2 ASSESSMENT OF ENVIRONMENTAL IMPACTS

2.1. The Land

2.1.1. Land Use and Classification

2.1.1.1. Methodology

The study and assessment on land-use covered the review of existing literature and maps of the project area. San Jose has an updated CLUP which was used as main reference for the land-use assessment.

2.1.1.2. Baseline Condition

San Jose Municipality Land-use Classification

The existing OMCPC power plant is located within the political jurisdiction of Brgy. Central, Municipality of San Jose, Province of Occidental Mindoro. The municipality of San Jose consists of 38 barangays and has a total area of 67,086.61 hectares based on San Jose's Comprehensive Land Use Plan. San Jose is bounded on the north by Rizal, Occidental Mindoro; Mansalay, Oriental Mindoro on the northeast; on the east and southeast by Magsaysay, Occidental Mindoro and to the south by Mindoro Strait.

Based on the proposed land use in the CLWUP of San Jose (subsequently approved), about 66.81% or approximately 44,811.37 hectares of the municipal land area is reserved as forest lands which increased by 4.86% from the existing land use. Other major land uses in the municipality are: agriculture lands (25.40%), agro-industrial (0.72%), mining/quarrying (0.27%), built-up areas (5.53%), special use (0.01%) and others land uses (0.91%). Former land uses such as Agriculture in Forestland and Grassland/Pastureland were already reclassified into general land uses while tourism areas was added in the classification. More than half of the land use is forest use because of vast forestlands situated at high elevations in the north and eastern portion of the municipality in the mountainous area. The existing project site is previously an agricultural area although the site has been an industrial area for a long time since the NPC Pulang Lupa Power Plant is located within the OMECO compound where the proposed additional powerhouse will also be constructed. In the current CLWUP, the OMECO area is now classified as an industrial area. **Table 2.1** shows the general land uses of San Jose Municipality. **Figure 2.1** is the general land use map of San Jose, Occidental Mindoro.

Table 2.1. Existing and proposed general land use of the Municipality of San Jose, 2017-2030

Land Uses	CLWUP		Existing Land Use		Proposed Land Use	
	Area (in hectares)	% Distribution	Area (in hectares)	% Distribution	Area (in hectares)	% Distribution
Built-up	2,423.00	4.39	3,180.46	5.76	3,711.87	5.53
Forest	21,543.50	39.03	34,192.94	61.95	44,811.37	66.81
Agriculture	16,868.00	30.56	15,797.14	28.62	17,034.35	25.40
Agriculture in Forestlands	1,175.00	2.13		0.00		
Mining/Quarrying	24.00	0.04	24.00	0.04	178.05	0.27
Grassland/ Pasture lands	12,520.00	22.58	1,045.56	1.89		
Agro-Industrial	20.07	22.68	333.47	0.60	485.00	0.72
Special use		0.04	8.00	0.01	8	0.01
Tourism					228.59	0.34
Others			611.37	1.11	611.37	0.91
TOTAL	55,192.94	100.00	55,192.94	100.00	67,068.60	100.00

Source: CLUP of San Jose, Occidental Mindoro (2017-2030)

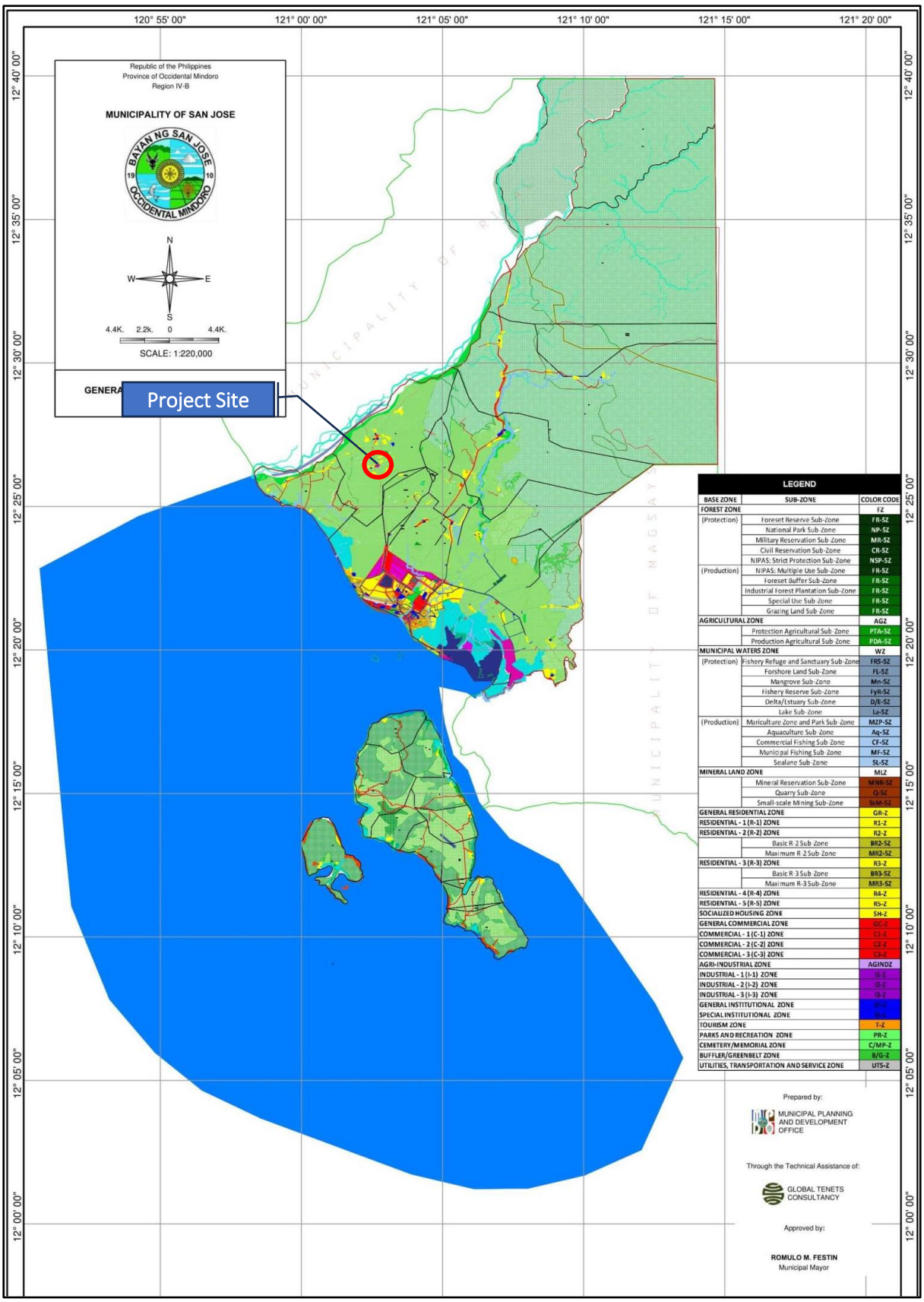


Figure 2.1. San Jose General Land Use Plan

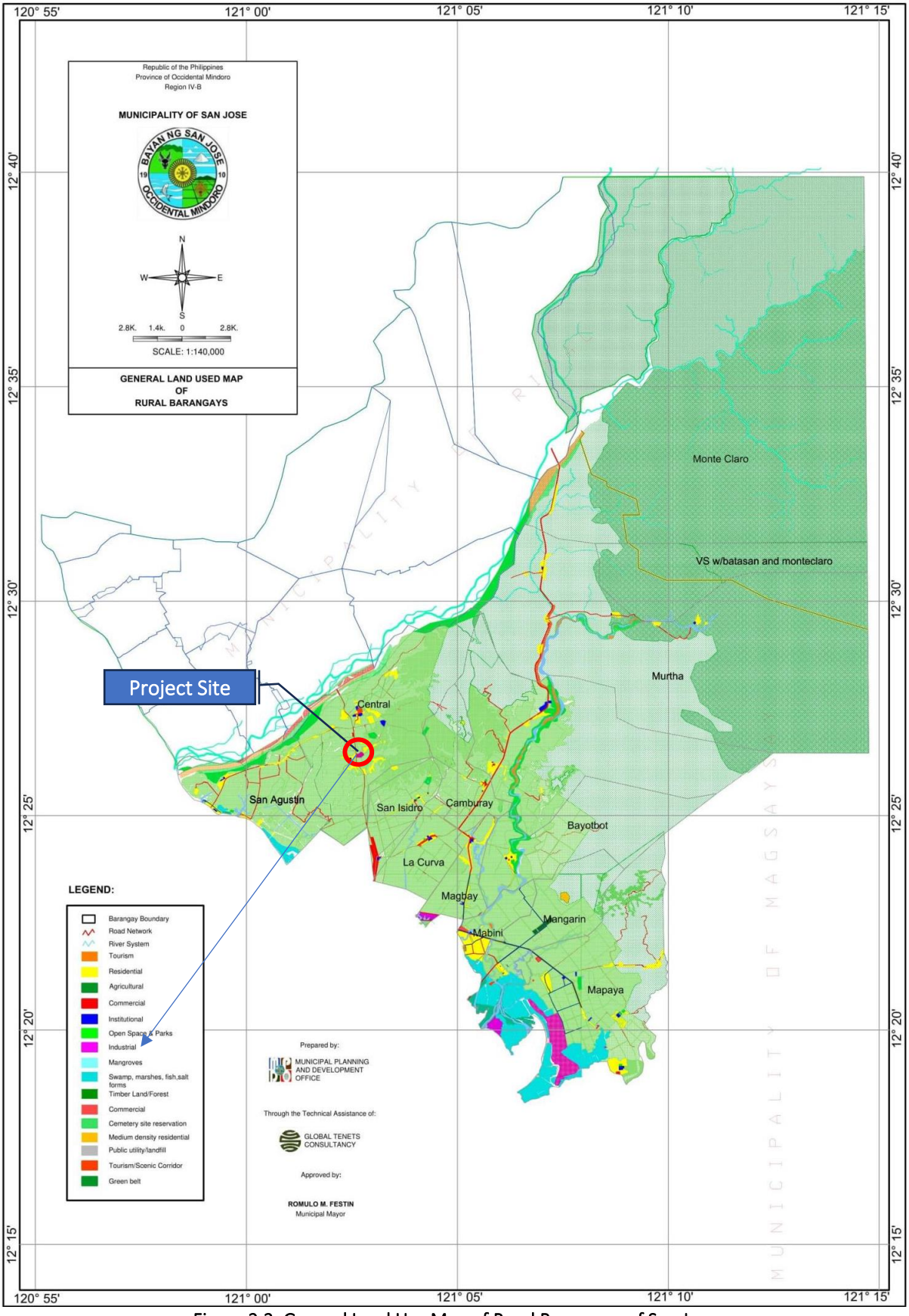


Figure 2.2. General Land Use Map of Rural Barangays of San Jose

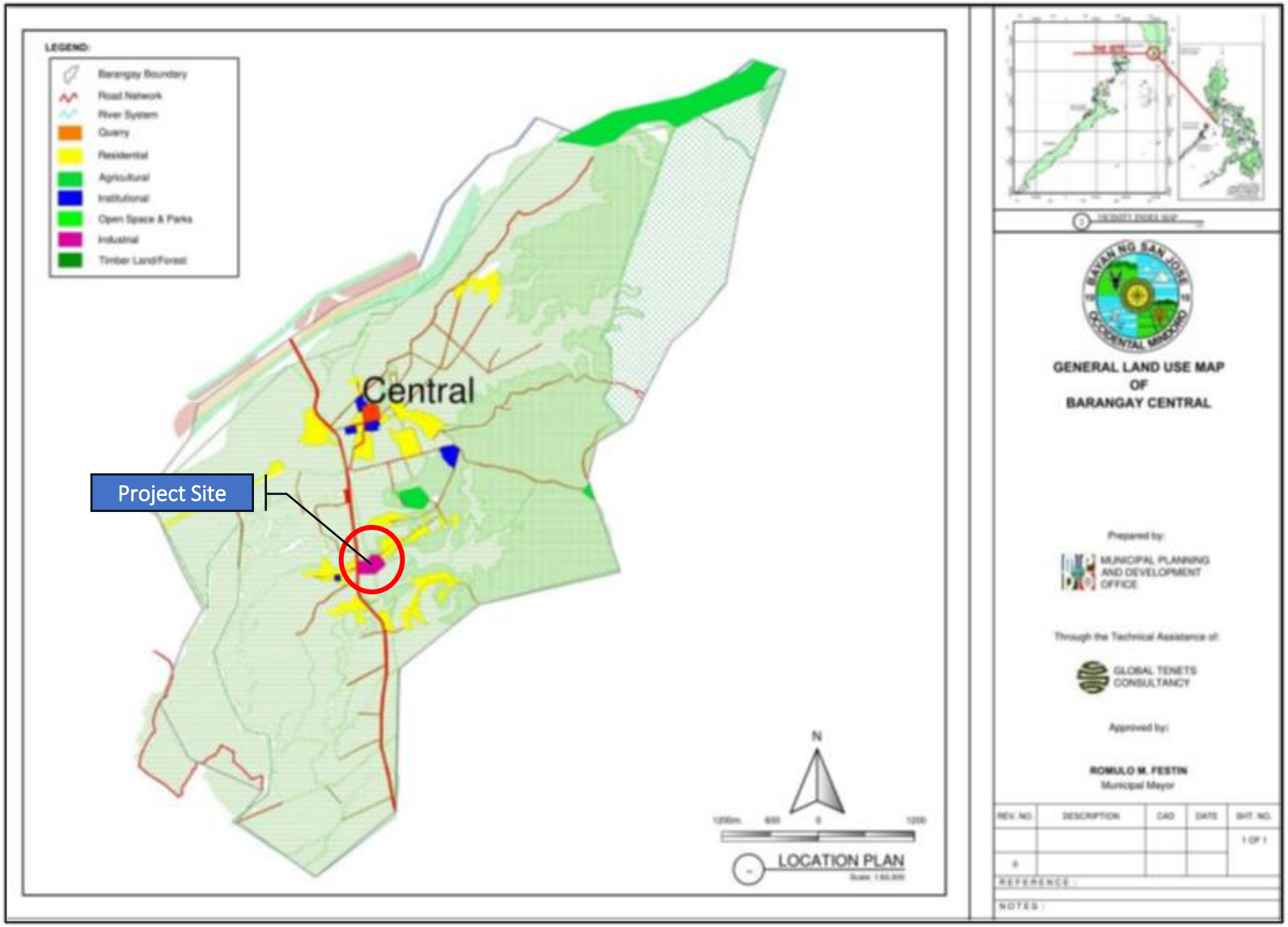


Figure 2.3. General Land Use Map of Brgy. Central, San Jose, Occidental Mindoro

2.1.1.3. Impact Assessment

Table 2.2. Predicted impacts of/on land use and classification to/by the proposed amendment of OMCPC SMRA Diesel Power Plant Expansion

List of Key Impacts	Phase Occurrence				Discussion
	Pre-Construction	Construction	Operation	Abandonment	
Change/ Inconsistency in land use					The existing power plant and the proposed additional powerhouse is situated in an area adjacent to the non-functional NPC Pulang-lupa power plant. The NPC power plant has been existent in the area for a long time as well as the OMECO warehouse, thus the development of the additional powerhouse beside the existing OMCPC power plant will not have significant impact on the land-use in the area. San Jose Municipal Ordinance No. 861 series of 2017, otherwise known as the Revised and Integrated Zoning Ordinance formally set aside the current area of OMCPC as an Industrial Zone.
Encroachment in Environmentally Critical Areas (ECA's)		☑	☑		Among the categorically defined Environmentally Critical Areas (ECA) in Memorandum Circular 2014-005, there are two technical definitions of ECA that fits the project area: areas frequently visited and or hard hit by natural calamities and water bodies as an ECA. San Jose and the rest of Occidental Mindoro are frequently visited by typhoon. A NIA irrigation canal which is a man-made waterbody passes through the area. The irrigation canal is utilized by farmers for the irrigation of rice paddies adjacent to it. The project will not discharge any of its effluent to the irrigation canal thus no significant impact will affect the artificial waterbody.
Possible Tenurial/Land Issue					The property in the project site was issued with Transfer of Certificate of Title (TCT) by virtue of free patent law. No tenurial or land issue arise when OMCPC leased the lot property from OMECO.

2.1.2. Geology/Geomorphology

2.1.2.1. Methodology

The impact of the proposed power generation project on the geology and geomorphology at the project site is assessed based on its conceivable effects on the geological materials, processes and values. The site's existing condition is derived from field surveys, available reports from the Mines and Geosciences Bureau (MGB), Philippine Institute of Volcanology and Seismology (PHIVOLCS), geologic literature and information shared to the consultants by the proponent. Geological and seismological data are mainly lifted from the consultant's own database, and from publicly available international and local sources.

The geological risk assessment employed the semi-quantitative approach, using observations made on similar projects in the country, and in other parts of the world. Statistical information on relevant geological hazards is used whenever available, and modeled to the site and the project as necessary.

2.1.2.2. Baseline Condition

Topography

The land surface at the site is generally flat and slopes slightly towards the southwest with a very gentle dip (2° to 5°). Some irregularities in the gentle topography is caused by small drainage channels that drain into the main Busuanga River, and by the hillier terrain to the east as the foothills are approached. The topographic map of the Project site is shown in Figure 2.4.

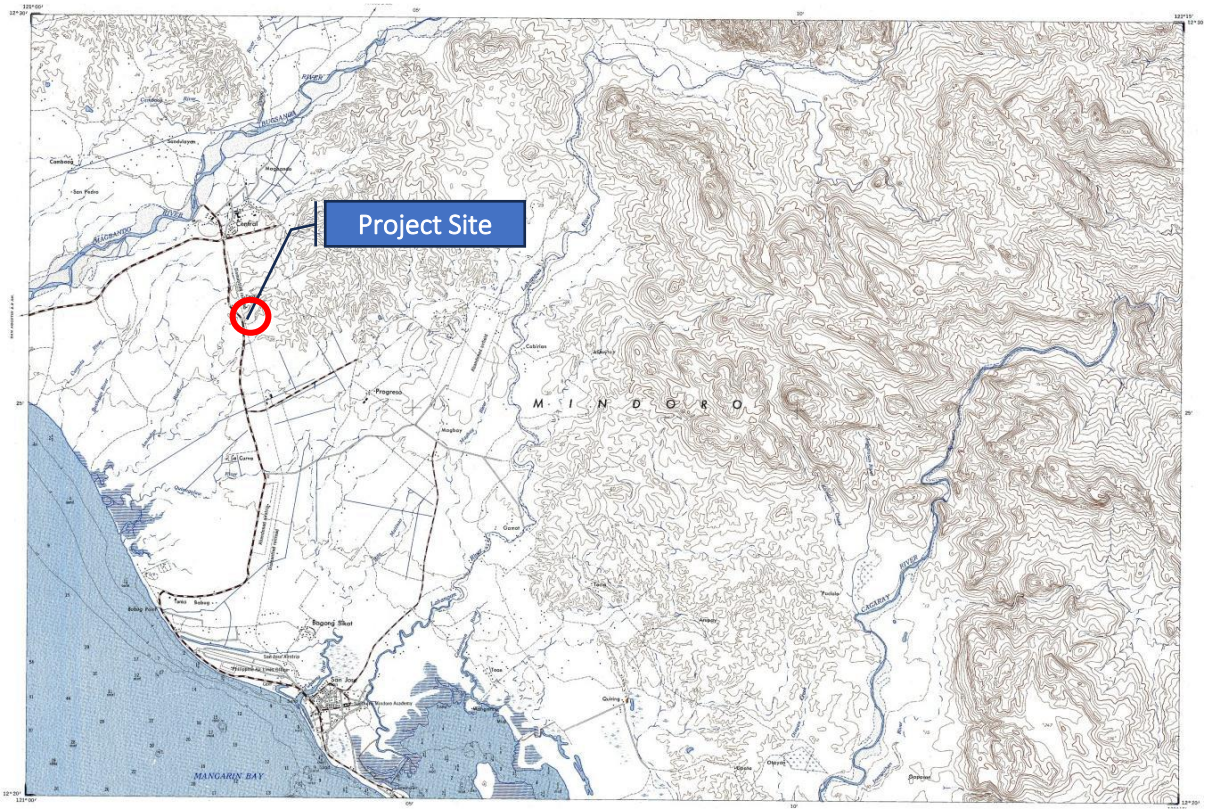


Figure 2.4. Topographic map of San Jose, Occidental Mindoro and adjoining municipalities including the project site

Regional Geology

The project site is part of the alluvial plains in the southwest coast of Mindoro (Figure 2.5). These alluvial plain borders the western coast of the island forming a wide north-south agricultural region almost extending the whole length of the island. On the east, the plain is bordered by the high central ridge of Mindoro including Mount Iglit-Baco. On the west is the Cuyo Passage that serves as the channel connecting South China Sea with the Sulu Sea. The major geologic structure in Mindoro Island is the north-south trending Central Mindoro Fault that stretches about 100 km from Mansalay to Puerto Galera. Previous works by the Mines & Geosciences Bureau (MGB) are vague on the recent activity of the Central Mindoro Fault, although topographic expressions along its trace seem to suggest that it is an active fault. The Aglubang River Fault appears to branch out of the Central Mindoro Fault south of Alcate, Victoria.

Another major structure is the Lubang Fault that traverses immediately the northern portions of Mindoro Island. This fault trends east west and is located between Mindoro and the Luzon mainland. The alignment of the Lubang Fault is often cited as the Verde Island transform which is traced for 380 km through the Bicol peninsula where it appears to be cut-off by the left lateral movement on the

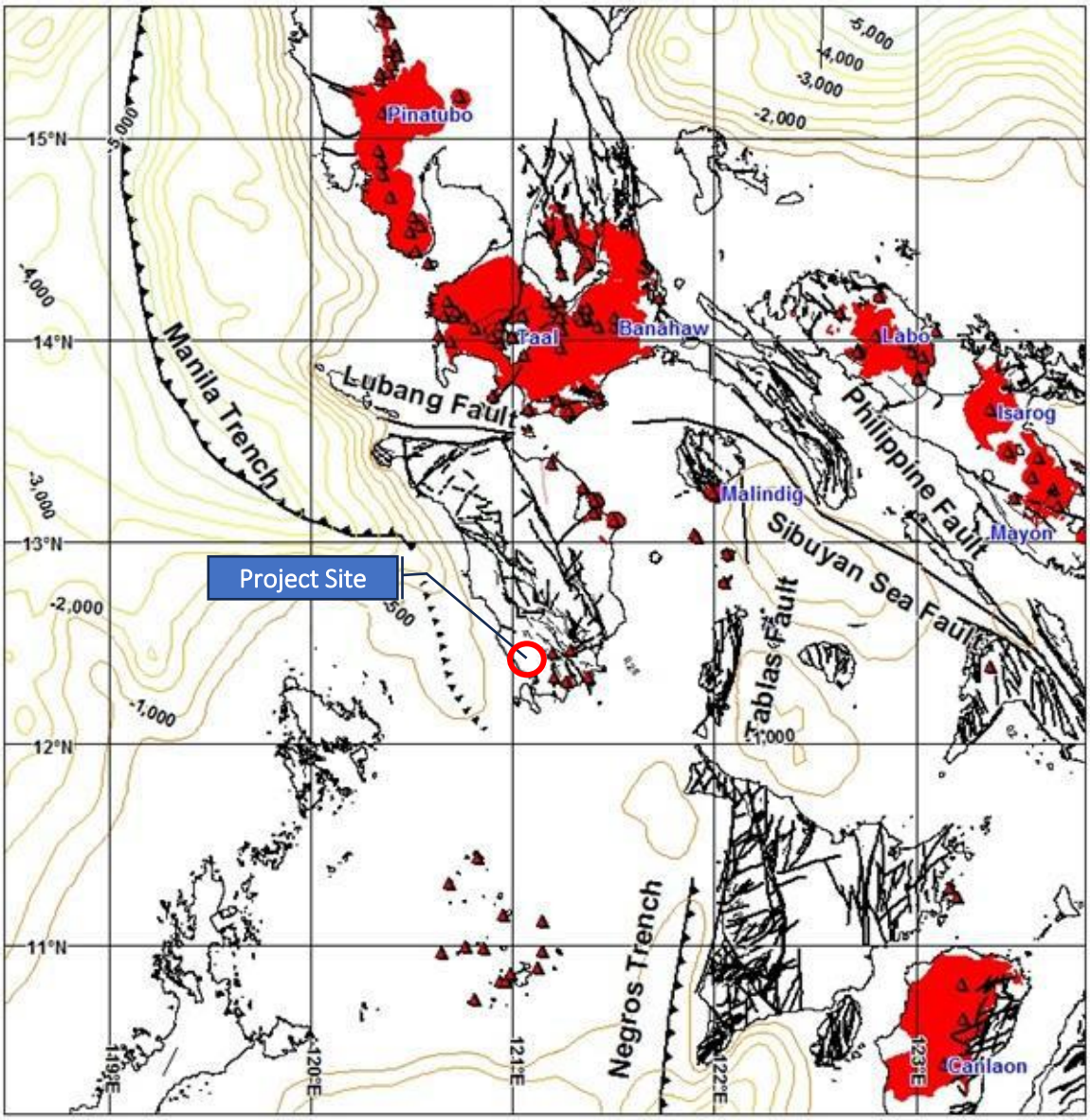


Figure 2.5. Most of the volcanic terranes (red) and faults (black lines) around the project site are associated with the tectonic activity along the Manila Trench. The active and potentially active volcanoes are labeled, along with the known active faults and subduction trenches.

Philippine fault. Verde Island hosts a small volcano that lies in the channel between Luzon and Mindoro. The pronounced feature provides a structural termination for the Manila Trench. Lubang, Ambil, and Golo islands appear to have recently rifted away from Mindoro along this Verde Island "transform." The work of de Boer et al. (1980) cites the rotation of Bataan and Cavite to be associated with this rifting. Intense seismicity occurs at the western end of the Verde Island transform leading de Boer et al. (1980, p. 26) to allude that the seismic swarm which reaches depths of 50 km below Lubang Island may be associated with rising magmas.

Volcanic activity in south-western Luzon which includes the extensive volcanic region around Banahaw Volcano, is difficult to relate to the subduction along the Manila Trench. Divis (1980) attributes the magmatic activity in this area to a leaky transform, although this model does not account for the source of the magma. The South Luzon Mountains are an older volcanic chain north of and parallel to the Verde Island transform extending from the west arm of Batangas Bay eastward for 50 km. Volcanism in this region may have commenced in middle Miocene up to the Pleistocene.

The western coast of Mindoro serves as the termination of both the Manila Trench to the north, and the Negros Trench to the south. In this coastal region it is opined that the edge of the Palawan micro-continent impinges on the island arc crushing the trenches and causing the orogeny in the central portions of Mindoro. Thus, thrust faulting and intense seismicity mark this convergent zone making it one of the more tectonically dynamic areas in the country.

Site Geology

The Geological Map of Mindoro Island (JICA-MMAJ, 1984) is shown in Figure 2.6. The regional stratigraphy of the area (MGB, 2010) comprises the following rock formations from, oldest to youngest: Halcon Metamorphics - As the oldest rock formation in the island, this unit is composed of metaconglomerates, schists and phyllites which form the backbone of the northwest ranges, extending around the northwestern coast from Puerto Galera to Mt. Halcon. This unit is dated as Pre-Jurassic to Jurassic.

- Baco Group which is further subdivided into the Mansalay Formation and the Lumintao Formation-Composed of slightly metamorphosed volcanic and clastic rocks and divided into two formations: the lower Mansalay Formation which is predominantly shale, sandstone, and slate to phyllite; and the upper Lumintao Formation composed mainly of basalt with basaltic tuff, sandstone, shale and slate to phyllite. The Mansalay Formation forms long belt from Mamburao to Mansalay in a northwest-southeast direction, while Lumintao Formation extends from Lumintao River to Mamburao on the western side of the island. This unit is dated as Jurassic.
- Mamburao Group - This is composed of basic volcanic rock, mainly basalt. Exposures of this rock are confined mainly along the lowland of Mamburao and Abra de Ilog. This unit is dated as Paleocene.
- Sablayan Group - Predominantly beds of limestone, calcareous sandstone, calcareous mudstone with andesite and andesitic tuff, this unit is distributed from Sablayan to Bulalacao, being found also along Mamburao River and in the headwaters of Magasawang Tubig River, the Banus River, the Sumagui River and the Tangon River in Oriental Mindoro. This unit is dated as Late Eocene to Late Miocene.
- Bongabong Group - Mostly conglomerate, tuffaceous sandstone and mudstone-siltstone, this unit is distributed in Rizal and Calintaan, Occidental Mindoro with exposures also extending from Victoria up to Bongabong. This unit is dated as Pliocene.
- Socorro Group - Mainly composed of terrace gravel and sand deposits, along with tuffaceous silt, andesitic tuff and limestone, major outcrops are found in the lowland of Oriental Mindoro from Puerto Galera to Roxas, covering also portions San Jose, Magsaysay, Sablayan and Mamburao in Occidental Mindoro. This unit is dated as Quaternary.
- Alluvial deposits - Detrital deposits formed by river systems, this unit is made up of silt, sand, and gravel extensively distributed along the shores, river channels, broad floodplains and delta found in both Occidental and Oriental Mindoro. This unit is also dated as Quaternary.

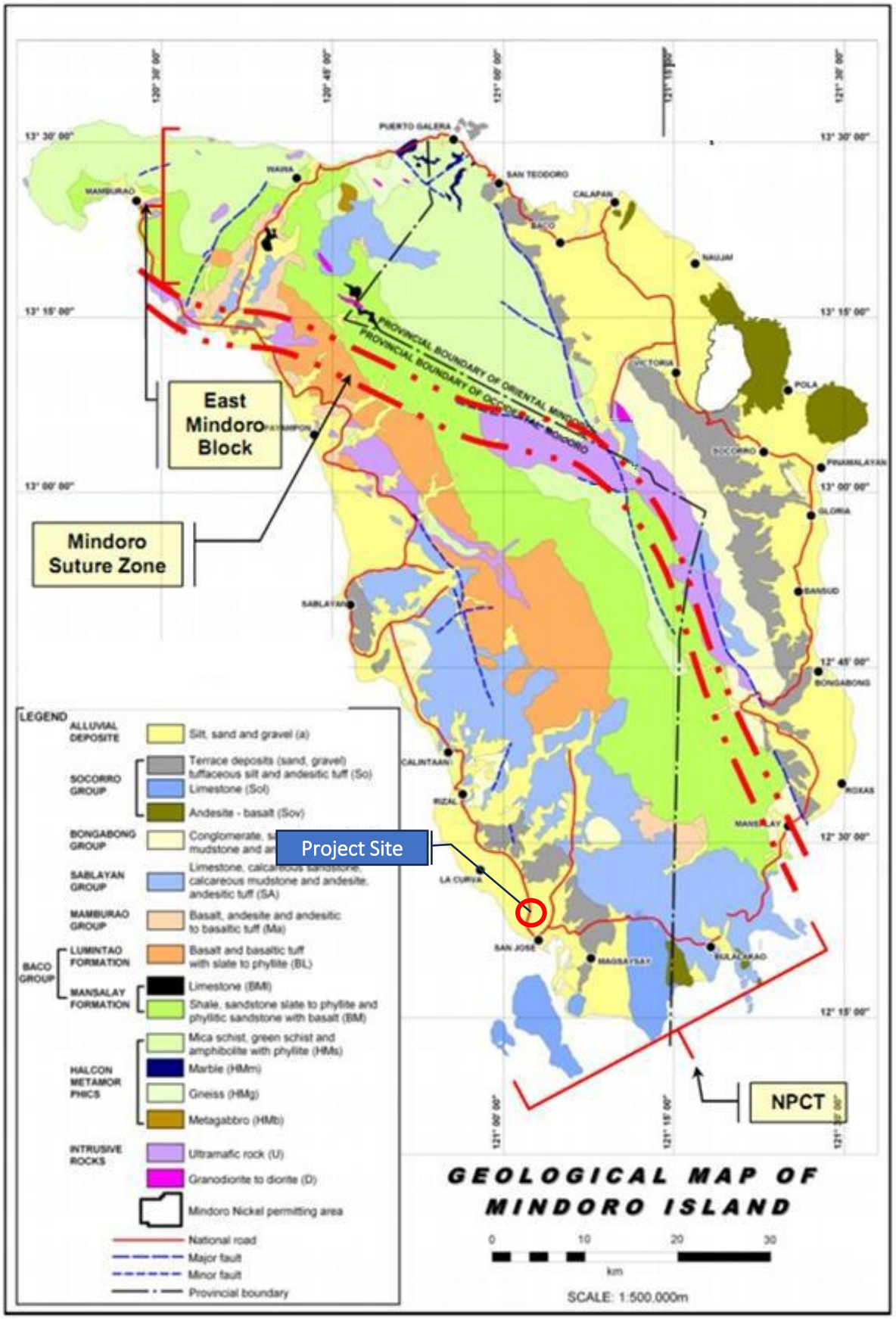


Figure 2.6. Geological map of Mindoro (originally after JICA, modified from Intex Resources, 2010).

The project site is located in the alluvial deposits which is the youngest and still unconsolidated materials on the western coast of Mindoro. The location of the project site is shown in Figure 2.7.

The digital elevation model of the site is also shown in the figure, highlighting the flat plains and the high ridges that border the area to the east. Geologic mapping and terrain analysis indicate that the dominant geologic process in the area is fluvial sediment deposition, where the active erosion in the high mountains in the east results to the deposition of large volumes of sediment on the alluvial plains.

This process is facilitated by the numerous rivers that traverse westerly from the ridge and forming a series of alluvial fans and flood plains that line the coast from San Jose to Sablayan.

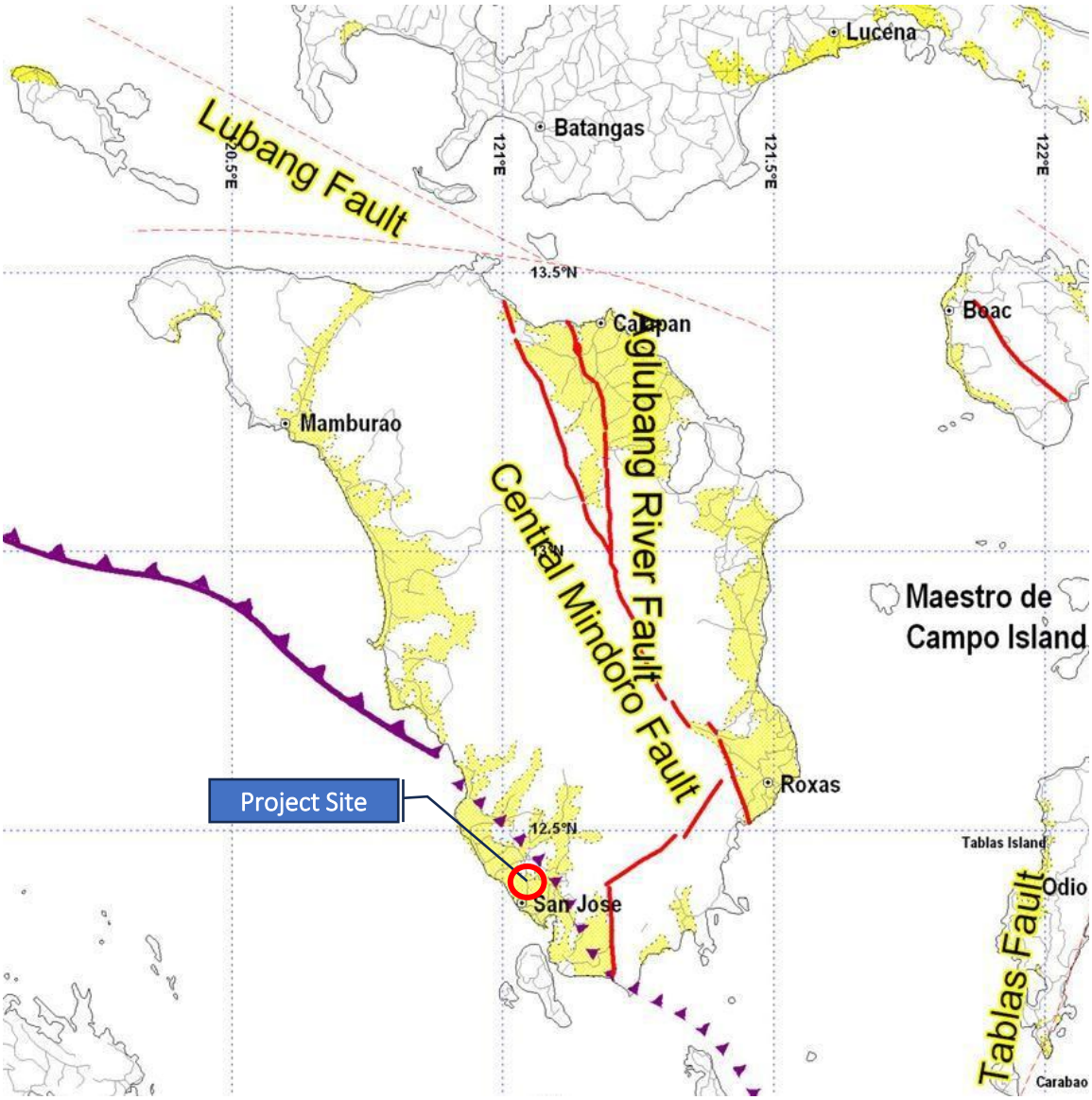


Figure 2.7. The project site is underlain by Quaternary Alluvium lying on a generally flat slope extending from the hilly to mountainous terrain to the shore on the west. This renders the site susceptible to liquefaction and flooding.

2.1.2.3. Impact Assessment

Table 2.3. Predicted impacts of/on geology to/by the proposed amendment of OMCPC SMRA Diesel Power Plant Expansion

List of Key Impacts	Phase Occurrence				Discussion
	Pre-Construction	Construction	Operation	Abandonment	
Change in surface landform		☑	☑	☑	Along the project site, the terrain is already flat, thus change in surface landform impact is insignificant.
Change in sub-surface/ underground morphology		☑	☑	☑	The additional powerhouse will only utilize isolated footing thus change in sub-surface/underground morphology is insignificant.
Inducement of subsidence, liquefaction, landslides, mud/debris flow, etc.		☑	☑	☑	The most significant geologic hazards associated to the site are related to volcanic, seismic and tsunami activities. Also, as a consequence of its geographic location and terrain, some threat from landslides, floods and typhoons exists. The map of seismicity around the project site is shown in **Figure 2.8**, which indicates that some significant earthquakes have occurred within the region. It is evident on this map that many of these earthquakes were caused by tectonic activity along the Philippine Fault zone, Manila Trench, East Zambales Fault, East Laguna Fault and the Casiguran Fault-East Luzon Trench region. For the region around the southern portion of the Manila Trench, the clustering of earthquakes around the Lubang Fault/Verde Island transform is evident. The most recent damaging earthquake near the site is the 1994 Mindoro earthquake, which occurred along the Aglubang Fault which caused destruction as a direct result of the ground shaking, and from the tsunami that immediately followed the earthquake. Another event occurred in 1995, although to a much less damaging effect. The damage caused by shaking during these earthquakes was attributed to poor construction practices and unfavorable geologic conditions (i.e., soft soil and presence of thick sediments near riverbanks and reclaimed areas). **Seismic Hazards** There are no active faults in the vicinity of the project. However, the active seismicity in the region brings threats related to ground shaking during earthquakes. Considering the active seismicity of the Philippines, ground shaking is a well-recognized geologic hazard in the country. Several studies on ground shaking have been conducted, one of which is a study conducted by PHIVOLCS and USGS on the expected seismic acceleration in the country. Thenhaus, et al. (1994) used the analysis of time, space and size distribution of earthquakes to evaluate the distance-dependent distribution of seismic energy and presented the results in three soil conditions (i.e., soft soil, medium soil and rock). The results of the calculations are shown in **Figures 2.9** to **2.11**. As shown on the maps, ground shaking is influenced by the position of the faults and other geologic structures because the expected seismic acceleration values vary parallel to the tectonic features. The peak ground acceleration value for soft soil in the San Jose plains was

List of Key Impacts	Phase Occurrence				Discussion
	Pre-Construction	Construction	Operation	Abandonment	
					estimated at 0.65g while that for medium soil is at 0.38 and that for rock condition is estimated at 0.22g. These values have the probability of not being exceeded in 50 years. **Ground Rupture** There is no known active fault at the project site, thus no threat from ground rupture is delineated. **Ground Acceleration** Liquefaction is possible to occur since the site is underlain by alluvial materials. The alluvium is a thick deposit of sediments coming mainly from Busuanga River and composed of sand and gravel that were left behind as the river meandered and flooded out of its channel. Such liquefaction has been observed in some areas around San Jose and the alluvial plains on the western coast of Mindoro. **Subsidence** Subsidence may occur as a result of compaction and settlement of the unconsolidated sediments. This may be triggered by external events such as by ground shaking during earthquakes or vibration caused by moving heavy equipment. Subsidence has also been observed in areas where large volumes of groundwater have been withdrawn from the alluvial deposits causing the sediments to shift in response to the lost volume. There is moderate probability of subsidence at the site considering the nature of the underlying unconsolidated sediments in the project site. **Mass Movements/Landslide** The terrain of the project site is relatively flat, thus there is no probability of occurrence of landslides. Such movement of sediments and debris constantly occur in the nearby hills and along Busuanga River and therefore there is the likelihood of sediment being deposited in the vicinity of the project site, particularly during intense rains and extreme floods. Being nearly 3 km from the active channels of Busuanga River, the main threat at the project site is minor silt and muddy waters depositing during floods. **Figure 2.12** shows the liquefaction hazards map from PHIVOLCS for the region around the project site. **Volcanic Hazards** The project site is far from active volcanoes, in Luzon such as Taal and Pinatubo and Canlaon in Visayas, to be directly affected by volcanic activities. Light ashfall may reach the project site especially during large volcanic eruptions. Slight ash deposition is expected with the particle size not to exceed a few millimeters in diameter and may be similar to that experienced during the 1991 Pinatubo eruption. The most extreme threat is merely light dusting, in which the ash deposits are in the order of a few mm to few cm thick.

List of Key Impacts	Phase Occurrence				Discussion
	Pre-Construction	Construction	Operation	Abandonment	
					Flooding Hazards Flooding is a known to have occurred along channels of Busuanga River reaching to nearby areas with low elevations. At the main channels of Busuanga River, floods have been documented to reach up to 3m above its normal river level. Two types of flooding may be expected in the vicinity of the project, namely: flashflood that occurs from the rapid accumulation of runoff, and fluvial flood that occurs when the Busuanga River overtops its riverbanks. The existing power plant and the proposed additional powerhouse is at an elevation of 20 m above sea level, and 3 km away from the active channels of the river, it is spared from the threat of the annual floods (**Figure 2.13**). However, with the extreme rainfall that may occur as part of climate change, heavy downpour within the watershed could lead to extreme flooding at the floodplains, and may cause the river to flow out of its channel. This threat is particularly present when debris flow occurs during which the rush of sediment-laden front of the floodwaters can easily overcome the channels and lead to meandering across the floodplain. A detailed analysis of micro-topography may be able to help identify the immediate threats from such meandering floods of the Busuanga River. However, in the long term, the role of small topographic irregularities may be of little relevance for the erosive front of debris flows.

2.1.3. Pedology

2.1.3.1. Methodology

Characterization of the soil in the project site was performed through available maps including the soil type mapping in the Geoportal.gov.ph. The Simplified Key to Soil Series of Occidental Mindoro published by the Department of Agriculture (DA) and PhilRice was also used as reference.

2.1.3.2. Baseline Condition

Based on the Geoportal's soil type mapping, San Jose, Occidental Mindoro consist of 11 soil series: Maranlig Gravelly Sandy Clay Loam, Rough Mountain Soil, Quingua (Clay Loam, Sandy Loam, Clay), River Wash, Magsaysay Clay, San Manuel (Silt Loam, Loamy Sand), San Miguel Silt Loam, Beach Sand, Hydrosol and Bolinao Clay Loam. One (1) type of soil blanket the OMCPC project site in Brgy. Central - the Magsaysay Clay (**Figure 2.14**). Magsaysay clay is a fine textured soil with no particular mineral that dominates and is found in areas with sell-distributed rainfall. It is a young soil in its incipient development stage toward a mature soil but has not yet fully developed its diagnostic horizon. **Figure 2.15** shows the soil fertility indicators and soil physical qualities of Magsaysay clay.

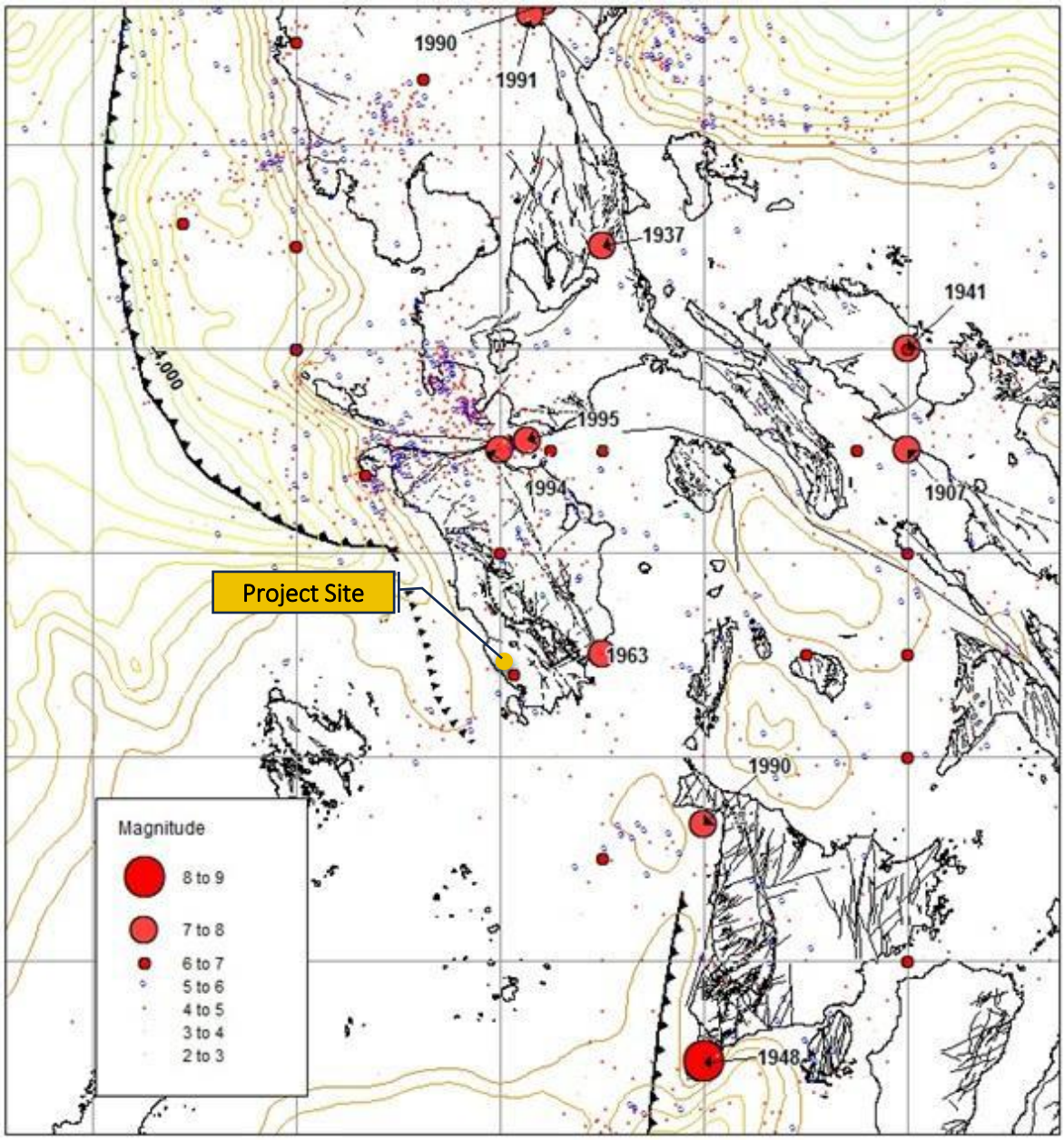


Figure 2.8. Seismicity map of the region around the project site

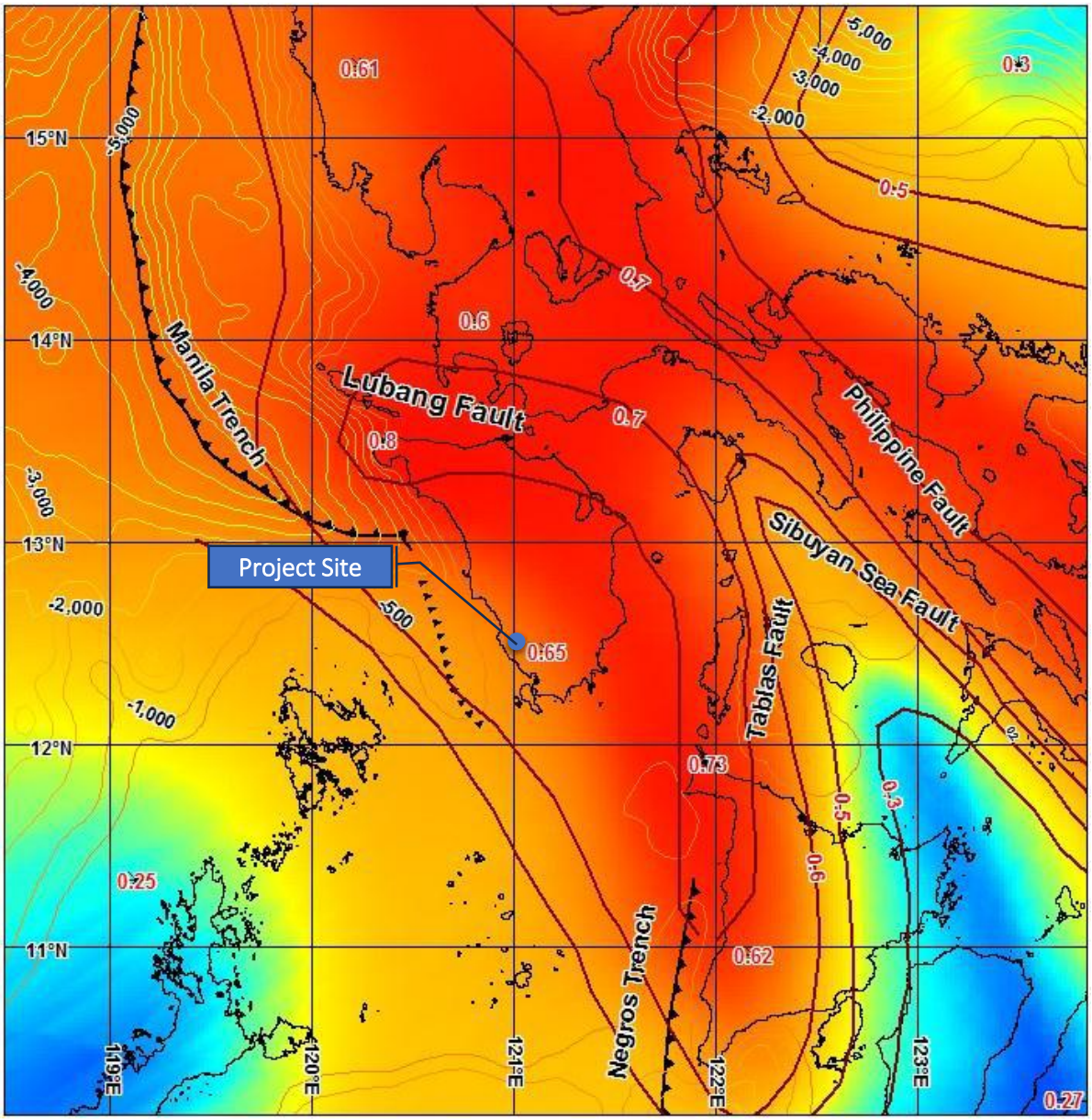


Figure 2.9. Seismic acceleration values for soft soil conditions estimated by probabilistic analysis (after Thenhaus et al, 1994).

