

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

ELCCA Properties Sdn. Bhd.

Proposed Reclamation and Capital Dredging for the Sunrise City Mixed Development at Mukim Kuala Nerus, District of Kuala Nerus, Terengganu, Malaysia

Volume I of III



August 2019



The expert in **WATER ENVIRONMENTS**

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Proposed Reclamation and Capital Dredging for the Sunrise City Mixed Development at Mukim Kuala Nerus, District of Kuala Nerus, Terengganu, Malaysia

Executive Summary

Prepared for Elcca Properties Sdn. Bhd.
Represented by Mr. Liew Ah Yong



Sunrise City Development

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1 Executive Summary

1.1 Introduction

1.1.1 Project Title

This Second Schedule Environmental Impact Assessment (EIA) is prepared for the **Proposed Reclamation and Capital Dredging for the Sunrise City Mixed Development at Mukim Mukim Kuala Nerus, District of Kuala Nerus, Kuala Terengganu, Terengganu, Malaysia** (hereafter referred to as 'the Project').

1.1.2 Project Proponent

The project proponent is Elcca Properties Sdn. Bhd. (hereafter referred to as 'the Proponent') with the contact details provided below:

Project Proponent	ELCCA Properties Sdn. Bhd. M602, Blok Mawar, Pangsapuri Permint Harmoni, Jalan Batas Baru, 20300 Kuala Terengganu, Terengganu Darul Iman, Malaysia Tel.: 609 – 6666 6431 Fax.: 609 – 6622 430
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Designation:	Director

1.1.3 EIA Consultant

The EIA consultant for this study is DHI Water & Environment (M) Sdn. Bhd. with the following contact details:

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Mohamad Hafiz bin Yahya, *Coordinator* (Tel.: 03 7958 8160)

1.1.4 EIA Scope

The present Second Schedule EIA study covers the impacts arising from the following activities:

- Reclamation of land
- Capital dredging
- Construction of breakwaters
- Construction of roads and bridges; and
- Construction of piled platforms

It is emphasised that this EIA does not assess the impacts of the topside development (both construction and post-construction). As outlined in the TOR, the planning for these components is in the conceptual phase and as such will be assessed in separate EIA(s).

The source of the reclamation material is marine sand from an offshore borrow site with current approvals; as such the borrow dredging activity is not included in the assessment. The dredged materials from the capital dredging are suitable for reclamation fill and will be used in the project reclamation, hence no assessment of dredge spoil disposal is required.

The focus of the impact assessment is based on the scope outlined in the approved Terms of Reference. The key components are:

- Coastal hydrodynamic and morphological impacts of the project footprint;
- Water quality, particularly suspended sediment plume impacts during reclamation and capital dredging;
- Socio-economic impacts; and
- Impacts on marine ecology, principally the loss of marine habitat, due to the project footprint

1.2 Project Description

1.2.1 Project Location

The Project is located along the southern shoreline of the State of Terengganu between the Sultan Mahmud Airport and the Kuala Terengganu (KT) Breakwater, known as Pantai Teluk Ketapang (Figure 1.1). Administratively, the Project is within Mukim Kuala Nerus, District of Kuala Nerus. The Project boundary is shown in Figure 1.2 and the corresponding coordinates are listed in Table 1.1.

