRXI-DC-0506-2021-002	06-May-21	AR-4: Matina Biao	06-Aug-21	182
DENRXI-DC-0630-2021-001	30-Jun-21	South Disposal Area 2: Matina Biao	30-Sep-21	170
Total				742

6.3.2 WATER USE

Below is the updated Davao City watershed map showing the project traversing the Matina River watershed.



The Environmental and Social Impact Assessment in the EIS identified the possibility of turbid water (due to earthworks during construction) affecting the domestic use of surface water. However, impact to ground water is considered small as most production wells are located downstream of Talomo watershed area which is outside the project site.



Shown above are the National Water Resources Board (NWRB) water permittees near the Davao River. No other water permittees were found near the project alignment. Below are the details:

Permit No.	Water Source	Permittee
8962	Groundwater	Davao Development Foundation, Inc.
14378	Surface water	Lapanday Agriculture & Development Corp.
14379	Davao River Pump 1	Lapanday Agriculture & Development Corp.
14380	Davao River Pump 2	Lapanday Agriculture & Development Corp.

6.3.3 EXISTING INFRASTRUCTURE AND SERVICE

Relocation of power posts, high voltage electrical lines, water pipes and communication lines are expected, particularly at the intersections with existing roads (Mintal, Catalunan Grade and Mandug Roads). This is included in the project cost under item B.12: Removal and Relocation of Utilities.

6.4 HEALTH AND SAFETY

6.4.1 INFECTIOUS DISEASES

The influx of construction workers may increase the risks of infectious diseases in the project area.

While HIV/AIDS/STD tests are not required for the hiring of workers, SUTJV is finalizing arrangements with Southern Mindanao Medical Center / Highly Accelerated Corrosion Testing (SPMC/HACT) for the

assessment, testing, diagnosis, intervention, treatment and support of workers. HIV/AIDS tests will be voluntary.

Meanwhile, monitoring of temperatures is implemented at the project as first line of screening for COVID-19 symptoms. Regular COVID-19 tests are also undertaken.

6.4.2 OCCUPATIONAL HEALTH

This is included in the Construction Health and Safety Plan approved by DOLE.

6.4.3 COMMUNITY HEALTH AND SAFETY

Community health and safety will be affected by the influx of construction workers, increase of vehicle traffic and operation of construction machineries during the construction. Mitigating measures are included in the Construction Health and Safety Plan approved by DOLE.

6.5 EMERGENCY RISK

6.5.1 FLOOD



Davao river and its fluvial zone show remnants of flooding events in the past. The EIS (2014) identified 2012 as the year of a pervious flood while interviews with some residents in the area revealed a big flood in 2017. This means a five (5) year flood cycle for Davao river can be expected.

The Buhangin, Davao City flood map show very high flood susceptibility around the project site. The EIS categorized the flood zones along Davao river as low water or high water flood zones. Low flood zones are 5 – 15m above sea level and have poor soil cover and not favorable to long-term agriculture and habitation. High flood zones are 20 – 30m above sea levels and have good soil cover and highly favorable to long-term agriculture. However, long-term habitation is discouraged even on high flood zones.

As per EIS, the existing flooding at Brgy. Tigatto maybe aggravated during construction (in EIS) due to localized flooding. Temporary, but sufficient and effective drainage facilities need to be provided to avoid inundation along the project. Temporary diversion of waterways will ensure continuous flow of water especially during high precepitation.

6.5.2 FIRE

This is included in the Construction Health and Safety Plan approved by DOLE.