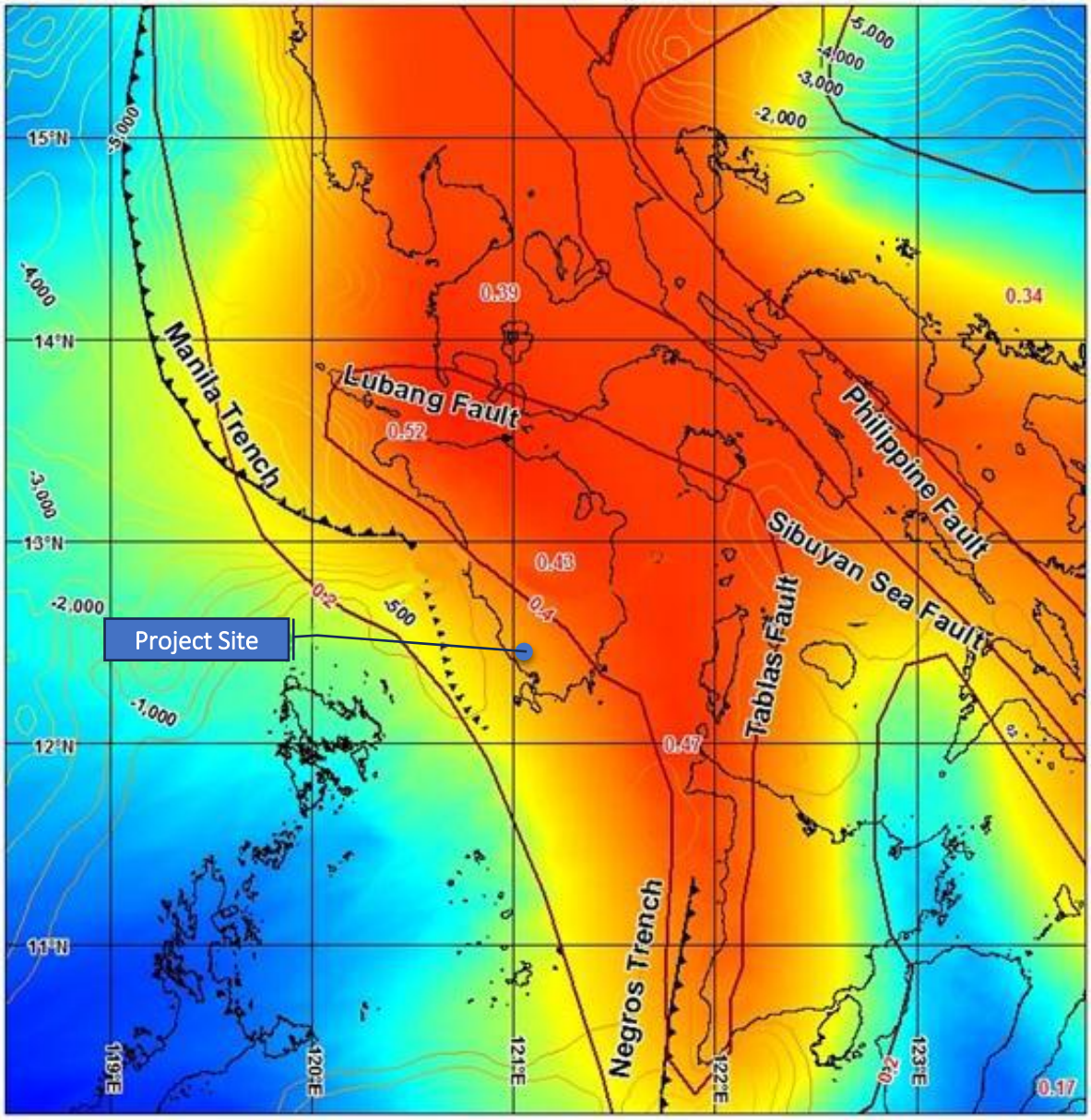


Figure 2.10. Seismic acceleration values for medium soil conditions estimated by probabilistic analysis (after Thenhaus et al, 1994).

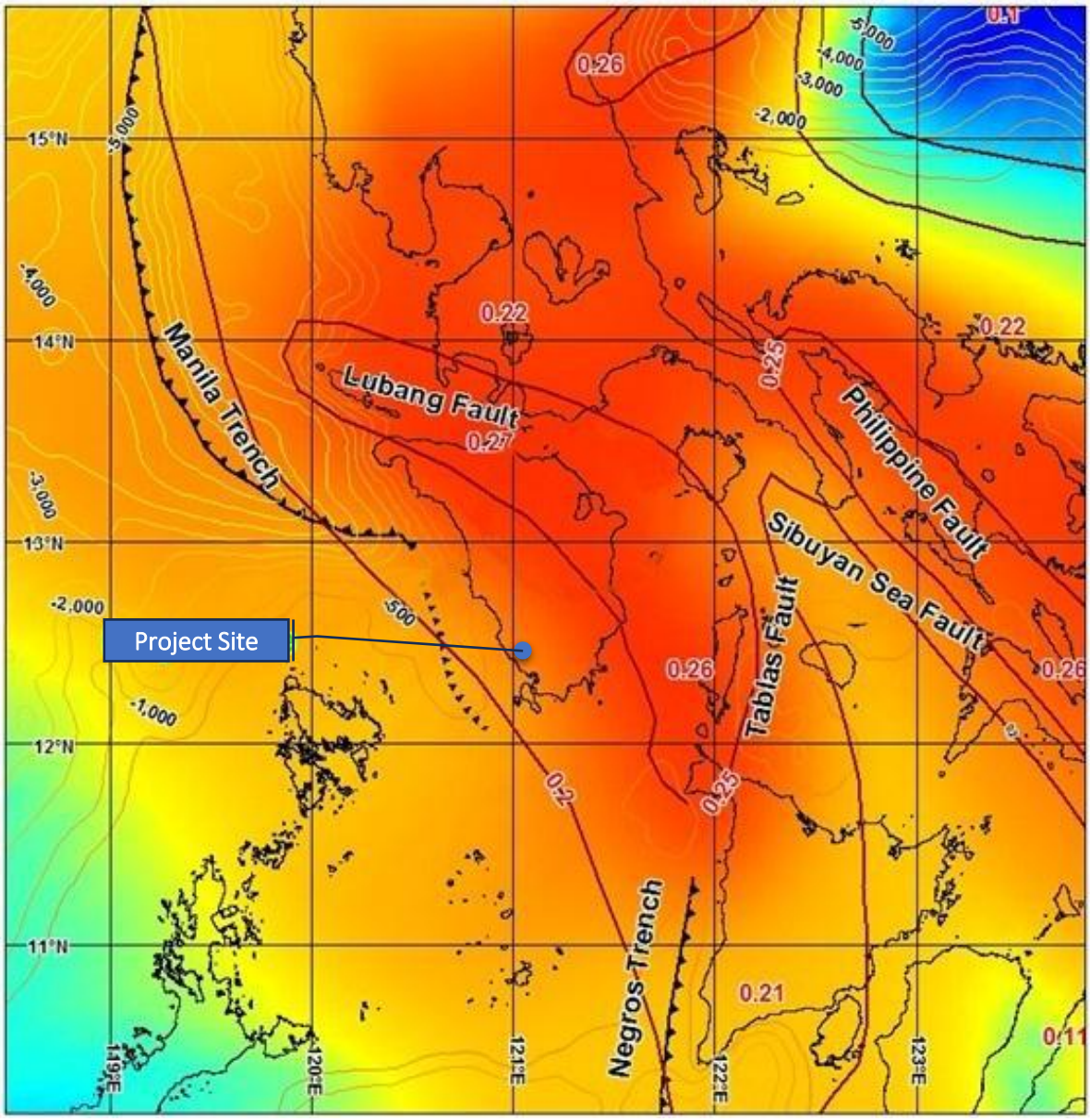


Figure 2.11. Seismic acceleration values for rock conditions estimated by probabilistic analysis (after Thenhaus et al, 1994).

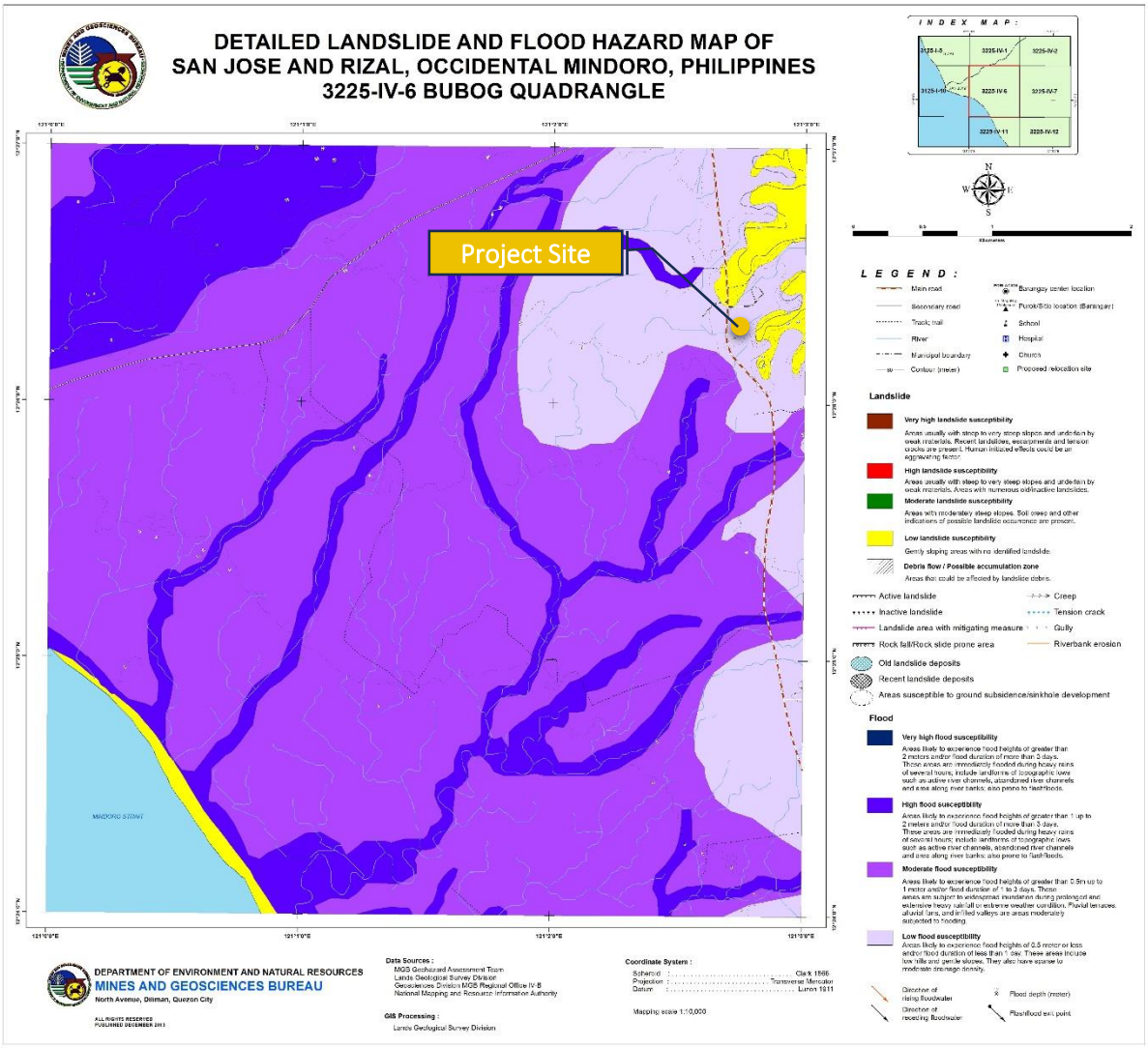


Figure 2.12. Detailed landslide and flood hazard map of San Jose and Rizal, Occidental Mindoro (Bubog quadrangle)

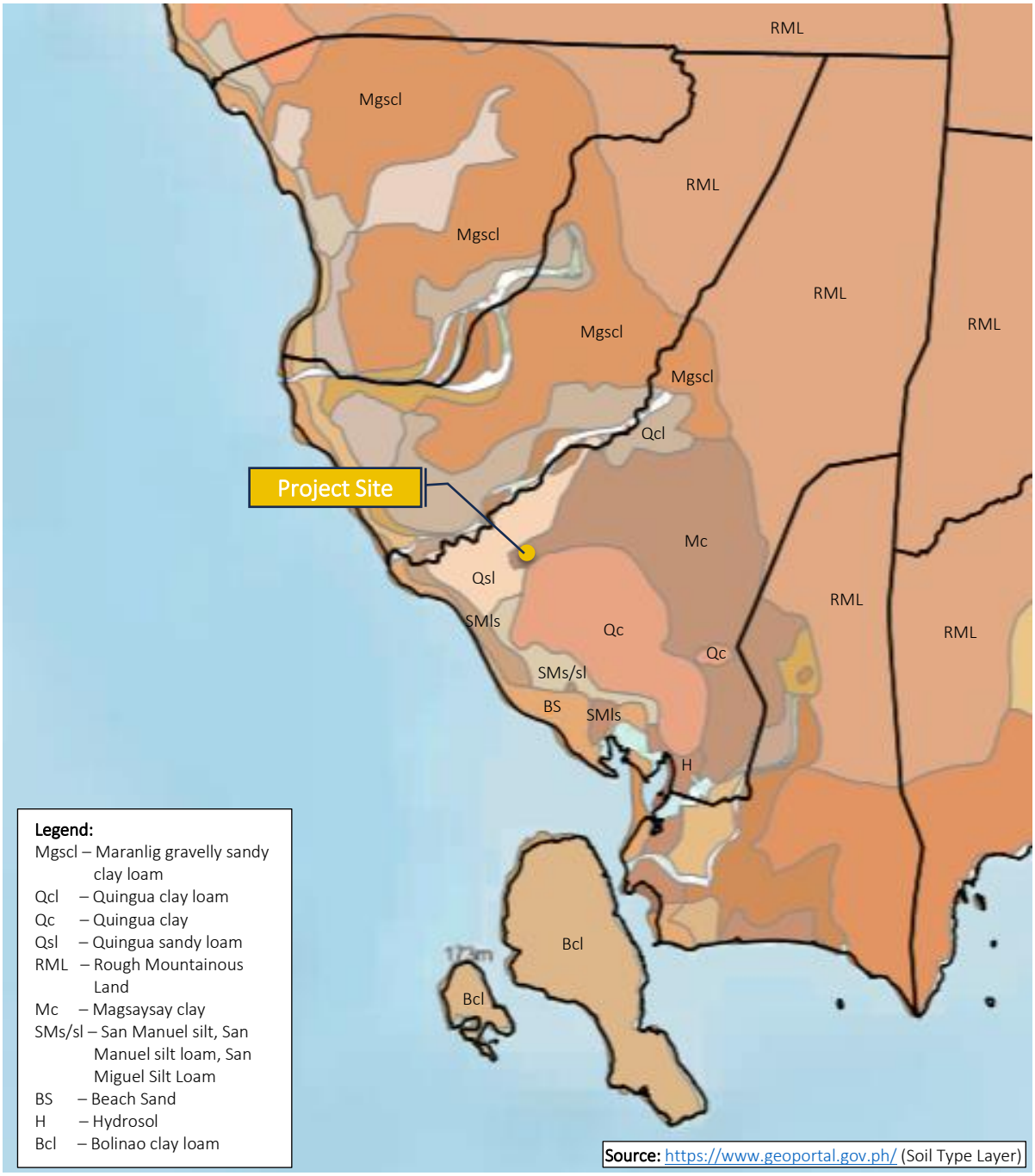
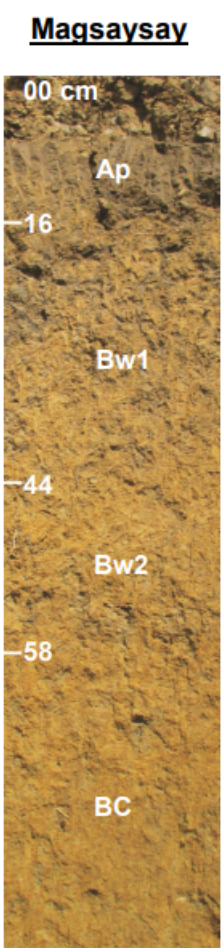


Figure 2.13. Soil map of San Jose, Occidental Mindoro and adjoining municipalities.



Soil Fertility Indicators	
Inherent fertility	High
Soil pH	Slightly acid to near neutral (6.6-7.1)
Organic matter	Low to moderate
Phosphorus (P)	High
Potassium (K)	Low
Nutrient retention (CEC)	High
Base saturation	High
Salinity hazard	None

Physical Soil Qualities	
Relief	Slightly sloping to rolling
Water retention	Moderate
Drainage	Good
Permeability	Good
Workability/tilth	Moderate
Stoniness	Gravels and highly weathered sandstones
Root depth	Moderate (>0.8m)
Erosion	Slight

Figure 2.14. Soil fertility indicator and physical soil qualities of Quingua Soil Series.

2.1.3.3. Impact Assessment

Table 2.4. Predicted impacts of/on pedology to/by the proposed amendment of OMCPC SMRA Diesel Power Plant Expansion

List of Key Impacts	Phase Occurrence				Discussion
	Pre-Construction	Construction	Operation	Abandonment	
Soil erosion/ loss of topsoil/ overburden		☑			Soil erosion is not projected as a significant impact since the area is flat and the proposed additional powerhouse will only use isolated footings for its foundation. Excavation is very minimal.
Change in soil quality/ fertility					Change in soil quality and fertility is minimal since the project area has been utilized for a longtime as project location for power plant back in the NAPOCOR days.

2.1.4. Terrestrial Flora and Fauna

2.1.4.1. Methodology

The fora and fauna rapid assessment was just ocular observation listing all the species observed on-site since an existing power plant is already situated in the area and the additional powerhouse will just be sited adjacent to it.

All the wildlife species observed, heard and encountered at the project site were recorded quantitatively. Direct and indirect method of identification was used in wildlife survey and assessment. The direct method is the actual sighting of faunal species either by the naked eye or with the use of camera. Indirect method employs the use of bioacoustics, the identification of species through its calls. This method has been more useful in avifaunal species identification.

2.1.4.2. Baseline Condition

Terrestrial Flora

The proposed project location of the additional powerhouse is just adjacent to the additional fuel tanks of the existing powerhouse. Adjoining buildings in the property is currently utilized by OMECO as warehouse and stockpile area. Since the site was already utilized as power plant location that has been operating since 2016, tree vegetation is minimal and open areas were dominated by grasses. The most dominant grasses are amorseko (*Chrysopogon aciculatus)* and talahib *(Saccharum spontaneum).* Other species observed are niog (*Cocos nucifera*), Auri (*Acacia auriculiformes*), Rain Tree (*Samanea saman*) and Mangga (*Manggifera Indica*). Adjacent to the new powerhouse are big trees mainly Auri, Mangga and Santol. OMCPC also planted Indian Lanutan or Indian Tree (*Polyalthia longifolia*) next to the perimeter fence to act as greenbelt and noise buffer. Plate 2.1 shows the vegetation growing at the proposed additional powerhouse

Table 2.5.List of plant species observed at the project site

Family Name	Scientific Name	Common Name	DAO 2017-11	IUCN
ANACARDIACEAE	*Buchanania arborescens*	Balinghasai	-	-
	Mangifera indica	Mango	-	-
ANNONACEAE	*Polyalthia longifolia*	Indian Lanutan/Tree	-	-
ARECACEAE	*Cocos nucifera*	Niog	-	-
ASTERACEAE	*Chromalaena odorata*	Hagonoy	-	-
EUPHORBIACEAE	*Macaranga tanarius*	Binunga	-	-
FABACEAE	*Acacia auriculiformes*	Auri	-	-
	Acacia mangium	Mangium	-	-
	Pithecellobium dulce	Kamachile	-	-
	Samanea saman	Rain Tree	-	-
MELIACEAE	*Sandoricum koetjape*	Santol	-	-
MORACEAE	*Ficus nota*	Tibig	-	-
	Ficus septica	Hauili	-	-
POACEAE	*Chrysopogon aciculatus*	Amorseko	-	-
	Cyperus rotundus	Mutha	-	-
	Eleusine indica	Paragis	-	-
	Saccharum spontaneum	Talahib	-	-

Terrestrial Fauna

Wildlife assessment was done by traversing the vicinity of the proposed project site doing ocular observation and recording of occurring wildlife. There were 14 wildlife species observed in the project area all of which are avian species belonging to 14 families that were observed during the assessment.

Most of the avian species commonly observed were the graminivorous Eurasian Tree Sparrow (*Passer montanus*), the frugivorous Asian Glossy Starling (*Aplonis panayensis*) and the insectivorous birds like the Philippine Pied Fantail and Blue-tailed Bee-eater (*Merops philippinus*). Other species observed are the frugivourous Yellow-vented Bulbul (*Pycnonotus goiavier*) and the White-collared Kingfisher (*Todiramphus chloris*). Table 2.1.6 shows the list of wildlife species observed in the proposed project site.

There were no endangered, threatened or vulnerable species observed in the project area. In terms of endemicity all the species are resident species except for two (2) endemic species and one (1) migratory species.

Table 2.6. List of wildlife species observed within the OMCPC power plant complex

Species	Common Name	Residency Status	Conservation Status	Feeding Role
Family Acanthizidae – Australasian Warblers				
Gerygone sulphurea	Golden-bellied Gerygone	Resident	LC	Insectivore
Family Alcedinidae – Kingfishers				
Todiramphus chloris	White-collared Kingfisher	Resident	LC	Piscivore
Family Apodidae – Swifts, Needletails				
Collocalia esculenta	Glossy Swiftlet	Endemic	LC	Insectivore
Family Columbidae – Doves, Pigeons				
Geopelia strata	Zebra Dove	Resident	LC	Graminivore
Family Estrildidae – Avadavats, Parrotfinches, Munias				
Lonchurra atricapilla	Chestnut Munia	Resident	LC	Graminivore
Family Hirundinidae – Martins, Swallows				
Hirundo rustica	Barn Swallow	Resident	LC	Insectivore
Family Laniidae – Shrikes				
Lanius cristatus	Brown Shrike	Migratory	LC	Carnivore
Family Meropidae – Bee-eaters				
Merops philippinus	Blue-tailed Bee-eater	Resident	LC	Insectivore
Family Nectariniidae – Sunbirds, Spiderhunters				
Nectarinia jugularis	Olive-backed Sunbird	Resident	LC	Frugivore
Family Oriolidae – Orioles				
Oriolus chinesis	Black-naped Oriole	Resident	LC	Frugivore
Family Ploceidae – Old World Sparrows, Weavers				
Passer montanus	Eurasian Tree Sparrow	Resident	LC	Graminivore
Family Pycnonotidae – Bulbuls				
Pycnonotus goiavier	Yellow-vented Bulbul	Resident	LC	Frugivore
Family Rhipiduridae – Fantails				
Rhipidura nigritorquis	Philippine Pied Fantail	Endemic	LC	Insectivore
Family Sturnidae –Starlings				
Aplonis panayensis	Asian Glossy Starling	Resident	LC	Frugivore/ Omnivore

2.1.4.3. Impact Assessment

Table 2.7. Predicted impacts of/on the terrestrial flora to/by the proposed amendment of OMCPC SMRA Diesel Power Plant Expansion

List of Key Impacts	Phase Occurrence				Discussion
	Pre-Construction	Construction	Operation	Abandonment	
Vegetation removal and loss of habitat		☑	☑	☑	The proposed additional powerhouse will only occupy 420 sq.m of the existing property within the OMCPC complex. The proposed project area for the powerhouse is already devoid of vegetation as the development area is already grassland even before the existing power plant of OMCPC was constructed. The existing trees will not be cut down as it is far from the proposed construction site of the new powerhouse.
Threat to existence and/ or loss of important local species		☑	☑	☑	Most of the wildlife species observed were generalists, capable of adapting to disturbance or relocating to adjacent habitats. The existing vegetation is of a typical grassland with intermittent trees in the perimeter. OMCPC also planted Indian Lanutan trees in their perimeter fence to serve as buffer and greenbelt. It is also suggested that OMCPC shall actively pursue enrichment planting along its adopted areas to improve diversity while at the same time establishing a carbon sink to compensate a portion of its emission and accommodate more wildlife. OMCPC is encouraged to also adopt a mangrove habitat and conduct mangrove planting along the coastal.
Threat to abundance, frequency and distribution of important species					Since the project area is already existing there are no longer important species found in the area. All the species of flora and fauna observed in the project area have a conservation status of least concern thus there is no threat to abundance, frequency and distribution of important species in the area. Furthermore, the adjoining area is vast and can provide ideal habitat to the existing wildlife.
Hindrance to wildlife access					The proposed additional powerhouse is only small and is only one floor thus it will not have significant impact in terms of hindrance to wildlife access. OMCPC planted trees within the vicinity and along the perimeter fence thus wildlife specifically the avian fauna can use the greenbelt as perching or roosting area. Furthermore, OMCPC did not fell all the big trees when construction for the existing power plant was started in 2015 thus the area is not devoid of vegetation and this provides habitat for birds typically occurring in the area.

2.2. The Water

2.2.1. Hydrology/Hydrogeology

2.2.1.1. Methodology

The hydrological features of the Project site were determined from reference materials such as the CLUP of San Jose.

2.2.1.2. Baseline Condition

Surface Water Resources

The Municipality of San Jose has both marine water and freshwater resources including groundwater and shallow springs. The municipality has mainly four major inland watersheds namely: Busuanga, Cabariwan, Caguray and Labangan. The whole of Ilin and Ambulong Islands is considered as another sub-watershed base on the CLUP of San Jose, Occidental Mindoro. Though the project area is proximal to Busuanga River of the Busuanga watershed but the site is actually within the Labangan watershed (Figure 2.15).

There are 11 major rivers and creeks that drains the four (4) abovementioned mainland watersheds and the Ilin-Ambulong Island. Headwaters and tributaries of the river systems in the area exhibit dendritic drainage pattern. Tributaries usually have narrow channels, rocky stream beds and steep gradients and flatten out upon reaching the base of the mountain range. Most of the rivers, creeks and tributaries emanate from the mountain ridge in the northeast and draining to sea in the west to Mindoro Strait.

In the old NAMRIA map, the names of the rivers in San Jose are the following (from North to South): Magbando-Bugsanga River, Curanta River, Buslugan River, Amindan River, Quinagalaw River, Rio Malinao – Tubaong River, Magbay River that eventually drains to Labangan River and Cabariwan River. In the CLUP (2017-2030) however, the river names discussed are the following: Paco River, Bubog River, Molasses River, Palanghiran River, Himarara River, Labangan River, Tubaon River, Manus Creek, Pandurucan River and Busuanga River.

It turned out that Molasses River is the more famous name of Amindan River referred to in the NAMRIA map. The uppermost tributary of Molasses/Amindan River emanates near the project site (Figure 2.16). An irrigation canal emanating from the footslopes of the mountain from the Busuanga River is also travering within the project site. The water is used by local farmers for irrigation of rice paddies.

Groundwater Resources

The Municipality of San Jose's groundwater potential is divided into three (3) categories: Shallow and Deep Well Areas, Deep Well Areas and Difficult Areas. The project site in Brgy. Central falls under the Shallow and Deep Well Areas. Figure 2.17 shows the groundwater potential map of San Jose, Occidental Mindoro base on San Jose's CLUP. In the groundwater availability map provided by the National Economic Development Authority (NEDA) in its Philippine Water Supply and Sanitation Master Plan – MIMAROPA Water Supply and Sanitation Databook and Regional Roadmap, the Municipality of San Jose's groundwater availability classification is area with local and less productive aquifer (Figure 2.18).

Majority of the barangays in San Jose especially the urban areas rely on groundwater for its domestic water requirement. San Jose Water District (SJWD) maintains 17 operating pumping stations which are all shallow wells. SJWD only taps shallow wells due to sulfur and salinity issues in deep wells. In the project site there are shallow

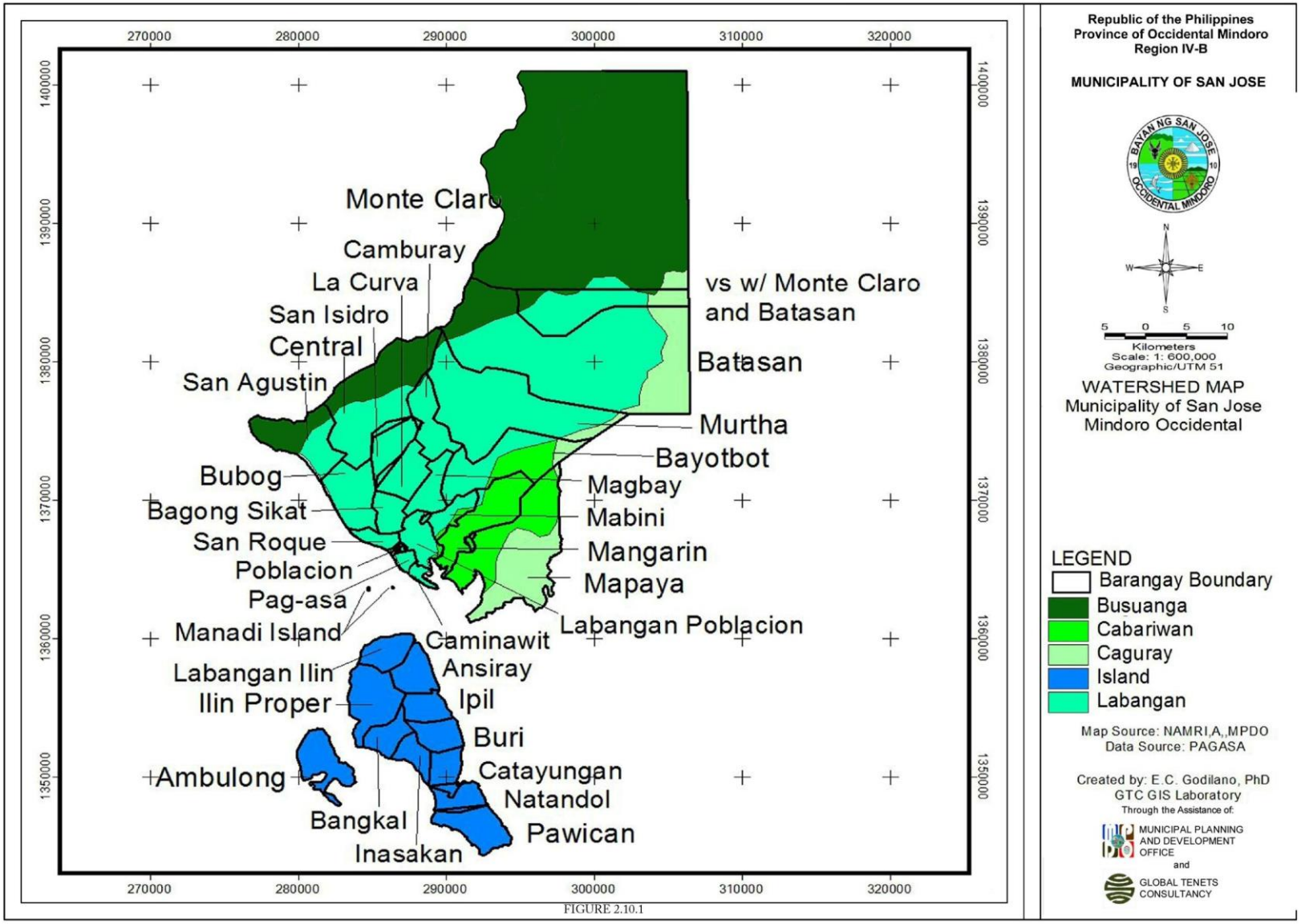


Figure 2.15. Watershed Map of San Jose, Occidental Mindoro

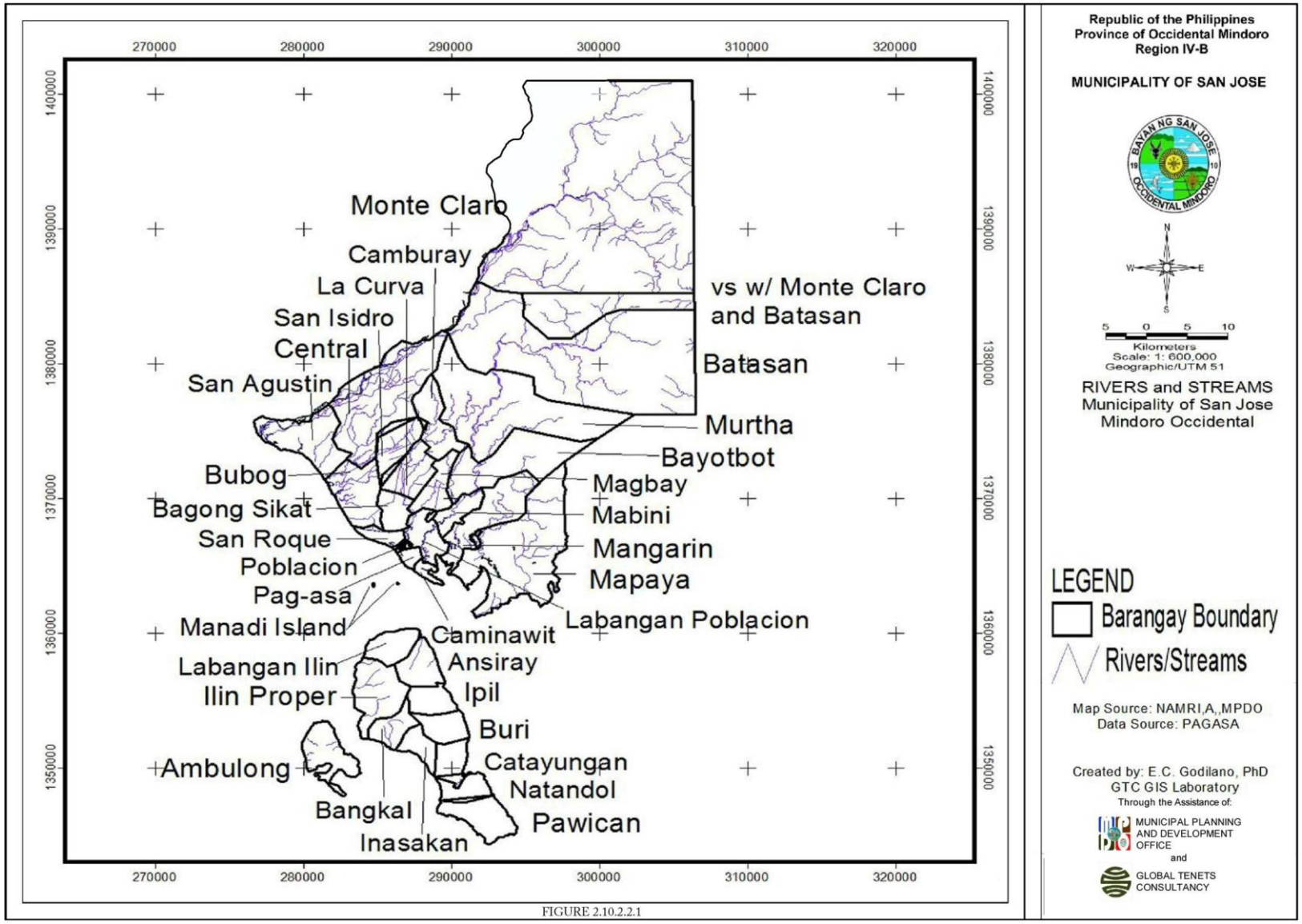


Figure 2.16. River and streams in San Jose, Occidental Mindoro

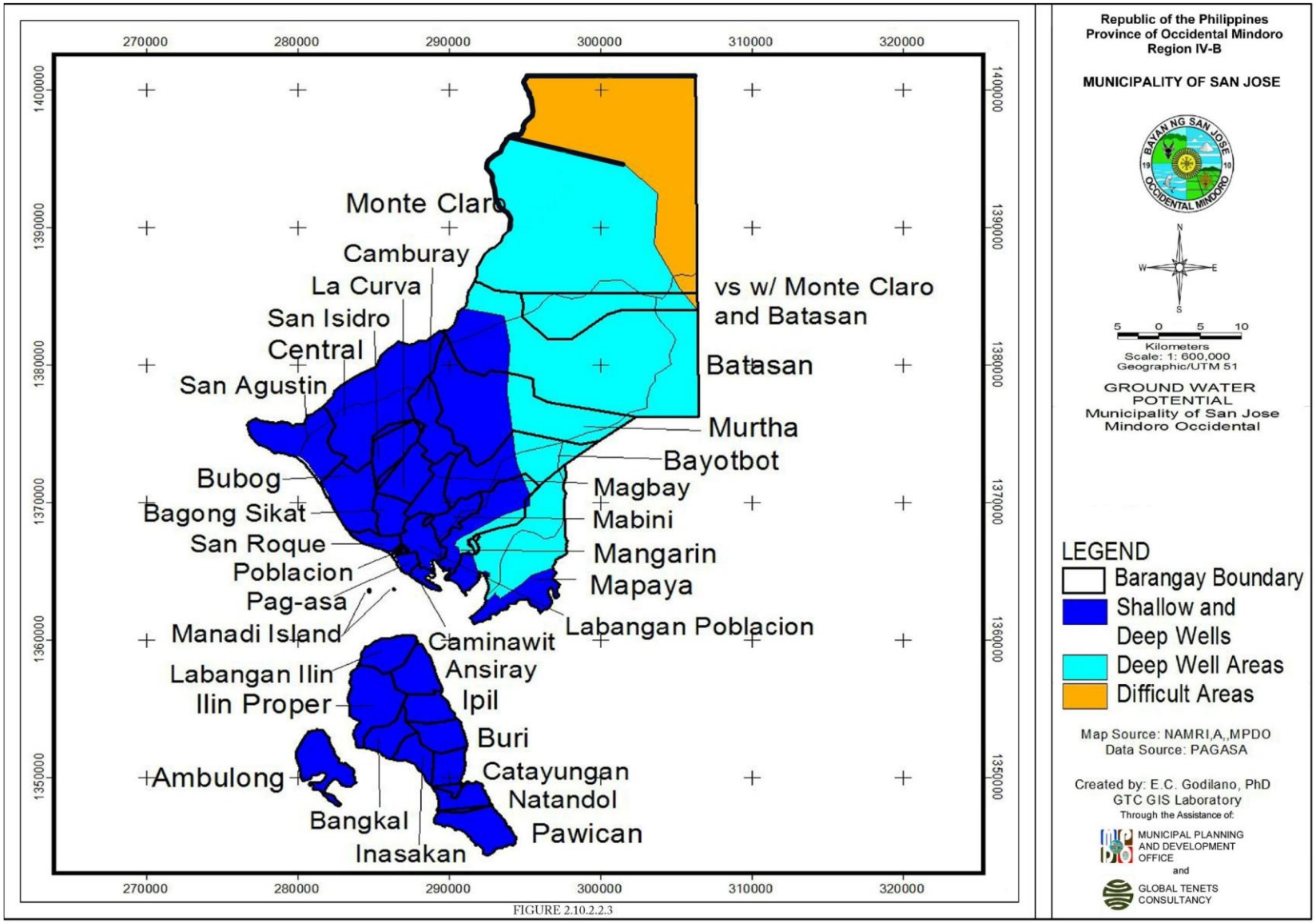


Figure 2.17. Groundwater potential of San Jose, Occidental Mindoro

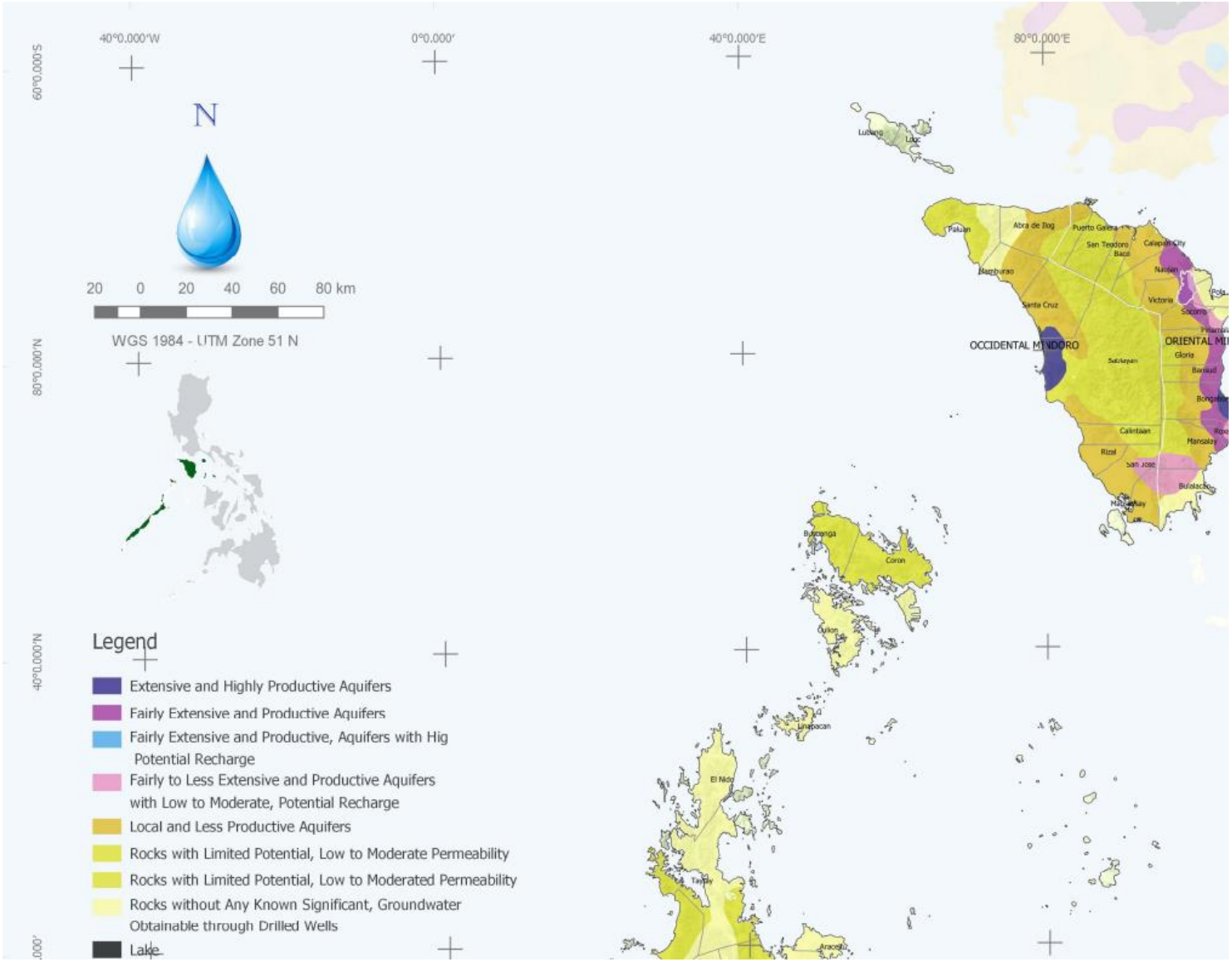


Figure 2.18. Groundwater availability of Mindoro (NEDA)

2.2.1.3. Impact Assessment

Table 2.8. Predicted impacts of/on hydrology/hydrogeology to/by the proposed amendment of OMCPC SMRA Diesel Power Plant Expansion

List of Key Impacts	Phase Occurrence				Discussion
	Pre-Construction	Construction	Operation	Abandonment	
Change in drainage morphology/ inducement of flooding/ reduction in stream volumetric flow					The nearest waterbody in the project site where the additional powerhouse will be constructed is the NIA irrigation canal. There is no perceived impact on the surface waterbody since the powerhouse will be constructed with prefabricated materials and footings excavation is minimal.
Change in stream depth					
Depletion of water resources/ competition in water use			☑	☑	OMCPC taps from the existing groundwater well of NPC in the OMECO compound. The water requirement of the company is minimal since the generator sets were equipped with each own cooling system. Water consumption of the company are mainly for domestic purposes and for make-up water for the cooling system thus water abstraction from groundwater well is not significant. Competition in water resource will be unlikely since OMCPC will not tap from the existing irrigation canal for both water requirements of the existing and proposed additional powerhouse.

2.2.2. Water Quality

2.2.2.1. Methodology

<u>Ambient Water Quality Monitoring Sampling Methodology</u>

The Water Quality Monitoring Manual (Volume 1), Manual on Ambient Water Quality of the Environmental Management Bureau was used in this study for the assessment of the water quality as well as its sampling and handling procedures. The methods for the analysis of the ambient water and effluent samples were based form the Standard Methods for the Examination of Water and Wastewater published by the American Public Health Association, American Water Works Association and the Water Environment Federation.

Grab sampling were conducted for the collection of the water samples in the study area. The samples were obtained by submerging the sampling containers against the flow/drift at a depth of 20cm. Sterilized sample containers such as the wide-mouthed glass for oil and grease, bac-T bottles for bacteriological parameters and two (2) 1-litre plastic containers for physico-chemical parameters were used for the gathering of the grab samples.

For the effluent water, sample is ideally collected at the discharge point of the wastewater treatment facility prior to its mixing the nearest receiving body of water (RBW). In the event that there is no discharge, photo-documentation is necessary to provide proof that there was no discharge at the time of sampling.

All the samples were cool-stored at about 4ºC, as necessary, and were sent to OSTREA Mineral Laboratory for analysis.