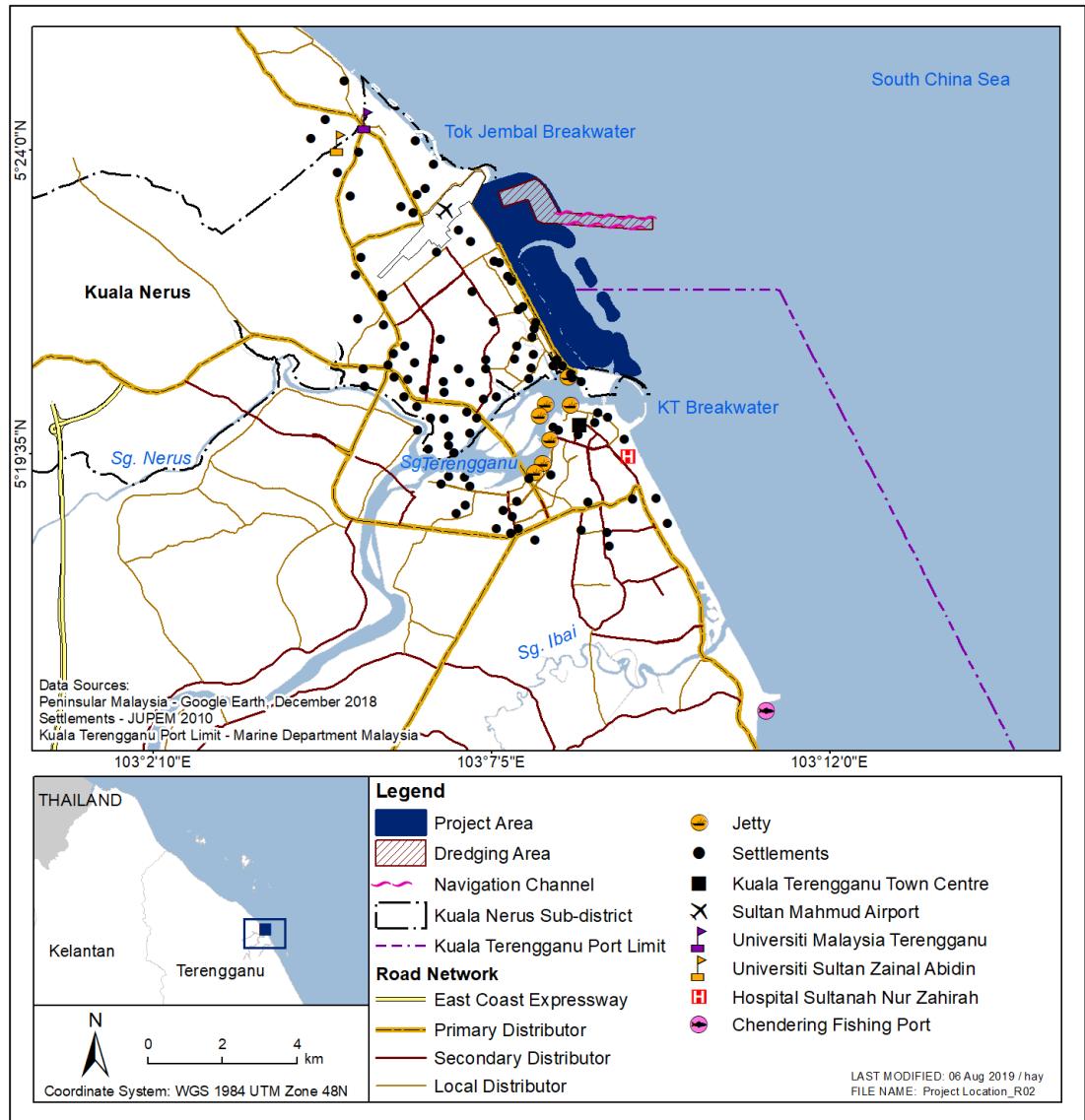


Figure 1.1 Regional setting of the Project.

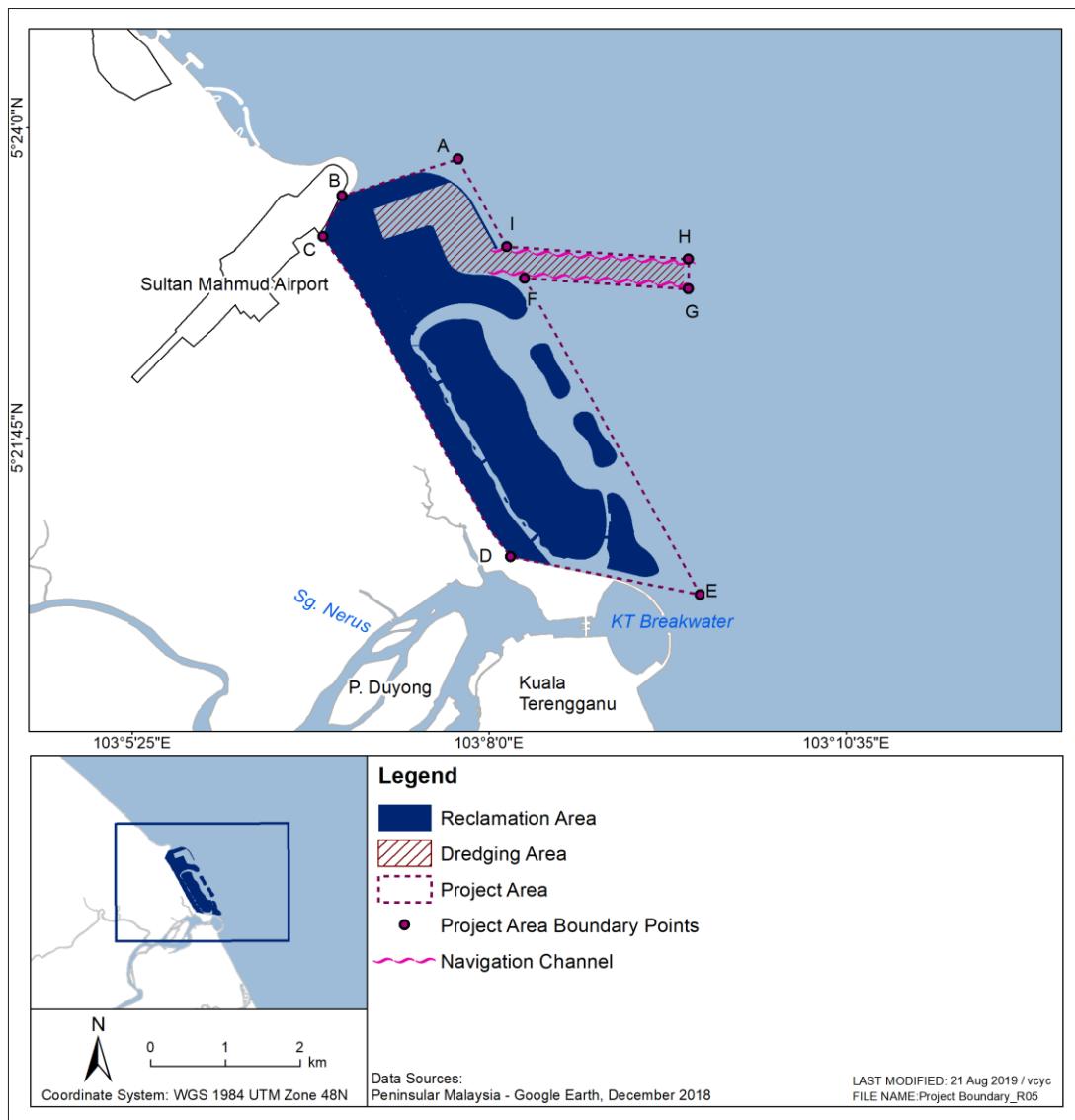


Figure 1.2 Project area which encompasses the reclamation area, dredging area and internal waterways.

Table 1.1 Coordinates of the Project boundary (WGS84 – degrees, minutes, seconds).

Point	Latitude (N)	Longitude (E)
A	5° 23' 46.93"	103° 7' 45.94"
B	5° 23' 30.76"	103° 6' 55.67"
C	5° 23' 13.00"	103° 6' 47.37"
D	5° 20' 53.86"	103° 8' 09.18"
E	5° 20' 37.57"	103° 9' 31.60"
F	5° 22' 55.08"	103° 8' 14.87"
G	5° 22' 50.67"	103° 9' 25.97"
H	5° 23' 3.72"	103° 9' 25.93"
I	5° 23' 8.85"	103° 8' 7.19"

1.2.2 Project Concept

The Project involves land preparation works (breakwater construction, reclamation and capital dredging) for the subsequent development of the Sunrise City project, which is a mixed development including residential, tourism, marine facilities including a cruise liner terminal, light industry, public facilities including public beaches, recreational areas, and a cultural and food hub for the local community. The Sunrise City development is intended to boost economic development in Terengganu, in particular the tourism industry, in line with existing Federal and State government policies.

The conceptual master plan for the Sunrise City development is shown in Figure 1.3. As described in Section 1.1.4 above, separate EIAs will be conducted for the topside components and will not be addressed in this present EIA.

The reclamation layout has been developed based on numerical modelling studies, to ensure that the development is sustainable with respect to the infrastructure and marine facilities such as navigation channel and turning basin, while at the same time ensuring there are no significant impacts to the adjacent shorelines and inland areas in terms of coastal erosion or flooding.