A portable digital Lutron YK-2001DO Dissolve Oxygen (DO) meter was used for determining the in-situ parameters such as the dissolve oxygen (DO) and Temperature.

Sampling Location

Three (3) ambient surface water quality monitoring stations were previously established in the study area for semi-annual monitoring purposes and one (1) wastewater effluent monitoring station (**Figure 2.19**) and these were re-visited and sampled for ambient water quality and effluent monitoring. **Table 2.9** presents the coordinates and details of the ambient surface water and effluent monitoring stations.

Table 2.9. OMCPC ambient water quality and effluent monitoring stations

Station ID	Coordinates	Description
OMCPC FWQ1	N12°26'28.42" E121°2'45.78"	The sampling site is located near the northwestern boundary of OMCPC near the front of the entrance gate. The monitoring station is situated in an irrigation canal which traverses in front of OMCPC power facility. It is the nearest surface waterbody to the facility. The station is prior to the confluence with the run-off water emanating from the facility.
OMCPC FWQ2	N12°26'27.69" E121°2'45.49"	The sampling site is also located near the northwestern boundary of OMCPC near the front of the entrance gate. The station is situated in the irrigation canal after the confluence with the run-off water emanating from the facility.
OMCPC FWQ3	N12°26'23.10" E121°2'47.64"	The sampling site is also located near the southwestern boundary of OMCPC near a small bridge connecting OMCPC to the OMECO compound. The station is situated in the irrigation canal 55 meter southwest of the south gate of OMCPC.
OMCPC EWQ1	N12°26'25.86" E121°2'47.56"	The discharge point of OMCPC for its oil and water separator located southwest, outside of the complex

Figure 2.19. OMCPC ambient surface water and effluent quality monitoring stations

Water Quality Monitoring Parameters

The water quality parameters for ambient surface water to be analyzed were listed in Table 2.10 to comply in the requirements stated in the discharge permit and the Environmental Monitoring Plan for the water quality monitoring.

Table 2.10. OMCPC Water Quality parameters for surface water and effluent water

Constituent	Parameter
Primary parameters	Color, pH, Total Suspended Solid (TSS), Dissolved Oxygen (DO), Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Thermotolerant fecal coliform, Nitrates (NO_3-N), Phosphates (PO_4-P) and Chloride (Cl)
Secondary parameters - inorganics	Ammonia (NH3-N)
Secondary parameters - metals	Hexavalent Chromium (Cr_{+6}), Arsenic (As), Cadmium (Cd), Lead (Pb), Copper (Cu) and Zinc (Zn)
Secondary parameters - organics	Oil & Grease, Surfactants (MBAS)

The DENR standards were used to compare the results obtained of the water quality sampling. The DENR Administrative Order 2016-08 (*Water Quality Guidelines and General Effluent Standards of 2016)* was used to characterize the ambient surface water physico-chemical and bacteriological characteristics.

2.2.2.2. Baseline Condition

The concentration of parameters for this monitoring event was compared to Class C since the receiving body of water is an irrigation canal for agricultural water supply.

Class C water classification's intended beneficial use is either of the following:

1. Fishery water for the propagation and growth of fish and other aquatic resources
2. Recreational Water Class II – for boating, fishing or similar activities; and
3. For agriculture, irrigation and livestock watering.

The succeeding table below shows the results of the samples analyzed collected for the OMCPC ambient water quality and effluent monitoring. The results of the analysis were compared to the Class C Standards of the DENR DAO 2016-08.

Ambient Freshwater Quality Monitoring

Primary Parameters

In the 2021 monitoring, FWQ1 to FWQ3 have pH value ranging from 7.7 to 7.8 while in the 2022 monitoring event pH value range from 6.96 to 7.45. This indicates that the waters in the sampling stations were all neutral and all are still within the DAO 2016-08 standard for pH for Class C water.

Temperature varies during sampling due to the difference in sampling time and season, any variation could not be attributed to the current operation of OMCPC.

The observed values for TSS the 2021 monitoring event range from 61 mg/L to 67 mg/L which is lower than DAO 2016-08 standard for pH for Class C water which is 80 mg/L. However, in the 2022 monitoring event, concentration ranges from 6 mg/L in FWQ1, 8 mg/L in FWQ2 while exceedance occurred at FWQ3 with a concentration of 170 mg/L. According to the sampling report, there was a continuous precipitation during the time of sampling that may have contributed to the exceedance. Effluent sample from the OMCPC wastewater treatment facility at the time of sampling is only 7mg/L.

BOD concentration of all the ambient fresh water samples taken at OMCPC monitoring stations in 2021 range from less than 1.0 to 1.0 mg/L. The new DAO 2016-08 BOD standard for Class C waters is 7. In their new discharge permit (Annex 2.1), BOD is no longer required thus there is no testing for BOD in 2022. COD concentration on the other hand ranges from 25 mg/L to 54 mg/L in 2021 and 30 mg/L to 71 mg/L in 2022. There is no standard for COD in the Class C waters.

Observed values for DO in 2021 were within prescribed values (minimum of 5 mg/L) ranging from a low of 8.2 mg/L to a high of 8.6 mg/L, an indication that the water is relatively aerated. DO was no longer tested in 2022.

Values obtained for total coliforms in the current monitoring event ranges from 35 x 10^2 MPN/100mL to 13 x 10^4 MPN/100mL. Considering that the sampling station is an irrigation canal proximal to residential areas with some portions used by farmers for wallowing of their carabaos for cooling, high concentration indicates that some of the residents may have been directing their run-off near the irrigation canal while carabaos may have been defecating while wallowing. Total coliform was no longer monitored in 2022.

The nitrate concentration for in 2021 ranges from 0.16 mg/L to 0.21 mg/L, when compared with the DAO 2016-08 standard for nitrate, the concentration is still way below the standard of 7 mg/L. Meanwhile, phosphate concentration ranges from 0.01 mg/L to 0.02 mg/L in 2021 and 0.12 mg/L to 0.23 mg/L in 2022; compared with the DENR standard, the concentrations were below the standard of 0.5 mg/L. The concentration of Chloride which ranges from 3.0 mg/L to 4.5 mg/L is very low when compared to the DENR standard of 350 mg/L. In the 2022 sampling, nitrate and chloride were no longer tested as the aforementioned parameters were no longer required for monitoring in their new discharge permit.

Secondary Parameters - Inorganics

Ammonia concentration ranges from 0.06 mg/L to 0.11 mg/L in 2021. Compared with the DAO 2016-08 for Class C water standard for ammonia which is 0.5 mg/L, the concentration is still within the standard. Ammonia was also no longer tested as it is no longer required for monitoring in their new discharge permit.

Secondary Parameters - Metals

Arsenic, cadmium, copper, zinc lead and hexavalent chromium were still less than their respective detection limits in all the surface water samples in 2021 and 2022 as prescribed in DAO 2016-08 for Class C waters. Although copper and zinc were also no longer tested as those are no longer required for monitoring in their new discharge permit.

Secondary Parameters - Organics

The 2021 concentration level of oil and grease in all surface water stations were way below the detection limit of the laboratory, the concentrations for all the monitoring stations are less than the 1.0 mg/L detection limit. In 2022, concentrations range from less than 1.4 to 2.9 but are still within the concentration limits for oil and grease.

Surfactant concentration was also below the detection limits set by laboratory in 2021 but the parameter was not tested in 2022 as it is no longer required in their new discharge permit.

Table 2.11. Result of the OMCPC ambient water quality baseline and monitoring, January 2021 and October 2022

Parameter	Analysis Method/Instrument	DENR Standard (Class C)	OMCPC FWQ1			OMCPC FWQ2			OMCPC FWQ3		
Date of Sampling			March 2015	Jan 08, 2021	Oct 20, 2022	March 2015	Jan 08, 2021	Oct 20, 2022	March 2015	Jan 08, 2021	Oct 20, 2022
Temperature, °C	*In-situ Sampling*	25-31	23.7	28.7	29	24.6	28.7	28	27.3	28.6	27
pH	Electrometric Method	6.5 – 9.0	7.6	7.8	7.08	7.7	7.7	6.96	7.3	7.8	7.45
BOD, mg/L	5 day BOD Test	7	16	<1	-	24	1	-	<1	1	-
COD, mg/L	Open Reflux Method	--	48	54	30	81	25	71	<5	46	36
DOa, mg/L	*In-situ Sampling*	5 (Minimum)	8.1	8.6	-	7.9	8.2	-	7.3	8.5	-
TSS, mg/L	Gravimetric	80	25	61	6	17	61	8	<1	67	170
Oil & Grease, mg/L	Liquid-liquid, Partition - Gravimetric	2	<1.0	<1.0	2.9	<1.0	<1.0	2.1	<1.0	<1.0	<1.4
Surfactants (MBAS)	Anionic Surfactants as MBAS	1.5	-	<0.10	-	-	<0.10	-	-	<0.10	-
Cr_{+6}, mg/L	Colorimetric	0.01	<0.01	<0.01	<0.004	<0.01	<0.002	<0.004	<0.01	<0.002	<0.004
Phosphate	Stannous Chloride Method	0.5	0.46	0.02	0.23	0.03	0.01	0.12	0.02	0.01	0.13
Ammonia	Ammonia – Selective Electrode	0.5	-	0.11	-	-	0.09	-	-	0.06	-
Nitrate – NO3-N	Colorimetry – Brucine	7	-	0.16	-	-	0.17	-	-	0.21	-
Chloride	Argentometric	350	-	3.0	0	-	4.5	0	-	3.4	0
As, mg/L	Manual Hydride Generation - AAS	0.02	<0.001	<0.0007	<0.0015	<0.001	<0.0007	<0.0015	<0.001	<0.0007	<0.0015
Cd, mg/L	Direct Acetylene Flame	0.005	<0.002	<0.003	<0.0005	<0.002	<0.003	<0.0005	<0.002	<0.003	<0.0005
Cu, mg/L	Direct Acetylene Flame	0.02	-	<0.005	-	-	<0.005	-	-	<0.005	-

Parameter	Analysis Method/Instrument	DENR Standard (Class C)	OMCPC FWQ1			OMCPC FWQ2			OMCPC FWQ3		
Pb, mg/L	Direct Acetylene Flame	0.05	<0.005	<0.01	<0.001	<0.005	<0.01	<0.001	<0.005	<0.01	<0.001
Zn, mg/L	Direct Acetylene Flame	-	-	28.7	-	-	28.7	-	-	28.6	-
Thermotolerant Fecal Coliform	Multiple Tube Fermentation	-	24000	7.8	-	3500	7.7	-	33	7.8	-
Time of Sampling					0952H		1014H			1035H	

Notes:
1. March 2015 is the baseline sampling
2. January 2021 is the water monitoring conducted in 2021 (only 1 sampling event was conducted)
3. October 2022 is the water monitoring conducted in 2022 (only 1 sampling event was conducted)
4. – means no standard or no sample for the particular parameter was done during the monitoring event

Table 2.12. Result of the OMCPC effluent monitoring 2021 and 2022

Parameter	Analysis Method/Instrument	DENR Standard (Class C)	OMCPC EWQ1	
Date of Sampling				
Temperature, °C	*In-situ Sampling*	3deg change	No Discharge	31
pH	Electrometric Method	6.0 – 9.5		7.45
BOD, mg/L	5 day BOD Test	50		-
COD, mg/L	Open Reflux Method	100		19
DOa, mg/L	*In-situ Sampling*	-		-
TSS, mg/L	Gravimetric	100		7
Oil & Grease, mg/L	Liquid-liquid, Partition - Gravimetric	5		1.4
Surfactants (MBAS)	Anionic Surfactants as MBAS	15		-
Cr_{+6}, mg/L	Colorimetric	0.02		<0.004

Parameter	Analysis Method/Instrument	DENR Standard (Class C)	OMCPC EWQ1	
Phosphate	Stannous Chloride Method	1	No Discharge	0.13
Ammonia	Ammonia – Selective Electrode	0.5		-
Nitrate – NO3-N	Colorimetry – Brucine	14		-
Chloride	Argentometric	450		0
As, mg/L	Manual Hydride Generation - AAS	0.04		<0.0015
Cd, mg/L	Direct Acetylene Flame	0.01		<0.0005
Cu, mg/L	Direct Acetylene Flame	0.04		-
Pb, mg/L	Direct Acetylene Flame	0.02		<0.001
Zn, mg/L	Direct Acetylene Flame	4		-
Total Coliform	Multiple Tube Fermentation	10,000		-
Time of Sampling				

Effluent Quality Monitoring

During the 2021 monitoring event, the wastewater containment facility from the oil and water separator has no discharge. Plate 2.1 and 2.2 shows the photographs of the compartments having low water level with the final discharge compartment empty of water.

Plate 2.1. Actual inspection of the oil and water separator final compartments. Also shown in the photo is the 1st and 2nd compartment.

Plate 2.2. Initial compartment which receives wastewater from the main oil and water separator. Also shown in the photo is the final discharge with no discharge at the time of sampling.

During the 2022 monitoring event, such as pH, temperature COD, TSS, oil & grease, phosphate and chloride were all way below the DENR Class C effluent standard.

Arsenic, cadmium, lead and hexavalent chromium were all less than their respective detection limits after the wastewater was tested and analyzed.

Parameters BOD, surfactant, ammonia, nitrate, copper, zinc and total coliform were no longer tested since the aforementioned parameters were no longer included as parameters to be monitored in the discharge permit.

2.2.2.3. Impact Assessment

Table 2.13. Predicted impacts of/on water quality to/by the proposed amendment of OMCPC SMRA Diesel Power Plant Expansion

List of Key Impacts	Phase Occurrence				Discussion
	Pre-Construction	Construction	Operation	Abandonment	
Degradation of groundwater quality Degradation of surface water quality		☑	☑	☑	Oil spills during construction and operation may potentially contaminate the groundwater table. Proper handling and storage of diesel, fuel oil and lubricants in covered areas with impermeable flooring and installation of proper bund walls will reduce risk from this environmental aspect. Highly probable impact from project activities is siltation/sedimentation of the irrigation canal within and near the project site during the construction phase due to earth-moving activities. Sediment accumulation or deposition may potentially drain to the canal. This would be likely especially during events of continuous heavy rains. Sedimentation ponds and silt traps, with proper maintenance and regular monitoring, may be deemed as reasonably adequate mitigation and control measure to manage the siltation and sedimentation impact. Establishment of additional silt traps or sedimentation ponds may be necessary if TSS and turbidity values will continue to be observed at elevated levels. Oil-contaminated wastewater may be generated by the power plant during its operation and could be carried by runoff or discharged to the irrigation system, hence degrading the quality of the irrigation water. Installation of a drainage system that will capture the oil-contaminated water and direct it to a wastewater treatment system with an efficient oil/water separator will render the water discharge compliant to the prescribed water quality parameters prior to discharge. Avoidance of spills, cleaning of spills with absorbents, proper housekeeping and use of dry method of cleaning (less water) will lessen the oil-contaminated wastewater. Oil spills during construction and operation may potentially contaminate the irrigation canal. Proper storage of fuel oil and lubricants in covered areas with impermeable flooring and observance of bunding standards will reduce risk from this environmental aspect.

2.3. The Air

2.3.1. Meteorology/Climatology

2.3.1.1. Methodology

Climatological data were obtained from PAGASA data. The closest PAGASA Station relative to the OMCPC project site is the San Jose Synoptic Station in San Jose, Occidental Mindoro. This station is located approximately 9 km south of the existing power plant and has available record since 1981. Climatologic indicators for the area include mean temperature, rainfall, relative humidity, wind speed

and direction. Other relevant information gathered from PAGASA is the climate and typhoon frequency maps and the 2020 and 2050 climate projection (Climate Change in the Philippines, 2011).

2.3.1.2. Baseline Condition

Climate

The Municipality of San Jose in Occidental Mindoro falls under Type I climatic condition based on the Modified Coronas Classification Scheme (Figure 2.20) characterized as two (2) pronounced seasons. San Jose and most of Occidental Mindoro has two distinct weather types: rainy season and dry season. Rains begin to fall in the province in late May, intensifying through June, July, August, September and October, and gradually subside in November. The months of August and September are the wettest periods, with storms directly passing through the area.

On the other hand, dry season starts in November, with rainfall subsiding in intensity, and altogether ceasing in January, February, March, and April. March and April are the driest period, with cloudless skies and parched earth characterizing the general area.

Rainfall

Records on climatological normals from 1981 to 2020 showed that the municipality experience, on average, 117 rainy days a year and a total rainfall of 2,388.7 millimeters. July and August both have the greatest number of rainy days at 20, while February and March had the least with two (2) days for each month. Rainfall was unevenly distributed throughout those years, ranging from 11.8 mm during the months of January and February to 507.3 mm in July. Compared with the previous record in the area from 1981 to 2010 to the current, rainy days decreased from 130 to 117 while total annual rainfall increased from 2,350 mm to 2,388.7. Climatological extremes record as of 2021 still shows that San Jose experienced its heaviest day of rain on October 21, 1998 at 286.7 mm.

Temperature

Yearly mean temperature record in the San Jose Synoptic station was 28.1°C, which has increase by 0.1°C when compared a decade ago. The coldest temperature was in January at 21.9°C while the hottest was during the month of April at 34.9°C. San Jose experienced its hottest day on June 03, 2019 with a temperature of 39.2°C, a new record that eclipsed the former hottest day at 38.5°C last April 28, 1992 (1981-2010), while its coldest day was still the record obtained last February 15, 1982 at 15.4°C.

Wind Pattern

The annual average wind speed in San Jose is 3 meters per second (m/s), characterized by the prevailing easterly winds. From November to May, the wind speed is generally 3 m/s when the *Amihan* trade wind prevails. From June to September, wind direction is generally west with speeds of 2-3 m/s. Transition occurs during October with the wind direction transitioning northeast with speeds of 2 m/s. Strongest wind recorded in San Jose, Occidental Mindoro occurred last December 25, 2019 at a staggering speed of 42 m/s, when Typhoon Ursula (Phanfone) traversed the Philippines during the Christmas Eve and Christmas Day.

Relative Humidity, %

Annual average relative humidity at San Jose is at 80%, 2% higher when compared to a decade ago. Most humid months were August and September with humidity reaching up to 89% while least humid was the month of March at 71% (3% higher when compared to 1981-2010 record). These values are typical for a tropical country like the Philippines.

Figure 2.20. Climate map of the Philippines

Cloud, octa

The mean annual cloud amount at San Jose is 5 okta. The cloudiest month was June to September at 6 okta while the least was during March to April at 3 okta.

Mean Sea Level Pressure, mbs

Mean sea level pressure (MSLP) is also an important input to the assessment of the climate in the area. The passage of the tropical cyclones causes the sea level pressure to drop owing to its cyclonic and divergence of wind. A low-pressure area generally indicates the presence of a cyclonic weather disturbance in the northern hemisphere while a high-pressure value indicates a divergence of wind or a fair-weather condition.

Annual mean sea level pressure is 1,009.3 millibars, ranging from the lowest monthly average of 1008.1 mbar in July and August and highest in February at 1011.3 mbar. MSLP has increased when compared to the 1981-2010 record in San Jose.

Lightning and Thunderstorms

Annual average number of days with thunderstorm was recorded at 97 (8 days higher compared to the previous record a decade ago) while number of days with lightning was at 132 days (5 days higher compared to the previous record a decade ago). The town experienced the greatest number of days with thunderstorm and lightning in June with 15 days and 20 days, respectively.

Tropical Cyclones

The Philippines experienced an average of 20 cyclones annually. Occidental Mindoro experiences one (1) cyclone in a year. The occurrence of tropical cyclones in the Philippines is shown in **Figure 2.21**.

2.3.1.3. Impact Assessment

Table 2.14. Predicted impacts of/on meteorology to/by the proposed amendment of OMCPC SMRA Diesel Power Plant Expansion

List of Key Impacts	Phase Occurrence				Discussion
	Pre-Construction	Construction	Operation	Abandonment	
Change in the local micro-climate		☑	☑		To assess the change in local micro-climate within OMCPC project area, the PAGASA published climate projections report[1] derived from models from updated future climate scenarios were used. Two scenarios were included in the projections: moderate emission scenario and high emission scenario. The data on climate change projections study for 2020 and 2050 (PAGASA, 2011) are presented in **Table 2.14** to **Table 2.15**. The study shows that mean temperature rises by 2020 would be 1.1°C and for 2050 it would be 2.1°C, both compared to baseline of 28.3°C.

1 PAGASA, 2018. "Observed Climate Trends and Projected Climate Change in the Philippines".

List of Key Impacts	Phase Occurrence				Discussion
	Pre-Construction	Construction	Operation	Abandonment	
					The existing power plant and the proposed additional powerhouse will have no significant impact on the local climate as the amount of emission from the existing power plant even at full operation would be insignificant compared to the current national greenhouse gas inventory.
Contribution in term of greenhouse gas emissions		☑	☑		Greenhouse gases will be generated from the operation of gensets and service vehicles that will eventually emit CO_2 and methane. The GHG emission estimate for the project's operation utilized the CO_2 emission calculation tool formulated by Greenhouse Gas Protocol. The GHG estimation of the power plant is limited to Scope 1 category (All direct emissions) of Greenhouse Gas Protocol. Fuel consumption of the existing power plant and the proposed additional powerhouse was computed using the fuel consumption data for the existing power plant and the project fuel consumption provided by OMCPC. Using the emission calculation, it is estimated that the potential CO_2-e of the project per month is 7,187.5 metric tonnes or 86,250.00 metric tonnes per year.

Table 2.15. Seasonal temperature change for 2020 and 2050 in Occidental Mindoro

Months	(1971-2000)	2020 (2006-2035)		2050 (2036-2065)	
		Change	Projected Value	Change	Projected Value
December-January-February (DJF)	26.5	0.9	27.4	1.9	28.4
March-April-May (MAM)	28.3	1.1	29.4	2.1	30.4
June-July-August (JJA)	27.3	0.9	28.2	1.8	29.1
September-October-November (SON)	27.1	1.0	28.1	1.9	29.0

Table 2.16. Seasonal rainfall change for 2020 and 2050 in Occidental Mindoro

Months	(1971-2000)	2020 (2006-2035)		2050 (2036-2065)	
		Change	Projected Value	Change	Projected Value
December-January-February (DJF)	159.5	-14.3	136.7	15.8	184.7
March-April-May (MAM)	265.9	-15.6	224.4	-23.8	202.6
June-July-August (JJA)	1091.2	13.6	1239.6	26.7	1382.6
September-October-November (SON)	762.6	3.2	787.0	-2.4	744.3

Table 2.17. Seasonal extreme events for 2020 and 2050 in San Jose, Occidental Mindoro

Parameters	OBS	2020	2050
No. of days with Temp. max >35°C	1075	1773	3410
No. of Dry Days	5437	7010	7128
No. of days with Rainfall >300 mm	8	5	14

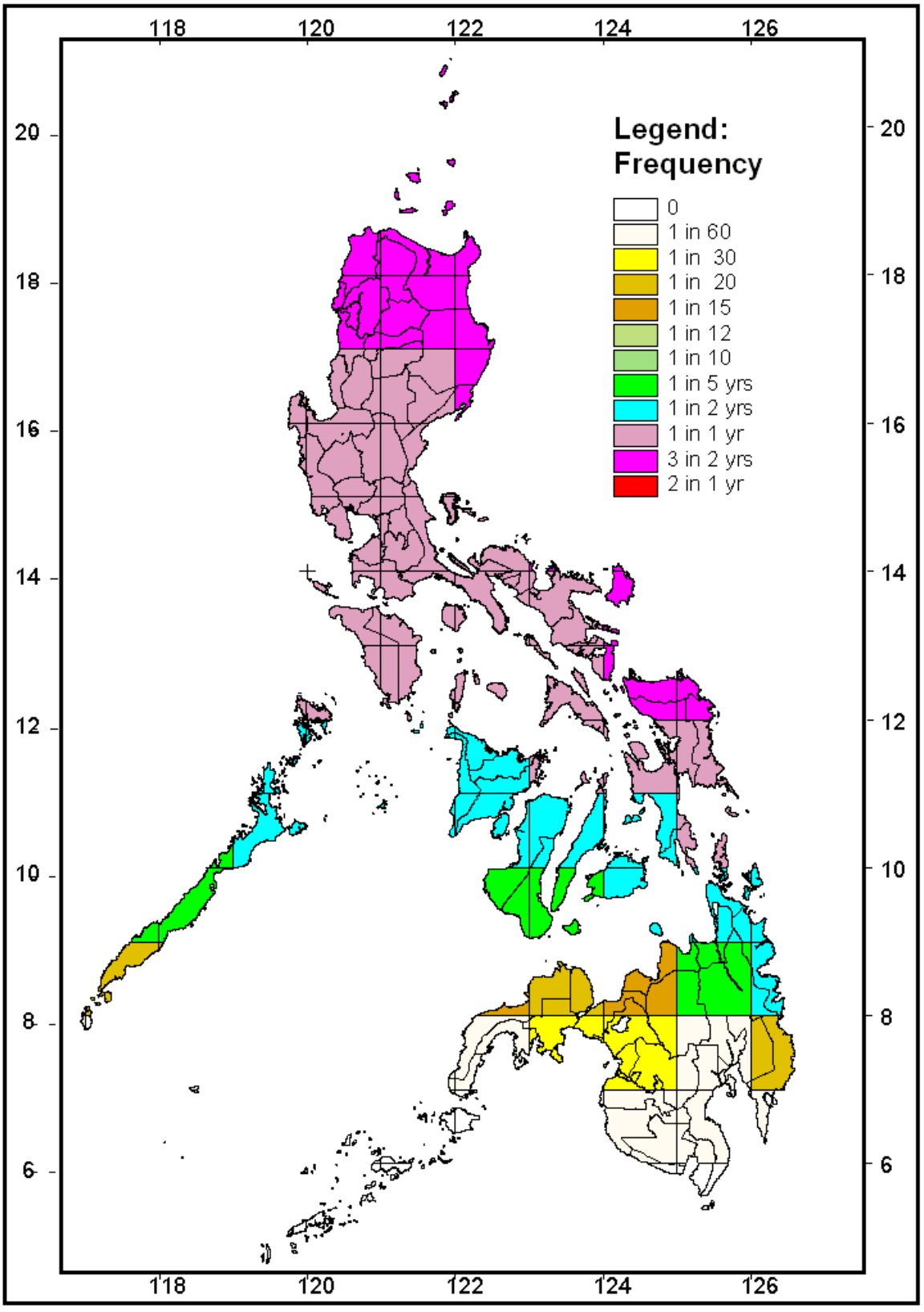


Figure 2.21. Cyclone map of the Philippines

2.3.2. Air Quality and Noise

2.3.2.1. Methodology

Ambient Air Quality Monitoring

OMCPC has been conducting ambient monitoring at four (4) locations through a third-party environmental service provider or third-party sampling team (Table 2.18 and Figure 2.22). The third-party monitoring team has been sampling particulates and gaseous air pollutants.

Table 2.18. Locations and coordinates of the ambient air quality monitoring stations

Sta ID	Location	Latitude (DMS)	Longitude (DMS)
STN 01	La Tierra Resort, Sitio Pulang Lupa	12°15'50.151"	121°2'50.946"
STN 02	Rice mill	12°26'20.711"	121°2'31.887"
STN 03	Brgy. Central basketball court	12°27'19.557"	121°2'44.290"
STN 04	Sitio Casuy (back of OMCPC)	12°26'32.707"	121°2'55.326"

Notes: (1) DMS – Degrees-Minutes-Seconds, (2) Coordinates are based from the report of MJL Environmental Services, Inc. (2022), (3) Station ID are based from the Self-Monitoring Reports (SMR)

Particulate pollutants are total suspended particulates (TSP), particulate matter equal to or less than 10 µm (PM_{10}), while gaseous air pollutants are sulfur dioxide (SO_2) and nitrogen dioxide (NO_2).

Based on the records provided by the OMCPC, the third-party monitoring team has conducted ambient air sampling once or twice a year at the said four (4) sampling stations and air pollutants since December 2019. Since August 2021, OMCPC and its contractor have been monitoring ambient PM_{10} instead of TSP.

Air Dispersion Modelling

Scope

The scope of air quality focused on determining the performance of the existing project in terms of compliance with emission and ambient air quality standards and on determining compliance of the existing and proposed project with the National Ambient Air Quality Guideline (NAAQG) through air dispersion modelling.

Regulatory Setting

The applicable air quality guidelines and standards for the project are as follows:

- National Emission Standards for Source Specific Air Pollutants (NESSAP) (Table 2 of DENR AO 2000-81);
- National Ambient Air Quality Standards (NAAQS) (; and
- National Ambient Air Quality Guidelines (NAAQG).

The NESSAP applies to the air pollutants in the stack prior to release to the atmosphere
The NAAQS set the limits of dispersed air pollutants downwind from an emission source. The NAAQS are enforceable and must be complied by the owner or person in-charge of an industrial operation, process or trade (DAO 2000-81)

Section 3 (Increment Consumption), Rule X (New/Modified Sources in Attainment Areas) of DAO 2000-81 (Plate 2.1) requires that dispersed emissions of proposed projects shall not exceed the NAAQG values or an increase in the increment consumption based on computer dispersion modeling.

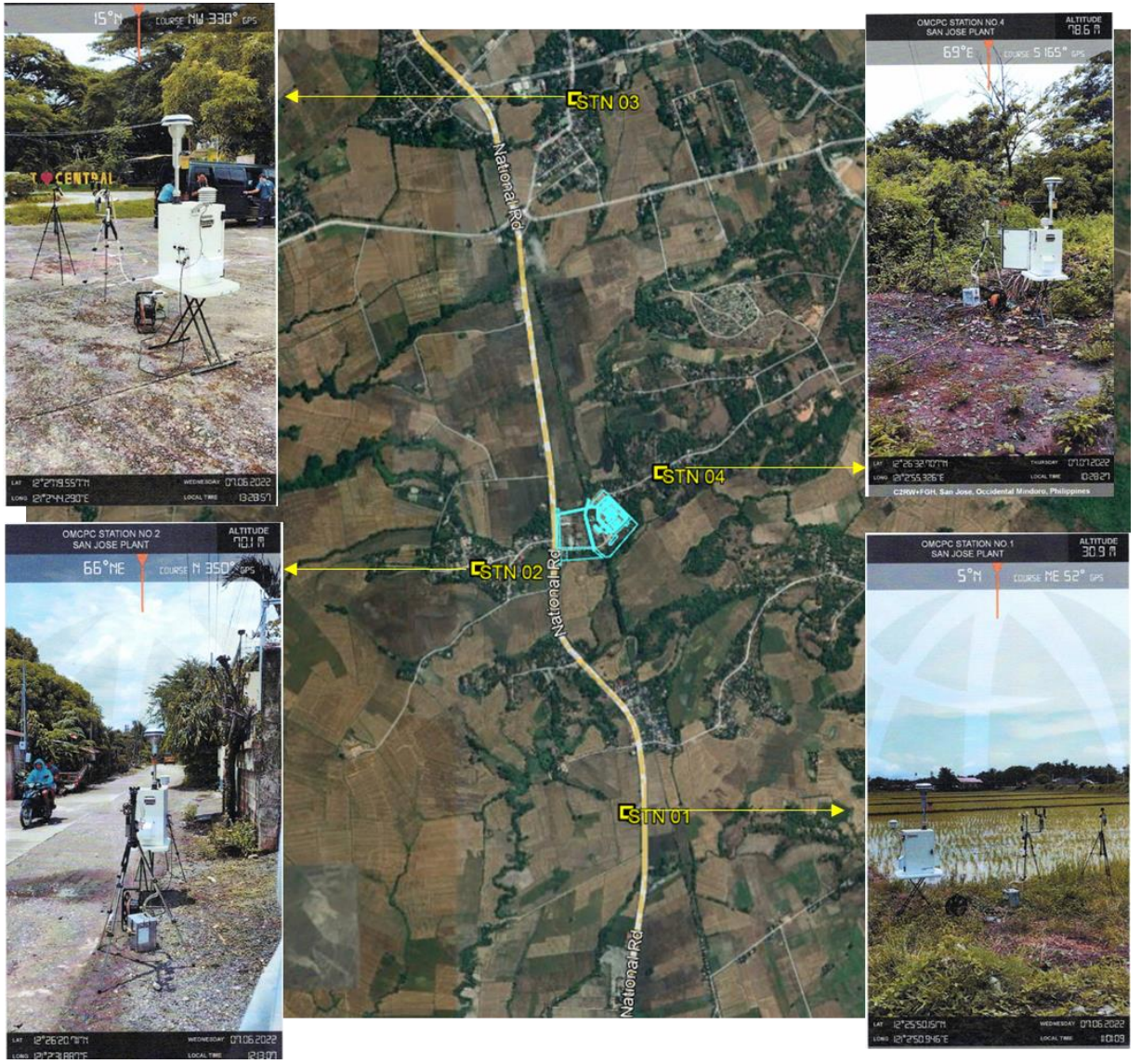


Figure 2.22. Locations of the air sampling stations and photographs of the air samplers (Source: MJL, 2022)

Section 3. Increment Consumption

No new source may be constructed or existing source modified if emissions from the proposed source or modification will, based on computer dispersion modeling, result in:

Exceedance of the National Ambient Air Quality Guideline Values; or
An increase in existing ambient air levels above the levels shown below

PM-10, annual arithmetic mean	17 micrograms per cubic meter
PM-10, 24-hr maximum	30 micrograms per cubic meter
Sulfur Dioxide, annual arithmetic mean	20 micrograms per cubic meter
Sulfur Dioxide, 24-hr maximum	91 micrograms per cubic meter
Nitrogen Dioxide, annual arithmetic mean	25 micrograms per cubic meter

In the case of multiple point sources at a single facility, the net emissions from all affected sources shall be included in a single increment analysis.

Plate 2.3. Section 3, Rule X of DAO 2000-81

This study focused on determining compliance of the project with the National Ambient Air Quality Guidelines (NAAQG) values by modelling the 24-hour and annual average concentrations of the primary air pollutants (SO_2, NO_2, TSP, and CO).

Furthermore, dispersion modelling included the hourly average concentrations of the above-mentioned air pollutants, which will be used as bases on determining the air quality monitoring stations for the project.

Guidelines on Air Dispersion Modelling

Proponents or project owners shall use the prescribed regulatory models of the DENR EMB to check compliance with their proposed projects (new or existing projects with modifications). The specified regulatory models are SCREEN3, AUSPLUME, AERMOD, and CALPUFF. SCREEN3 and AUSPLUME air dispersion models are for Tier 1 and Tier 2 or Tier 3 impact assessments, while AERMOD and CALPUFF are for Tier 4 impact assessments.

Proponents may use the more refined modelling techniques (Tier 3 or Tier 4) directly and skip the Tier 1 and Tier 2 screening methods.

This study utilized the latest version of AERMOD View (Version 11.2.0) in determining the predicted dispersed concentrations of air pollutants emanating from the existing and proposed generator sets. The American Meteorological Society (AMS) and the United States Environmental Protection Agency (U.S.EPA) developed the AERMOD model. Consequently, Lakes Environmental Software, Inc. (Lakes) in Ontario, Canada, developed the Graphical User Interface (GUI) of AERMOD, which Lakes named AERMOD View. (Plate 2.2).

According to the DENR-EMB's Guidelines on Air Dispersion Modelling, proponents should use AERMOD and CALPUFF in Tier 4 air quality impact assessment (DENR MC 2008).

Source Input Parameters

OMCPC has three (3) existing generator sets (gensets) with a rated capacity of 8 MW each (Table 2.19). The gensets used a mix of heavy fuel oil and diesel oil as fuel. Each genset has a stack with a height of 40.207 m from the ground.

OMCPC provided the site plan in .pdf format, which the preparer processed using AutoCAD and GIS software to generate the required file, e.g., shapefile in WGS84 UTM Zone 51, needed in AERMOD View. The source release parameters, such as the emission rates of sulfur oxide (SO_X as SO_2), nitrogen oxide (NO_X as NO_2), particulates, carbon monoxide (CO), exit gas temperature, and exit gas velocities, were from the emission test reports of DENR-accredited third-party stack samplers from December 2017 to July 2022. **Appendix A** presents the summary of the source input parameters, as extracted from the stack sampling monitoring reports.

For the proposed six (6) units of generator sets, the source release parameters were from existing gensets with the same rated capacities (1.6 MW and 1.1 MW) from the Mamburao Diesel Power Plant, except the proposed 1.2 MW, which was from technical specifications of Caterpillar CAT 3512 (**Table 2.20**). **Figure 2.23** and **Figure 2.24** show the locations of the existing and proposed stacks.

Building Profile Inputs

When wind flows over and around buildings, it creates wake zones - a potential cause of building downwash, as shown in **Figure 2.25**. Dispersed air pollutants from relatively lower stacks will be pulled or drawn by the wake zones, resulting in very high ground-level concentrations in the vicinities of the buildings.

Figure 2.26 and **Figure 2.27** show the elevation drawings of the existing and the proposed powerhouses, which were included in the building input profile program to generate the building input data in AERMOD. **Appendix C** shows the output data of the Building Profile Input Program (BPIP).

Modelling Domain or Calculation Area and Receptors

Receptors are locations or points in the modelling domain or calculation area. The model computes the concentrations of dispersed air pollutants from emission sources or stacks at each receptor. In this study, there are three (3) sets of receptors, as follows:

1. Multi-tier grid (**Figure 2.28**),
2. Cartesian plant boundary (**Figure 2.29**), and
3. Cartesian plant boundary intermediate (**Figure 2.29**).

The modelling domain has a dimension of 12 km by 12 km, which is also the extent of the multi-tier grid. Fine grids are assigned near the emission sources or the stacks, while coarse grids at 1 km to 6 km from the centroid of the stacks. The muti-tier grid has the following grid spacings.

a) 20-m grid spacing from the centroid of the stack to 1000 m (or 1 km) along the N-S and E-W directions
b) 100-m grid spacing from 1000 m (1 km) to 3000 m (3 km) of the stack to 1000 m (or 1 km) along the N-S and E-W directions; and
c) 200-m grid spacing from 3000 m to 6000 m of the centration of the stacks along the N-S and E-W directions

Receptor inputs in AERMOD dispersion modelling require the following information.

a) UTM (or x and y) coordinates (in m);
b) Elevation of each receptor (in m);
c) Hill height (Hz) (in m); and
d) Flagpole height or receptor height from ground level (optional).

Table 2.19. Source input parameters of the existing generator sets (gensets)

Source ID	Genset 1	Genset 2	Genset 3	Data Source
Brand	Caterpillar 16CM32	Caterpillar 16CM32	Caterpillar 16CM32	
Rated Capacity	8 MW	8 MW	8 MW	
Fuel	Heavy Fuel Oil/ Diesel Fuel	Heavy Fuel Oil/ Diesel Fuel	Heavy Fuel Oil/ Diesel Fuel	
Orientation of stack	Vertical	Vertical	Vertical	
X-coordinate (m) (WGS84 UTM Zone 51)	287,719.70	287,717.84	287,719.79	Extracted in AERMOD View using the imported site plan (**Figure 2.23** and **Figure 2.24)**
Y-coordinate (m) (WGS84 UTM Zone 51)	1,376,080.58	1,376,078.75	1,376,076.75	Extracted in AERMOD View using the imported site plan (**Figure 2.23** and **Figure 2.24)**
Base elevation (m)	24.98	24.98	24.98	Averaged elevations using SRTM data, as extracted by AERMAP View
Release height (m)	40.207	40.207	40.207	Elevation drawing (**Figure 2.25**)
Source Release Parameters				
Emission rate of SO_X (as SO_2) (g/s)	21.262	25.160	25.563	Emission test reports by DENR-accredited stack samplers
Emission rate of NO_X (as NO_2) (g/s)	11.254	17.661	15.500	Emission test reports by DENR-accredited stack samplers
Emission rate of PM (g/s)	2.214	1.625	1.671	Emission test reports by DENR-accredited stack samplers
Emission rate of CO(g/s)	5.098	5.379	5.017	Emission test reports by DENR-accredited stack samplers
Exit gas temperature (^oC)	289.1	303.5	307.5	Emission test reports by DENR-accredited stack samplers
Stack inside diameter (m)	1.09	1.09	1.09	Emission test reports by DENR-accredited stack samplers
Exit gas velocity (m/s)	28.11	28.74	28.13	Emission test reports by DENR-accredited stack samplers
Rain caps	None	None	None	

Notes: a) Emission test reports by DENR-accredited stack samplers from December 2017 to July 2022, b) Emission rates are 98th percentile values, c) Exit gas temperature, and exit gas velocity are averaged values

Table 2.20. Source input parameters of the proposed generator sets (gensets)

Source ID	Genset 1	Genset 2	Genset 3	Genset 4	Genset 5	Genset 6	Data Source
Brand	Caterpillar 3516B	Caterpillar 3516B	Caterpillar 3516B	Caterpillar 3512B	Caterpillar 3512B	Caterpillar 3516B	
Rated Capacity	1.6 MW	1.6 MW	1.6 MW	1.2 MW	1.2 MW	1.1 MW	
Fuel	Diesel fuel	Diesel fuel	Diesel fuel	Diesel fuel	Diesel fuel	Diesel fuel	
Orientation of stack	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	
X-coordinate (m) (WGS84 UTM Zone 51)	287,651.22	287,648.89	287,646.42	287,639.35	287,637.01	287,634.62	Extracted in AERMOD View using the imported site plan
Y-coordinate (m) (WGS84 UTM Zone 51)	1,376,021.67	1,376,023.97	1,376,026.50	1,376,033.72	1,376,036.11	1,376,038.53	Extracted in AERMOD View using the imported site plan
Base elevation (m)	23.5	23.5	23.5	23.5	23.5	23.5	Averaged elevations using SRTM data, as extracted by AERMAP View
Release height (m)	5.319 (initial height)	5.319 (initial height)	5.319 (initial height)	5.319 (initial height)	5.319 (initial height)	5.319 (initial height)	Elevation drawing (**Figure 8**)
Source Release Parameters							
Emission rate of SO_X (as SO_2) (g/s)	0.0127	0.0127	0.0127	0.1068	0.1068	0.0979	Based on emission test reports of existing gensets of Mamburao Diesel Power Plant, except the proposed 1.2 MW which was based from technical specifications CAT 3512
Emission rate of NO_X (as NO_2) (g/s)	4.0344	4.0344	4.0344	3.7803	3.7803	3.4653	-do-
Emission rate of PM (g/s)	0.0714	0.0714	0.0714	0.0946	0.0946	0.0714	-do-
Emission rate of CO(g/s)	0.2977	0.2977	0.2977	0.4431	0.4431	0.4061	-do-
Exit gas temperature (°C)	444.00	444.00	444.00	457.80	457.80	418.17	-do
Stack inside diameter (m)	0.45	0.45	0.45	0.45	0.45	0.45	Provided by OMCPC
Exit gas velocity (m/s)	43.28	43.28	43.28	33.10	33.10	30.19	Same source as emission rate data

Notes: a) Emission rates are 98th percentile values, b) exit gas temperature, and exit gas velocity are averaged values

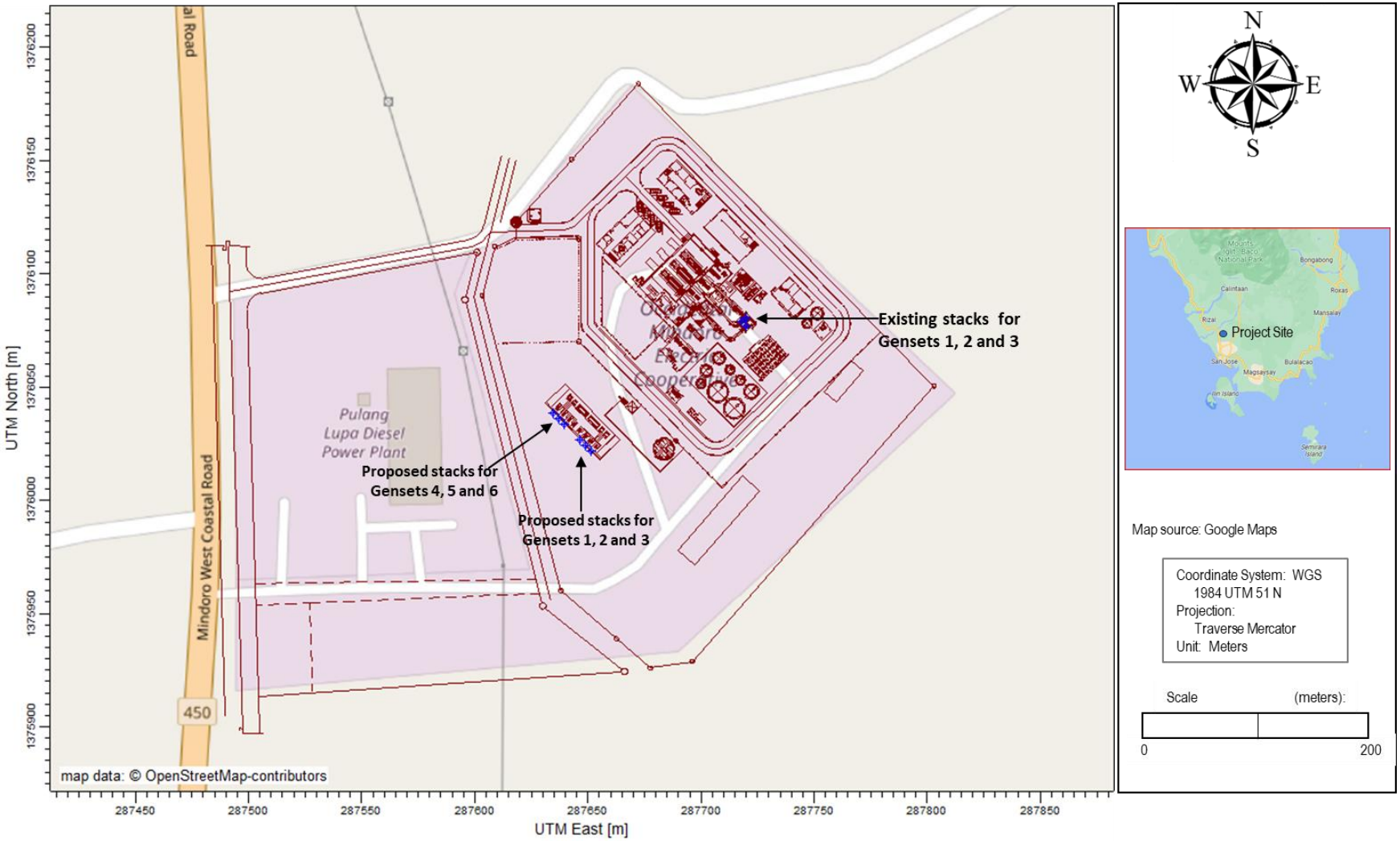


Figure 2.23. Locations of existing and proposed stacks of the diesel generator sets

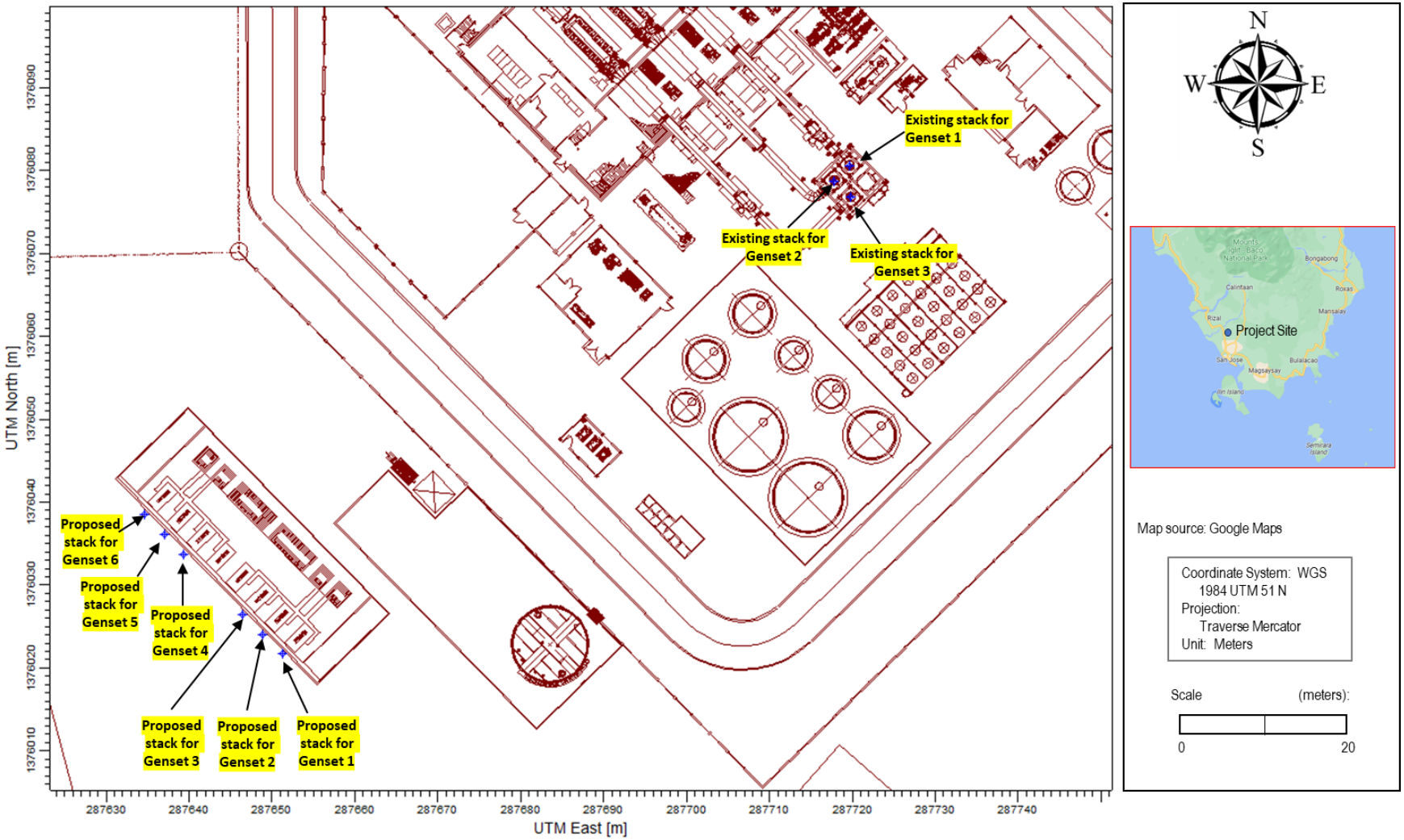


Figure 2.24. Closer view of the locations of the stacks for the existing and proposed gensets

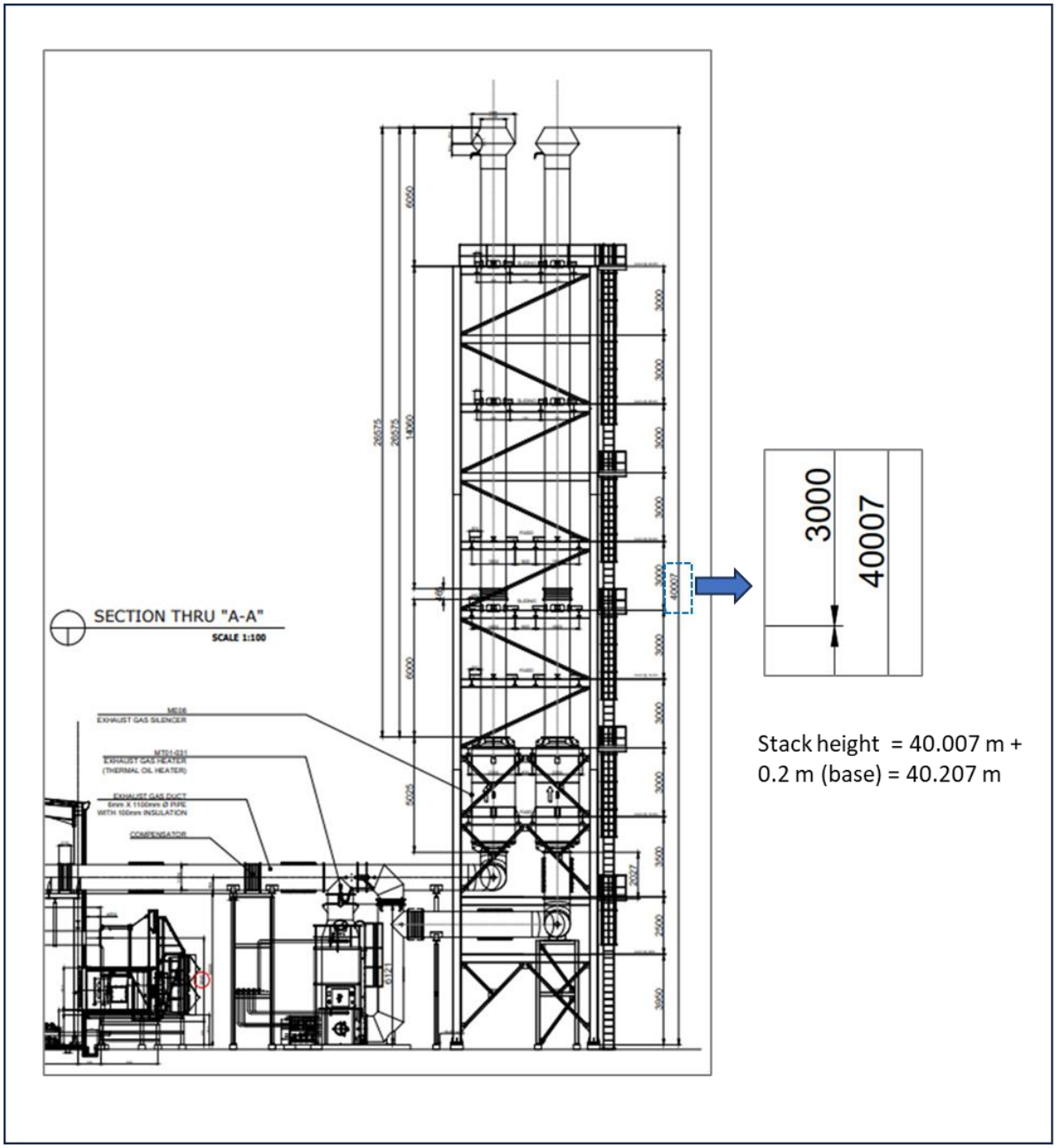


Figure 2.25. Elevation drawing of the stack of the existing powerplant

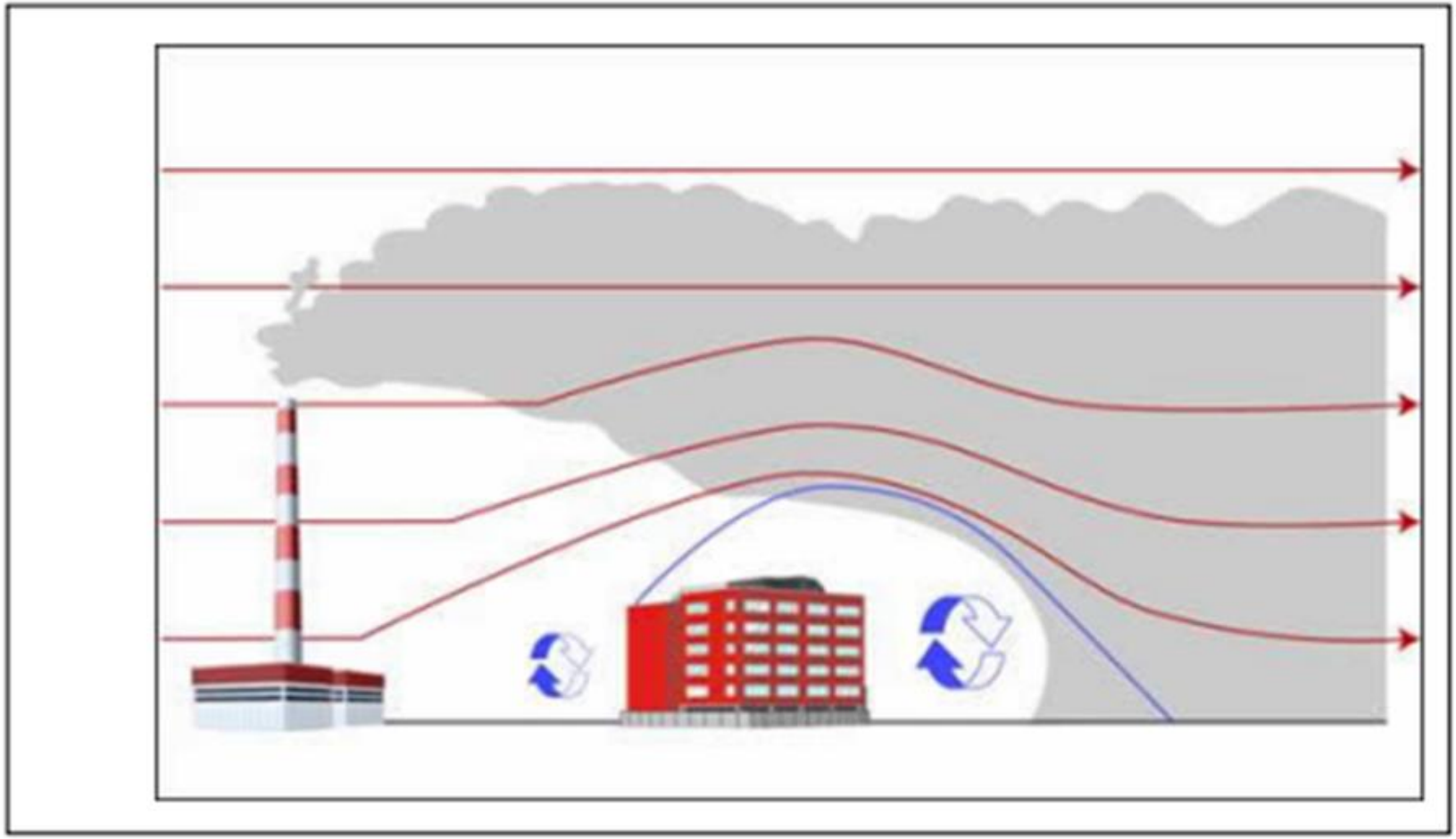


Figure 2.26. The building downwash concept where the presence of buildings forms localized turbulent zones that can readily force pollutants down to ground level (Source: DENR EMB 2008).

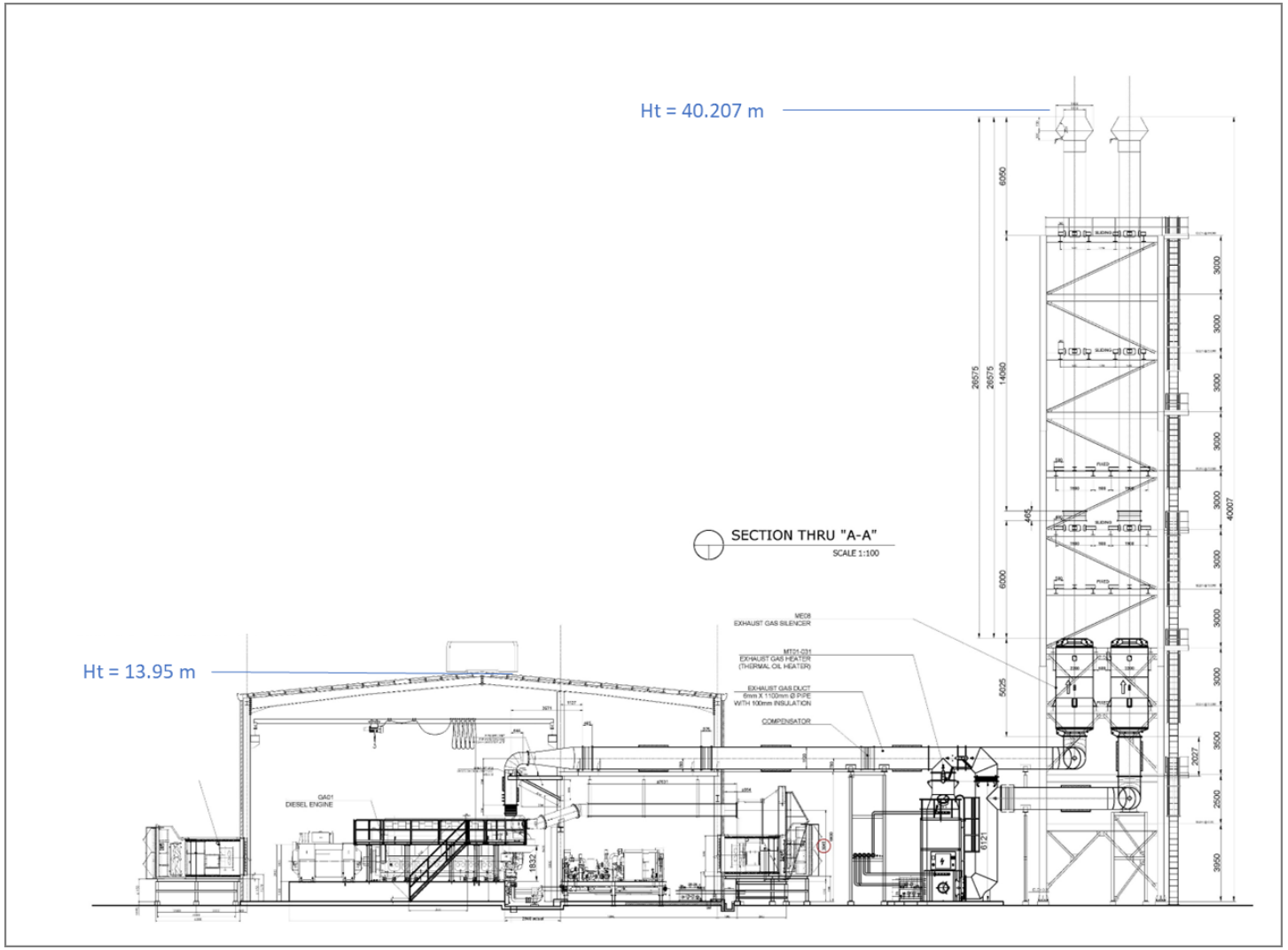


Figure 2.27. Elevation drawing of the power house and the existing stacks

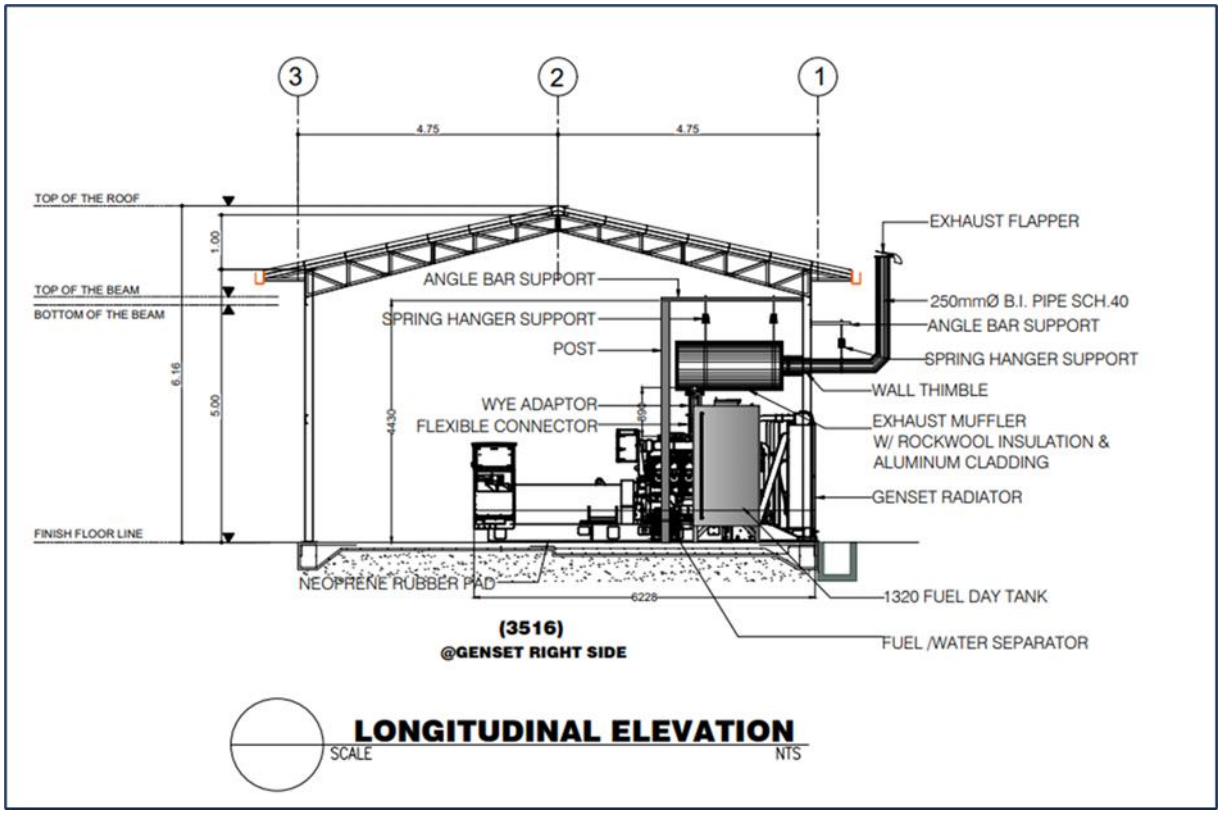


Figure 2.28. Elevation drawing of the powerhouse and stack of the proposed gensets.

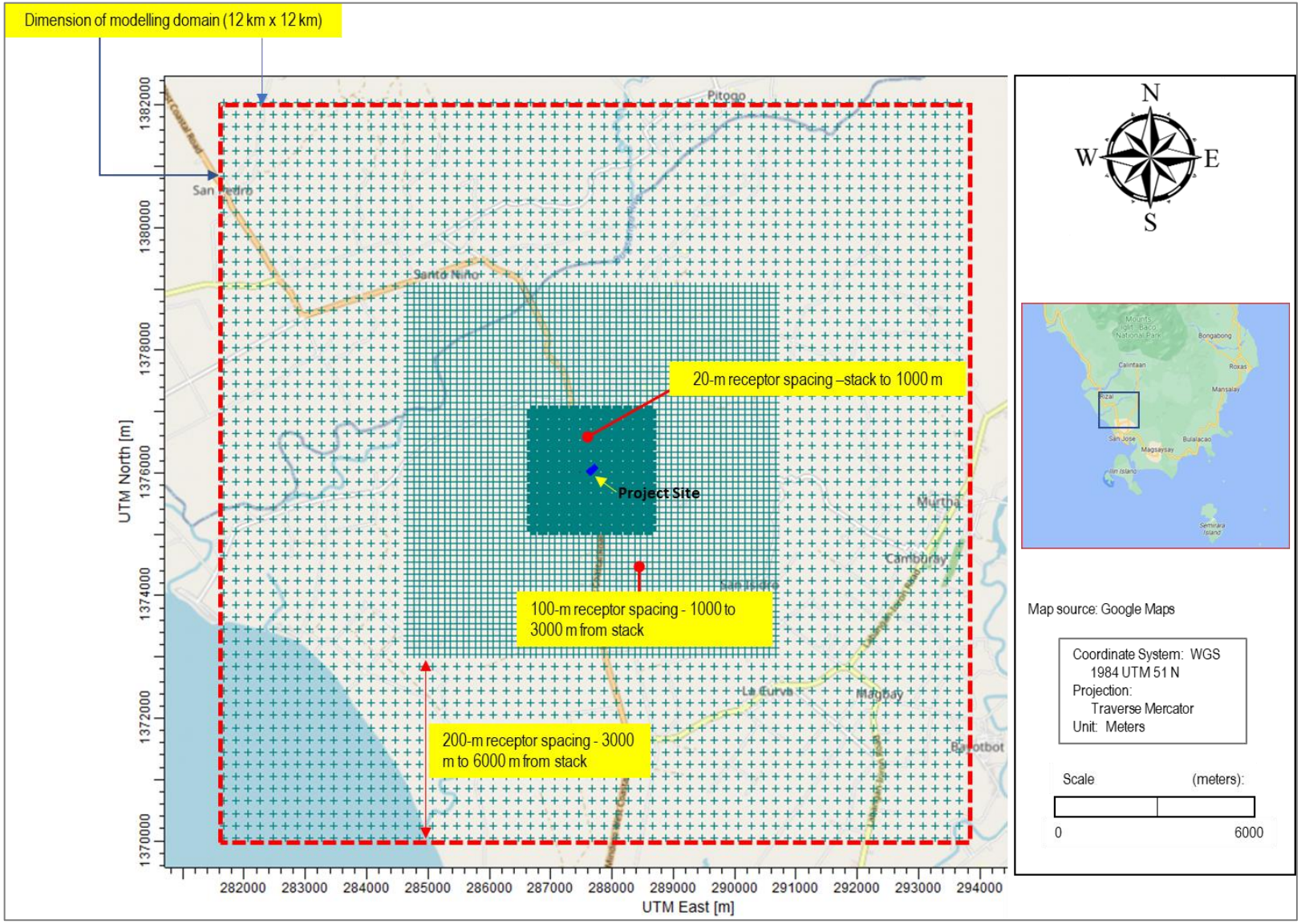


Figure 2.29. Multi-tier risk receptors

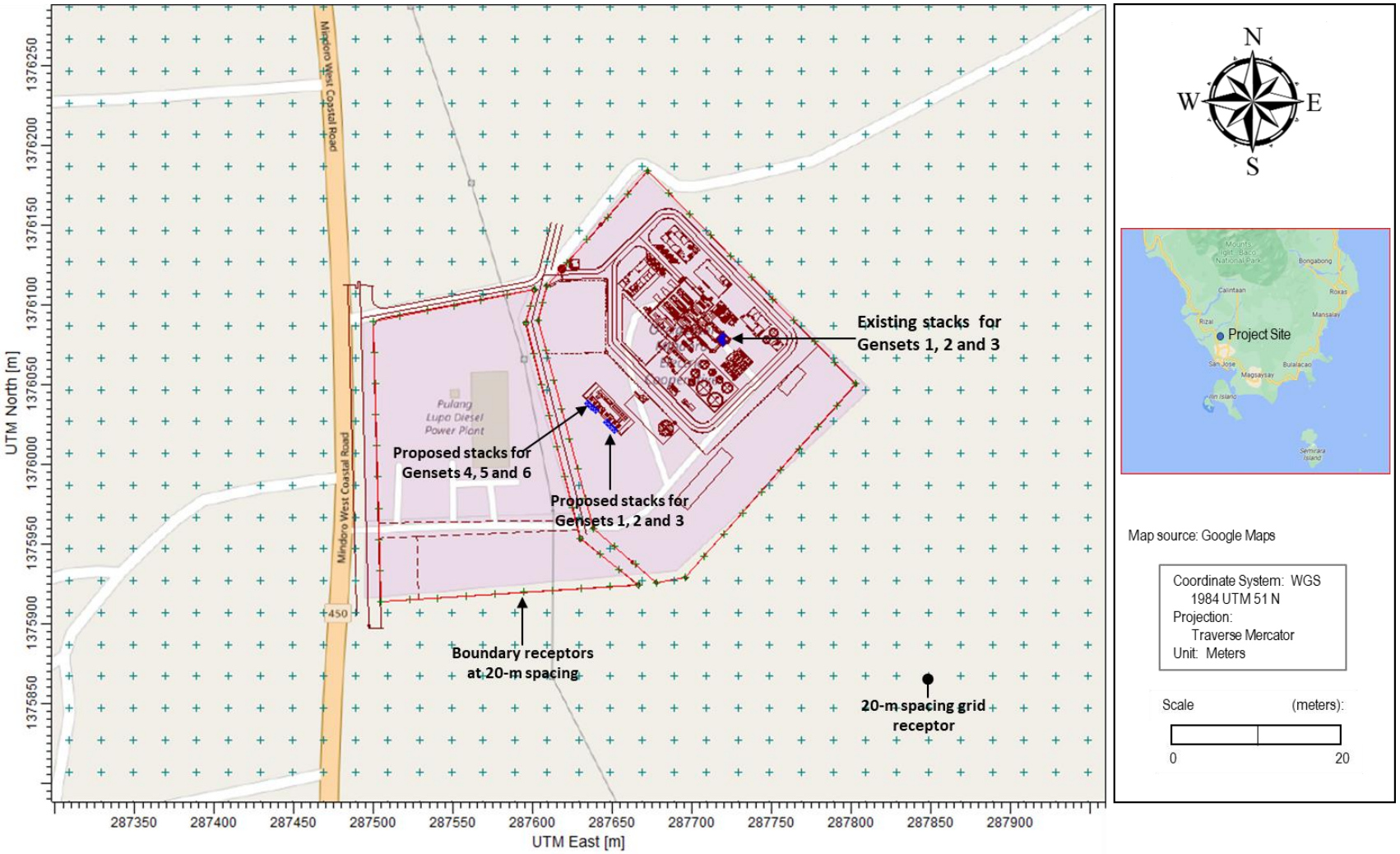


Figure 2.30. Closer view of receptors in the vicinity of the project site

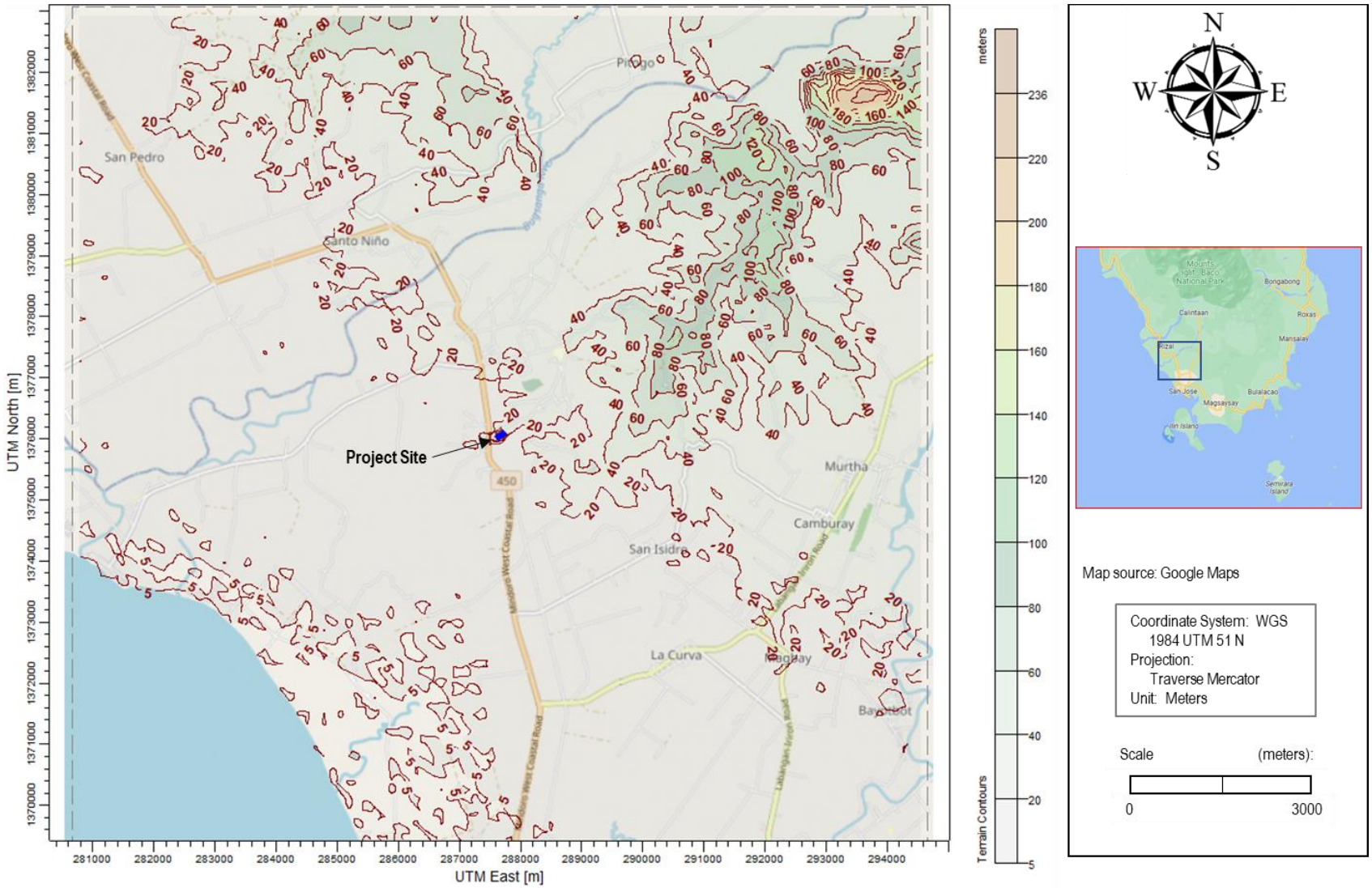


Figure 2.31. Terrain contours within the modelling domain

AERMAP View, a terrain preprocessor of AERMOD View, extracted the elevation at each receptor from the Shuttle Radar Topography Mission (SRTM) data. Figure 11 shows the generated elevation contours using AERMAP View. Complex terrain or terrain higher than the top of the projects' stacks is within the site's N-E and N-W quadrants.

The hill height (Hz) is the height of the terrain surrounding the receptor that will most influence the flow in stable conditions (www.weblakes.com). AERMAP View automatically generates the hill heights using the receptor coordinates.

The height of the receptor is 2 m from ground level. This height was based on sampling heights of at least two (2) meters, as provided in Section 1 (NAAQS), Rule XXVI of DAO-200081 (Implementing Rules and Regulations of RA 8749).

Meteorological Input Data

Meteorological data used in this study consisted of the surface and profile or upper air data files. The surface input data included, among others, the mechanical and convective turbulence scales, i.e., velocity and length scales, wind speed, wind direction, ambient air temperature, and other surface characteristics (**Plate 2.3**). The upper air input data are the wind speed, wind direction, air temperature, and standard deviations of wind speed and wind direction (**Plate 2.4**).

AERMET View, a meteorological preprocessor of AERMOD View, generated the input data files (surface and upper air data) using the preprocessed meteorological data, which are in SAMSON (*.sam) and TD 6201 (*.ua) formatted files), from Lakes Environmental Software, Inc. The data processing involved the following:

a) Generation of land cover within a 6-km radius from the centroid of the stacks using Geographic Information System (GIS) software (**Figure 12**);
b) Calculation of the area per land cover type (water, forest, cultivated area, grassland, urban or built-up, and bare or no vegetation) every 30-degree sector;
c) Designation of the albedo, Bowen Ratio, and surface roughness per land cover type; and
d) Calculate the average albedo, Bowen Ratio, and surface roughness per sector (every 30 degrees) by multiplying the area per land cover and the corresponding factor (Item c above) and adding the values obtained per land cover. **Table 2.21** shows the average values per sector.

Table 2.21. Average albedo, Bowen Ratio, and surface roughness per sector

Sector	Albedo	Bowen Ratio	Surface Roughness
1	0.257	1.042	0.218
2	0.187	1.039	0.560
3	0.230	0.875	0.338
4	0.261	0.861	0.186
5	0.270	0.822	0.159
6	0.279	0.758	0.080
7	0.240	0.735	0.108
8	0.130	0.354	0.040
9	0.252	0.932	0.108
10	0.252	0.908	0.094
11	0.258	0.886	0.198
12	0.218	1.015	0.410

The wind rose shows how frequently the wind blows from a specific direction at various speeds. The annual wind rose diagram shows the prevailing light winds (1 to 5 m/s) in the N-E and S-W quadrants, indicating the prevailing northeast and southwest monsoon winds in the Philippines, respectively (Figure 2.33). The southwest monsoon winds are apparent from May to August and became less frequent in September. In October, northeast winds start to dominate until February. The transition periods appear in May, April, and September or October (Figure 2.34 and Figure 2.35).

Modelling Options and Modelling Scenarios

The following are the options and settings used in the dispersion modelling.

a) Use of "Default" as the regulatory option,
b) Elevated terrain and flagpole height of 2 m,
c) Building downwash using the Building Profile Input Program (BPIP)
d) Tier 2 (Ambient Ratio Method or ARM) for NOX to NO2 conversion option,
e) No exponential decay,
f) Three (3) years of sequential hourly meteorological data,
g) 98th percentile values for the a) 24-hour average concentrations of SO_2, NO_2, and TSP and b) 1-hour and 8-hour average concentrations of CO, and
h) Hourly emission rate file for scenarios assuming intermittent operation (7 hours per day and 9 days per month)

The modelling scenarios are as follows:

a) Existing three (3) units of gensets - dispersed ambient air concentrations of SO_2 and NO_2 (or background levels) emanating from the three (3) existing gensets using three (3) years, and
b) Existing (3) units and proposed gensets (6 units) or a total of nine (9) gensets - cumulative impact or dispersed ambient air concentrations from the existing and proposed emission sources. The following were the additional simulations in case of exceedances with ambient guideline values.
c) Nine (9) days of operation per month in 3 years,
d) Seven (7) hours of operation per day in 3 years, and
e) Increasing the stack heights from an initial height of 5.32 m to a stack height in which the dispersed air concentrations are within the ambient guideline values.

Note that hourly emission rate files were used in simulating air pollutants for scenarios assuming 9 days of operation per month and 7 hours of operation per day.

Noise Level Monitoring

A Digital EXTECH 407764 sound meter that meets the American National Standard Institute (ANSI) standard was used in measuring noise level in the air quality sampling points was used in measuring noise in the areas coincident with the air quality sampling points. The arithmetic median of the readings was taken and compared with the National Pollution Control Commission (NPCC-1981) noise standards.

2.3.2.2. Baseline Conditions and Environmental Performance

Stack Emissions

Annex 2.1 summarizes the stack sampling results conducted by DENR-accredited stack samplers for the existing three (3) units of gensets of the OMCPC from December 2017 to July 2023. Results of stack sampling showed that stack gas concentrations of NO_X (as NO_2), particulate matter, and CO were within the National Emission Standards for Specific Air Pollutants (NESSAP) (or emission standards) set at 2000, 150, and 50 mg/Nm^3, respectively.

Surface File Name: Mindoro-met.SFC
Station Latitude: 13.367N | Upper Air Station ID: 00066666 | Onsite Station ID: N/A
Station Longitude: 121.167E | Surface Station ID: 66666 | Version: 21112 CCVR_SUB TEMP_SUB

Filter
Year: All | Month: All | Day: All | Julian Day: All | Show

Data Quality
Calms: 423 [hours] 1.61 [%] | Missing: 10 [hours] 0.04 [%]

Table | Graph

	Year	Month	Day	Julian Day	Hour	Sensible Heat Flux [W/m^2])	Surface Friction Velocity [m/s]	Convective Velocity Scale [m/s]	Vertical Potential Temperature Gradient above PBL	Height of Convectively-Generated Boundary Layer - PBL [m]	Height of Mechanically-Generated Boundary Layer - SBL [m]	Monin-Obukhov Length [m]	Surface Roughness Length [m]	Bowen Ratio	Albedo	Wind Speed - Ws [m/s]	Wind Direction - Wd [degrees]	Reference Height for Ws and Wd [m]	Temperature - temp [K]
Min.	2016	Jan	1	1	1	-999.0	-9.000	-9.000	-9.000	-999.0	-999.0	-99999.0	0.040	0.35	0.13	0.00	0.0	15.0	295.0
Max.	2018	Dec	31	366	24	292.7	1.315	2.641	0.018	2744.0	3602.0	8888.0	0.560	1.04	1.00	11.80	360.0	15.0	305.4
Graph						☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑
1	2016	Jan	1	1	1	-4.0	0.085	-9.000	-9.000	-999.0	60.0	13.7	0.108	0.74	1.00	2.10	181.0	15.0	299.0
2	2016	Jan	1	1	2	-1.9	0.057	-9.000	-9.000	-999.0	33.0	8.9	0.080	0.76	1.00	1.50	178.0	15.0	298.9
3	2016	Jan	1	1	3	-2.1	0.061	-9.000	-9.000	-999.0	36.0	9.8	0.108	0.74	1.00	1.50	184.0	15.0	298.8
4	2016	Jan	1	1	4	-4.0	0.085	-9.000	-9.000	-999.0	60.0	13.7	0.108	0.74	1.00	2.10	193.0	15.0	298.8
5	2016	Jan	1	1	5	-4.0	0.085	-9.000	-9.000	-999.0	60.0	13.7	0.108	0.74	1.00	2.10	203.0	15.0	298.8
6	2016	Jan	1	1	6	-5.4	0.103	-9.000	-9.000	-999.0	79.0	17.8	0.040	0.35	1.00	2.60	212.0	15.0	298.6
7	2016	Jan	1	1	7	-12.5	0.248	-9.000	-9.000	-999.0	297.0	109.7	0.040	0.35	0.63	4.10	225.0	15.0	298.2
8	2016	Jan	1	1	8	22.2	0.264	-9.000	-9.000	-999.0	325.0	-74.0	0.040	0.35	0.27	3.60	223.0	15.0	297.5
9	2016	Jan	1	1	9	81.0	0.261	-9.000	-9.000	-999.0	321.0	-19.8	0.108	0.74	0.28	2.60	197.0	15.0	298.2
10	2016	Jan	1	1	10	122.6	0.233	-9.000	-9.000	-999.0	271.0	-9.3	0.108	0.74	0.25	2.10	191.0	15.0	298.5
11	2016	Jan	1	1	11	142.1	0.188	-9.000	-9.000	-999.0	197.0	-4.2	0.108	0.74	0.25	1.50	184.0	15.0	298.8
12	2016	Jan	1	1	12	134.2	0.177	-9.000	-9.000	-999.0	179.0	-3.7	0.080	0.76	0.28	1.50	176.0	15.0	298.8
13	2016	Jan	1	1	13	116.6	0.142	-9.000	-9.000	-999.0	128.0	-2.2	0.108	0.74	0.24	1.00	183.0	15.0	298.8
14	2016	Jan	1	1	14	127.1	0.186	-9.000	-9.000	-999.0	193.0	-4.5	0.108	0.74	0.25	1.50	189.0	15.0	298.8
15	2016	Jan	1	1	15	103.0	0.182	-9.000	-9.000	-999.0	186.0	-5.2	0.108	0.74	0.25	1.50	202.0	15.0	298.8
16	2016	Jan	1	1	16	75.0	0.222	-9.000	-9.000	-999.0	252.0	-13.1	0.108	0.74	0.28	2.10	204.0	15.0	298.8
17	2016	Jan	1	1	17	18.5	0.199	-9.000	-9.000	-999.0	213.0	-38.0	0.040	0.35	0.27	2.60	221.0	15.0	298.5
18	2016	Jan	1	1	18	-13.3	0.192	-9.000	-9.000	-999.0	202.0	47.4	0.040	0.35	0.66	3.60	217.0	15.0	298.2
19	2016	Jan	1	1	19	-21.5	0.268	-9.000	-9.000	-999.0	333.0	80.5	0.040	0.35	1.00	4.60	224.0	15.0	298.0
20	2016	Jan	1	1	20	-21.5	0.268	-9.000	-9.000	-999.0	333.0	80.4	0.040	0.35	1.00	4.60	217.0	15.0	297.9
21	2016	Jan	1	1	21	-21.5	0.268	-9.000	-9.000	-999.0	333.0	80.4	0.040	0.35	1.00	4.60	220.0	15.0	297.8
22	2016	Jan	1	1	22	-18.2	0.227	-9.000	-9.000	-999.0	260.0	57.4	0.040	0.35	1.00	4.10	232.0	15.0	297.6
23	2016	Jan	1	1	23	-13.7	0.257	-9.000	-9.000	-999.0	312.0	111.2	0.108	0.93	1.00	3.60	240.0	15.0	297.8

Plate 2.4. Foreshortened screenshot of the meteorological surface input data

Profile File Name: Mindoro-met.PFL

Filter

Year: All Month: All Day: All

Table Graph

	Year	Month	Day	Hour	Measurement Height [m]	1, if this is the last (highest) level for this hour, or 0 otherwise	Direction the wind is blowing from for the current level [degrees]	Wind Speed for the current level [m/s]	Temperature at the current level [C]	Standard deviation of the wind direction fluctuations [degrees]	Standard deviation of the vertical wind speed fluctuations [m/s]
Min.	2016	Jan	1	1	15.0	1	0.0	0.00	21.9	99.0	99.00
Max.	2018	Dec	31	24	15.0	1	360.0	11.80	32.2	99.0	99.00
Graph					☐	☐	☐	☐	☑	☐	☐
1	2016	Jan	1	1	15.0	1	181.0	2.10	25.9	99.0	99.00
2	2016	Jan	1	2	15.0	1	178.0	1.50	25.8	99.0	99.00
3	2016	Jan	1	3	15.0	1	184.0	1.50	25.6	99.0	99.00
4	2016	Jan	1	4	15.0	1	193.0	2.10	25.6	99.0	99.00
5	2016	Jan	1	5	15.0	1	203.0	2.10	25.6	99.0	99.00
6	2016	Jan	1	6	15.0	1	212.0	2.60	25.5	99.0	99.00
7	2016	Jan	1	7	15.0	1	225.0	4.10	25.1	99.0	99.00
8	2016	Jan	1	8	15.0	1	223.0	3.60	24.4	99.0	99.00
9	2016	Jan	1	9	15.0	1	197.0	2.60	25.1	99.0	99.00
10	2016	Jan	1	10	15.0	1	191.0	2.10	25.4	99.0	99.00
11	2016	Jan	1	11	15.0	1	184.0	1.50	25.6	99.0	99.00
12	2016	Jan	1	12	15.0	1	176.0	1.50	25.6	99.0	99.00
13	2016	Jan	1	13	15.0	1	183.0	1.00	25.6	99.0	99.00
14	2016	Jan	1	14	15.0	1	189.0	1.50	25.6	99.0	99.00
15	2016	Jan	1	15	15.0	1	202.0	1.50	25.6	99.0	99.00
16	2016	Jan	1	16	15.0	1	204.0	2.10	25.6	99.0	99.00
17	2016	Jan	1	17	15.0	1	221.0	2.60	25.4	99.0	99.00
18	2016	Jan	1	18	15.0	1	217.0	3.60	25.1	99.0	99.00
19	2016	Jan	1	19	15.0	1	224.0	4.60	24.9	99.0	99.00
20	2016	Jan	1	20	15.0	1	217.0	4.60	24.8	99.0	99.00
21	2016	Jan	1	21	15.0	1	220.0	4.60	24.6	99.0	99.00
22	2016	Jan	1	22	15.0	1	232.0	4.10	24.5	99.0	99.00
23	2016	Jan	1	23	15.0	1	240.0	3.60	24.6	99.0	99.00
24	2016	Jan	1	24	15.0	1	210.0	1.50	25.0	99.0	99.00
25	2016	Jan	2	1	15.0	1	116.0	2.10	25.2	99.0	99.00
26	2016	Jan	2	2	15.0	1	112.0	3.60	25.4	99.0	99.00

Plate 2.5. Foreshortened screenshot of the meteorological profile input data

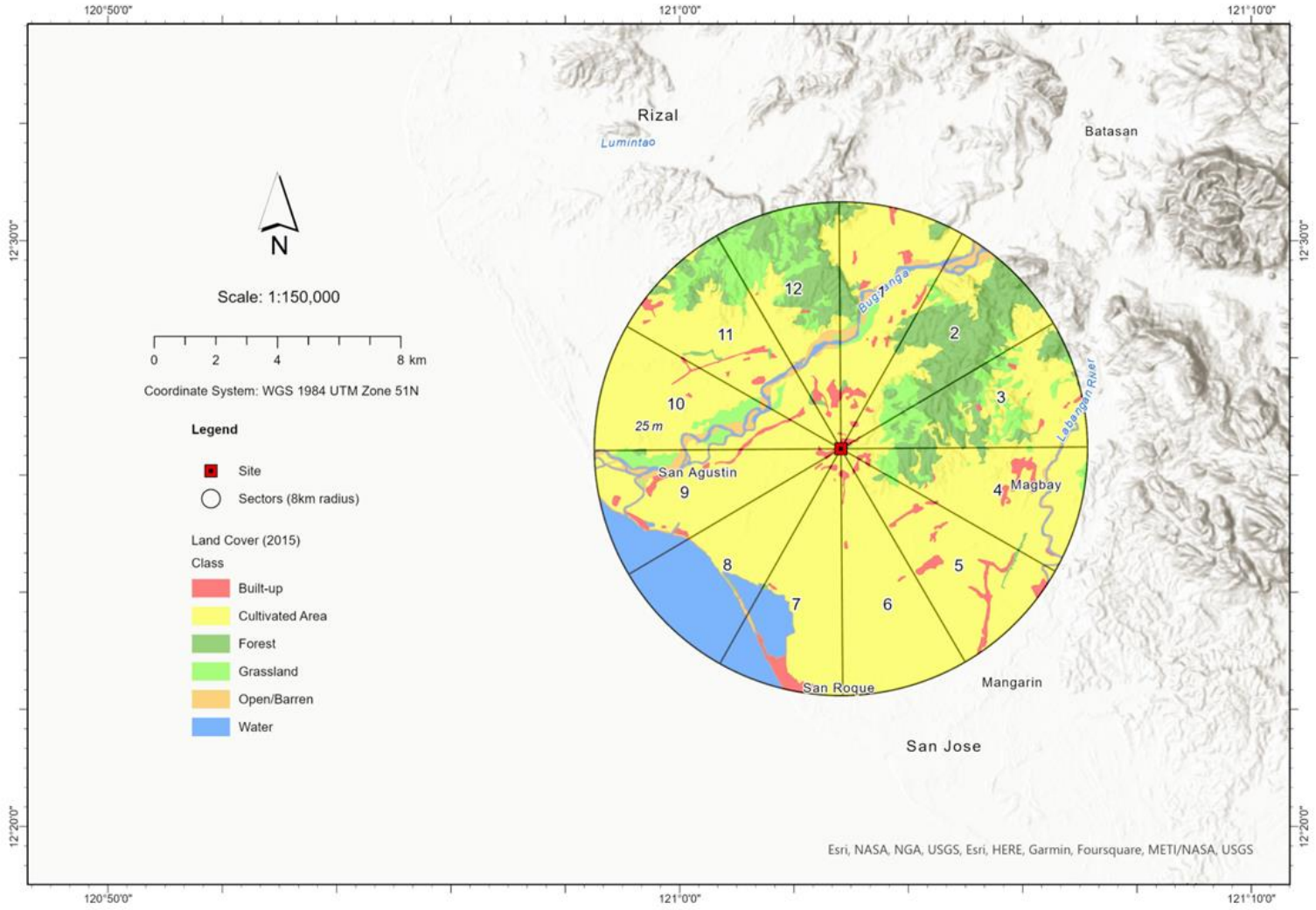
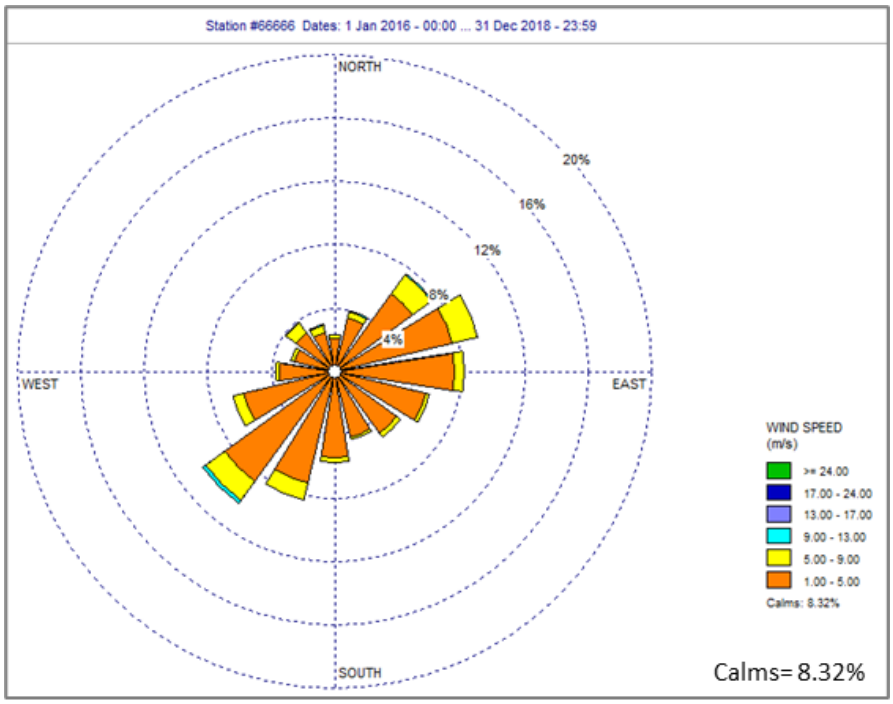
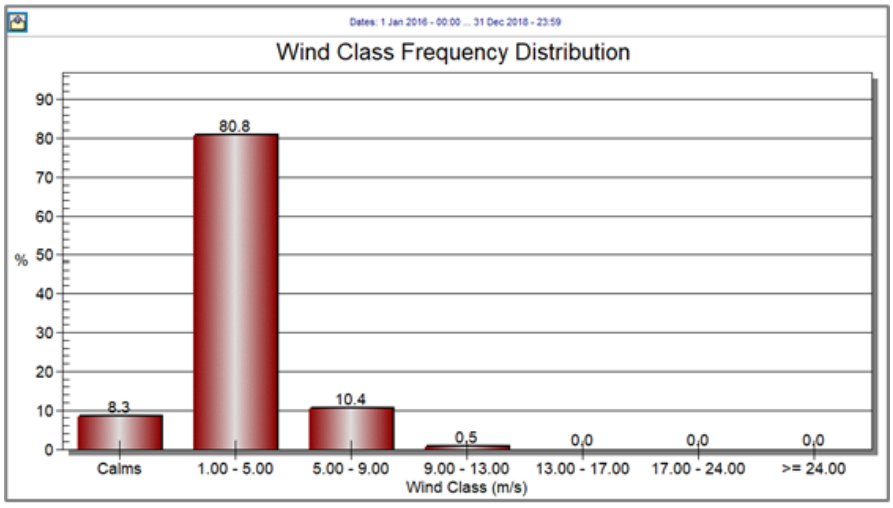