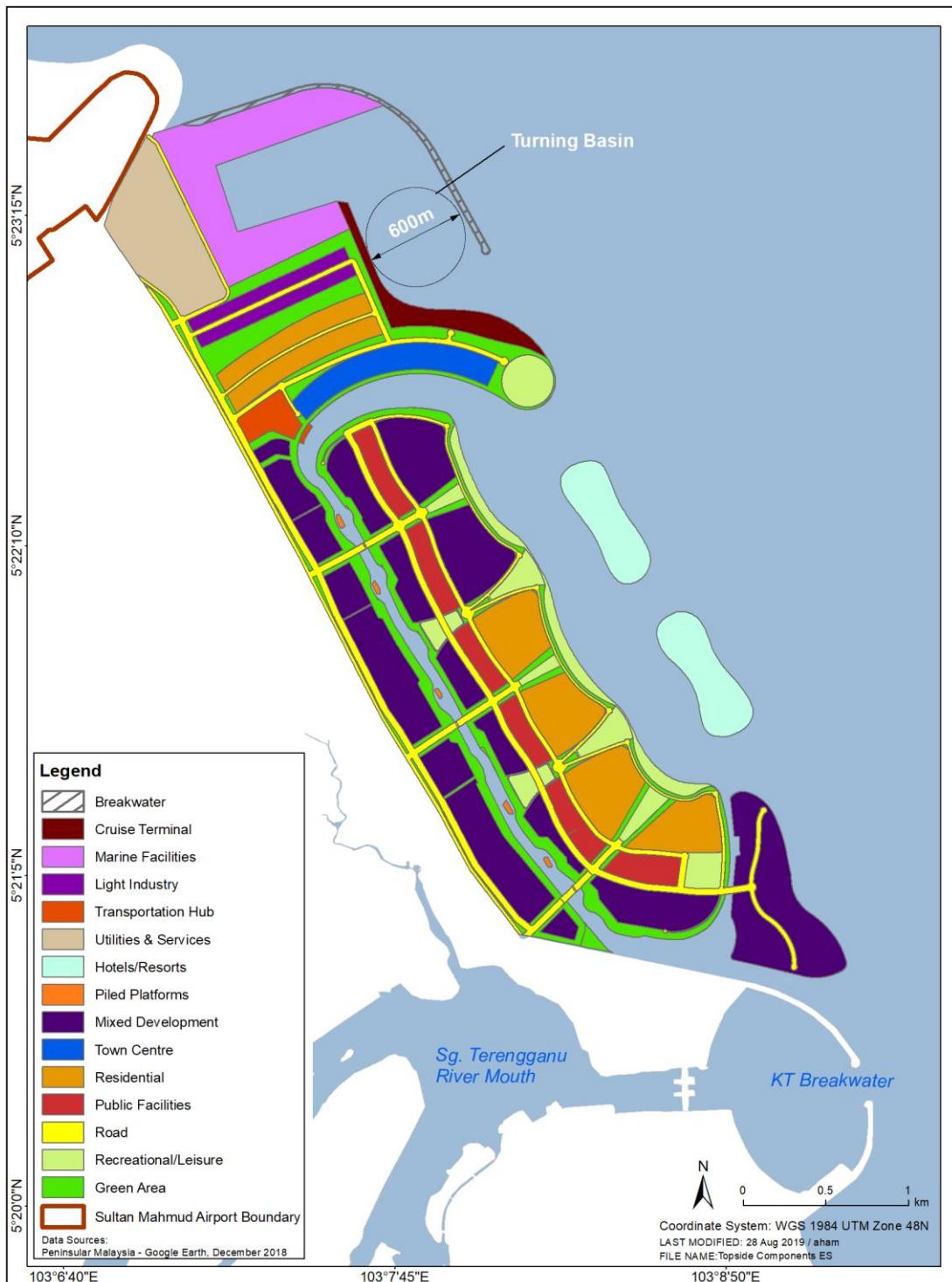


Figure 1.3 Conceptual Sunrise City project topside components.

1.2.3 Project Components

The key Project components are summarised below (see also Figure 1.4):

- Reclamation of 768 hectares (1,898 acres) over five phases, requiring 62 million m³ of sand.
- Capital dredging of 8.3 million m³ for breakwater construction, navigation channel and turning basin to a depth of -12 m CD. All dredged materials will be reused in the reclamation.

Sand fill material will be sourced from an approved marine site offshore of Kijal, approximately 124 km southwest of the Project site.