Figure 2.32. Land cover within 6-km radius from the centroid of the existing and proposed stacks



(a) Wind rose (Jan 1, 2016 to Dec 31, 2018)



(b) Wind class frequency distribution

Figure 2.33. Annual wind rose diagram (top) and wind class frequency distribution (bottom)

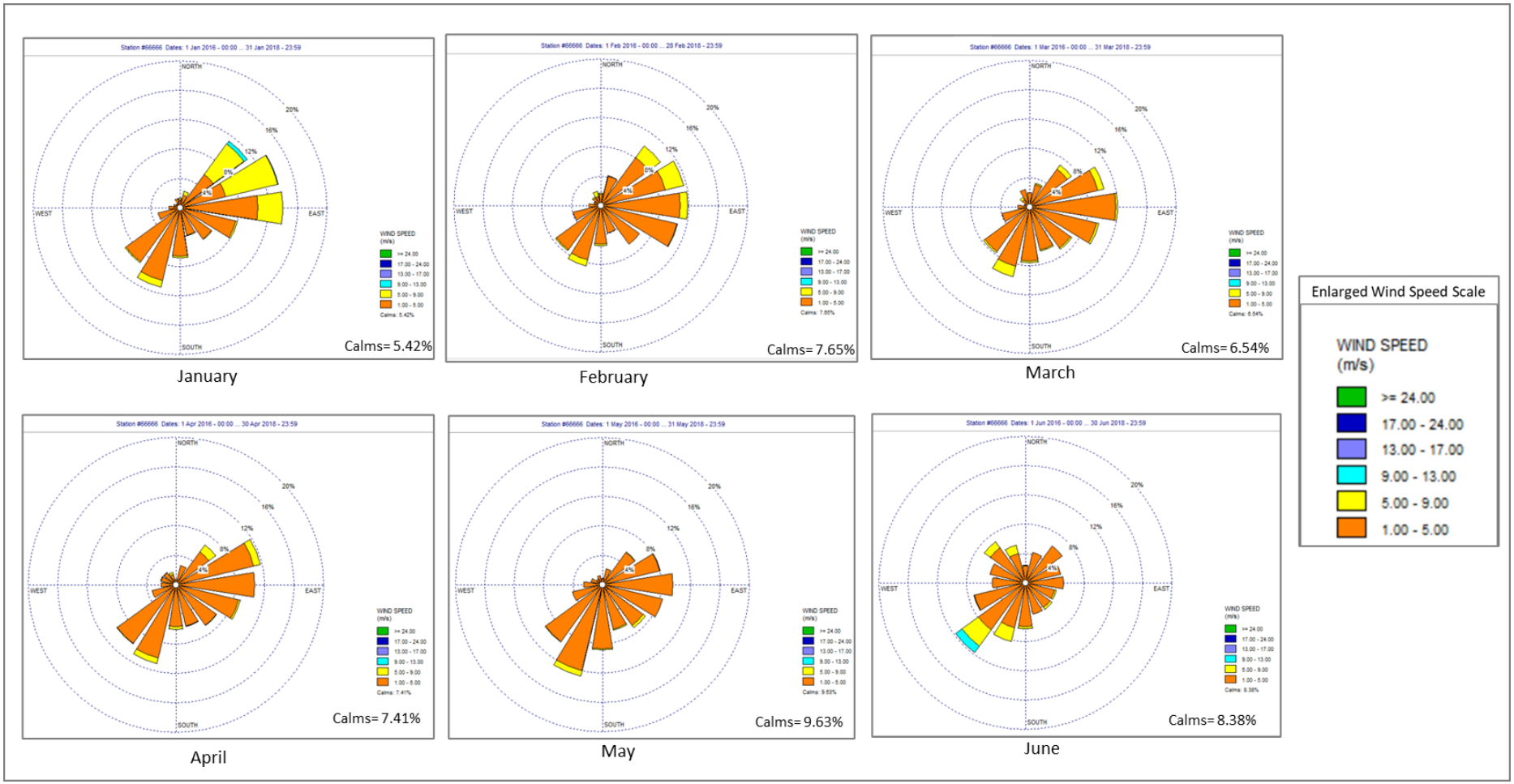


Figure 2.34. Wind rose diagrams for January to June (2016 to 2018)

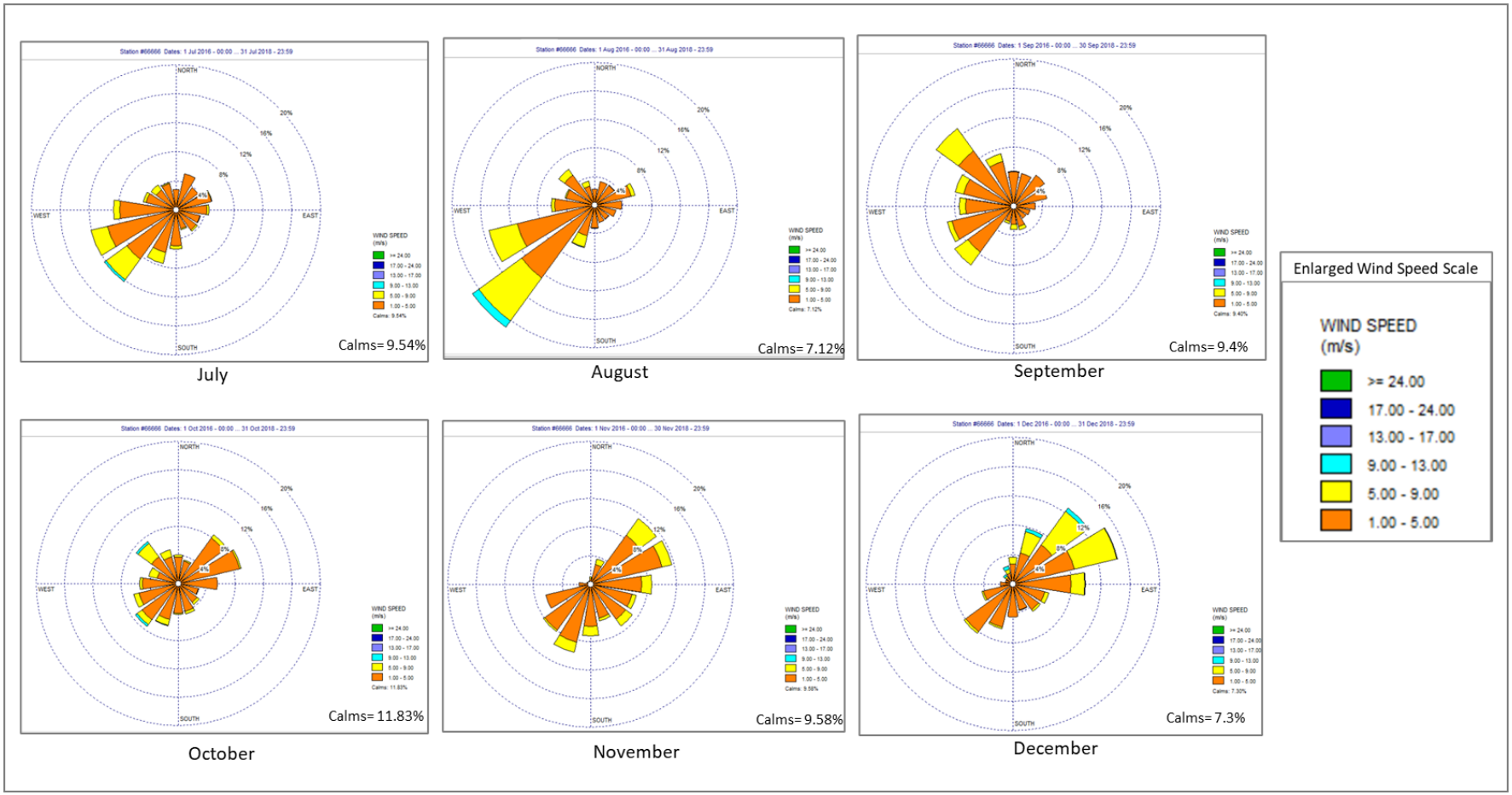


Figure 2.35. Wind rose diagrams for July to December (2016 to 2018)

However, the stack sampling results for SO_X (as SO_2) from December 2017 to July 2019 were greater than the NESSAP set for SO_X (as SO_2) at 700 mg/Nm^3. This period, though, was within the grace period in which facilities using bunker fuel were allowed to operate without penalties, according to the Memorandum of the DENR Secretary dated July 30, 2007. On September 27, 2019, however, the said memorandum was revoked by then DENR Secretary Cimatu and requires submission of the results of the source emission and ambient air quality monitoring. OMCPC implemented fuel blending using 80% LFO and 20% HFO to address the SO_2 exceedance in the existing power plant. General maintenance and cleaning of smokestack was also conducted by OMCPC.

From December 2019 onwards, the stack sampling results for SO_X (as SO_2) were within the emission standards set at 700 mg/Nm^3, except for the recent stack sampling results (July 2023) for SO_X (as SO_2), which exceeded the corresponding emission standard.

As SO_X (as SO_2) emissions are proportional or related to the percentage of sulfur content of the fuel, an appropriate mixture of bunker fuel and diesel fuel ensures compliance with the emission standard for SO_X (as SO_2).

Ambient Air Quality

Figure 2.36 to Figure 38 show the plots of the measured ambient air concentrations of TSP, PM_{10}, SO_2, and NO_2 at four (4) established stations from December 2019 to June 2022. Ambient monitoring for the project has been conducted twice yearly except in 2020 due to travel restrictions on COVID-19.
The results of ambient monitoring were within the ambient quality standards set for TSP, PM_{10}, SO_2, and NO_2 at 300, 200, 340, and 360 µg/Nm^3, respectively. The monitoring data, however, is limited because there are only five (5) data points for each pollutant, making it difficult or inappropriate to statistically determine trends in air quality.

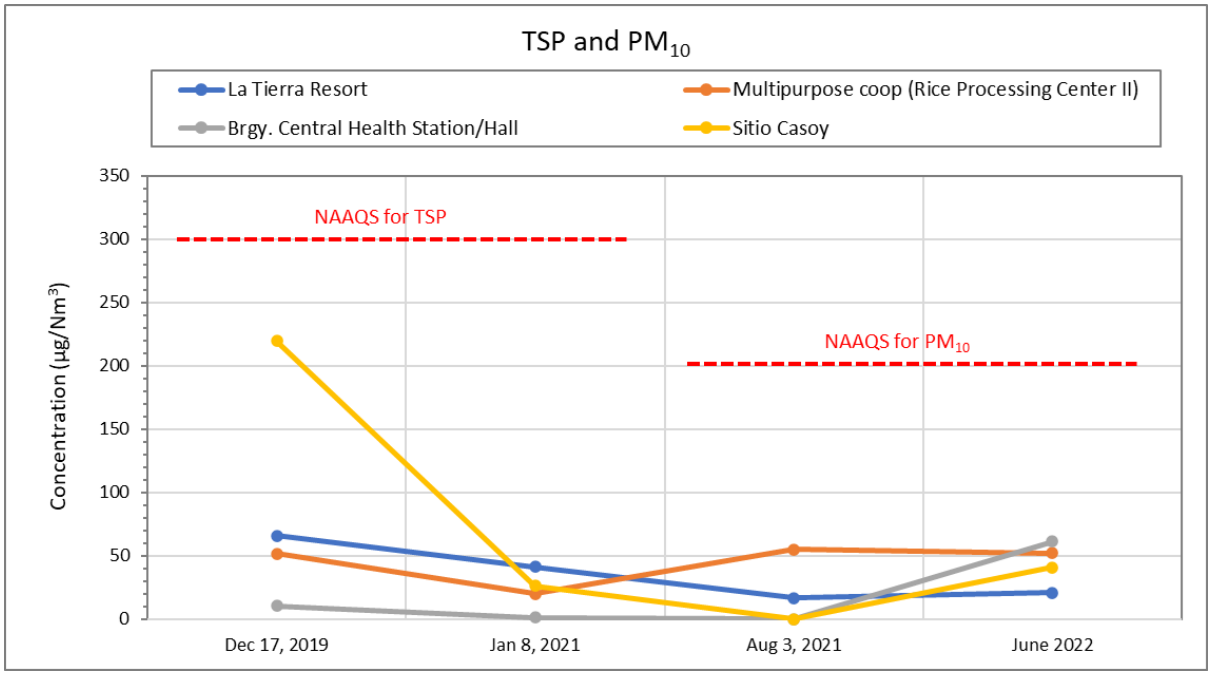


Figure 2.36. Measured ambient TSP in 2019 to 2022

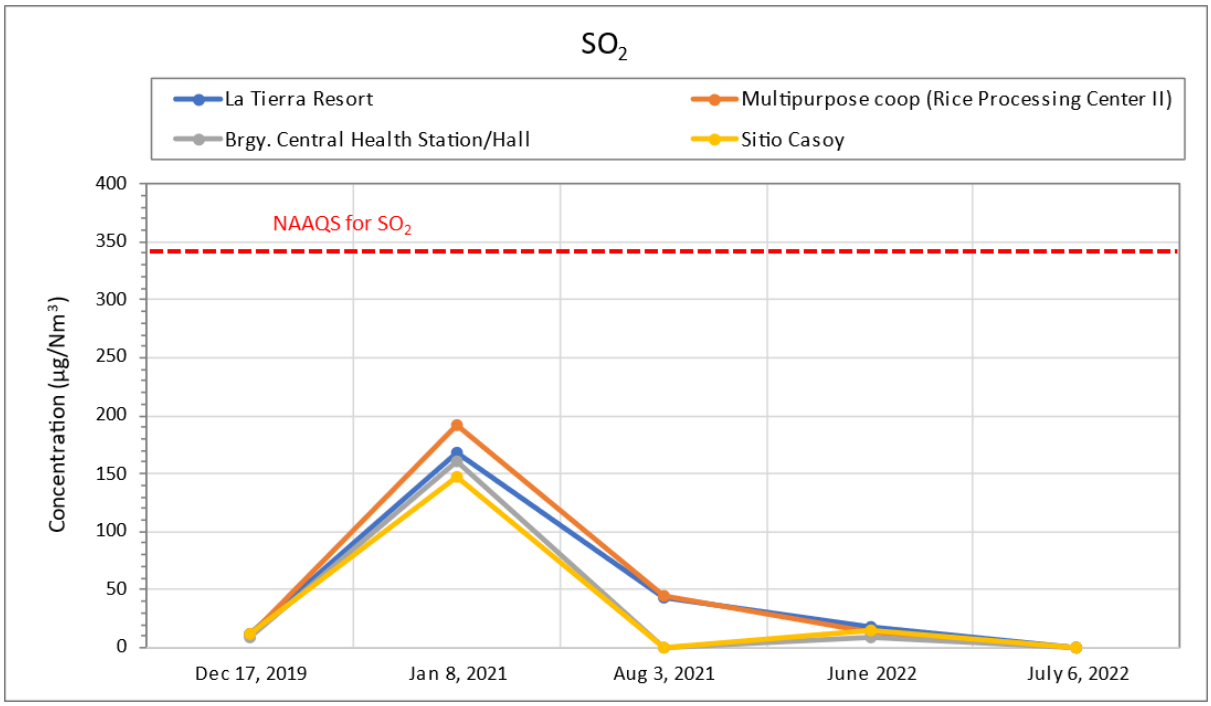


Figure 2.37. Measured ambient SO_2 in 2019 to 2022

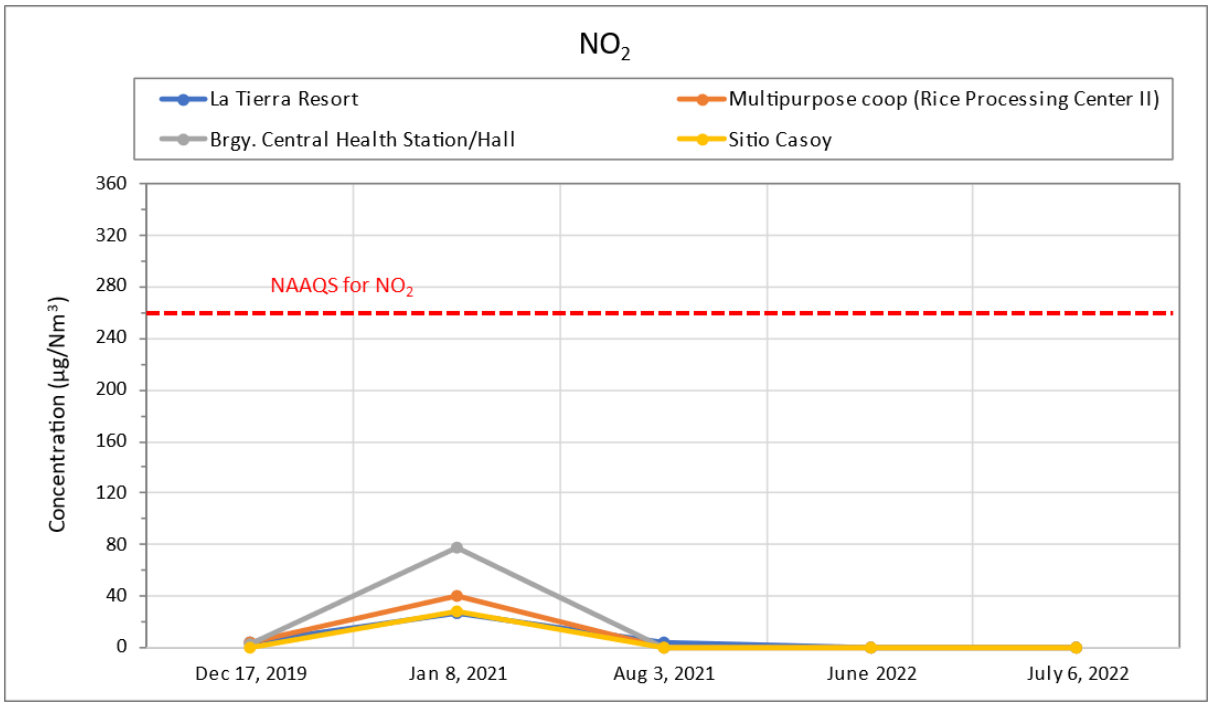


Figure 2.38. Measured ambient SO_2 in 2019 to 2022

Furthermore, as can be seen in **Figure 2.38**, only two (2) stations (STN 02 and STN 04) are likely downwind of the source during ambient monitoring, and the other stations (STN 01 and STN 03) are crosswind of the prevailing wind flows, which are the northeast and southwest winds. According to Section 1, Rule XXVI (Source Specific Ambient Air Quality Standards) of DAO 2000-81, it is advisable to conduct ambient monitoring downwind of the emissions source or the power plant.

Thus, future compliance monitoring shall consider the prevailing wind flows during monitoring and the locations of the highest predicted concentrations based on air dispersion modelling.

Noise Level

OMCPC also conducts noise monitoring along the ambient air quality monitoring areas. These areas are outside the community. As shown in **Tables 2.22** to **2.24** the noise levels in all the monitoring stations except for STN1 exceeded the maximum allowable noise base on their respective category. Noise sources however were identified mostly emanating from the passing of different vehicles mainly tricycles and motorcycles and from barking dogs. In STN 2 noise emanating from the power plant was recorded to contribute to the maximum allowable noise as it is undergoing pre-commissioning checks. In STN 3, the noise levels exceeded the dBA standards for a contiguous area primarily used as residential area, mainly due to residential activities and from incessant barking of dogs as well as vehicles passing near the basketball court.

Table 2.22. Ambient noise levels in OMCPC STN1 (Class A)

	Sound Reading (dB)				
1	46.9	47.8	48.5	46.0	47.5
2	46.4	46.2	47.7	48.8	46.3
3	46.1	45.8	45.2	46.0	45.2
4	46.3	52.6	47.9	47.7	50.1
5	50.2	51.3	51.7	49.6	50.8
6	52.1	48.8	52.3	49.5	51.1
				Minimum	45.2
				Median	47.9
				Maximum	52.6
				Average	48.4
				NPCC Standard for Class A during Daytime	55

Note: Noise reading was taken during daytime 1222H to 1227H

Table 2.23. Ambient noise levels in OMCPC STN2 (Class C)

	Sound Reading (dB)				
1	68.4	69.0	69.6	69.5	69.9
2	69.8	69.2	69.7	69.8	69.4
3	68.5	69.6	68.5	70.2	69.7
4	68.6	69.3	69.0	69.4	69.
5	68.0	69.4	69.1	69.9	69.0
6	69.5	70.1	69.7	70.1	70.3
				Minimum	68.0
				Median	69.5
				Maximum	70.3
				Average	69.4
				NPCC Standard for Class A during Daytime	55

Note: Noise reading was taken during daytime 1423H to 1428H

Table 2.24. Ambient noise levels in OMCPC STN3 (Class A)

	Sound Reading (dB)				
1	69.4	67.8	66.0	66.9	66.6
2	66.7	66.2	65.4	65.4	66.9
3	66.2	66.2	68.2	65.3	67.4
4	65.3	67.2	67.3	62.4	66.9
5	68.7	69.4	67.8	69.6	68.4
6	66.6	69.2	69.6	67.7	67.6
				Minimum	62.4
				Median	67.1
				Maximum	69.6
				Average	67.1

	Sound Reading (dB)
NPCC Standard for Class A during Daytime	55

Note: Noise reading was taken during daytime 1531H to 1536H

Table 2.25. Philippine Ambient Noise Standards

Category[1]	Maximum Allowable Noise (dBA) by Time Periods[2]		
	Daytime	Morning/Evening	Nighttime
AA	50	45	40
A	55	50	45
B	65	60	55
C	70	65	60
D	75	70	65

Note: [1]**Class AA** - a section of contiguous area, which requires quietness, such as areas within 100 meters from school sites, nursery schools, hospitals and special houses for the aged; **Class A**- a section of contiguous area, which is primarily used for residential areas; **Class B** – a section or contiguous area, which is primarily a commercial area; **Class C** – a section primarily zoned or used as a light industrial area and **Class D** – a section, which is primarily reserved, zoned or used as a heavy industrial area. [2]**Morning** - 5:00 A.M. to 9:00 AM; **Daytime** - 9:00 A.M. to 6:00 P.M; **Evening** - 6:00 P.M. to 10:00 P.M.; **Nighttime** - 10:00 P.M. to 5:00 A.M.

2.3.2.3. Impact Assessment

Table 2.26. Predicted impacts of/on ambient air quality and noise to/by the proposed amendment of OMCPC SMRA Diesel Power Plant Expansion

List of Key Impacts	Phase Occurrence				Discussion
	Pre-Construction	Construction	Operation	Abandonment	
Degradation of air quality		☑	☑		The dispersion modelling results are in two (2) categories: a) existing sources and b) existing and proposed sources. Predicted dispersed air pollutants from the existing sources (or the existing three gensets) provided the background air quality in the area, while the combined or predicted cumulative dispersed air pollutants emanating from the existing and proposed sources (or a total of 9 gensets) aimed to check compliance with the ambient guideline values. **Table 2.27** summarizes the results of the predicted air pollutant concentrations based on dispersion modelling results in **Figure 2.39** to **Figure 2.48**. Predicted concentrations of SO_2 and NO_2 emanating from the three (3) existing gensets were within the corresponding ambient guideline values (**Table 2.28**). As the emission rates for particulates (PM) are relatively lower than those of SO_2 and NO_2, then it follows that the predicted dispersed concentrations for TSP (particulates) and CO were less than those of SO_2 and NO_2, thus results for TSP and CO for the existing sources are not presented in **Table 2.28**. Furthermore, the ambient guidelines for CO are very high at 10,000 and 35,000 µg/Nm^3 at 8- and 1-hour averaging periods, respectively; thus, dispersed concentrations of CO may be acceptable in compliance with ambient guideline values. For the existing and proposed emission sources (or a total of 9 gensets) the predicted dispersed concentrations of SO_2, TSP, and CO were

List of Key Impacts	Phase Occurrence				Discussion
	Pre-Construction	Construction	Operation	Abandonment	
					within the ambient guideline values set for these air pollutants, as shown in **Table 2.29**. The predicted dispersed NO_2 was 1,832.6 µg/m^3, which exceeded the ambient guideline value set for NO_2 at 150 µg/Nm^3. As discussed in the previous section (**Section 1.3.2.6 -Modelling Options and Modelling Scenarios**), the simulations included hourly emission rate files for scenarios with intermittent operations (9 days per month and 7 hours per day) and increasing the stack heights to determine the stack height that yielded dispersed pollutant concentrations to within ambient guideline values, as shown in **Table 2.28**. **Table 2.28** shows that at stack heights of 5.32 to 14 m, the dispersed concentrations of NO_2 are greater than the corresponding ambient guideline value. The highest dispersed concentration is within the project boundary, northeast of the proposed stacks. However, the predicted dispersed concentrations outside the project boundary are greater than the ambient guideline values for NO_2. Simulated NO_2 concentrations were very high in the N-E and S-W quadrants of the project site, as shown in **Figure 2.39** onwards. At a stack height of 15 m, the highest predicted 24-hour average concentration of NO_2 (at the 98th percentile) of 151.3 µg/m^3 was slightly higher than the corresponding ambient guideline value. However, the dispersed ambient air concentrations outside the project boundaries were within ambient guideline value. Note that the Department of Labor and Employment (DOLE) air quality standards apply to areas within the project boundaries; thus, assessment of compliance with the ambient guideline values of the DENR focused on areas outside the project site. Based on the results of the simulations, this study recommends a stack height of 15 m for each of the proposed genset. OMCPC will consider the suggestion in the design.
Increase in ambient noise level		☑	☑		The predicted sound levels when the existing power plant is operating were not seen to have adverse impacts on the communities west and northeast of the plant site. The predicted maximum sound level (35 decibels - unlagged noise) was less than the DENR (NPCC) nighttime criteria of 45dB for a Class A (residential area). Similarly, the predicted sound levels from both existing and proposed additional powerhouse were not seen to have adverse impacts on the communities west and northeast of the site. The additional gensets will be located inside the powerhouse which will attenuate further the 35 decibel noise. If compared with the noise monitoring, the noise measured within the community during monitoring sometimes exceeds 55dB for DENR NPCC daytime criteria.

Table 2.27. Highest predicted dispersed concentrations of air pollutants in comparison with the ambient guideline values assuming continuous operation in 3 years

Pollutant	Averaging Period	Predicted Concentration (µg/m³)	DENR Ambient Guideline Value (µg/Nm³)	Remarks	Reference Figure
Existing Diesel Generator Sets (Gensets 1, 2, and 3)					
SO_2	24 hours	85.7	180	Within guideline value	Figure 2.29
SO_2	1 year	22.0	80	Within guideline value	Figure 2.30
NO_2	24 hours	47.3	150	Within guideline value	Figure 2.31
NO_2	1 year	12.1	Not specified	Within IFC guideline value of 40 µg/Nm³	Figure 2.32
2) Existing (3 units) and Proposed Diesel Generator Sets (6 units)					
SO_2	24 hours	88.8	180	Within guideline value	Figure 2.33
TSP	24 hours	75.8	230	Within guideline value	Figure 2.34
CO	1 hour	567.8	35,000	Within guideline value	Figure 2.35
CO	8 hours	485.8	10,000	Within guideline value	Figure 2.36
NO_2	24 hours	1832.6	150	Exceeded ambient guideline value	Figure 2.37 and Figure 2.38
Note: As there is no local ambient guideline value for NO_2 at 1 year averaging period, the ambient guideline value of the International Finance Corporation (IFC) is used to compare model result					

Table 2.28. Highest predicted dispersed concentrations of air pollutants using hourly emission rate files or at various stack heights

Pollu-tant	Scenario	Averaging Period	Highest Predicted Concentration (µg/m³)	DENR Ambient Guideline Value (µg/Nm³)	Remarks	Reference Figure
NO_2	Nine (9) days of continuous operation per month in 3 years. Stack heights of proposed stacks = 5.32 m	24 hours	1270.8	150	Exceeded ambient guideline value*	Figure 2.29 and Figure 2.30
NO_2	Seven (7) hours of operation per day in 3 years. Stack heights of proposed stacks = 5.32 m	24 hours	847.2	150	Exceeded ambient guideline value*	Figure 2.31 and Figure 2.32
NO_2	Increased stack height of proposed stacks to 8 m; continuous operation in 3 years	24 hours	334.6	150	Exceeded ambient guideline value*	Figure 2.33 and Figure 2.34
NO_2	Increased stack height of proposed stacks to 12 m ; continuous operation in 3 years	24 hours	181.4	150	Exceeded ambient guideline value*	Figure 2.35 and Figure 2.36
NO_2	Increased stack height of proposed stacks to 13 m ; continuous operation in 3 years	24 hours	164.1	150	Exceeded ambient guideline value*	Figure 2.37
NO_2	Increased stack height of proposed stacks to 14 m; continuous operation in years	24 hours	156.1	150	Exceeded ambient guideline value*	Figure 2.38
NO_2	Increased stack height of proposed stacks to 15 m; continuous operation in years	24 hours	151.3	150	Dispersed ambient air concentrations outside the project boundaries are within ambient guideline value	Figure 2.39 and Figure 2.40

*Note: The highest dispersed concentration is within the project boundary, specifically northeast of the proposed stacks. The predicted dispersed concentrations outside the project boundary, however, are greater than the ambient guideline values for NO_2.

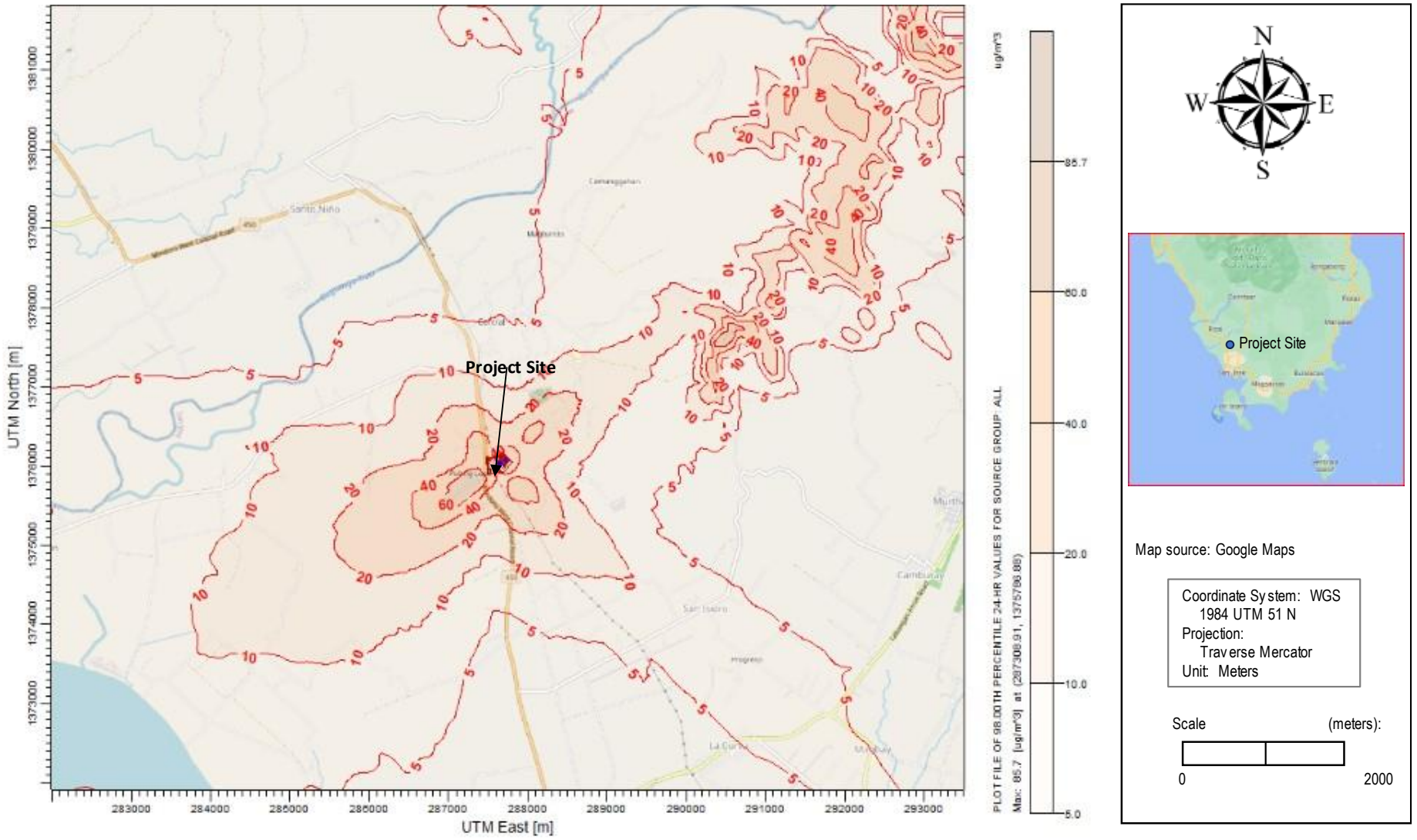


Figure 2.39. Plot of 98th percentile 24-hour values of dispersed SO_2 emanating from emissions of existing gensets (Gensets 1, 2, and 3)

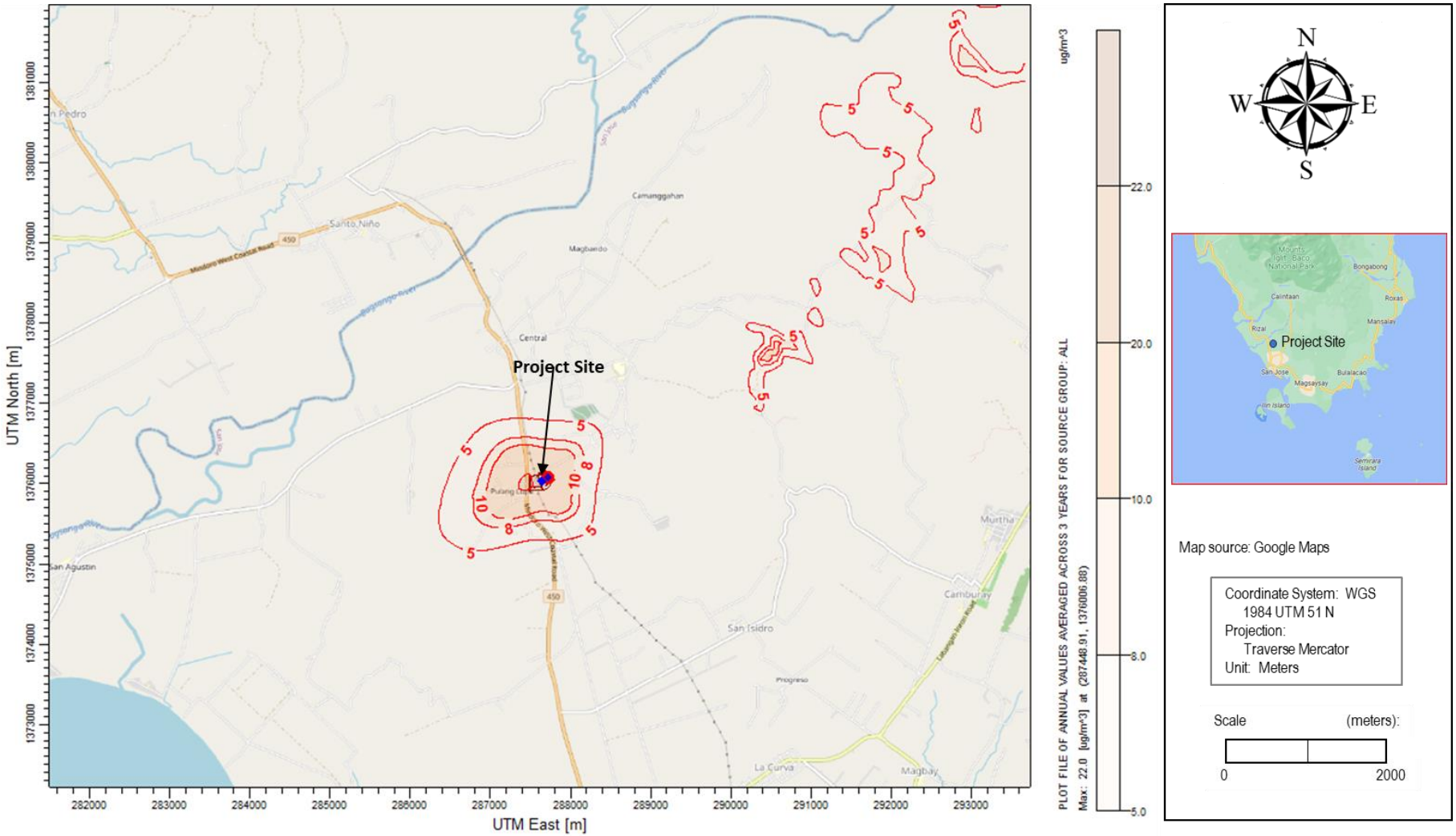


Figure 2.40. Plot of annual average dispersed SO_2 emanating from emissions of existing gensets (Gensets 1, 2, and 3)

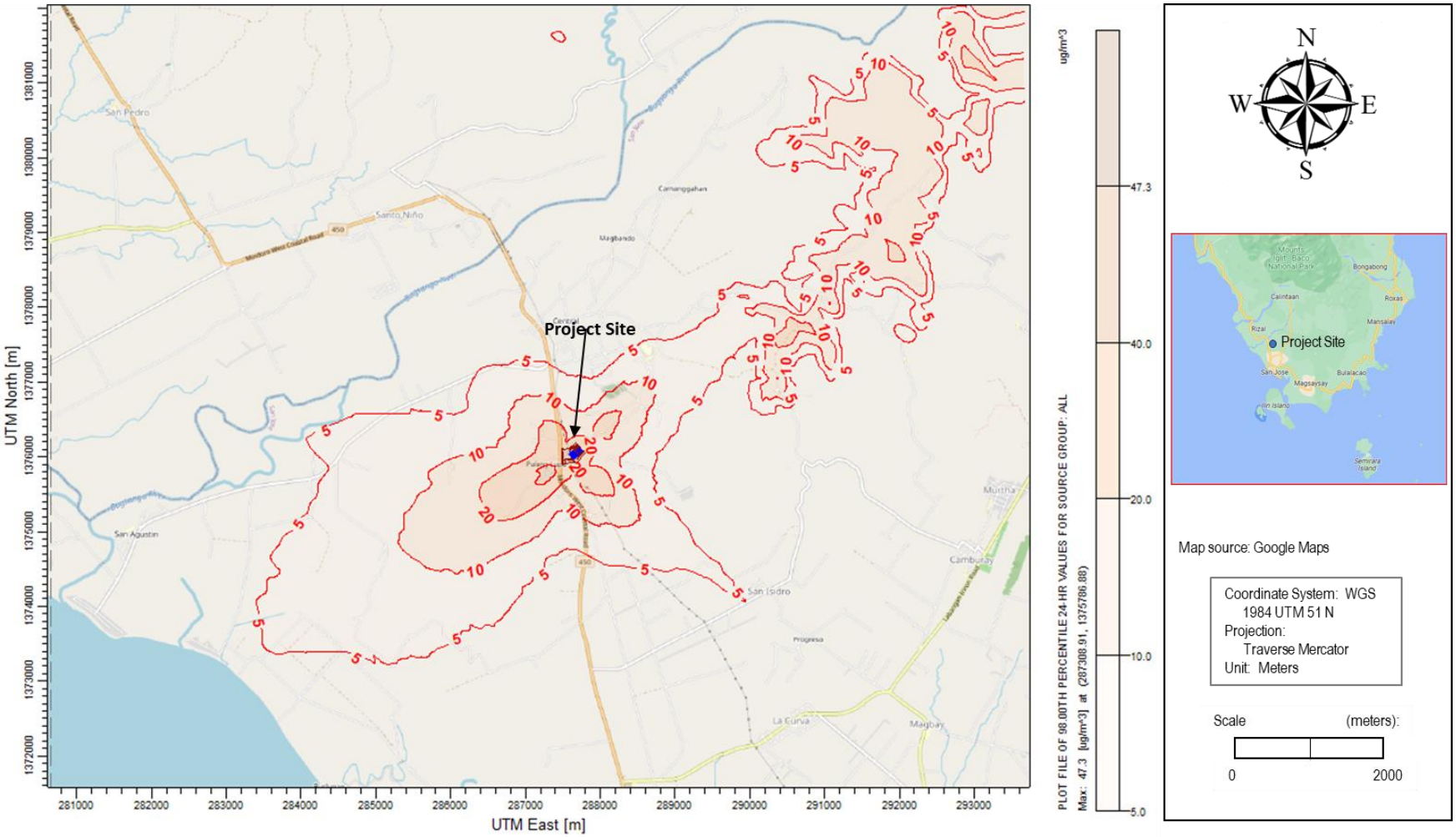


Figure 2.41. Plot of 98th percentile 24-hour values of dispersed NO_2 emanating from emissions of existing gensets (Gensets 1, 2, and 3)

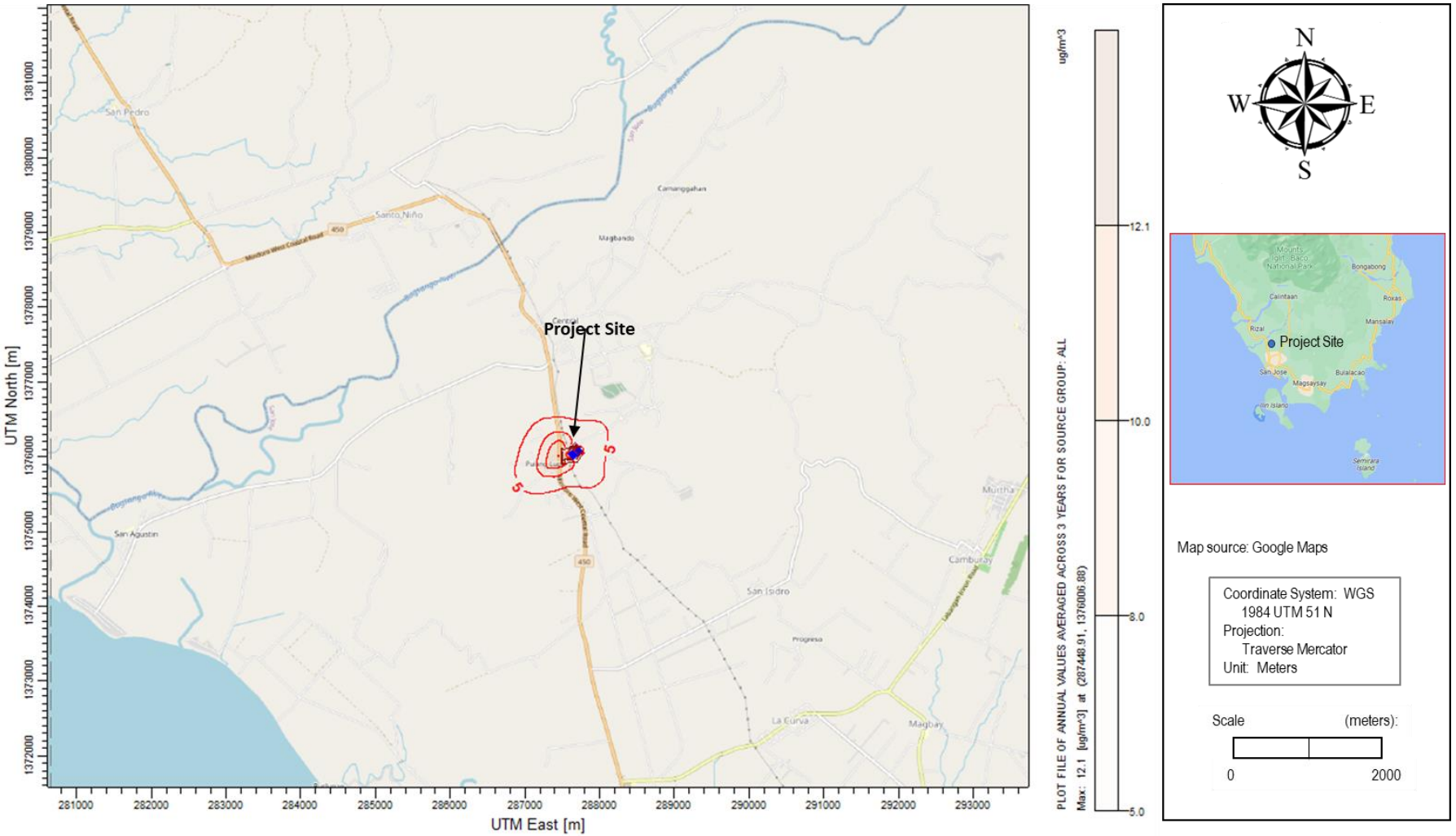


Figure 2.42. Plot of annual average dispersed NO_2 emanating from emissions of existing gensets (Gensets 1, 2, and 3)

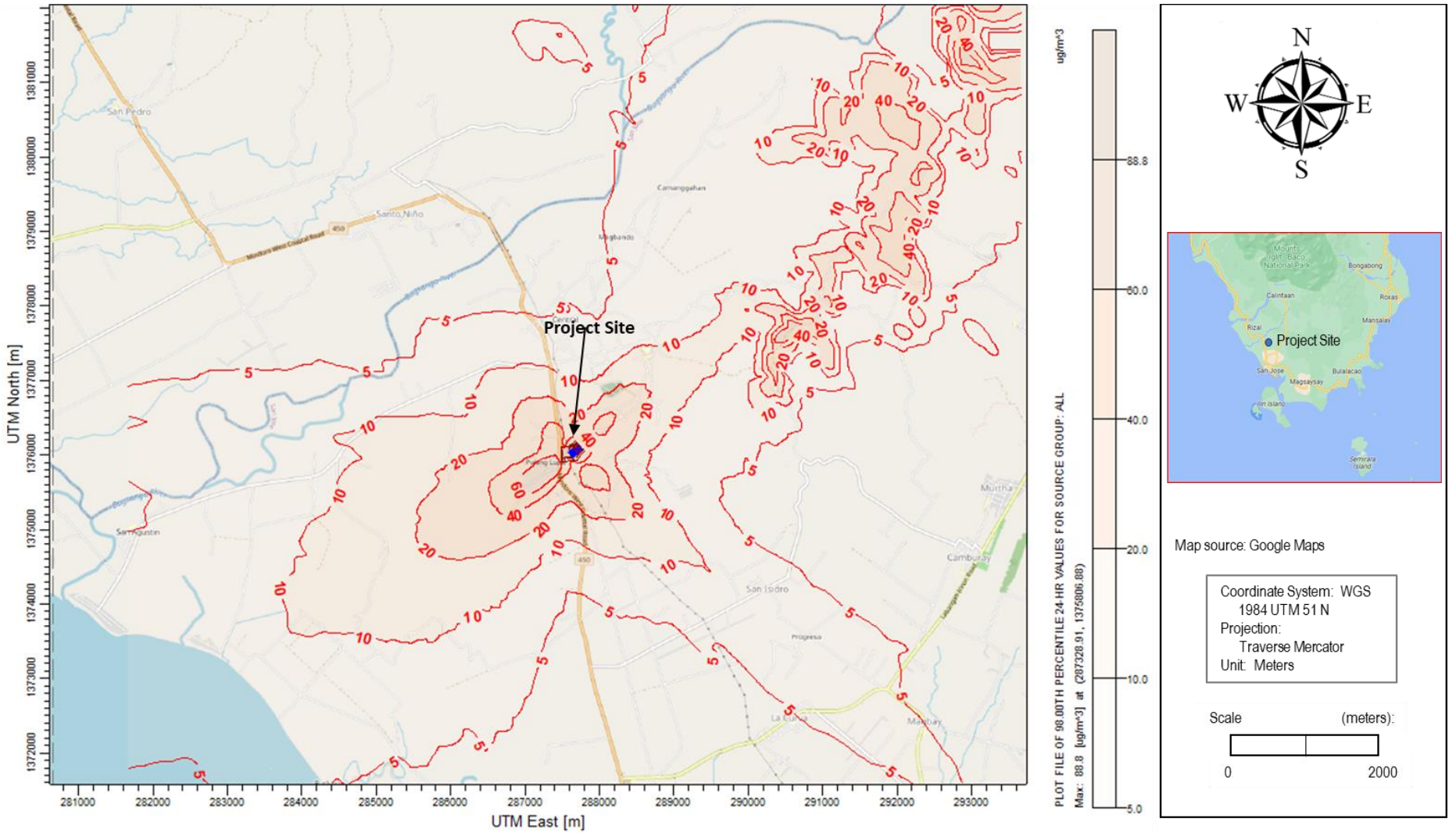


Figure 2.43. Plot of 98th percentile 24-hour values of dispersed SO_2 emanating from emissions of existing gensets (Gensets 1, 2, and 3) and proposed six (6) units of gensets (Stack heights = 5.32 m)

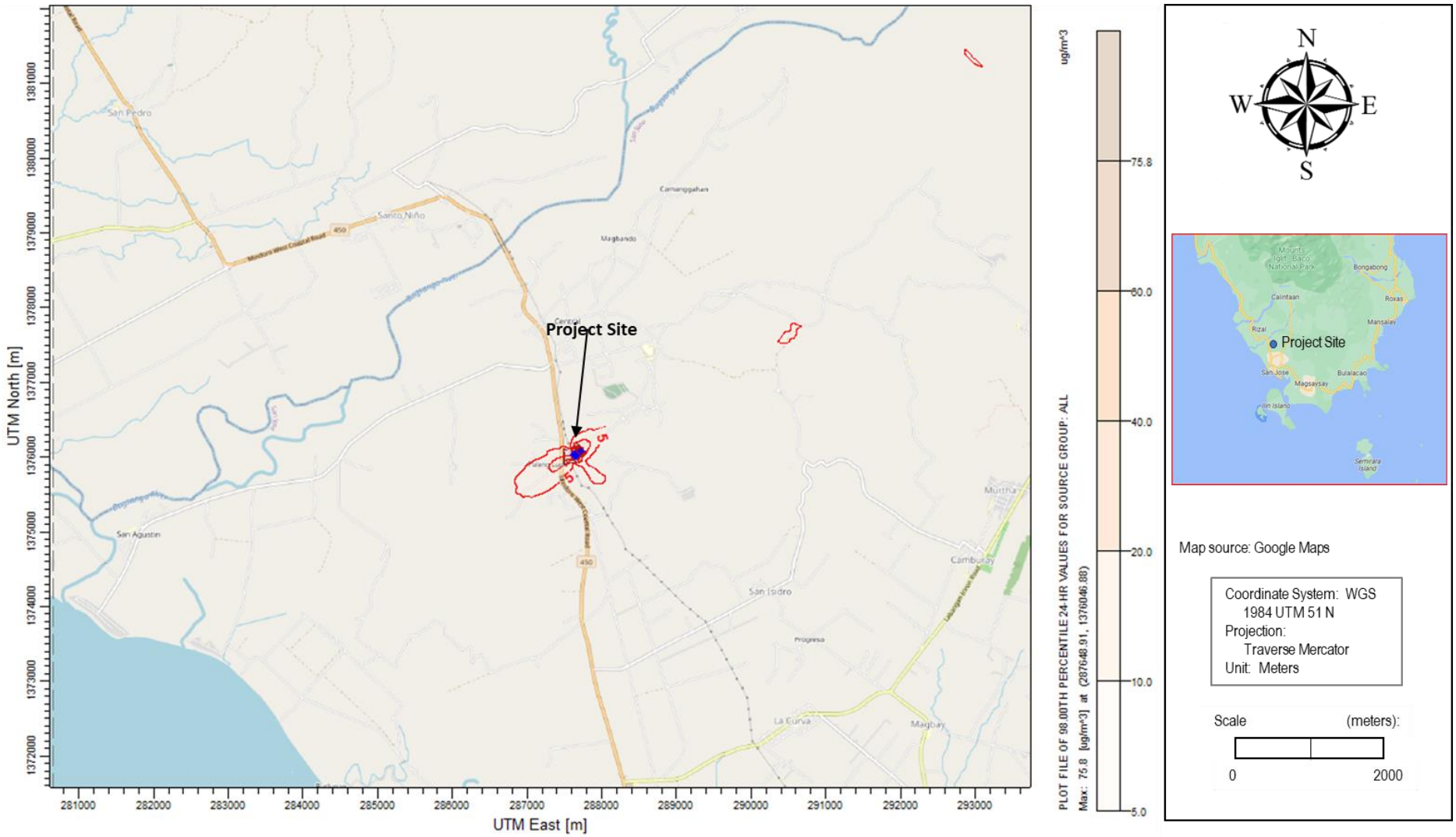


Figure 2.44. Plot of 98th percentile 24-hour values of dispersed TSP emanating from emissions of existing gensets (Gensets 1, 2, and 3) and proposed six (6) units of gensets (Stack heights = 5.32 m)

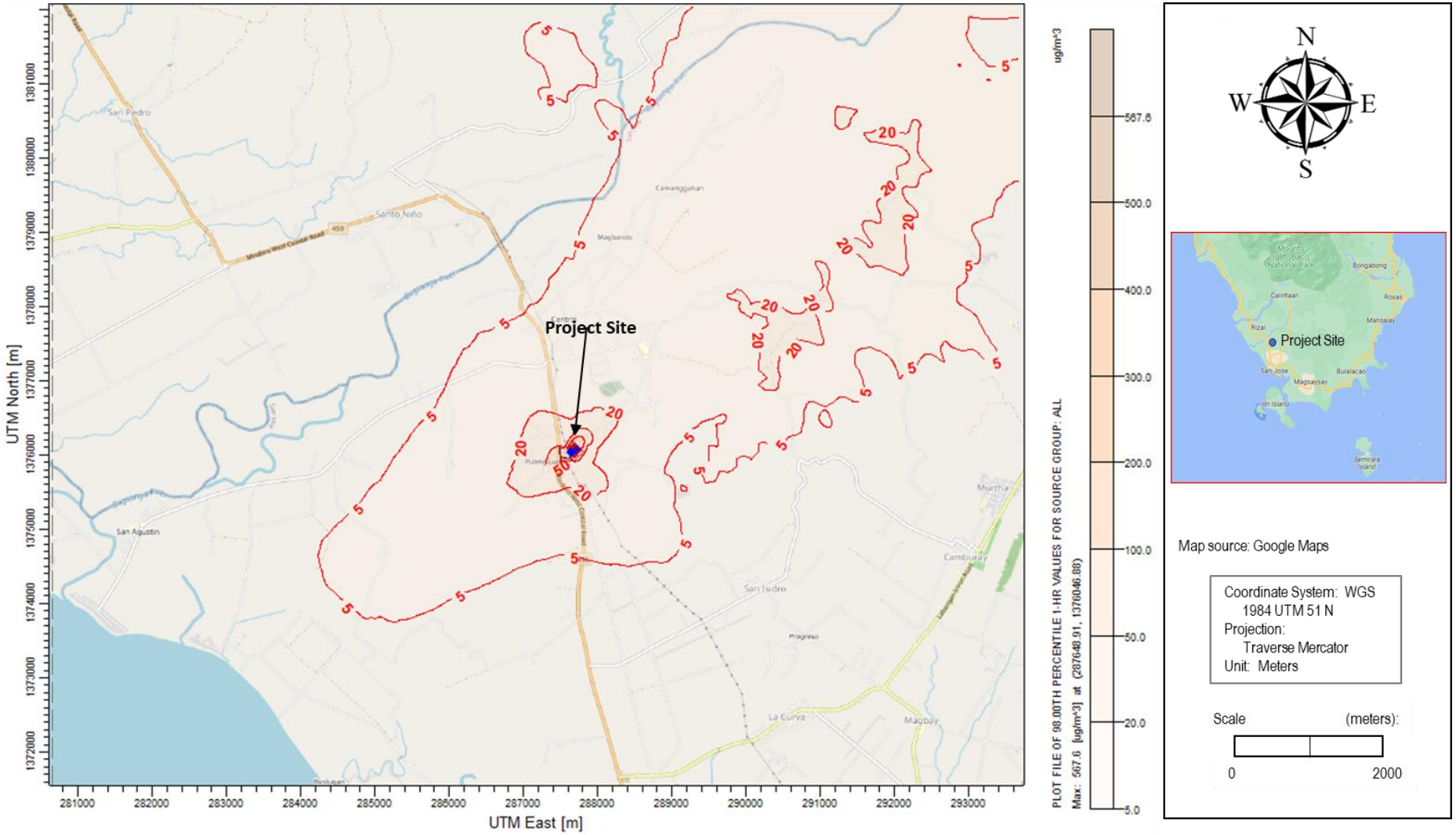


Figure 2.45. Plot of 98th percentile 1-hour values of dispersed CO emanating from emissions of existing gensets (Gensets 1, 2, and 3) and proposed six (6) units of gensets (Stack heights = 5.32 m)

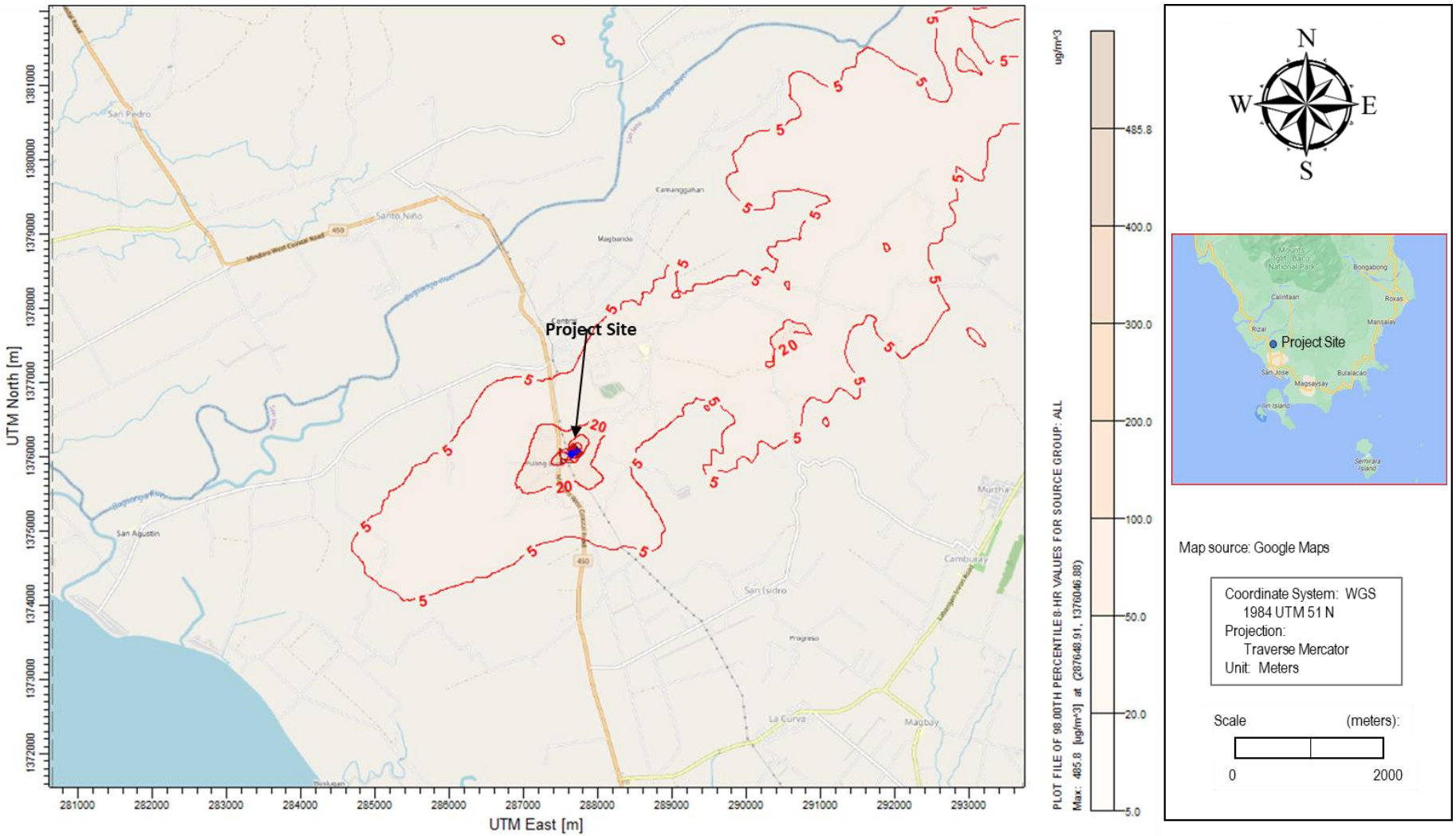


Figure 2.46. Plot of 98th percentile 8-hour values of dispersed CO emanating from emissions of existing gensets (Gensets 1, 2, and 3) and proposed six (6) units of gensets (Stack heights = 5.32 m)

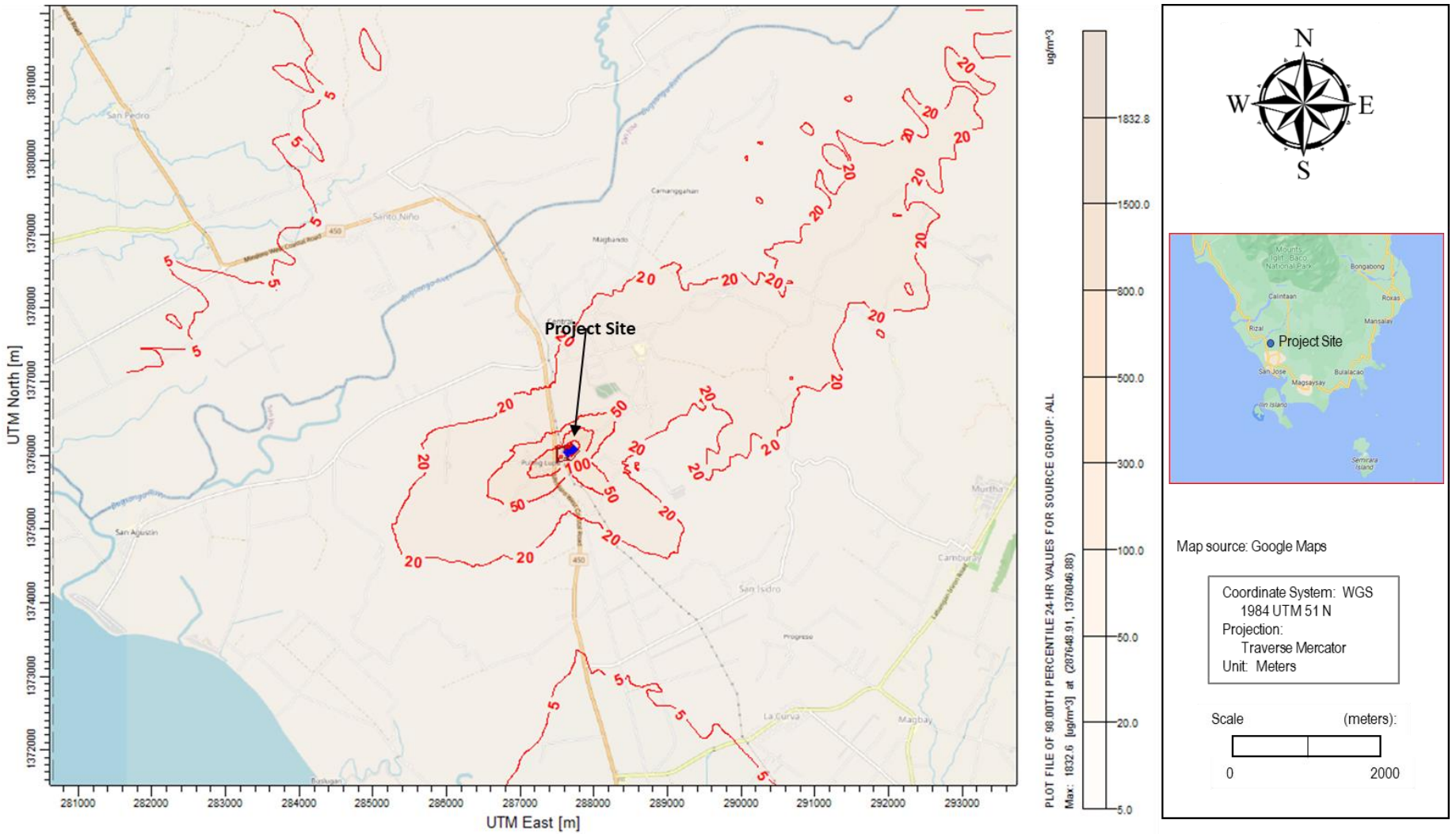


Figure 2.47. Plot of 98th percentile 24-hour values of dispersed NO_2 emanating from emissions of existing gensets (Gensets 1, 2, and 3) and proposed six (6) units of gensets (Stack heights = 5.32 m)

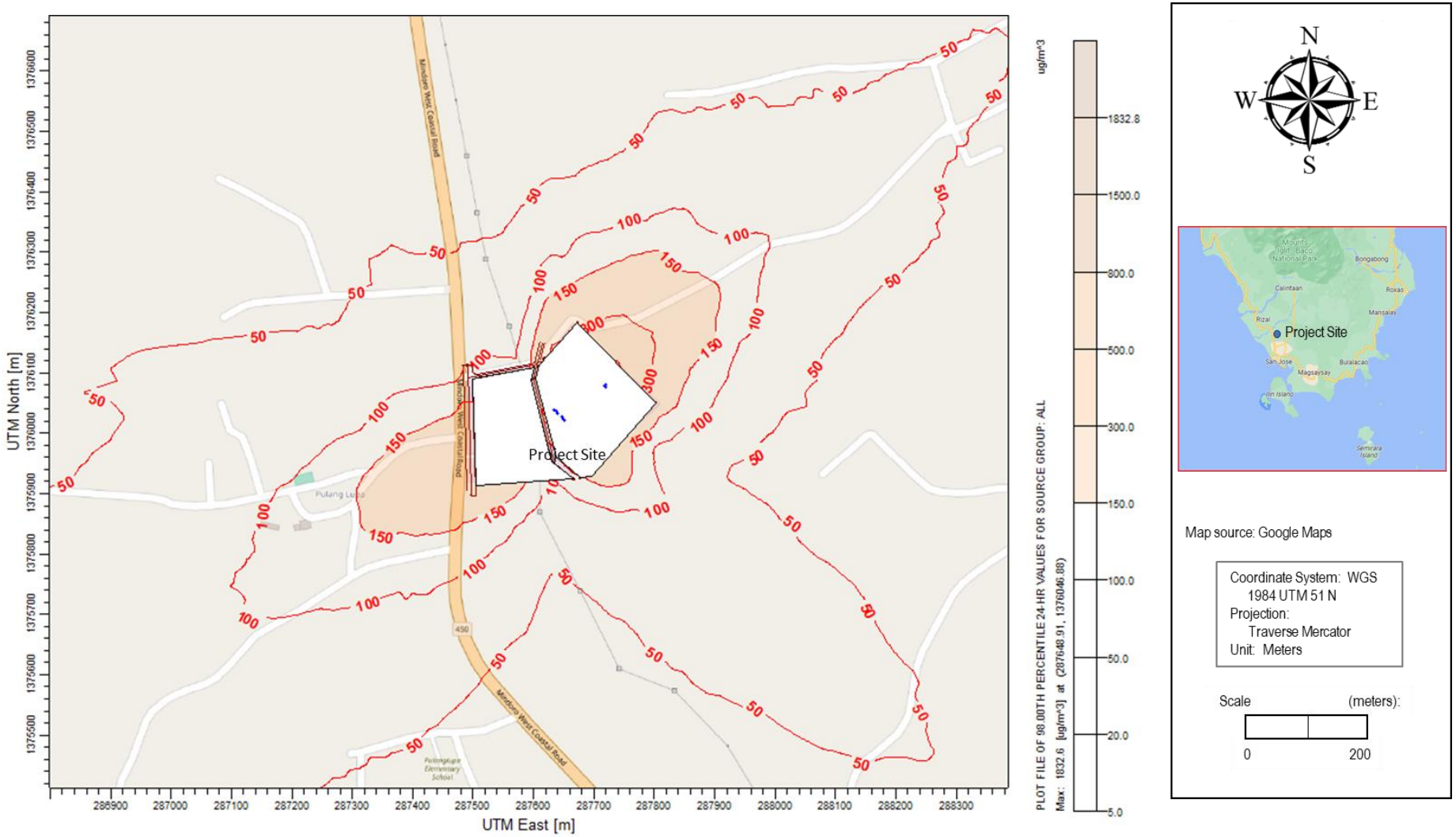


Figure 2.48. Closer view of the plot of 98th percentile 24-hour values of dispersed NO_2 emanating from emissions of existing gensets (Gensets 1, 2, and 3) and proposed six (6) units of gensets (Stack heights = 5.32 m)

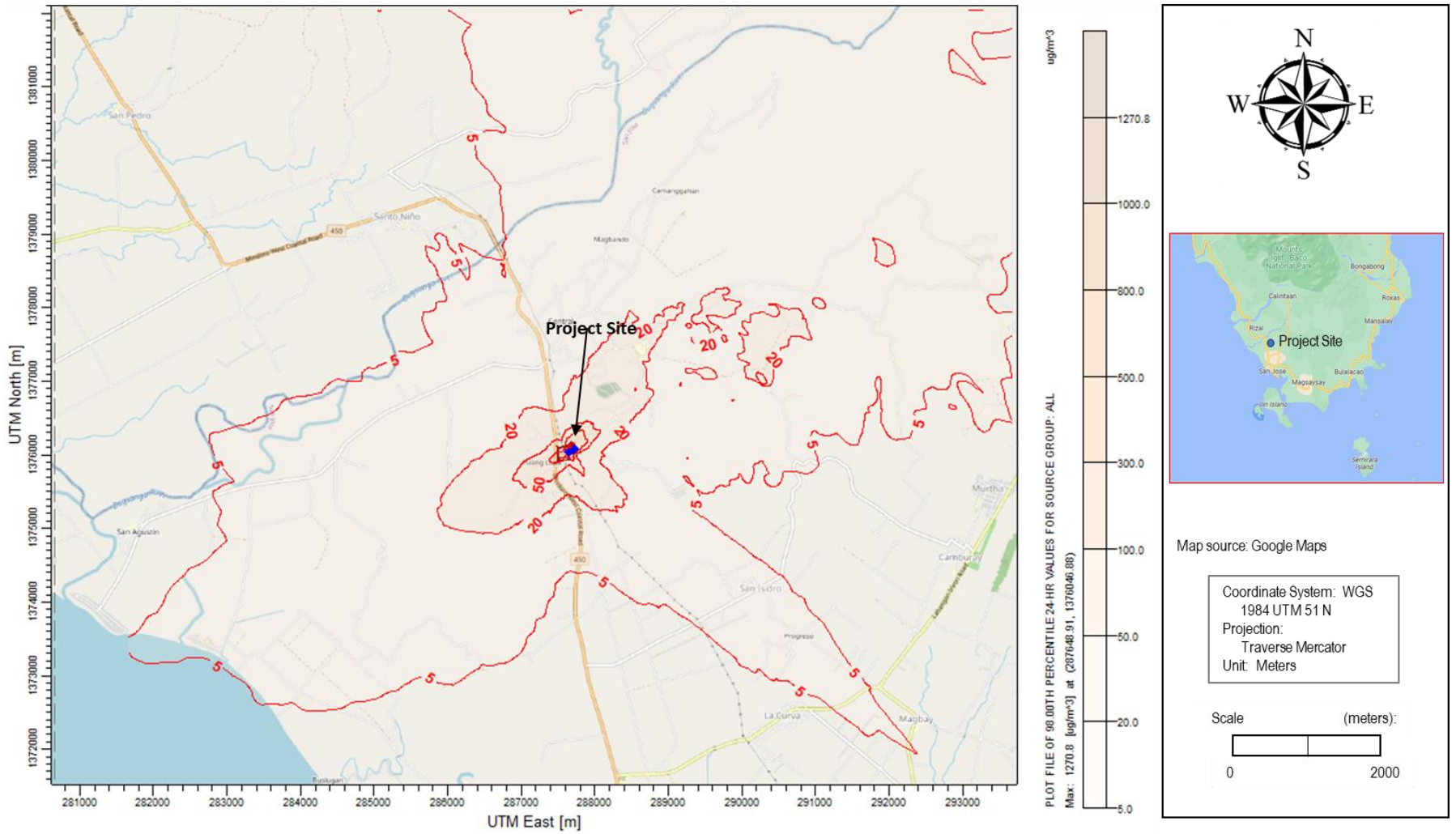


Figure 2.49. Plot of 98th percentile 24-hour values of dispersed NO_2 emanating from emissions of existing gensets (Gensets 1, 2, and 3) and proposed six (6) units of gensets (Stack heights = 5.32 m) assuming nine (9) days of continuous operation per month

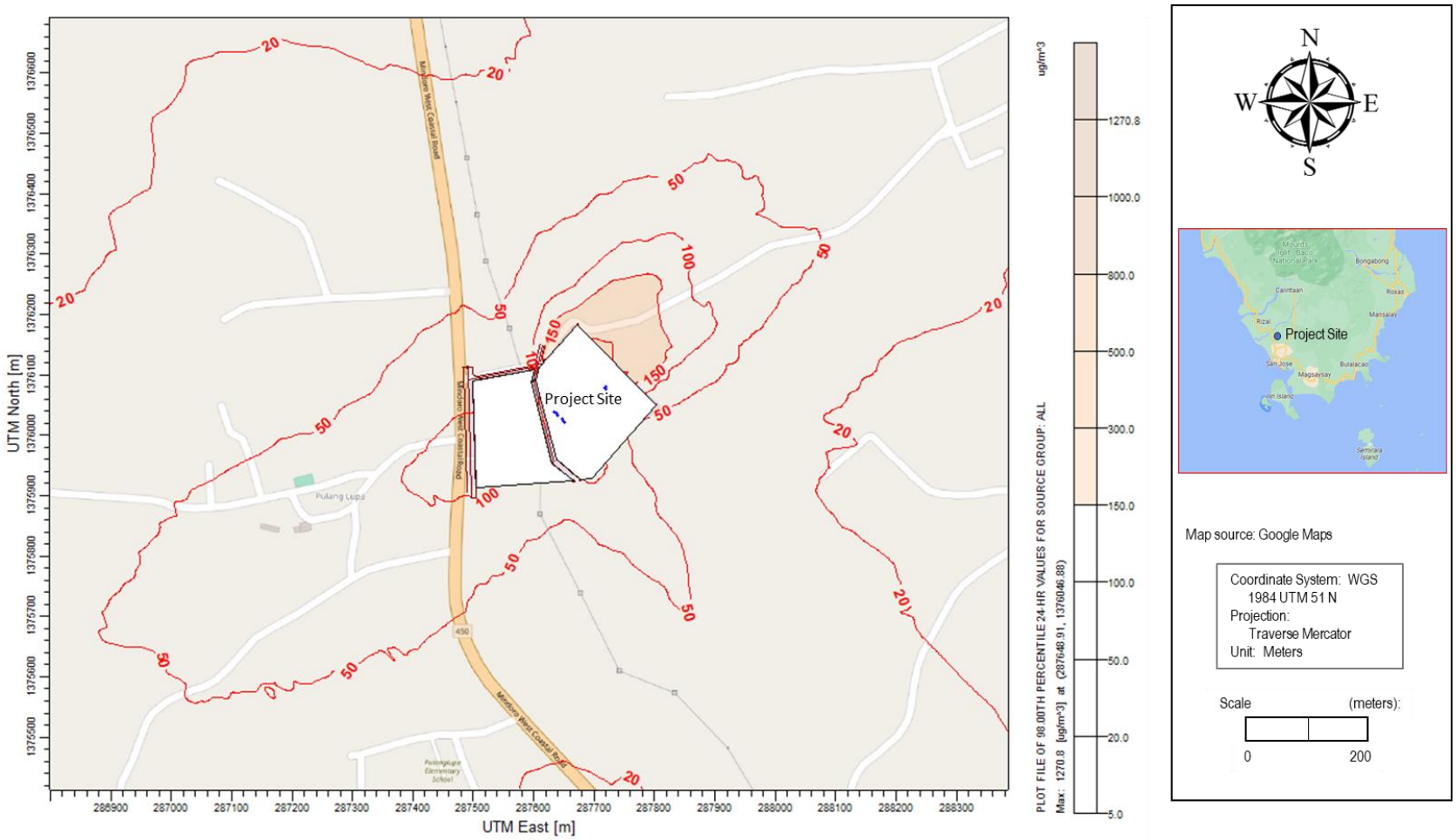


Figure 2.50. Closer view of the plot of 98th percentile 24-hour values of dispersed NO_2 emanating from emissions of existing gensets (Gensets 1, 2, and 3) and proposed six (6) units of gensets (Stack heights = 5.32 m) assuming nine (9) days of continuous operation per month

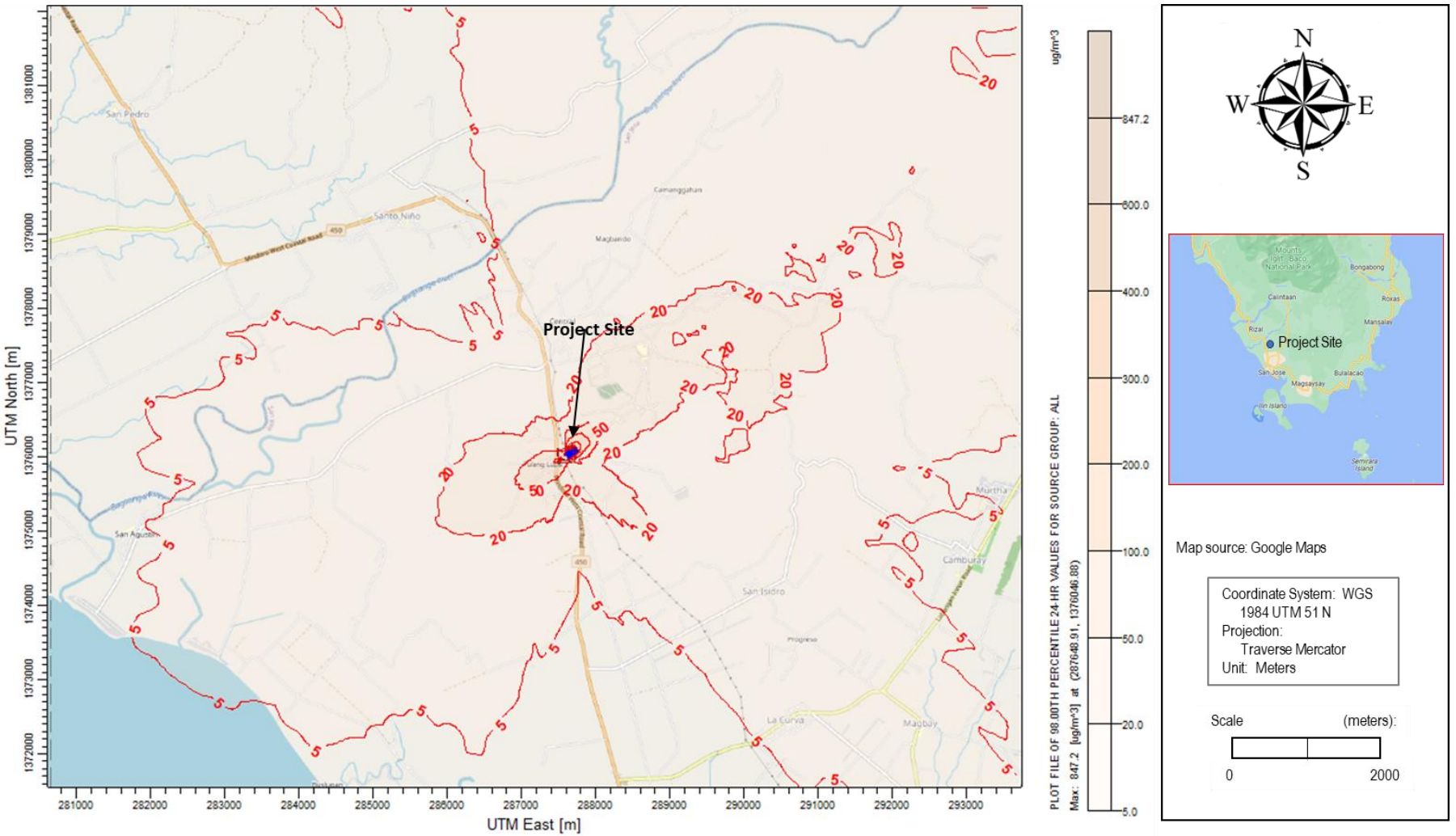


Figure 2.51. Plot of 98th percentile 24-hour values of dispersed NO_2 emanating from emissions of existing gensets (Gensets 1, 2, and 3) and proposed six (6) units of gensets (Stack heights = 5.32 m) assuming seven (7) hours of operation per day per month

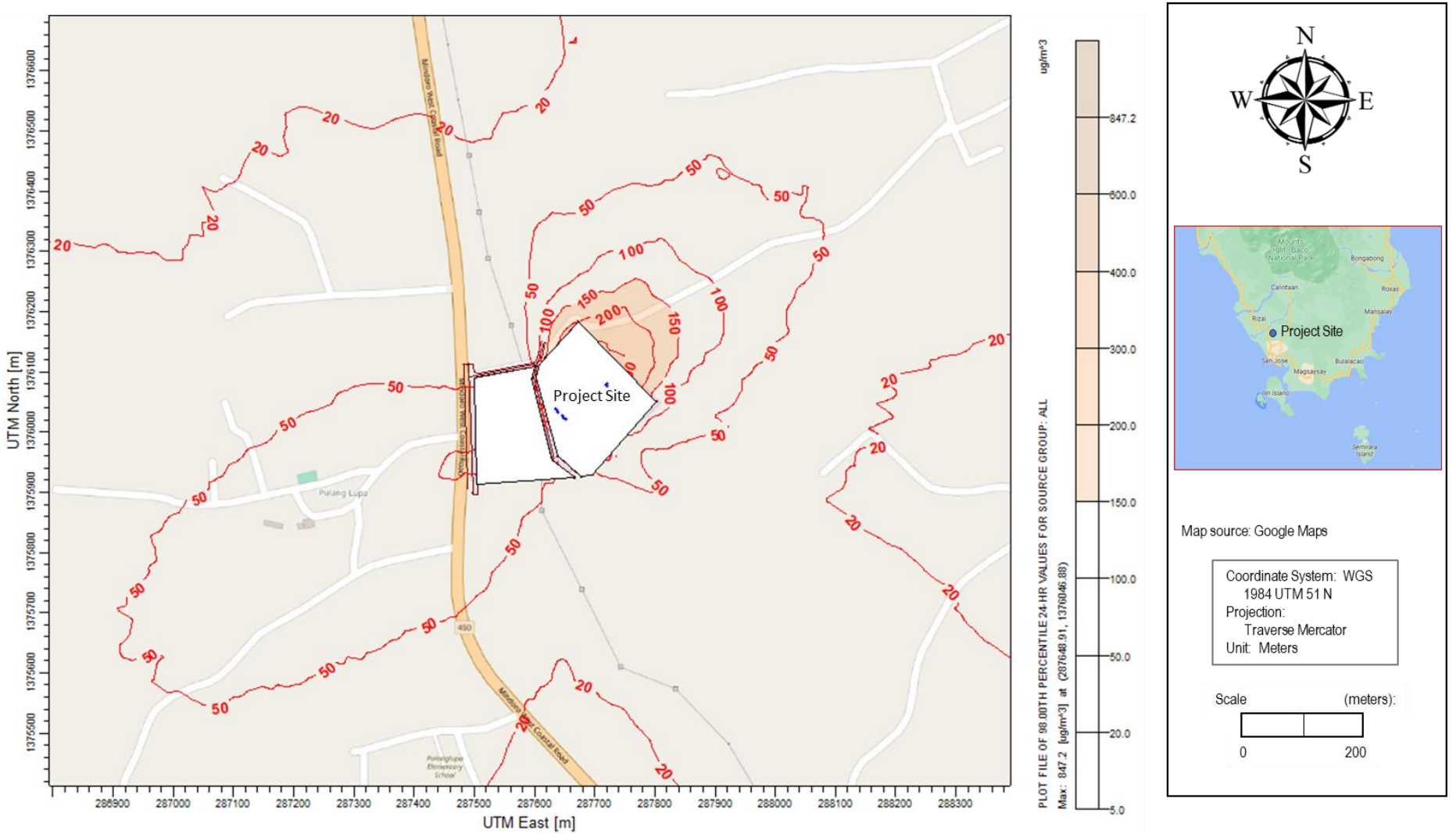


Figure 2.52. Closer view of the plot of 98th percentile 24-hour values of dispersed NO_2 emanating from emissions of existing gensets (Gensets 1, 2, and 3) and proposed six (6) units of gensets (Stack heights = 5.32 m) assuming seven (7) hours of operation per day per month

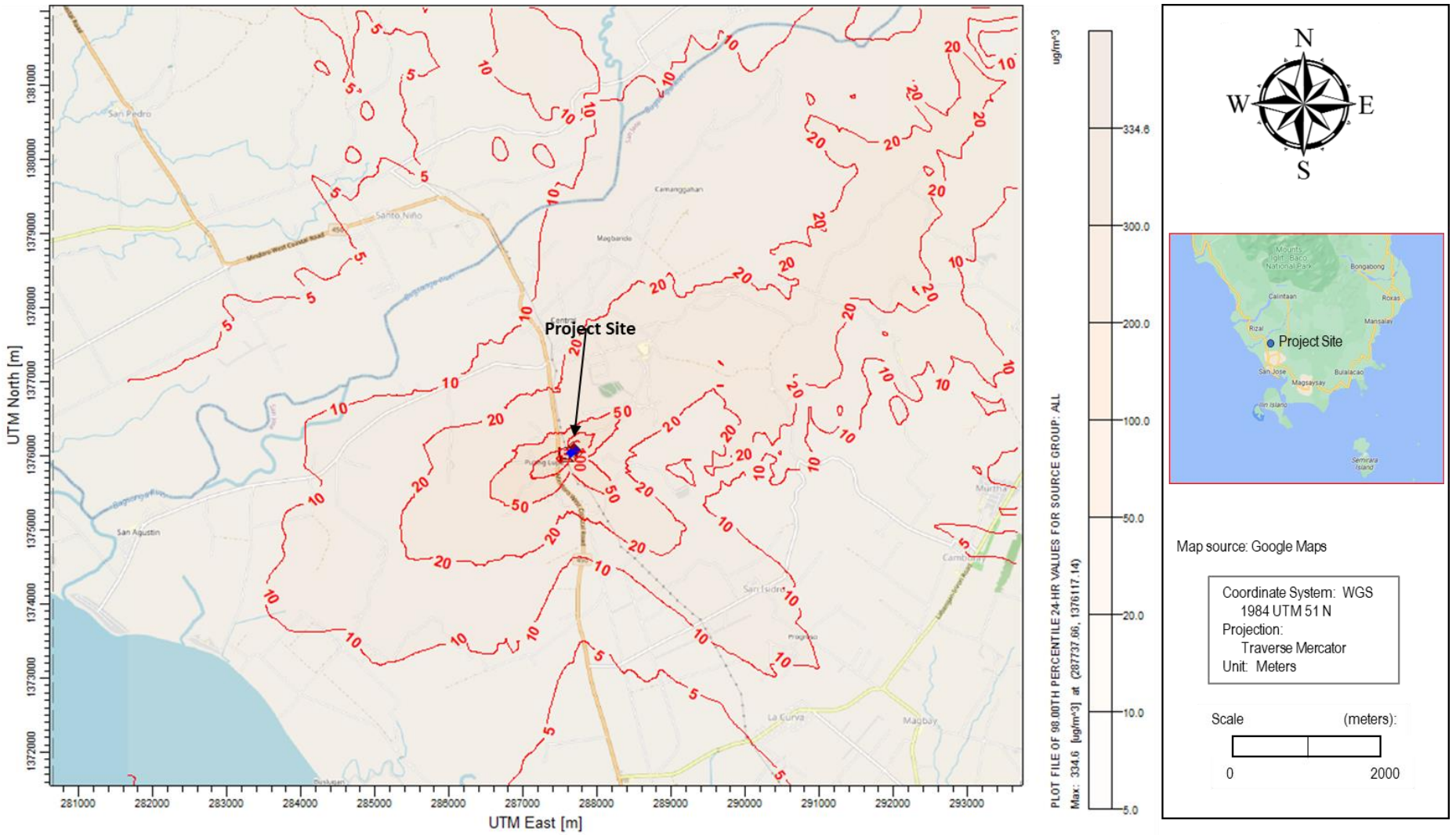


Figure 2.53. Plot of 98th percentile 24-hour values of dispersed NO_2 emanating from emissions of existing gensets (Gensets 1, 2, and 3) and proposed six (6) units of gensets (Stack heights = 8 m)

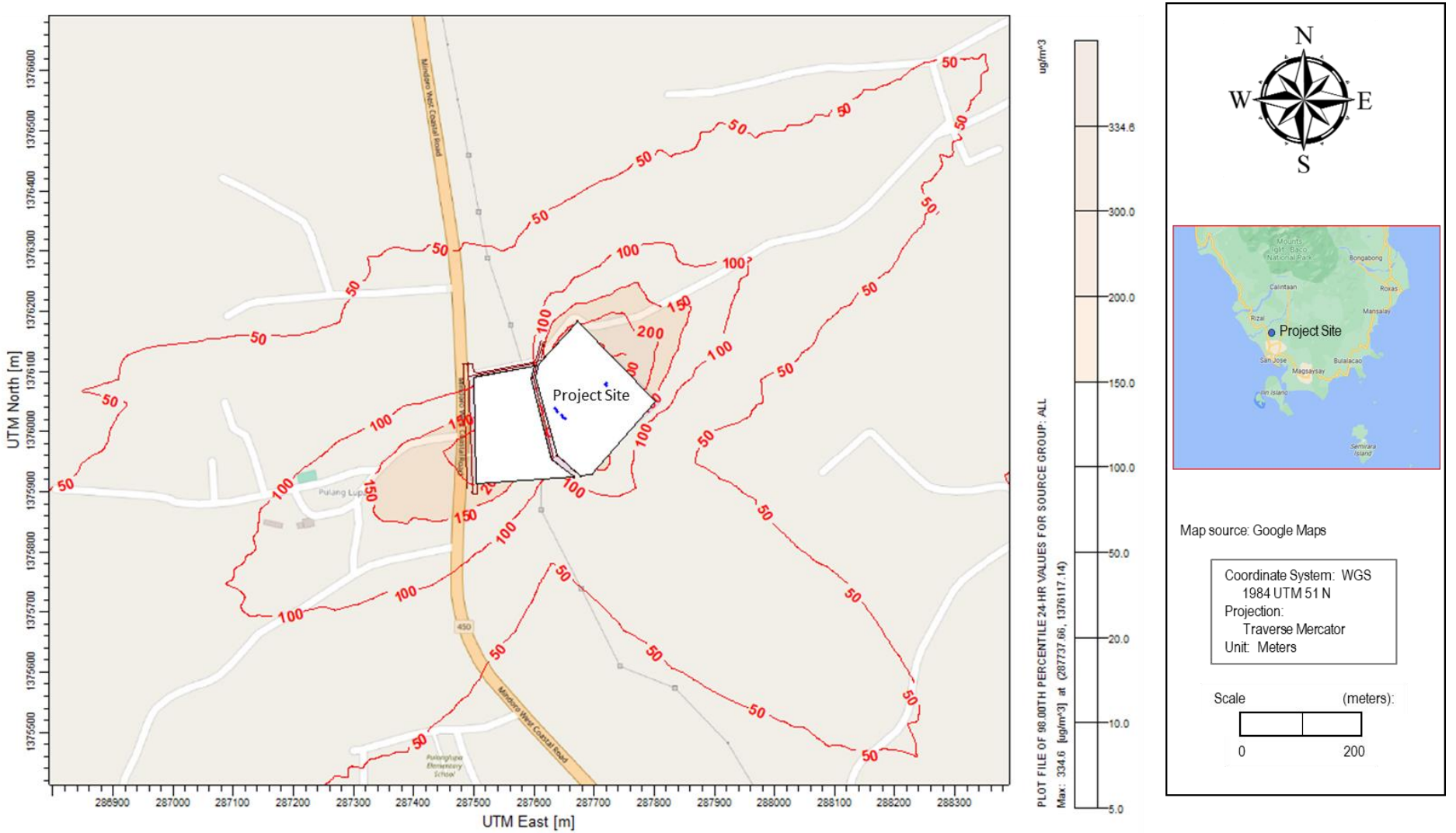


Figure 2.54. Closer view of the plot of 98th percentile 24-hour values of dispersed NO_2 emanating from emissions of existing gensets (Gensets 1, 2, and 3) and proposed six (6) units of gensets (Stack heights = 8 m)

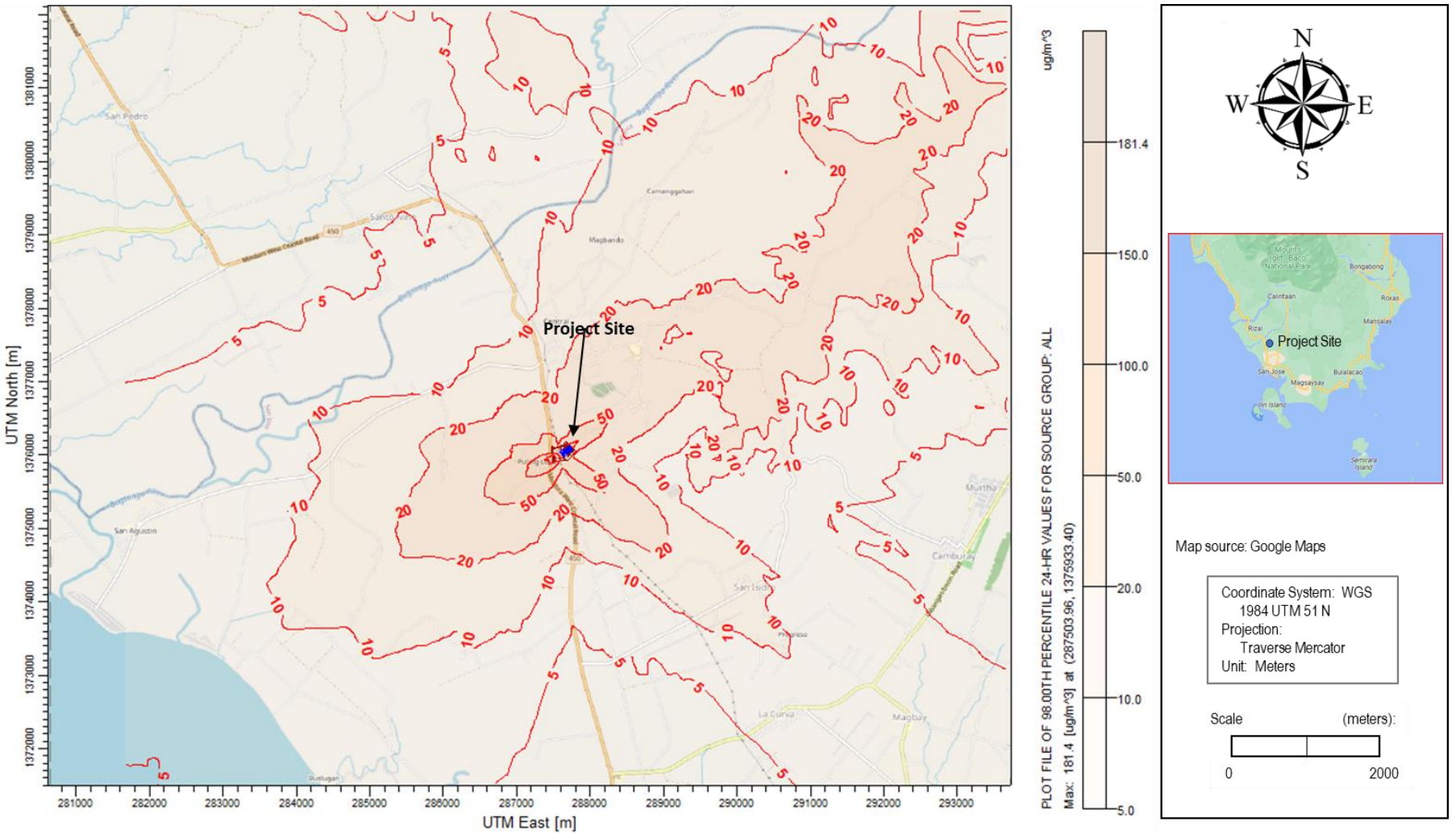


Figure 2.55. Plot of 98th percentile 24-hour values of dispersed NO_2 emanating from emissions of existing gensets (Gensets 1, 2, and 3) and proposed six (6) units of gensets (Stack heights = 12 m)