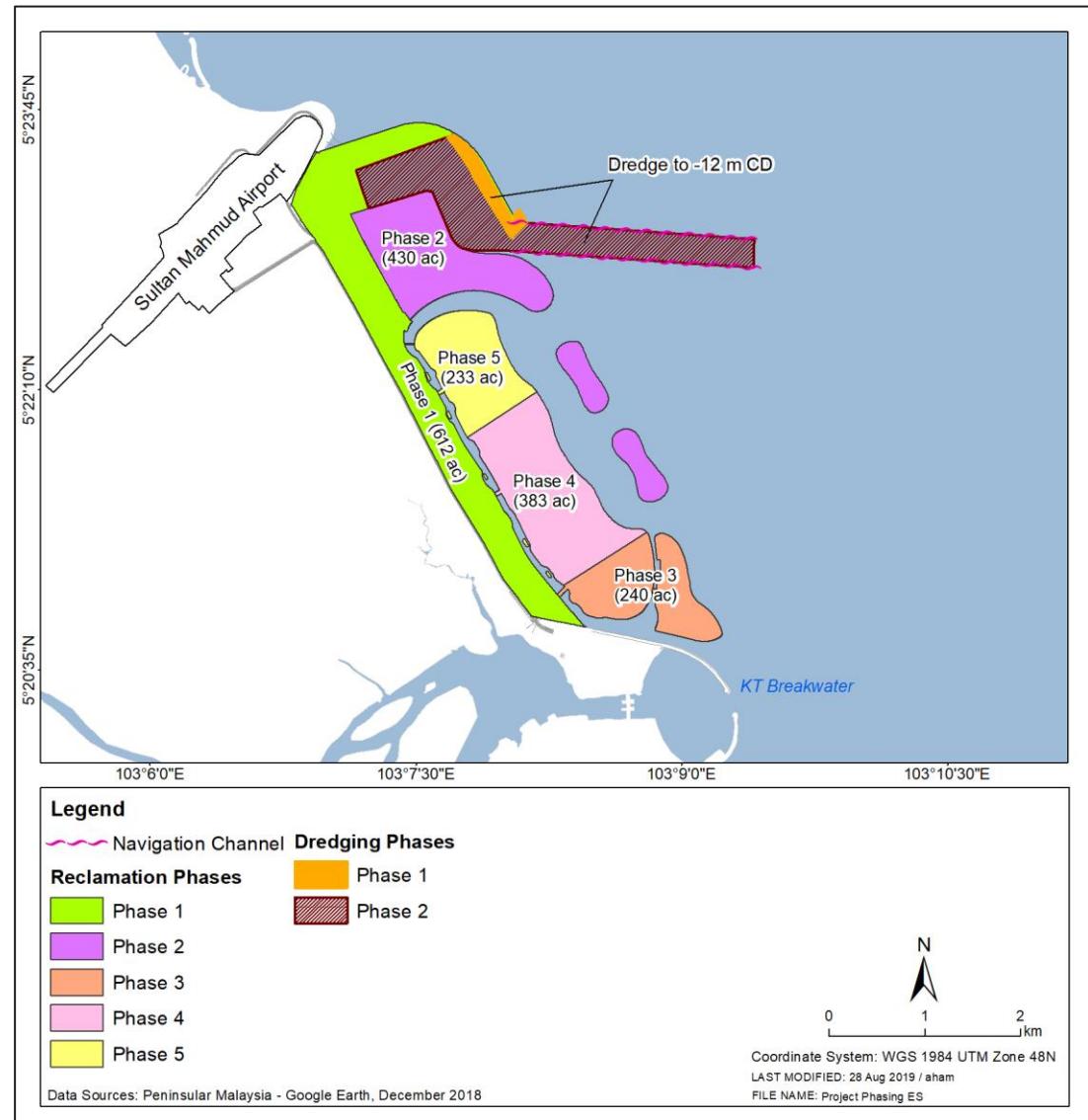


Figure 1.4 Reclamation phases and dredging area.

1.2.4 Project Activities and Implementation Schedule

The Project will be carried out over five consecutive phases, with targeted commencement in the first quarter of 2020 and planned completion approximately six years later.

The breakwater in the northern part of the Project will be constructed first during Phase 1 and will include capital dredging works over approximately 1.6 months. Phase 1 works also includes reclamation along the length of the coastline in the Project area.

Phase 2 involves reclamation to create the basin for the marine facilities in the north, capital dredging of the navigation channel and basin, and reclamation of the two seaward facing islands. The duration of the Phase 2 works is expected to be 17.5 months (inclusive of downtime), which includes dredging works for approximately 8.1 months (exclusive of downtime).

Phases 3 to 5 involve reclamation works only, with Phase 3 works forming the southern piled platforms and phases 4 and 5 the piled platforms. The anticipated schedule for Phases 3, 4 and 5 is 11.1, 15.6 and 8.3 months respectively.

The overall schedule of six years takes into account weather downtime, where it is expected that no works will be carried out during the Northeast Monsoon period for phases 1 and 2. It is expected that reclamation works for phases 3 to 5, being relatively sheltered by the newly reclaimed areas of phases 1 and 2, will be possible year-round.

1.3 Existing Environment

1.3.1 Environmentally Sensitive Areas (ESA)

Among the environmentally sensitive areas (ESAs)¹ near the Project includes four marine parks, mangrove areas, and coastal areas:

- Coastal Area (ESA Rank 3): The shoreline along the Project area is categorised as ESA Rank 3 by the NPP-CZ.
- Mangrove (ESA Rank 2): The nearest mangroves are located 1 km from the southern inland boundary of the Project along a tributary of Sg. Terengganu. Mangrove patches are also present farther upstream in Sg. Terengganu scattered along the shorelines of Kuala Terengganu, Pulau Wan Man, Pulau Duyong, and Pulau Sekati.
- Marine parks (ESA Rank 1): Four marine parks have been gazetted in Terengganu Waters which are Pulau Kapas, Pulau Bidong, Pulau Redang, and Pulau Perhentian Besar. The Project is located more than 10 km from these marine parks.

1.3.2 Sensitive Receptors

Among the sensitive receptors identified are various cemeteries, educational facilities, medical facilities, recreational areas, palaces, fish aggregating devices (FADs), fish landing areas, and settlements. The ESAs and sensitive receptors near the Project are shown in Figure 1.5. Farther afield, the nearest coral reefs are reported at the Pulau Kapas marine park approximately 15 km from the Project area.

1.3.3 Physiographic Context

The coastal region of Terengganu is largely formed of sandy beaches which are dynamic in nature as a result of seasonal variations in wind, waves and currents from the Southwest and the Northeast monsoons. These seasonal variations also strongly influence ecology and water quality. During the Southwest monsoon period (May to September), the winds are south-westerly and largely blow offshore or in parallel with the coast, leading to relatively calm conditions. In contrast, during the Northeast monsoon (November to March), winds are stronger and predominantly north-easterly, leading to higher waves as shown in Figure 1.6.

Current flows are towards the south under tidal flood conditions and northwards during ebb tides. Current speeds are similar during the northeast and southwest monsoons, but are lower during inter-monsoon periods; they are generally low in the Project area, with mean current speeds up to 0.16 m/s and maximum speeds up to 0.4 m/s.

¹ ESAs have been identified as per definition in the Planning Guidelines for Conservation and Development in Environmentally Sensitive Areas (*Garispanduan Perancangan Pemuliharaan dan Pembangunan Kawasan Sensitif Alam Sekitar*, GPPPP) by PLANMalaysia (2017).

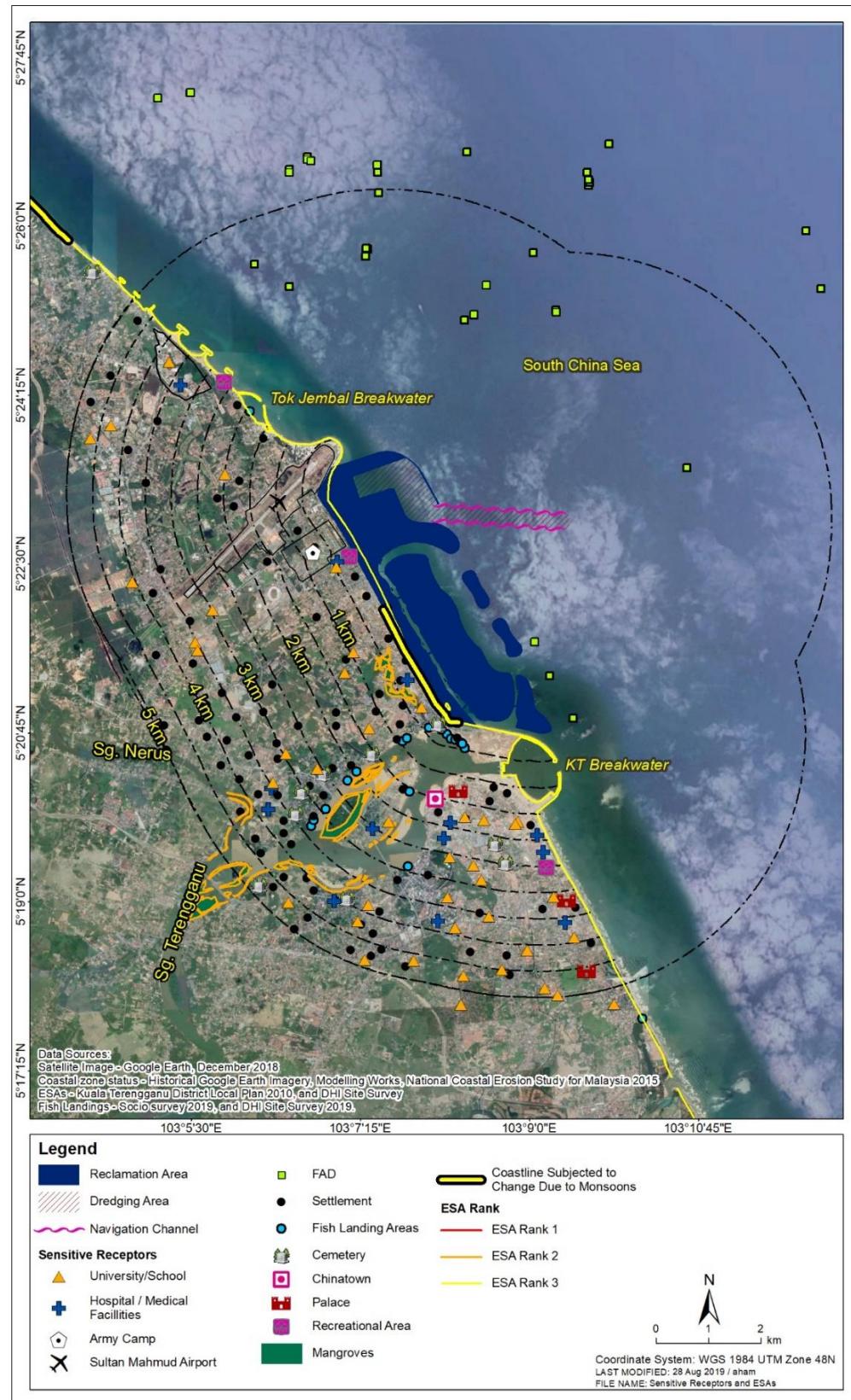


Figure 1.5 ESAs and sensitive receptors located near the Project location.