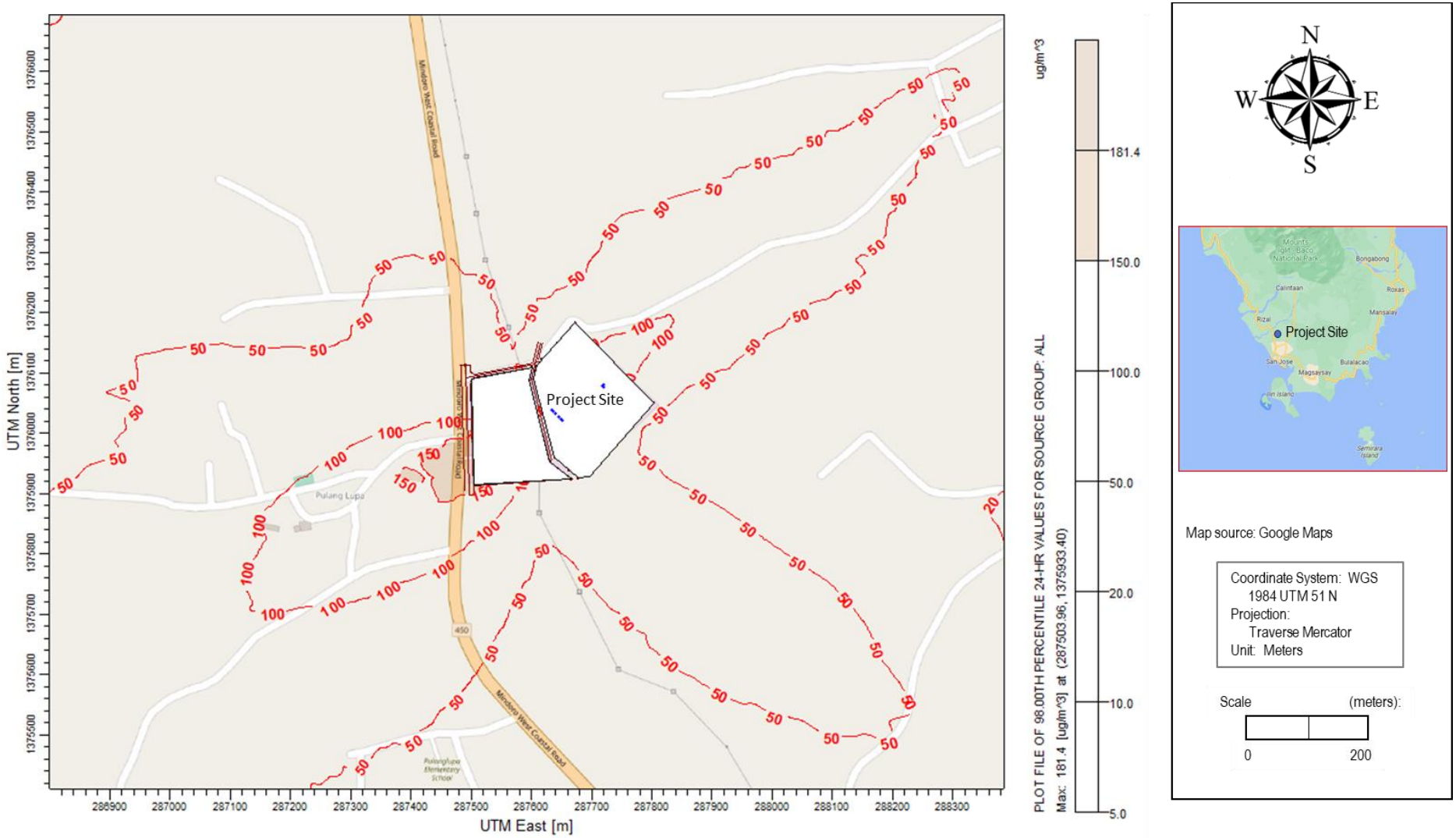


Figure 2.56. Closer view of the plot of 98th percentile 24-hour values of dispersed NO_2 emanating from emissions of existing gensets (Gensets 1, 2, and 3) and proposed six (6) units of gensets (Stack heights = 12 m)

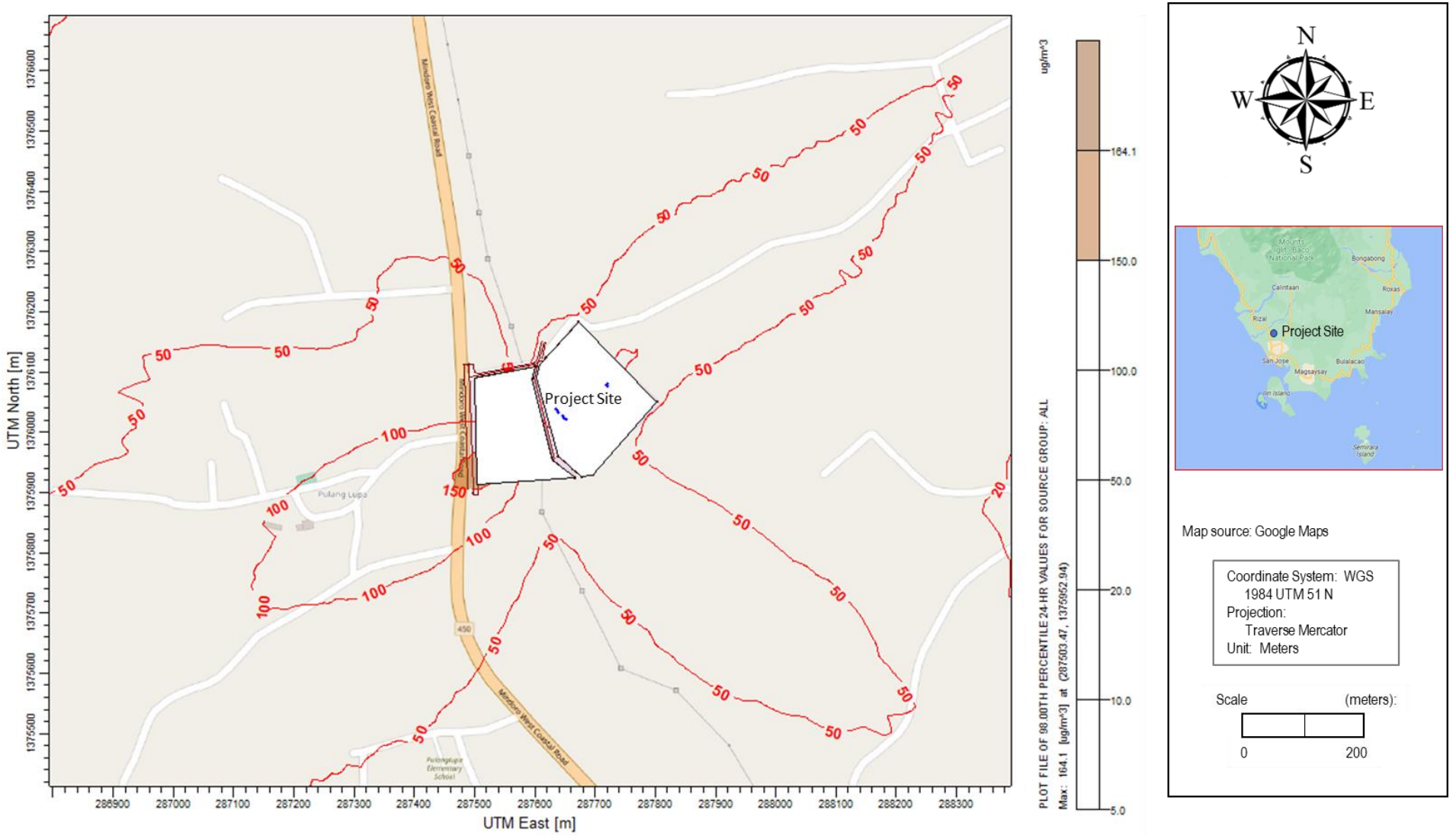


Figure 2.57. Closer view of the plot of 98th percentile 24-hour values of dispersed NO_2 emanating from emissions of existing gensets (Gensets 1, 2, and 3) and proposed six (6) units of gensets (Stack heights = 13 m)

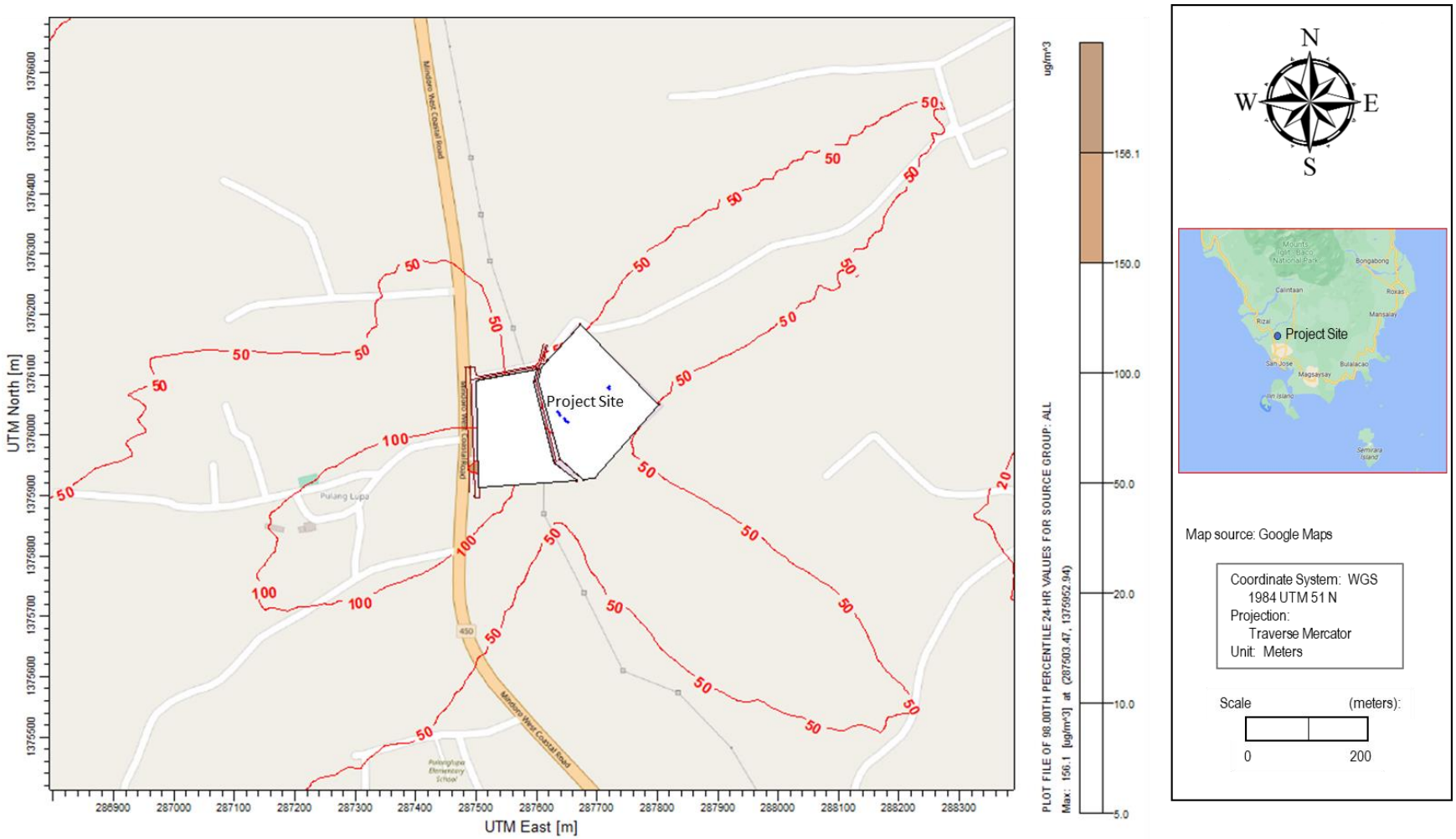


Figure 2.58. Closer view of the plot of 98th percentile 24-hour values of dispersed NO_2 emanating from emissions of existing gensets (Gensets 1, 2, and 3) and proposed six (6) units of gensets (Stack heights = 14 m)

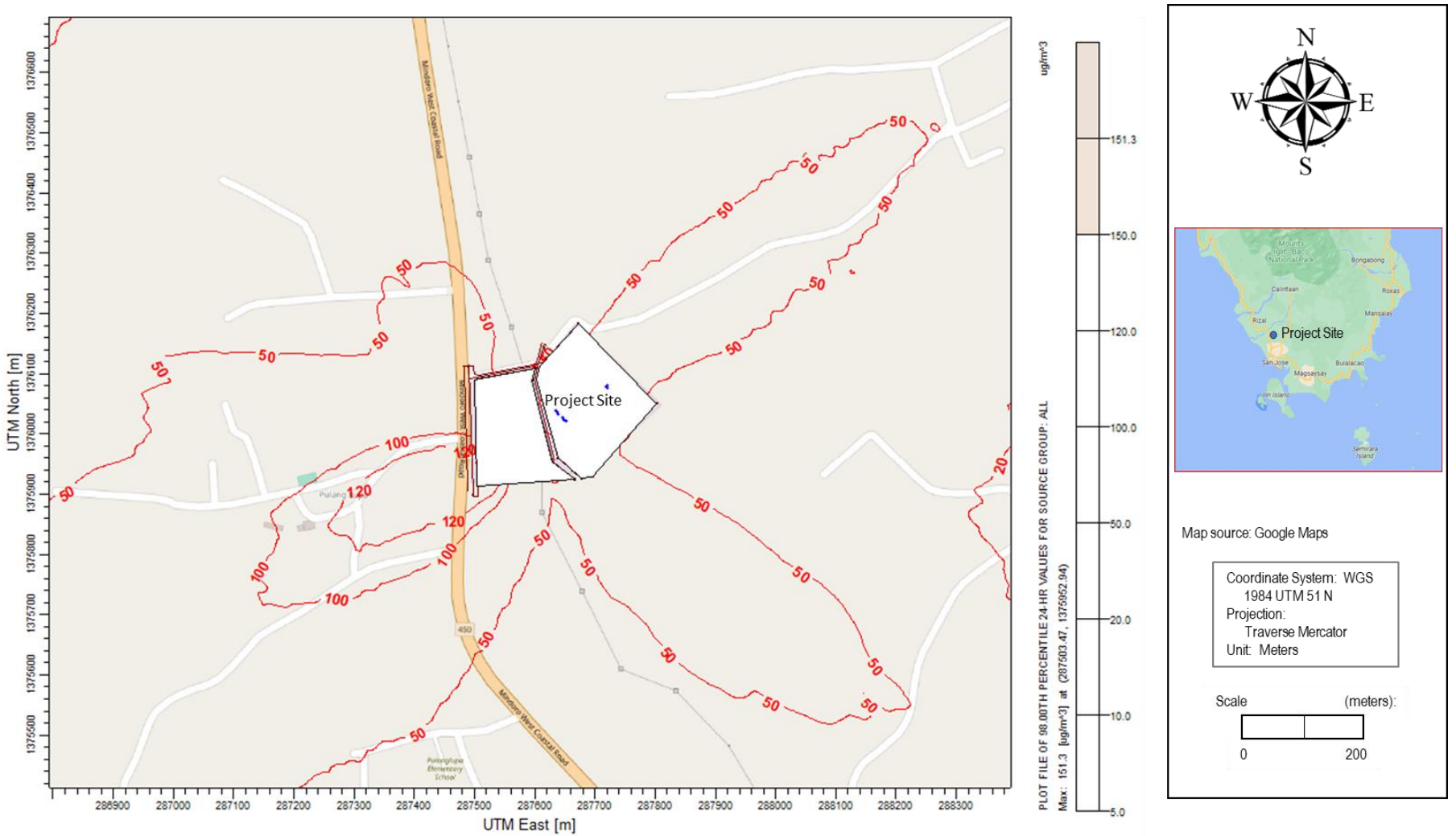


Figure 2.59. Closer view of the plot of 98th percentile 24-hour values of dispersed NO_2 emanating from emissions of existing gensets (Gensets 1, 2, and 3) and proposed six (6) units of gensets (Stack heights = 15 m)

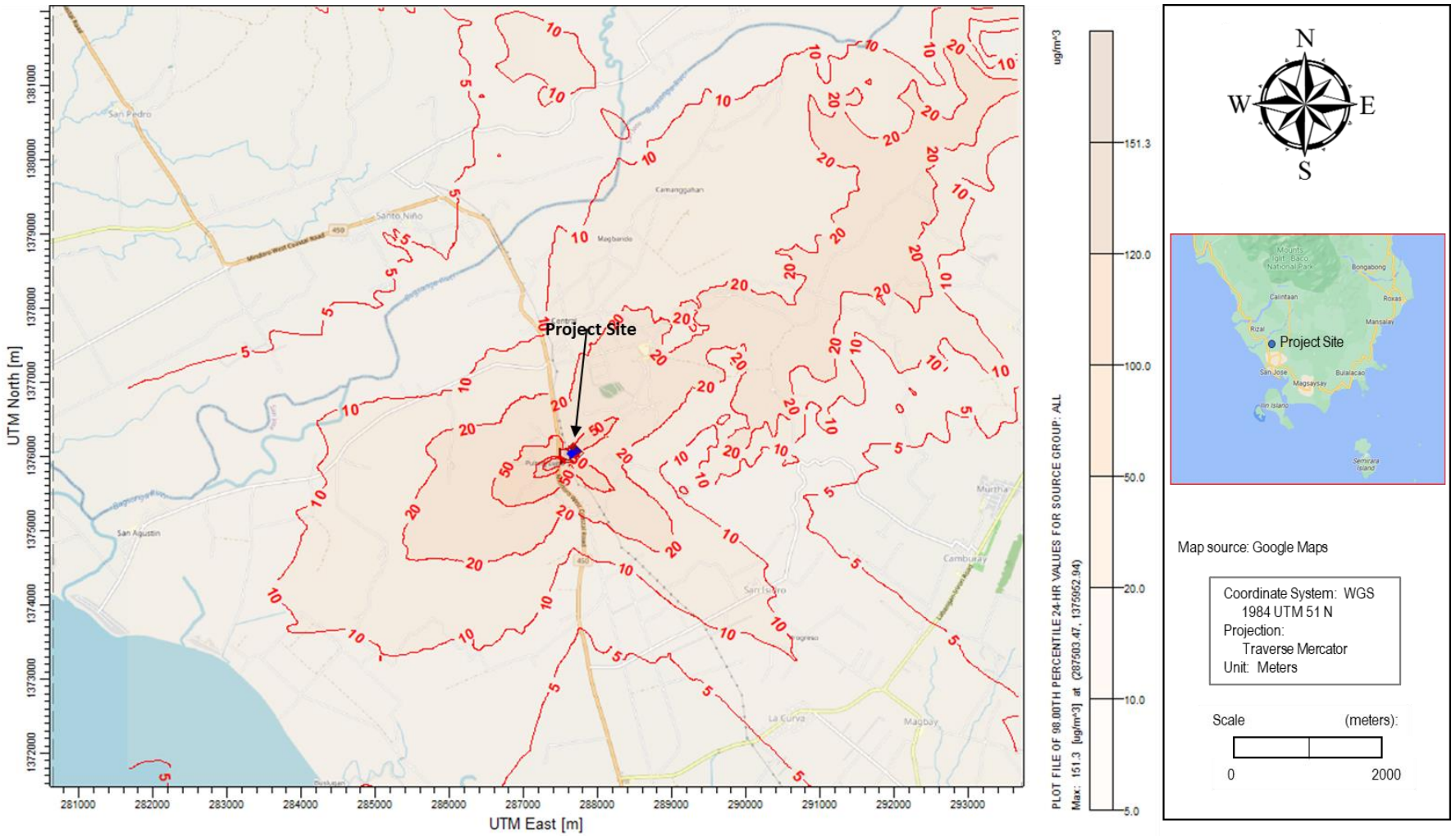


Figure 2.60. Plot of 98th percentile 24-hour values of dispersed NO_2 emanating from emissions of existing gensets (Gensets 1, 2, and 3) and proposed six (6) units of gensets (Stack heights = 15 m)

2.4. The People

2.4.1. Demographics

2.4.1.1. Methodology

Socio-economic profiles of the host local government units were used as bases to describe the historical and current socio-economic condition of the impact barangays and local government units. Profiles of the municipalities were obtained from their respective Municipal Planning and Development Office (MPDO) while barangay profiles were requested from barangay authorities. Additional secondary information were either obtained from publication, books and other reference materials as well as from the internet websites.

2.4.1.2. Baseline Condition and Environmental Performance

Socio-Economic Profile of Occidental Mindoro

Occidental Mindoro has a total population of 525,354 or 16.27% of MIMAROPA's total population (NSO, 2020). The province's population grows at an annual average rate of 1.59% from 2015-2020. The population density is 90 per square kilometer. The population of the province increased by 37,940 people when compared to 487,414 population in 2015.

San Jose is the most populated municipality with a population of 153,267 in 2020, which is 29.17% of the province's total population. Sablayan, which has the largest land area, ranks second in terms of population count with its populace reaching 92,598. Looc is the least populated municipality with a population of 7,802 in 2020. Occidental Mindoro's population is expected to reach 536,768 by the year 2025 as projected by the NSO based on the 2015 Census of Population.

Total enrolment in the province for both private and public elementary schools reached 74,292 students (SY 2019-2020) posting a slight increase of 0.95% from the previous school year's enrolment in 2018-2019. Out of the total elementary school enrollees, 96.50% attended public schools while only 3.42% attended private schools. Elementary participation rate is at 85.65% while completion rate is at 92.65%.

On the other hand, enrolment in the secondary level for the SY 2019-2020 for public and private schools totaled 58,590, 4.6% higher than the previous school year. Public high schools were attended by 88.85% of the total secondary students, while 11.15% of high school students went to private schools. Secondary participation rate is at 76.8% while completion rate is at 83.36%.

Correspondingly, there was an increase in the number of schools in both elementary and secondary levels only for government-operated schools. Four (4) new government elementary schools were opened during the SY 2019-2020 for a total of 303 while no new government secondary school was opened in the said school year. There is still no government stand-alone senior high school in the province while three (3) private stand-alone senior high school offer SHS curriculum. This is one (1) school higher when compared with the SY 2018-2019. Integrated schools in the province are at 15 schools, 2 schools higher when compared with the SY 2018-2019. Most of the integrated schools are private with only three (3) government integrated schools. In total, there are 407 schools in the province consisting of 9 kinder schools (all private), 324 elementary, 56 secondary, three (3) stand-alone SHS and 15 integrated schools the school year 2019-2020.

Based on the Status Report on Millenium Development Goals using CBMS Data: Province of Occidental Mindoro, the average literacy rate (15-24 years old) in the province is 93.6% for female and 92.4% for

male. Also, 85.3% and 81.0% of women and men, respectively, are functional literate. Simple literacy refers to a person's ability to read and write with understanding a simple message in any language or dialect. Functional literacy on the other hand, includes not only reading and writing skills but also numeric skills.

Majority of the gainful workers in Occidental Mindoro worked in the agriculture, forestry and fishing sector accounting for 42.89% of the total gainful workers 15 years old and over (2010). This indicates that majority of the people in the province depends on agriculture for their livelihood. On the contrary, only 4.67% of the total employed persons in the province worked in the service sector, 6.67% in the government, 5.10% in trade and 6.01 in the industry while 23.72% were laborers and skilled workers.

Labor force participation rate (LFPR) in Occidental Mindoro last 2020 is at 60.4. Employment rate is at 92.0% in 2020. The province had a considerably low unemployment rate in 2018 at 4.9% and then a high of 8.0% in 2020. Visible underemployment in the province, on the other hand, increased from 24.9% in 2018, 28.0% in 2019 and 38.7% in 2020. This means that there has been increase in the number of people in the province who wanted more hours of work but are only given 40 hours of work in a week.

Socio-Economic Profile of San Jose, Occidental Mindoro

San Jose is a first-class municipality located at the southern part of the province of Occidetal Mindoro with a total land area of 67,068.61 hectares. The municipality is shares common boundary with Rizal on the north, Oriental Mindoro's Municipality of Mansalay on the east and Magsaysay to the southeast. Mindoro Strait serves as boundary towards the west and southeast of the municipality.

Population size and number of households by barangay

The total population of the three (3) classified barangays - urban, rural and island - as of 2012 was 125,861 with a total household of 29,173. Of the total number of population 43.08% or a population of 54,222 resides in the rural barangays while 45.89% or a population of 57,758 resides in the urban barangays. The urban/rural population manifests the preference of people to reside in the rural areas.

Table 2.29 shows that among the 38 barangays, Barangay San Roque marked the largest population at 12,517 or 9.95% of the overall population of the Municipality of San Jose, followed by Caminawit with a population of 10,242 or 8.14% of the total municipal population. The third barangay in the Urban Classified Barangays is Pag-asa with a population of 9,990 or 7.94% of the total municipal population. Likewise, of the 38 barangays of San Jose, Barangay Poblacion 1 of the Urban Classified Barangays had the least population size at 140 or 0.11% of the total San Jose population.

Table 2.29. Population size and number of households by barangay, Municipality of San Jose, Occidental Mindoro

Number	Barangay	Population	Percentage	Number of households
Urban Barangays				
1	Bagong Sikat	5,685	4.52	1,225
2	Barangay Poblacion 1	140	0.11	60
3	Barangay Poblacion 2	247	0.20	77
4	Barangay Poblacion 3	1,019	0.81	245
5	Barangay Poblacion 4	503	0.40	126
6	Barangay Poblacion 5	1,251	0.99	326
7	Barangay Poblacion 6	335	0.27	98
8	Barangay Poblacion 7	354	0.28	115
9	Barangay Poblacion 8	256	0.20	76

Number	Barangay	Population	Percentage	Number of households
10	Bubog	8,343	6.63	1,963
11	Caminawit	10,242	8.14	2,237
12	Labangan Poblacion	6,876	5.46	1,669
13	Pag-asa	9,990	7.94	2,428
14	San Roque	12,517	9.95	3,191
	Sub-Total	**57,758**	**45.89**	**13,836**
Rural Barangays				
1	Batasan	4,946	3.93	1,099
2	Bayotbot	2,212	1.76	512
3	Camburay	1,835	1.46	421
4	Central	9,268	7.36	2,064
5	La Curva	3,416	2.71	849
6	Mabini	2,445	1.94	586
7	Magbay	3,591	2.85	828
8	Mangarin	3,236	2.57	765
9	Mapaya	6,863	5.45	1,614
10	Monteclaro	3,863	3.07	874
11	Murtha	5,297	4.21	1,215
12	San Agustin	5,231	4.16	1,191
13	San Isidro	2,019	1.60	472
	Sub-Total	**54,222**	**43.08**	**12,490**
Island Barangays (Rural)				
1	Ambulong	2,105	1.67	409
2	Ansiray	941	0.75	195
3	Bangkal	932	0.74	183
4	Buri	551	0.44	115
5	Catayungan	1,039	0.83	234
6	Ilin Proper	1,854	1.47	389
7	Inasakan	637	0.51	147
8	Ipil	708	0.56	135
9	Labangan Ilin	961	0.76	199
10	Natandol	1,594	1.27	340
11	Pawican	2,559	2.03	501
	Sub-Total	**13,881**	**11.03**	**2,847**
	Grand Total	**125,861**	**100.00**	**29,173**

Source: CLWUP 2017-2030 Comprehensive Land and Water Use Plan – Socio Economic and Physical Profile (SEPP) Volume 1

Historical population growth

Table 2.30 shows that the average growth rates posted in the municipality over the years 1903 to 2020 were all positive. The highest growth rate incurred during the years 1948-1960 at 9.85%. There were fluctuations over the years but still remained positive. The least growth rate observed was at 0.56% in the year 1948. Over the course of 117 years, there was an increase of 151,503 people in the Municipality of San Jose although there might be a variance since in 1969, several barangays formerly under San Jose became a separate municipality of what is now Magsaysay thus the significant decrease in growth rate by 1970.

Table 2.30. **Historical population growth,** Municipality of San Jose, Occidental Mindoro

Year	Total population	Increase/decrease	Percentage increase/decrease	Growth rate
1903	1,764			
1918	7,703	5,939	336.68	9.76%

Year	Total population	Increase/decrease	Percentage increase/decrease	Growth rate
1939	11,788	4,085	53.03	2.15%
1948	12,443	655	5.56	0.56%
1960	36,211	23,768	199.02	9.85%
1970	44,761	8,550	23.61	2.10%
1975	53,100	8,339	18.63	3.49%
1980	66,262	13,162	24.79	4.53%
1990	87,520	21,258	32.08	2.82%
1995	101,411	13,891	15.87	2.80%
2000	111,009	9,598	9.46	1.96%
2007	118,807	7,798	7.02	0.94%
2010	131,188	12,381	10.42	3.67%
2015	143,430	12,242	9.33	1.71%
2020	153,267	9,837	6.86	1.41%

Average household size per barangay

Table 2.31 shows that the average household size of the 38 barangays of the municipality was at 4. At the urban barangay level, the highest average household size is at Barangay Bagong Sikat and Caminawit at 5. The lowest was with Barangay Poblacion 2 at 2. On the other hand, at the Rural Barangay level, the highest average was 5 at Barangay Batasan, Barangay Central where the OMCPC power complex is located has an average household size of 4. At the Island Barangay level, almost all the barangays has an average household size of 5 except for Barangays Catayungan and Inasakan at 4.

Table 2.31. Average number of households by barangay, Municipality of San Jose, Occidental Mindoro

Number	Barangay	Total Population		Number of Households		Average Household*
		No.	%	No.	%	
Urban Barangays						
1	Bagong Sikat	5,685	4.52	1,225	4.20	5
2	Barangay Poblacion 1	140	0.11	60	0.21	2
3	Barangay Poblacion 2	247	0.20	77	0.26	3
4	Barangay Poblacion 3	1,019	0.81	245	0.84	4
5	Barangay Poblacion 4	503	0.40	126	0.43	4
6	Barangay Poblacion 5	1,251	0.99	326	1.12	4
7	Barangay Poblacion 6	335	0.27	98	0.34	3
8	Barangay Poblacion 7	354	0.28	115	0.39	3
9	Barangay Poblacion 8	256	0.20	76	0.26	3
10	Bubog	8,343	6.63	1,963	6.73	4
11	Caminawit	10,242	8.14	2,237	7.67	5
12	Labangan Poblacion	6,876	5.46	1,669	5.72	4
13	Pag-asa	9,990	7.94	2,428	8.32	4
14	San Roque	12,517	9.95	3,191	10.94	4
	Sub-Total	**57,758**	**45.89**	**13,836**	**47.43**	**4**
Rural Barangays						
1	Batasan	4,946	3.93	1,099	3.77	5
2	Bayotbot	2,212	1.76	512	1.76	4
3	Camburay	1,835	1.46	421	1.44	4
4	Central	9,268	7.36	2,064	7.08	4
5	La Curva	3,416	2.71	849	2.91	4
6	Mabini	2,445	1.94	586	2.01	4
7	Magbay	3,591	2.85	828	2.84	4
8	Mangarin	3,236	2.57	765	2.62	4
9	Mapaya	6,863	5.45	1,614	5.53	4

Number	Barangay	Total Population		Number of Households		Average Household*
		No.	%	No.	%	
10	Monteclaro	3,863	3.07	874	3.00	4
11	Murtha	5,297	4.21	1,215	4.16	4
12	San Agustin	5,231	4.16	1,191	4.08	4
13	San Isidro	2,019	1.60	472	1.62	4
	Sub-Total	**54,222**	**43.08**	**12,490**	**42.81**	**4**
Island Barangays (Rural)						
1	Ambulong	2,105	1.67	409	1.40	5
2	Ansiray	941	0.75	195	0.67	5
3	Bangkal	932	0.74	183	0.63	5
4	Buri	551	0.44	115	0.39	5
5	Catayungan	1,039	0.83	234	0.80	4
6	Ilin Proper	1,854	1.47	389	1.33	5
7	Inasakan	637	0.51	147	0.50	4
8	Ipil	708	0.56	135	0.46	5
9	Labangan Ilin	961	0.76	199	0.68	5
10	Natandol	1,594	1.27	340	1.17	5
11	Pawican	2,559	2.03	501	1.72	5
	Sub-Total	**13,881**	**11.03**	**2,847**	**9.76**	**5**
	Grand Total	**125,861**	**100.00**	**29,173**	**100.00**	**4**

Source: CLWUP 2017-2030 Comprehensive Land and Water Use Plan – Socio Economic and Physical Profile (SEPP) Volume 1
Note: * - rounded off to a whole number

Population Density by Barangay classification

Built-up density provides a picture of the concentration of population in a given area. Urban classified barangays are denser at 24.93 persons per hectare compared to the two (2) other classified barangay. Rural classified barangays have an average density of 1.14 persons/ha and the Island classified barangays at a density of 1.63 persons/ha.

Population density by barangays

Table 2.32 manifests that the average population density of 2.48 persons/hectare of the whole municipality reflects a sparse density of San Jose. It further implies that it could still admit additional legal settlers into the community. However, the entry of migrants/settlers into the area must be regulated to avoid the negative effects of migration. Among the 38 barangays, Barangays Batasan of the rural barangays has the lowest density at 0.53 persons per hectare, followed by Barangay Bayotbot at 0.91 persons/hectare and 0.87 persons/hectare at Barangay Buri of the Island Barangays.

Table 2.32. Population size and number of households by barangay, Municipality of San Jose, Occidental Mindoro

Number	Barangay	Total Population		Land Area (in hectares	Population Density
		No.	%		
Urban Barangays					
1	Bagong Sikat	6,564	4.58	559.08	11.74
2	Barangay Poblacion 1	283	0.20	5.70	49.63
3	Barangay Poblacion 2	415	0.29	8.87	46.79
4	Barangay Poblacion 3	1,323	0.92	11.20	118.09
5	Barangay Poblacion 4	500	0.35	8.66	57.71
6	Barangay Poblacion 5	1,569	1.09	8.67	181.04
7	Barangay Poblacion 6	398	0.28	6.71	59.30
8	Barangay Poblacion 7	436	0.30	10.94	39.84
9	Barangay Poblacion 8	348	0.24	6.31	55.18
10	Bubog	9,356	6.52	1,351.27	6.92
11	Caminawit	12,223	8.52	170.58	71.65

Number	Barangay	Total Population		Land Area (in hectares	Population Density
		No.	%		
12	Labangan Poblacion	9,683	6.75	718.33	13.48
13	Pag-asa	11,232	7.83	171.60	65.46
14	San Roque	14,706	10.25	298.75	49.23
	Sub-Total	**69,036**		**3,337**	
Rural Barangays					
1	Batasan	6,260	4.36	10,123.48	0.62
2	Bayotbot	2,492	1.74	2,396.02	1.04
3	Camburay	1,849	1.29	1,055.85	1.75
4	Central	10,901	7.60	3,624.87	3.01
5	La Curva	2,938	2.05	879.36	3.34
6	Mabini	3,410	2.38	513.40	6.64
7	Magbay	3,034	2.12	703.75	4.31
8	Mangarin	4,299	3.00	1,655.70	2.60
9	Mapaya	7,982	5.57	4,288.68	1.86
10	Monteclaro	5,985	4.17	15,952.84	0.38
11	Murtha	3,855	2.69	4,942.82	0.78
12	San Agustin	5,363	3.74	1,644.05	3.26
13	San Isidro	1,785	1.24	735.22	2.43
	Sub-Total	**60,153**		**48,516**	
Island Barangays (Rural)					
1	Ambulong	2,224	1.55	1,033.41	2.15
2	Ansiray	1,032	0.72	775.21	1.33
3	Bangkal	933	0.65	603.19	1.55
4	Buri	607	0.42	641.83	0.95
5	Catayungan	1,021	0.71	502.32	2.03
6	Ilin Proper	2,124	1.48	1,398.05	1.52
7	Inasakan*	625	0.44	483.02	1.29
8	Ipil	789	0.55	606.64	1.30
9	Labangan Ilin	1,070	0.75	689.10	1.55
10	Natandol	1,521	1.06	477.53	3.19
11	Pawican	2,295	1.60	1,002.03	2.29
	Sub-Total	**14,241**		**8,212**	
	Cajui Island			1.06	
	Buri Island			5.23	
	Manadi Island			2.27	
	Sub-Total			**8.56**	
Barangay in conflict with					
1	VS W/ BATASAN AND MONTECLARO			2,299.44	-
2	VS W/ CAMBURAY AND SAN ISIDRO			23.52	-
3	VS W/ CATAYUNGAN AND NATANDOL			97.81	-
4	VS W/ CENTRAL AND SAN ISIDRO			101.20	-
5	VS W/ LAPANGAN AND MABINI			27.87	-
6	VS W/ MANGGARIN AND MAPAYA			51.83	-
7	VS W/ PAWICAN AND NATANDOL			68.35	-
8	VS W/ SAN ISIDO AND LACURVA			69.58	-
	Sub-Total			**2,739.61**	
	Grand Total	**143,430**		**62,813.00**	

Source: CLWUP 2017-2030 Comprehensive Land and Water Use Plan – Socio Economic and Physical Profile (SEPP) Volume 1

Gender Ratio

In 2014, comparing gender among babies at age 1 year old, more female babies (10.99%) were born than the male babies of same age (3.30%). Nevertheless, in the succeeding age groups, there are more male than females. Figure 2.61 shows the age and gender structure of the municipality as of 2014.

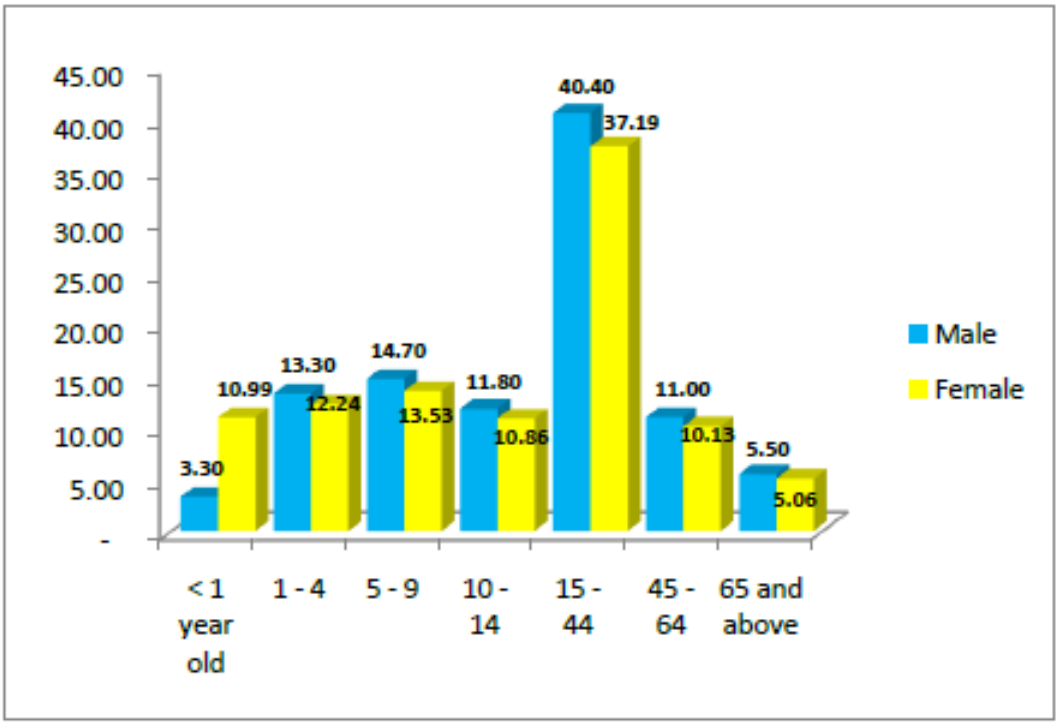


Figure 2. 61. Percentage of age and gender structure, San Jose, Occidental Mindoro

Ethnic Groupings

The Municipality of San Jose is composed of different ethnic groups. Indigenous Mangyan peoples comprises 3.42 of the population of the Municipality. Mangyans in the municipality are divided into different tribes anthropogenically labelled as HAGURA (Hanunuo, Gubatnon and Ratagnon, and Buhid). Other people in the locality are Visayans, Batangueños and Ilocanos.

In the host barangay of Central there is no recorded tribal community or ancestral domain although there are few individuals (approximately six (6)) who belongs to the Mangyan tribe. Barangays Batasan and Monteclaro located in the hinterlands hosts most of the Mangyan IP's in the Municipality of San Jose.

Dialects/Language Spoken and Understood

The population of San Jose is multi-lingual. A mixture of different dialects and languages are understood and spoken by the population. However, Tagalog is the most outspoken dialect used daily by the people in the community. There is also a significant number of the San Jose population who speak Hiligaynon-Ilonggo and Ilocano. Native settlers like Mangyan speak with their own Mangyan dialect. Children could quite easily shift from Tagalog to their native tongue. Aside from Tagalog-based Filipino language, English is also once in a while spoken and/or understood by the people of the communities while others can speak Chinese and other foreign languages.

Educational Services

The Local Government units of San Jose recognized the importance of education in molding responsible citizenry. To achieve this goal, the San Jose District at present is composed of 75 public and private elementary schools with complete elementary education. Aside from the formal education, other programs were undertaken in the District not only for the enhancement of the pupil's development but also of the teaching staff. The student development programs included those concerned with testing programs, nutrition development programs and competitions in sports and academics. For staff development, seminars and trainings were conducted for a more effective and efficient teaching skills. There is also a constant improvement and/or updating of the curriculum to meet the demands of better education. As far as the secondary level is concerned, there are five (5) private and seven (7) public high schools. The 12 secondary schools of San Jose have enough teaching staff to meet the needs of their secondary students. To further enhance the education of their community people, San Jose has five (5) tertiary schools. Three (3) of these tertiary schools are offering vocational courses only while two (2) offers both degree and vocational courses. The schools in San Jose are all dispersed in the local communities to make them more accessible to the students.

In Brgy. Central, owing to its large area, there are four (4) government elementary schools and two (2) secondary schools (1 private and 1 government). There are also eight (8) daycare centers in the host barangay.

Housing

Based on the 2014 CBMS data, about 63.93% of the 29,173 households stated that they are the owners of their residences or they own their residence but without the consent of lot owner while the remaining 36.07% stated that their residences were either rented or they are squatting. Dwelling units were either single detached or duplex and some are apartment types. Housing materials are either concrete hollow block with galvanized roofing or are made of light materials and some households were made up of salvaged//makeshift materials.

Only 24,103 households out of 29,173 have access to sanitary toilets while the remaining 17.38% have no access to sanitary toilets. Most of the households with no access to sanitary toilets are from the island barangays.

In terms of access to safe water, 11.16% or 3,255 households have no access to safe water. Majority of households with access to safe water were due to its proximity to the San Jose Water District which caters to the water demands of the urbanized barangays and some rural barangays. Brgy. Central relies mostly on deepwell and some level 2 water system.

Sports and Recreation

There are numerous sports and recreation facilities that exist in San Jose. Basketball, volleyball and tennis courts, gymnasium, movie houses, billiard halls, karaoke/videoke bars, disco houses, cockpit arena, public plaza, public beach (with cottages), private swimming pools and many more are available for recreation and leisure activities in the municipality. Numerous basketball courts are found in each barangay. Some barangays are provided with more than one (1) basketball court that serves as major venue of various outdoor sports activities. In other barangays, these facilities are utilized as places to solar dry rice during harvest season. The sports and recreation activities are usuallyengaged by the youth, as well as, adults in the municipality for their physical fitness. Other recreational structure like the Children's Park was established to cater to children.

Social Welfare

The Municipal Social Welfare and Development Office (MSWDO) is in-charge of all matters related to social welfare and development services. Two social workers facilitate the undertakings of the said office. The Senior Citizens Office was established through the initiative of civic groups. Moreover, there are 77 social welfare office/stations dispersed in each barangays to cater to the needs of the residents in their specific areas.

Indigent community members are prioritized in DSWD Assistance Program, specifically the economically depressed conditions clientele that consist of families, women, children, youth, senior citizen, disabled persons, and victims of natural or man-made calamities. Among the 38 barangays, Barangay Caminawit has the largest number of families (384 or 20.01% of its total households) that are economically depressed followed by Barangays Pag-asa, Central and Batasan. As of 1999, there are around 4,648 clientele served by the MSWDO.

As of 2014, 85 service centers provides the needs day care services neighborhood play of the municipality and approximately 67 of these service centers attend to the needs of pre-school education.

Protective Services

The SJOM police force station, located within the periphery of the Municipal Building of San Jose in the town proper is manned by 90 police officers represented by three (3) Police Chief Officer, one (1) NUP and 86 PNCOs all equipped with organic firearms and long and short firearms to handle the peace and order of the 156,791 total population of the municipality. Police force population ratio is recorded at 1:1,650 which is still below the standard ratio of 1:1,000. The PNP Police Station is provided with a patrol car and motorcycle to undertake security service and immediate response if necessary. Generally, San Jose is the second most peaceful municipality in the country (next to Marinduque) having low crime incidence. Although there are certain petty crime incidences, the existing number of police force is still considered efficient to maintain peace and order situation in the locality. The support and cooperation provided by the "Barangay Tanods", numerous civilian volunteers, traffic enforcers and private security entities rendering protective services contribute to the maintenance of peace and order in the municipality. In addition, the presence of an Army Detachment in the area also strengthens the maintenance of peace and order and in the drive against insurgency, illegal drugs and illegal fishing.

Economic Characteristics

Income/ Poverty Threshold

There were 6 (56.6%) poor income households for every 10 households. About four (4) in every 10 households have income below the food threshold (41.1%).

Labor Force and Employment

In 2012, out of 61,456 working individuals 33, 887 or 55.14% were employed while 2,606 or 4.24% were unemployed. The rest are unknown whether employed or unemployed. Agriculture absorbs 76% or 25,754 of those engaged in non-agricultural activities such as industrial, commercial service, private practitioners, public service, and others.

Economic Activities

Various economic activities were engaged in by the members of the labor force in the barangays of the municipality. The economic activities vary in nature - from odd jobs in private or in public institutions to professional endeavors. The 2009 CBMS Data of LGU-San Jose mentions that, majority of the

livelihood activities engaged by each of the barangays focused more on hunting, forest products gathering, farming, forestry/tree plantation, and livestock/poultry raising.

Agriculture

About 17,543.86 hectares of the total land area of San Jose is agricultural land most of which are devoted to production of rice and other cash crops. Grasslands on the hand are set aside for livestock production. San Jose's principal crops are categorized into food crops (i.e. rice or "palay", corn, garlic, monggo, legumes and vegetables), commercial crops (i.e. coconut, cashew, tobacco etc.) and the fruit-bearing trees (i.e. banana, mango, etc.). Rice (palay) gives an average yield of 90 cavans per hectare whether it is irrigated or unirrigated. Furthermore, it was observed that corn, garlic and onion have significant produce, however, statistical data is unavailable.

Farming Practices

The use of various farm inputs such as fertilizers, pesticides, herbicides and high yielding varieties of palay are considered a common practice among local farmers to increase production and to maintain the quality of farm products. Though the use of hand tractors and other machineries for tilling of farmlands are already known in the locality, most still rely on animal labor (carabao) for plowing and prefer manual labor for other farming activities. During dry season, the farmers utilize the rainfed farms for the production of cash crops such as garlic and other crops which require minimum water. Furthermore, multiple cropping schemes like planting of mixed agricultural crops (vegetables, rice, root crops and fruits) is the common practice by both upland and lowland dwellers. Both farmers adopt the early maturing varieties of rice and high value vegetable crops.

Irrigation

Most of San Jose rice farms are irrigated. Out of the 10,724 has, only 38.64% or 4,144 hectares are un-irrigated. A recorded average yield per hectare shows that un-irrigated areas are equally productive with the irrigated farms. Communal Irrigation System (CIS) irrigate a total of 3,246 has covering 285 has in Barangay Batasan and 2,961 has in Barangay Central. About 229 has also enjoy the same privilege in Monte Claro. The irrigation system provided by the National Irrigation Authority (NIA) benefited 1,752 farmers. Some local farmers, with sufficient financial capacity, manage to irrigate their farmland using water pumps.

Existing agricultural/post-harvest facilities

The Municipality of San Jose has the largest number of agricultural support facilities such as rice mills, warehouses, solar dryers. It also has a pool of experts from the Department of Agriculture, the Department of Agrarian Reform (DAR) and the existing agricultural school. These experts can be tapped in cases when technical and technology assistance are needed. Furthermore, a breeding station is also available to provide improved livestock quality. The National Food Authority (NFA) provides warehouse and rice mills aside from the facilities operated by NFA. Privately operated rice mills, feed mill, and warehouses also accommodate local farmers. Moreover, barangays basketball courts and concrete roads are being utilized in some areas where solar dryer is either unavailable or inadequate.