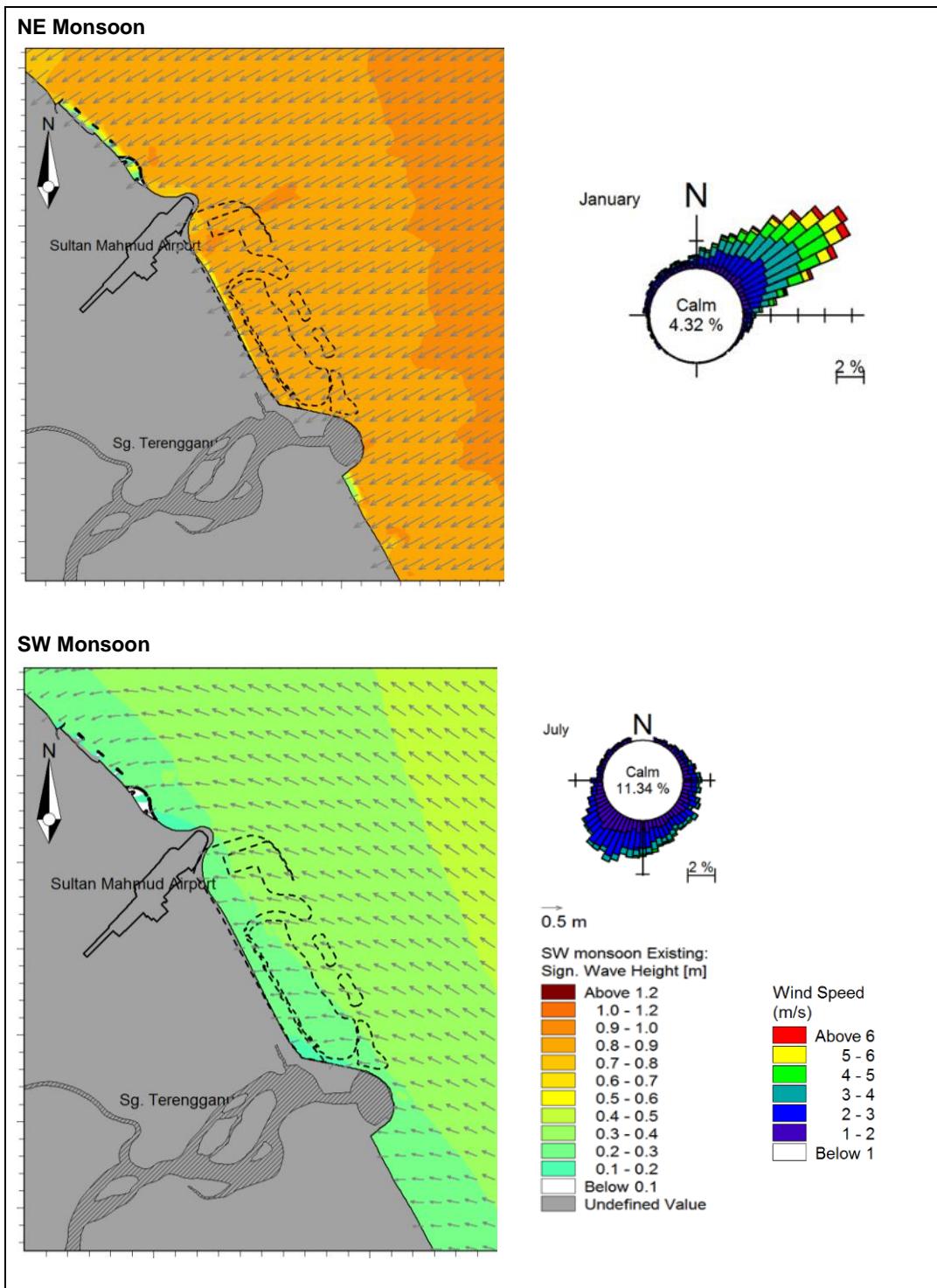


Figure 1.6 A comparison of modelled waves (left) and wind speed and direction (right) in the two monsoon periods. Wind roses are monthly estimates from 10 years of CFSR wind.

The Project itself is located in the shallow areas (between -1 to -8 m CD) off Pantai Teluk Ketapang, a sandy beach between artificial headlands formed by the airport runway reclamation in the north and the Kuala Terengganu breakwaters to the south (Figure 1.1). The seabed in the Project area is sandy and free of heavy metal contaminants and organic pollution.

In terms of coastal morphology, this area is stable, particularly the northern end. An offshore breakwater has been built at the southern part (Figure 1.7) and has mostly stabilised the

southern part of the stretch, although seasonal changes in the shoreline during monsoon seasons may still occur.

The coastal road along the shoreline, Jalan Pantai Teluk Ketapang, has recently been upgraded (an East Coast Economic Region (ECER) project) and is protected by a rock revetment and artificial sand nourishment is presently being carried out.

North of the airport runway, recent coastal protection works have been implemented including the Universiti Malaysia Terengganu (UMT) Coastline Protection Structures by the Department of Irrigation and Drainage (2008) and the Tok Jembal breakwaters constructed in 2016 to create a sheltered area for the berthing of small boats and to support recreational activities. The coastal protection works were carried out to address the significant erosion experienced in this area since the Sultan Mahmud Airport runway extension completed in 2008. Although the protected stretch of shoreline is now stabilised, erosion still persists north of the protected area.



Figure 1.7 Satellite image (Google Earth) of the coastal strip in the Project area showing existing coastal interventions.

The southern limit of the Project site is bounded by the trained river mouth of Sg. Terengganu, which is the main river in the Sg. Terengganu basin originating from the upper watershed of Kenyir Lake with a total catchment area of approximately 5,000 km². Rainfall and consequently river outflows show a strong seasonal pattern that is also a product of the monsoons with the highest discharge rates for Sg. Terengganu in the months of September to March, corresponding to the Northeast monsoon. Flooding also primarily occurs during this period, mainly caused by an increase in water levels in Sg. Terengganu and its tributaries that run parallel to the shoreline.

Within the Project site itself there are no rivers or streams discharging across the beach. There is one drain outlet draining runoff from the south side of the airport runway extension draining

into the Project site. Three soakaways are also located along Pantai Teluk Ketapang which drain the hinterland areas.