Livestock and Poultry Production

The raising of the above-named animals play an important role in augmenting family income and/or some of the food needs of the families. Various types of livestock and poultry raised in the 38 barangays of the municipality such as swine, cattle, carabaos, goats, horses, dogs, chicken, fighting cocks, roosters, ducks, and turkeys. Furthermore, commercial livestock and poultry farms producing layers, broilers and meat products also exist. To enhance livestock in the area, the local and/or national government

undertook animal dispersal and livestock extension services. Thus, farmers availed of the swine, cattle and carabao dispersal programs.

Cattle Industry

The Municipality of San Jose was once number one producer of cattle in Region IV in 1970's-1980's but because of the peace and order problems, the cattle industry weakened. In addition, the grazing areas were affected by the declaration of large portions as Protected Areas and the issuance of CADTs where the renewal of the same is under the approval of the Biodiversity Management Bureau (BMB) or IPs. To date, despite that there are only two (2) existing permittees left in Barangay Batasan that comprise a total area of 1,061 has, San Jose still remains as the number one producer of beef products supplying the Metro Manila area.

Marine Resources

Fishing is another significant economic activity in the locality especially dwellers living along the coastal area. Most of these communities depended on fishing as their source of income. Out of the 38 barangays in San Jose, there are 21 barangays engaged in fishing particularly in coastal barangays and other barangays in San Jose like Caminawit, Mangarin, Mapaya, Bubog, San Agustin, Ilin and Ambulong Island, fishing is considered one of the major sources of income of 1,854 fishermen. A significant economic activity in the locality considering that the Municipal fishing ground zone is 95,275.72 has. With its fertile fishing grounds, the fishing sector is undoubtedly seen as an economic booster if given developmental priority.

Among the important marine resources of San Jose are species of finfish, species of coral, a thousand species of other invertebrates, species of algae, a diverse collection of sea grass and species of mangroves.

Records also showed that aside from fishing, other activities related to fishing involve seaweeds farming and other sources of fish catch from fish pens/cages.

Mining Industry

Some areas of San Jose are found to have abundant reserves of minerals. Considered in abundance are copper, iron, gold, nickel, chromite, limestone, sand and gravel. Mining activities are located in the eastern part of San Jose wherein two BGMS prospected sites of copper deposits can be found. At the northern part adjacent to Magsaysay has also been identified a limestone deposit.

Trade, Commerce and Industry

Commercial establishments in the municipality according to DTI totaled to 1,030. Most are wholesale and retail (95.05 percent). Others include Banking and Finance and Insurance establishments. Known commercial banks are: Allied Bank, Metrobank, PNB, DBP, Land Bank, CARD Bank, Veterans Bank and other Rural Banks. While there were a number of possible sources of capital which may be tapped for their crops and livestock/poultry production and in fishing activities, the main sources though came from income obtained from previous cropping season or from earnings from livestock and poultry raised.

However, those who lacked earnings or capita, borrowed/obtained their monetary needs from private crop and fish traders/buyers, the landowners, their parents or the 5-6 system of borrowing. Furthermore, local farmers which are financially incapacitated in cultivating their lands availed or sought assistance from banking and lending institutions with legal interest rates or through a

middleman with high interest rates. If local farmers chose to do business with middlemen, mode of payment is in cash or in kind depending upon the conditions and terms of payment that both parties agreed upon. On the other hand, banking institutions prefer to provide loan assistance to an organized farmer's cooperative rather than individual farmers.

San Jose Wet and Dry Public Market covers a total land area of 4,202 sq.m which serves as the center of commercial and trading activities. It is the largest public market in the province offering the most diverse goods and services. About 760 stalls are operating regularly from 5:00 a.m. to 7:00 p.m. everyday. Local traders and middlemen from neighboring towns, Panay, Island and Coron, Palawan, facilitate commodity flow and exchange.

About 20 registered manufacturing and processing industries are operating at different scales. These could be classified into: manufacturing of hollow blocks/bricks/concrete pipes, food processing, processing of bath/detergent soap, and furniture-making. A total of 117 workers are employed by industries occupying a total land area of 1.6556 has or an average space of 0.08278 ha per industry. There are around eight (8) cottage industries in the locality. One is engaged in the production of peanut brittle while the rest are engaged in the production of bread. The volume of production is considered to be sufficient for local consumption only.

Transportation System

Most roads in the Poblacion area and nearby barangays are concreted and asphalted. The major thoroughfares are Rizal Street, Liboro Street, Bonifacio Street, Mabini Street, and the streets in and around the public market. Tricycles are the common means of transportation around town. Jeepneys provide the main mode of public transportation between San Jose and other towns of the province. Vans and sports utility vehicles (SUVs) are likewise numerous. The number of land vehicles in San Jose has grown because of the population boom starting in the early 2000s. Pumpboats also provide access to nearby Island Barangays. One can charter pump boats to ferry them to island resorts and diving spots.

The town is served by the San Jose Airport, with regular scheduled flights (MWFSS) to and from Manila by Cebu Pacific. Flights approximately take 45 minutes. Dimple Star, RORO Transport, JAM Liners take direct bus routes from Cubao (in Quezon City), Sampaloc (in Manila) and Alabang (in Muntinlupa City) to San Jose that includes a roll-on/roll-off ferry that operates between Abra de Ilog and Batangas City (a three-hour trip across the Verde Island Passage). It is also accessible via the Calapan Mindoro Pier-San Jose from the Oriental Mindoro. Furthermore, San Jose is linked to all towns of Occidental Mindoro via a mostly-dusty provincial highway that runs from north to south. Roads in and around San Jose are well-paved generally on flat terrain. Local bus and jeepney operators ply the route from the northernmost town of Abra de Ilog all the way to south of San Jose. From San Jose Bus Terminal, travelers can ride a jeepney to Magsaysay, the last town of the province of Occidental Mindoro, and further across the mountains to Bulalacao, Oriental Mindoro via the newly constructed Roxas-Bulalacao-San Jose Road.

Infrastructure and Utilities

Roads and Bridges

There are 16 bridges, mostly made of concrete and steel, existing in generally good condition. On the other hand, a total of 498.219 km of a road network system surrounds the Municipality of San Jose providing internal and external accessibility. Majority of the said roads are classified as barangay roads comprising about 75% or 376.25 km. Only 38% of the total barangay roads are paved while the rest are unpaved and found mostly concentrated in the rural barangays. About 60% of the total road network remains unpaved isolating areas during a heavy rainfall.

The urban roads of SJOM within a 1 km radius during peak periods (7:00 am to 8:30 am, 11:00 a.m. - 1:30 p.m. and 4:30 p.m. - 6:00 p.m.) are able to take up about 2000 motorized vehicles, 75% of which are tricycles and cars, 6% by motor bikes and trucks and the rest by other passenger vehicles like buses and vans. During non-peak hours, a one km road radius absorbs 1400 vehicle units (personal communication, PNP Inspector Roi Robin Urbina, 2015).

Airport and Port/Wharves

An airport is located at Barangay San Roque in the Municipality of San Jose. It enhances air transport from the Municipality to Manila and vice-versa. Cebu Pacific has available daily round trip flights. Motorized boats ply daily from Caminawit pier to Antique and Palawan.

Public Utilities

Power Supply

OMCPC and Pag-asa Grain Center Inc. (PGCI) is the only source of electric power in the municipality with bulk of the power supply provided by OMCPC. The Occidental Mindoro Electric Cooperative (OMECO) is the major distributor of power supply in 29 barangays of San Jose Majority of the total households of San Jose have connections to the source of electricity while the other households resort to kerosene, LPG and other fuel for lighting.

Water Supply/Sources

Around 20 barangays are being served by either Levels II or III water supply. However, out of 13,111 households only 4,200 or 32.03% have access to a piped water distribution system. This reveals that majority of households depend on Level I water system such as shallow well pitcher pumps, hand pumps and springs.

Level I water system is the primary source of water supply of 26 barangays where Levels II and III water system is inaccessible. There are around 17,771 households that depend on Level I water system. To date, there are 8,087 Level I water source. Of which, 99.31% or 8,031 are shallow wells. Only 0.69% or 75 rely on springs. However, there are a few households specifically within the urban areas, which have access to all levels of water supply for their domestic consumption.

Solid waste management

According to the FHSIS Annual report for year 2014, there were 25949 households or 92.16% that performed satisfactory disposal of solid waste. Solid waste is collected and dumped in an 8 has disposal site in Barangay San Isidro. The average waste collection in urban areas is at 106 m^3 per day.

Host/Direct Impact – Barangay Central

Demographic Characteristics

Barangay Central is composed of 22 sitios and is located 14 kms from the main town area of San Jose, Occidental Mindoro. It has a population size of 12,178 corresponding to 7.95% of the total population of the municipality. The total number of households is 2,494 with an average household size of 4.37 (2015 census). The barangay's population density is 3.36 persons/ha which corresponds to the same average population density for the whole municipality.

Water Supply /sources

Water in the barangay is sourced from deep wells and through a water distribution system with corresponding water fees and charges. Other households especially those located outside the

Poblacion area and marginal lands usually rely on existing springs and shallow wells located in several parts of the barangay. In Sitio Kasuy, there is a free-flowing source of water that provides a reliable water supply even during summer season. This water source also irrigates the rice and vegetable areas. As part of the development programs of the barangay, continuous search in several parts of the barangay for possible sources of water has been practiced. As stated by some participants during the Focus Group Discussion (FGD), the search led them to discover allegedly the presence of a natural gas source in Sitio San Carlos, Barangay Central. However, upon discovery, numerous residents, backed up by the church opposed for the further exploration and excavation activities due to the possible dangers it may cause to the people and environment. This "discovery" naturally disappeared.

Status of Agricultural Land and agricultural practices in the Barangay

Most of the people in the barangay engage in farming activities. Some of these farmers are tenants while others have their own farm lands. There are also few agricultural lands owned by private entities that utilized their land as a ranch while others preferred to cultivate their lands for agricultural production by hiring tenant farmers. At present, the Communal Irrigation System in the area which source its water from Busuanga River can irrigate 2,961 hectares of rice lands in the barangay out of the 3,624.87 has total land area of Brgy. Central.

There is a common practice in the area known as "tampa". A worker is regularly paid a daily wage rate of PhP350 with accompanying snacks provided by the contractor. However, at times, because of the financial needs of the worker, he is forced to secure an advance of PhP130/day from the contractor. He is then given the amount equivalent to the number of days he should be working for. However, when the time comes for the worker to work, he will not be able to get anything from the work he rendered. His day's work which should have been PhP350/day has become PhP130/day. And since this has already been advanced earlier, the worker gets nothing nor any additional pay.

Health Condition in the Barangay

According to the participants, common causes of illnesses in the barangay come from cough, colds and flu. There is also one reported case of dengue in the barangay. Other common illnesses in the barangay are lifestyle related diseases such as diabetes, hypertension and other related ailments as a result of alcohol consumption.

Traffic Management

With the presence of OMCPC, the participants mentioned that several investment projects are expected to be established in the locality. Thus, heavy loads and large vehicles will be expected to enter and leave the locality due to the increasing industrial and commercial activities.

Based on the current operation of the company, there was no significant traffic build-up in the area since road widening programs and improvement on transportation services was already implemented by the DPWH, effectively converting the national road in the vicinity to a four-lane highway.

2.4.1.3. Impact Assessment

Table 2.33. Predicted impacts on the socio-economics of the proposed amendment of OMCPC SMRA Diesel Power Plant Expansion

List of Key Impacts	Phase Occurrence				Discussion
	Pre-Construction	Construction	Operation	Abandonment	
Displacement of settler/s • Displacement / disturbance of properties • Change/ conflict in land ownership • Change/ conflict right of way • Impact on Public Access		☑	☑		No resident will be displaced in the process. The area where the new powerhouse will be established is just situated adjacent to the existing power plant of OMCPC. The OMCPC complex is inside the OMECO compound which fenced ad gated and there are no residents within the compound since NPC started operating in the area. For a long-time the subject property of land is private and titled. Furthermore, there is no right of way conflict nor conflicts in land ownership. Common access road is being shared by OMCPC and resident of Sitio Casuy which is situated at the back of OMCPC. The public road is opened at all time and during fuel delivery, the company doesn't obstruct the traffic flow since OMCPC has wide parking area in the complex.
In-migration		☑	☑	☑	At OMCPC's current operation, there is no problem about in-migration. The current power plant is being operated only by about 38 personnel most of which are locals or resides within Occidental Mindoro. The project ensures that the members of the community with the skills to carry out the necessary tasks are hired for the job. The more advanced and sophisticated skill requirements were sourced from outside the municipality or province but OMCPC provides an accommodation area within the complex. The construction of the additional powerhouse will only require 22 manpower since the powerhouse that will be constructed is small and gensets that will be installed is modular. In terms of operation of the additional powerhouse, the existing manpower is expected to carry-out the tasks and only five (5) additional manpower will be added since the additional gensets will only serve as back-up in case of emergency breakdown or preventive maintenance of the existing power plant. The aforementioned figures are small compared to the number of investors, truckers, wholesalers and mall workers that already migrated in the municipality due to stable power supply. In fact Gaisano Capital San Jose is already established due to stable power supply. In the same regard, more hotels, restaurants and resorts were constructed as the tourism industry was uplifted due to the steady power supply. Seasons Hotel and Convention, SJ Mansion Hotel and other new establishments have operated because of the power supply provided by OMCPC. With available power supply, increased business activity is expected and influx of migrants will not necessarily be informal since these people will be employed in the various economic sectors.

List of Key Impacts	Phase Occurrence				Discussion
	Pre-Construction	Construction	Operation	Abandonment	
Cultural/ Lifestyle change					More of the *Mangyans* like those few that have already settled in Brgy. Central may potentially leave their culture and adopt ways of people in the lowland as more employment opportunities will be made available. OMCPC provides assistance as part of its corporate social responsibility and extends its livelihood and educational programs to IPs such as donation of classroom to Taganop Elementary School.
Threat to delivery of basic services/ resource competition					There are no additional threats to the delivery of basic services arising from the additional construction of powerhouse within the OMCPC complex. The municipality and barangay will continue their mandates to provide basic services to their constituents. The MLGU and BLGUs will continue to receive benefits and CSR funded projects. In fact, the LGU will benefit from the operation of additional powerhouse, as taxes such as Real Property Tax and additional permits that are legally required will be paid locally by OMCPC. This will mean additional revenues of both the municipality and barangays that can possibly provide additional basic services. In fact, OMCPC has been the consistent top tax payer for the last three consecutive years (2020-2022) for the operation of the existing power plant. Additional power facility constitutes additional real property taxes.
Generation of Local Benefits from the project Enhancement of employment and livelihood opportunities Increased revenue of LGUs					Local business tax means the fees charged and the method by which a local governing authority grants the privilege of engaging in or managing any business, profession, or occupation within its jurisdiction. OMCPC is the top tax payer in San Jose for the last three (3) years and the revenue of the LGU from these taxes helps in increasing the municipal budget which in turn means additional budget for basic services that will benefit the whole municipality. Furthermore, stable power supply means more investors for the municipality that will uplift further the trade and commerce. Subsequently, economy will be boosted and more jobs is generated. This is evident now in San Jose as malls such as Gaisano Capital, hotels like the Seasons Hotel and Convention Center as well as major fast-food chains were now established and flourishing. By adding the back-up powerhouse, power outage is lessened and more investors will be attracted. More investors mean additional employment and livelihood opportunities.
Traffic congestion					Traffic congestion within the vicinity of the project area of OMCPC did not occur as previously predicted since the company ensures that its fuel delivery trucks were immediately allowed inside the facility to discharge fuel. The power complex has ample parking inside the facility thus traffic congestion did not occur along the main highway. Furthermore, DPWH had already widened the main highway into four-lanes thus traffic congestion is highly unlikely to occur.

2.4.2. Public Health

2.4.2.1. Methodology

A focal group discussion was conducted in Barangay Hall of Barangay Central, San Jose, Occidental Mindoro. Interviewed Health Personnel included barangay health workers and the Municipal Health Officer. Residents in impact communities were also interviewed on household health status, availed health services and programs, sources of food and water and household waste management.

2.4.2.2. Baseline Condition and Environmental Performance

San Jose Health Profile

Health

There are eighty-six health facilities available in the municipality (2010 Busuanga Watershed Characterization and Vulnerability Assessment Report). The private health facilities include three (3) private hospitals, five (5) medical clinics, and six (6) dental clinics. Seven drugstores/pharmacies also exist in the area. Usually, private health facilities are situated in urban barangays. The public health facilities include San Jose District Hospital, one (1) Rural Health Center, 38 Barangay Health Center, and 29 Barangay Health Stations.

The San Jose RHU has for its staff a doctor (Municipal Health Officer), a Medical Officer IV, two (2) dentists, two (2) public health nurses, one (1) Medical Technologist, 18 Rural Midwives, three (3) Municipal Sanitary Inspectors, two (2) supervisors, three (3) nursing attendants, two (2) Dental Aide, one (1) TB Microscopist, one (1) Malaria Microscopist, one (1) Nutrition Officer II, one (1) pharmacist, one (1) pharmacy aide, four (4) casual nurses, three (3) casual midwives, 11 RN Heals, one (1) detailed administrative aide, three (3) administrative aides, one (1) data encoder, and one (1) utility worker. Providing support to the RHU personnel especially at the Barangay levels are the 1,046 accredited Barangay Health Workers (BHWs), 38 Barangay Nutrition Scholars (BNS). Health services rendered by rural health midwives are specifically in marginal areas of the municipality.

Live Births and Deaths

According to the 2014 Annual MHO Accomplishment Report the crude birth rate was 20.24%; while the rate of deaths per 1000 population was 4.67%. On the other hand, the rates of maternal and infant deaths were 1.76 % and 5.99%, respectively.

Mortality

The health status of an area reflects to a certain extent the healthiness of the people living therein. As reflected in the 2022 MHO LGU Health Score Card, the three (3) major causes of mortality in the municipality were Hypertension (136), Pneumonia (86) and Cancer (82). The other leading causes of mortality were Myocardial Infarction (51), Diabetes Mellitus (48), Cerebro Vascular Accident(47), Pulmonary Tuberculosis (43), Hypertensive Cardio Vascular Disease (42), Senility (32) and Asthma (25).

Morbidity

The top three leading causes of morbidity (2022 MHO LGU Health Score Card) is Acute Respiratory Infection (ARI) for ages 5 and above with 7,293 cases; Hypertension with 4,012 cases and Animal bites with 3,512 cases. The other leading causes of morbidity were Influenza like illness (3,397), ARI in below 5 (3,123), influenza (1,148), Acute Watery Diarrhea (949), PTB (746), Skin Diseases (734) and Diabetes Mellitus (722).

2.4.2.3. Impact Assessment

Table 2.34. Predicted impacts on public health of the proposed amendment of OMCPC SMRA Diesel Power Plant Expansion

List of Key Impacts	Phase Occurrence				Discussion
	Pre-Construction	Construction	Operation	Abandonment	
Threat to public health and safety					Based on the recent perception survey, Key Informant Interview (KII) and Focal Group Discussion (FGD) pertaining to the perceived impacts of the existing power facility, majority of the residents did not complain of any ill-effects of the power plant to public health and safety in its seven (7) years of operation. In fact, Brgy. Central is gracious of the budget assistance extended to the community in terms of additional legal drugs and medicine as well as equipment and assistance to BHWs and BNS. OMCPC also conducts free medical outreach program for the community. It even extends its assistance to some of the adjoining barangays as well as IP communities in the uplands.

2.4.3. FGD, KII and Perception Survey

2.4.3.1. Methodology

<u>Public Consultation</u>

Data and information in this section came from primary and secondary data. Primary data were generated from focus group discussions (FGDs), key informants' interviews (KIIs) and surveys conducted from 28-30 July 2023. Among the participants were municipal officials from San Jose, Occidental Mindoro, barangay officials from Central, and representatives of sectoral groups such as barangay health workers, barangay nutrition scholar, farmers and irrigator's association member, women, and senior citizens. The study team also conducted discussions with the ComRel, Environment and Safety officers of OMCPC.

<u>Perception Survey</u>

There were 96 respondents for the socio-economic survey all from Brgy. Central. The computation of the number of respondents per barangay is based on 2020 population census of the Philippine Statistics Authority (PSA) and was extrapolated to 2023 population based on the population growth rate of Brgy. Central. The percentage of the population of a barangay to the total number of respondents was then computed. The sample size is based on the extrapolated 2023 population of the Brgy. Central using Slovin's formula with a 95% confidence level with a margin of error of +/- 5%.

$$n = \frac{N}{1+Ne^2}$$

Where: n = sample size
N = population size
e = margin of error

The enumerators are the BHWs of Brgy. Central. They were chosen because they are all from the barangays and are very familiar with the residents. In addition, they have been interviewing the residents from previous municipal and barangay surveys as well as the OMCPC pre-scoping survey and have the necessary experiences. The enumerators underwent half day training to administer the survey questionnaires. The consolidated results of the socio-economic and perception survey are also presented and discussed in this chapter.

Table 2.35. OMCPC perception survey sample size distribution

Barangay	AGR	2020 Population	2021	2022	Sample Size
Central	2.36%	12,178	12,465	12,760	96
					Total: 96

2.4.3.2. Baseline Condition and Environmental Performance

Public Consultation

The stakeholders' consultations were conducted in compliance with the requirements set by the EMB during the technical scoping meeting. These series of stakeholders' consultations are summarized below.

Table 2.36. Result of FGD and KII surveys

Aspect	Discussion
Discussion of prior and present situation of OMCPC operation	• Former operation of power providers in the area emits black smoke and fumes smells oily, oil spill is a common occurrence and plant operation is noisy. No assistance is provided to the community • In the current OMCPC operation, there were no more fume smell, oil spill no longer occurs and noise from the power plant is significantly reduced. Revenue from tax increased and IRA was also increased. Livelihood assistance to womens association such as dressmaking. There are feeding programs, vitamins and medicine assistance, extra dam as plume for irrigation and provides assistance to different sectors in the community. • The additional powerhouse will mean job creation and employment. Reliable electricity means irrigators will no longer rely on portable generators for water pump operation thus more economical. Brown-out or power outage will be reduced and taxes that will be paid by the company will also increase.
Discussion on SDP and CSR	• OMCPC were able to provide computers and photocopying machines in the in the schools in Brgy. Central; • Tree planting activities over the years and the first activity was already forest like; • Toilet bowls for sanitation were provided; • Computers for Brgy. Health Center Use; • Launching of Haplos Musmos Program (i.e., provision of milk and vitamins to all schools within the barangay), feeding programs; • Infrastructure assistance such as cementing of road, establishment of waiting shed and street lights; and • Dressmaking assistance livelihood (i.e., provision of sewing machine and capital)
Potential SDP projects that shall be implemented by OMCPC	• Priority on health projects such as ambulance, vitamins for mothers and senior citizens as well as maintenance medicine • Increased the scholars for college education

Aspect	Discussion
	• Additional tree planting activities • Business related trainings and financial capital assistance to start micro-enterprise • Assistance for farm to market roads
IEC activities	• Strengthening of IEC activities so that all sectors know about the activities of OMCPC • Strengthen coordination with LGU by providing notices for forthcoming activities • OMCPC's current operation is OK and has no significant negative to the environment and community
Approval on the additional powerhouse	• All the participants endorse the project as it will ensure stable power supply and ensures less occurrence of brown-out, increased tax revenue and continuous assistance to the community

Perception Survey

Respondent's Demographic Information

Position of the Respondents in the Family

As observed in **Table 2.36**, majority (70 or 73.68%) of the interviewed individuals were either the mother or father of the household, who may or may not be the head of the family. Meanwhile, there were nine (9 or 9.47%) and three (3 or 3.16%) respondents who identified themselves as the head of the household and spouses of the heads, respectively.

Table 2.37. Position of the survey respondents in the family.

Position of the Respondent	Total	%
Daughter/Son	8	8.42
Head	9	9.47
Mother/Father	70	73.68
Other Relatives	1	1.05
Spouse	3	3.16
No Response	4	4.21
TOTAL	95	

Gender and Age

Table 2.38 depicts the age distribution of the respondents relative to their gender. Accordingly, it can be inferred that the surveyed population was mostly comprised of females (58 or 61.05%) belonging to the 30 to 59 years (41 or 70.69%) age bracket. The male population, on the other hand, accounted for 37 or 38.95% of the respondents with the majority belonging to ages 35 to 59 years old. However, it should be noted that there was one (1) male respondent who did not identify his age group.

Table 2.38. Age distribution of the respondents by gender.

Age Bracket Of The Respondent	Female		Male		Total	
	Subtotal	%	Subtotal	%	Subtotal	%
15-19	0	0.00	1	2.70	1	1.05
20-24	4	6.90	1	2.70	5	5.26
25-29	5	8.62	4	10.81	9	9.47
30-34	7	12.07	2	5.41	9	9.47
35-39	7	12.07	7	18.92	14	14.74
40-44	9	15.52	2	5.41	11	11.58
45-49	5	8.62	5	13.51	10	10.53
50-54	5	8.62	7	18.92	12	12.63

Age Bracket Of The Respondent	Female		Male		Total	
	Subtotal	%	Subtotal	%	Subtotal	%
55-59	8	13.79	5	13.51	13	13.68
60-64	5	8.62	2	5.41	7	7.37
65 pataas	3	5.17	0	0.00	3	3.16
No Response	0	0.00	1	2.70	1	1.05
SUBTOTAL	58	61.05	37	38.95	95	100

Marital Status

Majority (71 or 74.74%) of the interviewed respondents were married. Conversely, there were seven (7) or 7.37% who were still single while nine (9) or 9.47% were widowed. Meanwhile, the proportion of respondents who were separated from their spouses, and were in a live-in arrangement were 2.11% and 5.26%, respectively (Table 2.39).

Table 2.39. Marital status of the survey respondents

Marital Status	Total	%
Single	7	7.37
Married	71	74.74
Widowed	9	9.47
Separated	2	2.11
Live-In	5	5.26
No Response	1	1.05
TOTAL	95	100

Religion

Catholic faith was discovered to be the most prevalent religion (72 or 75.79%) among the surveyed residents of Barangay Central. Other religious affiliations of the respondents are Born Again (5.26%), Christian (1.05%), Iglesia ni Cristo (13.68%), Jehova's Witness (1.05%), and Protestants (1.05%). However, there were two (2) respondents who did not disclose their religious affiliations (Table 2.40).

Table 2.40. Religious affiliation of the respondents

Religion	Total	%
Catholic	72	75.79
Born Again	5	5.26
Iglesia ni Cristo	13	13.68
Protestants	1	1.05
Jehovah's Witness	1	1.05
Christian	1	1.05
No Data	2	2.11
TOTAL	95	100

Education

Out of the 95 respondents, at least one-fifth had reached and/or completed secondary education. This constituted for 19 or 20% and 28 or 29.47% of the respondents, respectively. In terms of tertiary education, approximately 15.79% were able to finish their college education while seven (7) or 7.37% completed vocational courses. Again, two (2) of the interviewed individuals did not divulge their educational attainment (Table 2.41).

Table 2.41. Highest education attainment of the survey respondents

Highest Educational Attainment	Total	%
Elementary Level	4	4.21
Elementary Graduate	7	7.37
High School Level	19	20.00
High School Graduate	28	29.47
College Level	13	13.68
College Graduate	15	15.79
Vocational	7	7.37
No Data	2	2.11
TOTAL	95	100

Income/Employment

As shown from Table 2.42, majority of the surveyed male (33 or 89.19%) and female (38 or 65.52%) population have a source of income. In totality, this corresponded to approximately 74.74% of the population.

Table 2.42. Proportion of the population with and without a source of income based on gender.

Livelihood Status	Female		Male		Total	
	Subtotal	%	Subtotal	%	Subtotal	%
With Source of Income	38	65.52	33	89.19	71	74.74
Without a Source of Income	20	34.48	4	10.81	24	25.26
TOTAL	58	100	37	100	95	100

Occupation

Out of the 71 individuals with a source of income (Table 2.43), more than one-fifth of the respondents stated that their principal livelihoods were farming and employment (Table 7). Accordingly, these occupations constituted for 43.84% of the working respondents. Meanwhile, self-employment or business was found to account for approximately 15.02%. It is noteworthy that two (2) of the interviewed individuals have multiple occupations.

Table 2.43. Present occupation of the respondents

Occupation	Total	%
Barangay Employee	12	16.43
Driver	3	4.10
Employed (Teacher, Sales, Security Guard, Helper, Baker, Bookkeeper)	16	21.92
Farmer	16	21.92
Hired Laborer	6	8.22
Self-employed/Business	11	15.02
Skilled Worker (Assistant Operator, Draftsman, Electrician, Mason, Construction worker)	8	10.96
No Response	1	1.37
TOTAL	73*	100

Multiple response*

Location of Livelihood

Table 2.44 illustrates the distance of the respondents' livelihood from the barangay. Accordingly, about 50.83% of respondents were found to be working within the barangay. Meanwhile, there were 16.84%

and 4.21% of the respondents working outside the barangay and outside of town, respectively. The "Not Applicable", on the other hand, stands for the interviewed individuals without a source of income.

Table 2.44. Location of the respondents' occupation

Workplace	Total	%
Within the Barangay	50	52.63
Outside the Barangay	16	16.84
Outside of Town	4	4.21
Not Applicable	24	25.26
No Data	1	1.05
TOTAL	95	100

House Information

House Ownership

In accordance with **Table 2.45**, majority (85 or 89.47%) were discovered to be owners of the establishment they currently reside in. Meanwhile, the non-owners were either caretakers (2 or 22.22%) or residing with the owners for free (6 or 66.67%). For the latter, the respondents remarked that the house is owned by their relatives. However, there was one (1) respondent who did not disclose their living arrangements and home ownership.

Table 2.45. House ownership

House Ownership	Total	%
Owned	85	89.47
Not Owned	9	9.47
No Response	1	1.05
TOTAL	95	100

Land Ownership

Table _ showcases the proportion of the respondents who owned the land where they are presently dwelling, which was equivalent to 79 or 83.16% of the surveyed population. In contrast, those who do not own the land–which was approximately 13.68% of the respondents–established their houses on the lands of their relatives (69.23%) or private individuals (30.77%).

Table 2.46. Land ownership

Land Ownership	Total	%
Owned	79	83.16
Not Owned	13	13.68
Relatives	*9*	*69.23*
Private Individual	*4*	*30.77*
No Data	3	3.16
TOTAL	95	100

Electricity

As depicted in **Table 2.47**, 85 out of 95 respondents (89.47%) attested to have their own power line for electricity, which was predominantly sourced from the Occidental Mindoro Electric Cooperative, Inc. (OMECO). Those who do not own power lines were found to be sourcing from their relatives.

Table 2.47. Source of electricity connection of the respondents

Source of Electricity	Total	%
Owned	85	89.47
Not Owned	9	9.47
No Response	1	1.05
TOTAL	95	100

Lighting Fuel

Out of 95 respondents, only 18 or 18.95% identified other sources of lighting fuel. Delving further, it was discovered that solar (38.89%) was the primary alternative, followed by candles (27.78%), and kerosene lamps (16.67%). There was one (1) respondent who claimed to illegally tap on other power lines for lighting fuel.

Table 2.48. Alternative sources of lighting fuel

Lighting Fuel	Total	%
Generator	2	11.11
Candles	5	27.78
Kerosene lamp	3	16.67
Solar	7	38.89
Illegal tapping	1	5.56
TOTAL	18	100

Fuel for Cooking

Charcoal (33.33%), LPG/Gasul (30.36%), and wood (27.38%) were found to be the principal fuels used for cooking, consecutively (Table 2.49). However, it was worth noting that the interviewed individuals typically use a combination of these fuels.

Table 2.49. Different types of fuels used by the respondents for cooking.

Fuel for Cooking	Total	%
LPG/Gasul	51	30.36
Charcoal	56	33.33
Gas/ Kerosene	3	1.79
Wood	46	27.38
Electricity	12	7.14
TOTAL	168*	100

Multiple response*

Household Appliances

As showcased in Table 2.50, the leading household appliances owned by the respondents are electric fan (75 or 22.66%), television (74 or 22.36%), and washing machine (68 or 2.54%), sequentially. Other household appliances in their possession were found to be electric irons, refrigerators, stereos, gas/electric stoves, microwaves, and laptops/personal computers.

Table 2.50. Household appliance

Ownership of House Appliances	Total	%
Microwave	6	1.81
Stereo	15	4.53
Television	74	22.36
Refrigerator	30	9.06
Electric Fan	75	22.66
Personal Computer	4	1.21

Ownership of House Appliances	Total	%
Laptop	12	3.63
Washing Machine	68	20.54
Gas/ Electric Stove	13	3.93
Electric Iron	34	10.27
TOTAL	331*	100

Multiple response*

Roof Materials

Yero or galvanized iron (GI) sheets (60.58%) were found to be the predominant material used for roofing. This was succeeded by cement (16.06%) and wood (16.06%), consecutively. Other materials used were bamboo, nipa, or cogon (Table 2.51).

Table 2.51. Different materials used by the respondents for roofing

Roof Materials	Total	%
Cement	23	16.06
Yero/ GI sheets	83	60.58
Wood	22	16.06
Bamboo	7	5.11
Nipa/Cogon	1	0.73
No Response	1	0.73
TOTAL	137*	100

Multiple response*

Wall Materials

As observed from Table 2.52, the primary choice of the respondents for wall material was cement (74 or 64.91%). Meanwhile, other respondents also used wood (19.30%), bamboo (7.89%), and nipa/cogon (1.75%) for walling. Nonetheless, it should be pointed out that the enumerated wall materials were also utilized conjointly.

Table 2.52. Various materials used for the walls of the respondent's houses.

Wall Materials	Total	%
Cement	74	64.91
Wood	22	19.30
Bamboo	9	7.89
Nipa/Cogon	2	1.75
No Response	7	6.14
TOTAL	114*	100

Multiple response*

Community Information

Leading Sources of Income

Farming was the primary occupation in the barangay, which was echoed by 88 or 92.63% of the interviewed individuals. Consecutively, the respondents also identified businesses (58 or 25.22%) and employment in carpentry, construction, and sewing (50 or 21.74%) as the other major sources of income of the residents (refer to Table 2.53).

Table 2.53. Top three (3) leading sources of income within the barangay

Leading Sources of Income	Total	%
Business	58	25.22
Employment	1	0.43

Leading Sources of Income	Total	%
Farming (i.e., includes livestock and poultry)	88	38..26
Fishing	11	4.78
Hired Laborer	11	4.78
Others (i.e., Driver, Helper, OFW)	9	3.91
Skilled Worker (i.e., Carpentry, Construction, Seamster)	50	21.74
No Response	2	0.87
TOTAL	230	100

Multiple response*

Other Potential Sources of Income

Apart from discerning the leading sources of income, other potential livelihood the residents may venture into was also consulted. In accordance with **Table 2.54**, majority (77 or 55.40%) of the respondents perceived businesses (e.g., barbershops, online selling, mini-groceries, etc.) as the most feasible income-generating activity the residents may venture into. Other occupations the respondents proposed to consider were farming, carpentry, and construction among others.

Table 2.54. Other potential sources of income

Potential Sources of Income	Total	%
Business (Barbershop, Food Business, Online Selling, Mini-Grocery Store, Sari-sari Store)	77	55.40
Driver	4	2.88
Farming (includes livestock and poultry)	20	14.39
Fishing	1	0.72
Hired Laborer	11	7.91
Skilled Worker (Carpentry, Construction, Seamstress)	14	10.07
No Response	12	8.63
TOTAL	139	100

Multiple response*

Membership to Local Organizations

As inferred from **Table 2.55**, approximately 86.32% of the respondents (82 out of 95) were not part of any local organization. Meanwhile, those with organizations, which corresponded to roughly 10.53% of the respondents–were affiliated with an economic, women, or religious organization. Out of the 10 individuals with organizations, only six (6) of them disclosed their roles in the organization. In particular, the respondents were either heads of the organization (2 or 33.33%), treasurers (2 or 33.33%), or members (2 or 33.33%).

Table 2.55. Membership to local organizations

Are you a member of local organizations?	Total	%
No	82	86.32
Yes	10	10.53
Economic	*2*	*20.00*
Women's	*1*	*10.00*
Religious	*3*	*30.00*
Unspecified	*4*	*40.00*
No Response	3	3.16
Total	95	100

Educational Institutions

Generally, the respondents have at least one (1) elementary student (54 or 38.57%) in their family with the majority (37 or 68.52%) enrolled in Siete Central Elementary School. In terms of secondary educations, the proportion of respondents with a child belonging to either high school, junior high school, and/or senior high are 38 or 27.14%, 13 or 9.29%, and 14 or 10%, respectively. Meanwhile, Central National High School was the predominant school for secondary education. For the respondents with household members taking tertiary education (21 or 15%), Occidental Mindoro State College was found to the principal educational institution (18 or 85.71%).

Table 2.56. List of the educational institutions attended by the household members

Schools attended by the household members	Total	%
Elementary	54	38.57
Camanggahan Elementary School, San Jose, Occidental Mindoro	*4*	*7.41*
Hilltop Elementary School, San Jose, Occidental Mindoro	*8*	*14.82*
Holy Family Academy, San Jose, Occidental Mindoro	*1*	*1.85*
Pulanglupa Elementary School, San Jose, Occidental Mindoro	*4*	*7.41*
Siete Central Elementary School, San Jose, Occidental Mindoro	*37*	*68.52*
High School	38	27.14
Central National High School, San Jose, Occidental Mindoro	*29*	*76.32*
Holy Family Academy, San Jose, Occidental Mindoro	*8*	*21.05*
Unspecified	*1*	*2.63*
Junior High School	13	9.29
Central National High School, San Jose, Occidental Mindoro	*9*	*69.23*
Holy Family Academy, San Jose, Occidental Mindoro	*2*	*15.38*
Unspecified	*2*	*15.38*
Senior High School	14	10
Central National High School, San Jose, Occidental Mindoro	*10*	*71.43*
Holy Family Academy, San Jose, Occidental Mindoro	*1*	*7.14*
Pedro T. Mendiola Sr. Memorial National High School, San Jose, Occidental Mindoro	*1*	*7.14*
Philippine Central Islands College, San Jose, Occidental Mindoro	*2*	*14.29*
College/Vocational	21	15
Divine Word College of San Jose, Occidental Mindoro	*1*	*4.76*
Mindoro School of Electronics, San Jose, Occidental Mindoro	*1*	*4.76*
Occidental Mindoro State College, San Jose, Occidental Mindoro	*18*	*85.71*
Southern Luzon College of Business, Maritime, Science and Technology, Inc., Dasmariñas, Cavite	*1*	*4.76*
TOTAL	140*	100

Multiple response*

Community Problems

Table 2.57 depicts the recurring problems observed by the respondents in the community. Accordingly, the most prominent concern in the community was found to be the lack of job opportunities (69 or 32.70%). This was followed by health concerns and persistence out-of-school youth (OSY), which was raised by 16.11% and 13.27% of the respondents, respectively. It was also noteworthy that two (2) of the interviewed individuals did not perceive any problems in the community.

Table 2.57. Persisting problems observed in the community

Community Problems	Total	%
Child Labor	14	6.64
Drug pushing/ addiction	6	2.84
Health Concerns	34	16.11

Community Problems	Total	%
Out-of-School Youth (OSY)	28	13.27
Lack of Job Opportunities	69	32.70
Peace and Order	14	6.64
Political Issues	17	8.06
Polluted Environment	27	12.80
None	2	0.95
TOTAL	211*	100

Multiple response*

Positive Attributes of the Barangay

Despite the above-listed problems, the respondents identified some positive aspects of their community. To name a few, these were the presence of trustworthy and reliable government officials (29.56%), many school-aged children are in school (23.90%) and clean environment (17.61%). Nevertheless, one (1) respondent claimed that there are no positive attributes in the barangay (Table 2.58).

Table 2.58. Perceived positive attributes of the community

Positive Attributes of the Barangay	Total	%
Clean Environment	28	17.61
Good governance	21	13.21
High Employment Rate	24	15.09
Many school-aged children are in school	38	23.90
Trustworthy and reliable government officials	47	29.56
None	1	0.63
TOTAL	159*	100

Multiple response*

Women's Involvement

To have a vivid understanding of the gender equality in the community, the respondents were also inquired about the women's involvement in household-level decision-making. As deduced from Table 2.59, women play a significant role in the decision-making of every household, particularly on the aspects regarding financial concerns (19.08%), nurturing and raising children (18.87%), education of children (18.03%), and daily chores (18.03%).

Table 2.59. Women's involvement in household decision-making

Category	Total	%
Financial Concerns	91	19.08
Education of Children	86	18.03
Approach in Nurturing and Raising Children	90	18.87
Purchase of Family Assets	62	13
Daily Chores	86	18.03
Social and Wedding Concerns	62	13
TOTAL	477*	100

Multiple response*

Potential Livelihood for Women

The primary occupation identified by the respondents to empower women financially was business endeavors (85 or 59.03%). Other income-generating activities emerging from the surveys (Table 2.60) were dressmaking (36 or 25%) and farming (12 or 8.33%). Conversely, there were four (4) individuals who opted to provide no response.

Table 2.60. Various income-generating activities the women may venture into

Potential Sources of Income for Women	Total	%
Business	85	59.03
Farming	12	8.33
Hired Laborer	5	3.47
Seamstress	36	25
Others (Laundrywomen, Teacher, Doctor)	2	1.39
No Response	4	2.78
TOTAL	144*	100

Multiple response*

Problems Encountered by Women

Despite the majority (55 or 57.89%) perceiving no gender issues in the community, the 33 or 34.74% of the respondents who have claimed otherwise had identified the loss of livelihood (60.61% of the individuals who responded 'Yes') as the primary concern faced by women. While one (1) respondent pointed out abuse and discrimination, the rest have not specified the problems encountered by women (refer to Table 2.61).

Table 2.61. Recurring problems faced by women in the community

Are there problems encountered by women?	Total	%
Yes	33	34.74
Loss of Livelihood	*20*	*60.61*
Victims of Abuse and Discrimination	*1*	*3.03*
Unspecified	*12*	*36.36*
None	55	57.89
No Response	7	7.37
TOTAL	95	100

Perspective About the Proposed Project

Perception of Change

More than four-fifths of respondents (82 or 86.32%) claimed to have notice some changes in the environment for the last five (5) years. However, it should be noted that three (3) of the interviewed individuals did not offer an opinion for this query.

Table 2.62. Respondents' perception whether there are changes in the environment for the last half decade

Perception of change in the environment for last five (5) years	Total	%
With Change	82	86.32
Without Change	10	10.53
No Response	3	3.16
TOTAL	95	100

Observed Changes in the Environment

Table 2.63 presents the respondents' perceived changes for the last half decade, as well as the entity or institutions assisting them in resolving the adverse changes. Accordingly, it can be deduced that the five (5) leading changes were the intensifying number of factories and other industrial plants (43 or 17.27%), increased farm harvest (41 or 16.47%), population growth (35 or 14.06%), increased flooding (28 or 11.24%), as well as reduced flooding (27 or 14.75%) and air pollution (27 or 14.75%). Nonetheless, it was crucial to note that more than half of the respondents did not have a definite opinion on the potential changes in the environment.

For the observed adverse changes, the institutions identified who have contributed in assisting the respondents in addressing the problem were government officials from the barangay, municipal, provincial, and national levels, as well as non-governmental organizations (NGO) or private institutions (Table 2.63).

Table 2.63. List of the observed changes in the last five (5) years and institutions that contribute to addressing the observed adverse effects

Observed changes in the environment for the last five (5) years	Increased		Decreased		No Opinion		Institutions assisting to resolve the observed detrimental changes
	Total	%	Total	%	Total	%	
Establishment of factories, and other industrial plants	43	17.27	2	1.09	50	8.16	1, 2, 3, 4, 5, 6
Conversion to Subdivisions	23	9.24	2	1.09	70	11.42	1, 2, 3, 4, 5
Quantity of Farm Harvest	41	16.47	14	7.65	40	6.53	1, 2, 3, 4, 5, 6
Flooding	28	11.24	27	14.75	40	6.53	1, 2, 3, 4, 5, 6
Forest	14	5.62	23	12.57	58	9.46	1, 2, 3, 4, 5, 6
Population	35	14.06	12	6.55	48	7.83	1, 2, 3, 4, 5, 6
Migration	19	7.63	14	7.65	62	10.11	1, 2, 3, 4, 5, 6, 7 (unspecified)
Water Pollution	6	2.41	23	12.57	66	10.77	1, 2, 3, 4, 5, 6, 7 (unspecified)
Air and Noise Pollution	12	4.82	27	14.75	56	9.14	1, 2, 3, 4, 5, 6
Traffic	13	5.22	18	9.84	64	10.44	1, 2, 3, 4, 5, 6
Peace and Order	15	6.02	21	11.48	59	9.62	1, 2, 3, 4, 5, 6
TOTAL	249*	100	183*	100	613*	100	-

Multiple response*
Legend: 1 - Barangay, 2 - Municipal Government, 3 - Provincial Government, 4 - National Government, 5 - NGO o Private Organizations, 6 - Religious Affiliations, 7 - Others

Changes that Greatly Affected the Respondents

In accordance to the aforementioned changes observed in the last half decade, the respondents perceived flooding (32 or 19.88%), quantity of farm harvest (21 or 13.04%), as well as the establishment of factories and other industrial plants (19 or 11.80%) as the top three changes that had greatly impacted the respondents. Nonetheless, it is important to note that roughly 16.77% of the interviewed individuals did not provide an answer (Table 2.64).

Table 2.64. List of changes which greatly impacted the respondents

Changes Affecting the Respondents	Total	%
Establishment of factories, and other industrial plants	19	11.80
Conversion to Subdivisions	4	2.48
Quantity of Farm Harvest	21	13.04
Flooding	32	19.88
Forest	6	3.73
Population	14	8.70
Migration	6	3.73
Water Pollution	5	3.11
Air and Noise Pollution	5	3.11
Traffic	8	4.97
Peace and Order	11	6.83
Concreting of Roads	3	1.86
No Response	27	16.77
TOTAL	161*	100

Multiple response*

Calamities

Ninety-seven percent of the respondents were found to be devastated by typhoons in the last half decade, which coincided with the fact that the Philippines is a typhoon-prone country. On the other hand, 1.33% of the interviewed individuals indicated that they suffered from landslide while 24.44% experienced earthquakes for the same time period.

Table 2.65. Different calamities experienced by the respondents in the last five (5) years

Types of Calamities	Total	%
Typhoon	92	40.89
Earthquakes	55	24.44
Flooding	75	33.33
Landslide	3	1.33
TOTAL	225*	100

Multiple response*

Understanding of the Proposed Project

Awareness of OMCPC

As shown in Table 2.66, almost all of the respondents (97.89%) were familiar, or at least, have heard OMCPC prior to the conduct of the study. One of the claimed to be unfamiliar with the company while the other opted not to answer.

Table 2.66. Awareness of the respondents about OMCPC

Level of Awareness about Occidental Mindoro Consolidated Power Corporation (OMCPC)	Total	%
Familiar or Knowledgeable	93	97.89
Unfamiliar	1	1.05
No Response	1	1.05
TOTAL	95	100

Awareness on the Proposed Project

Focusing on the proposed amendment of the OMCPC's ECC, 76 out of the 95 respondents (80%) ascertained that they were aware of the proposal prior to the implementation of the household survey. In contrast, 16 or 16.84% interviewed individuals were unaware of the proposed project as of the time of the study.

Table 2.67. Proportion of the respondents who were aware and unaware of the proposed project of OMCPC.

Awareness of the Proposed Project Prior the Survey	Total	%
Aware	76	80
Unaware	16	16.84
No Response	3	3.16
TOTAL	95	100

Sources of Information

Out of the 76 respondents who were aware of the proposed projects, the leading sources of information were found to be barangay officials (37 or 48.68%), followed by radio, television, and newspaper (36 or 47.37%), as well as social media posts (36 or 47.37%). Apart from the aforementioned sources, some of the respondents also listed relatives, friends, neighbors, as well as barangay meetings/consultations as their sources of information.

Table 2.68. Various sources of information of the respondents prior to the survey.

Sources of Information	Total	%
Barangay Officials	37	21.14
OMCPC Employees	1	0.57
Relatives/Friends/Neighbors	29	16.57
Radio/ TV/ Newspaper	36	20.57
Social Media Posts	36	20.57
Barangay Meetings and Consultations	26	14.86
Surveys and other research endeavors	10	5.71
TOTAL	175*	100

Multiple response*