In general, the water quality in the Project area at the time of the surveys (i.e. September and October of 2017 coinciding with the inter-monsoon period) was good, with low suspended solids. No visible plumes were observed discharging from the river at the time of sampling, although the nearshore areas around the river mouth and within the Project site were observed to be more turbid than offshore.

However, elevated ammonia levels were detected at the Sg. Terengganu river mouth, while faecal coliform counts were also high inside the river and the areas around the river mouth. Bacterial pollution in other stations in the Project site was however low, indicating rapid die-off and / or flushing of the riverine discharges, and also the absence of other sources along the coastline.

Oil and grease levels were below the laboratory detection limit in all areas, indicating low oil and grease pollution within the coastal waters despite certain stations being located within areas of high navigation activities.

1.3.4 Marine Ecology

As mentioned above, the Project is located in shallow subtidal areas between 1 to 8 m below chart datum and is generally a high energy area characterised by medium sand. Surveys indicate no primary producer habitats such as coral reefs and seagrass in the area apart from several algae patches. Three fish aggregating devices (FADs) were however detected approximately 250 m from the southern part of the Project site (see Figure 1.5 above). More than 30 FADs were observed and / or reported near the Project site comprising of tyres, sunken boats, and concrete. Surveys indicate these are generally colonised by soft coral and other epibenthos such as barnacles.

Although sandy subtidal coastal areas in general also function as a nursery ground to fish fauna, structured habitats (such as mangroves, coral, seagrasses, etc.) generally has significantly enhanced juvenile density relative to unstructured habitats. Estuaries are considered a highly suitable area for fish fauna to spawn, develop and grow during early life and in Sg. Terengganu, the presence of mangroves along the river banks also increases the fish habitat value. The nearest mangrove area within 1 km from the Project is located along a tributary of Sg. Terengganu which runs parallel to the shoreline approximately 300 m inland. The mangroves comprise mainly of nipah.

Fish fauna sampling in the Project area carried out on neap and spring tides on two occasions (intermonsoon periods post- and pre-NE monsoon) corroborate this, with relatively low numbers of fish fauna caught. The lowest was three individuals and the highest 55 over a one-hour sampling period. The number of species caught ranged between two and 17.

Overall, Ikan Kekek (*Leiognathus brevirostris*) had the highest abundance, followed by Ikan Cencaru (*Megalaspis cordyla*). Most of the fish fauna caught were determined to be adults with only three and one species of juveniles caught during neap and spring tide respectively during pre-NE monsoon and ten species during the post-NE monsoon period.

Macrobenthic surveys in the study area showed species composition typical of subtidal sandy areas along the east coast of Peninsular Malaysia, with polychaetes dominating, accounting for just over half of the total macrobenthic density. This was followed closely by molluscs (46.5%) which was dominated by gastropods, with only small numbers of bivalves and schaphapods. All other phyla made up only 3.0% of the total density.

Macrobenthos density in the Project area was high, with an average of 1,067 and a range of between 320 to 2,500 individuals/m². A more recent survey in the Project area in March 2019 (inter-monsoon period between the Northeast to Southwest monsoons) recorded a much higher density ranging from 168 to 16,375 ind./m².

The planktonic community is variable and patchy, with phytoplankton densities ranging from around 14 to 1,210 cells/L during a pre-NE monsoon survey in the Project area to up to almost 22,000 cells/L in a survey carried out post NE monsoon. Zooplankton densities were low, with between 3 to 16 individuals/L. Eight phyla of zooplankton were identified dominated by arthropods (55%) comprised primarily of copepods. Other phyla recorded included cnidarians (18%), annelids (15%), radiozoans (11.6%), while remaining represented less than 1 % of the total density. Higher densities of both phyto- and zooplankton were observed in the marine areas compared to inside the Terengganu river mouth.

Further afield, marine protected areas lie more than 10 km from the Project site as shown in Figure 1.8. Two species of sea turtles (green turtles and hawksbill turtles) nest along the beaches of Terengganu, however, none of these recorded nesting sites are in the vicinity of the Project. The Kuala Terengganu District Fisheries Office confirmed that the closest nesting area to the Project site is at Kapas Island, located approximately 17 km away.

It is noted that there are isolated cases of incidental nesting at Pantai Seberang Takir by sea turtles, with one nesting recorded in 2018. However, the Department of Fisheries (Rantau Abang Turtle Centre) do not monitor or manage these sites as the nesting numbers are inconsistent and very low (personal communication with En. Mohammad Firdaus bin Abdullah on 8 July 2019).

Painted terrapins are another endangered species found in Peninsular Malaysia which nest along beaches and can be affected by coastal reclamation projects. However no painted terrapins are reported to nest in the vicinity of the Project, with the nearest nesting sites over 50 km away. River terrapins are found in Sg. Terengganu, with known nesting sites located more than 30 km upstream of the mouth of Sg. Terengganu.

The coastal waters in Terengganu also support cetacean species such as dugong, whales, and dolphins; these have generally been sighted in the waters around 10 km offshore of the shoreline.

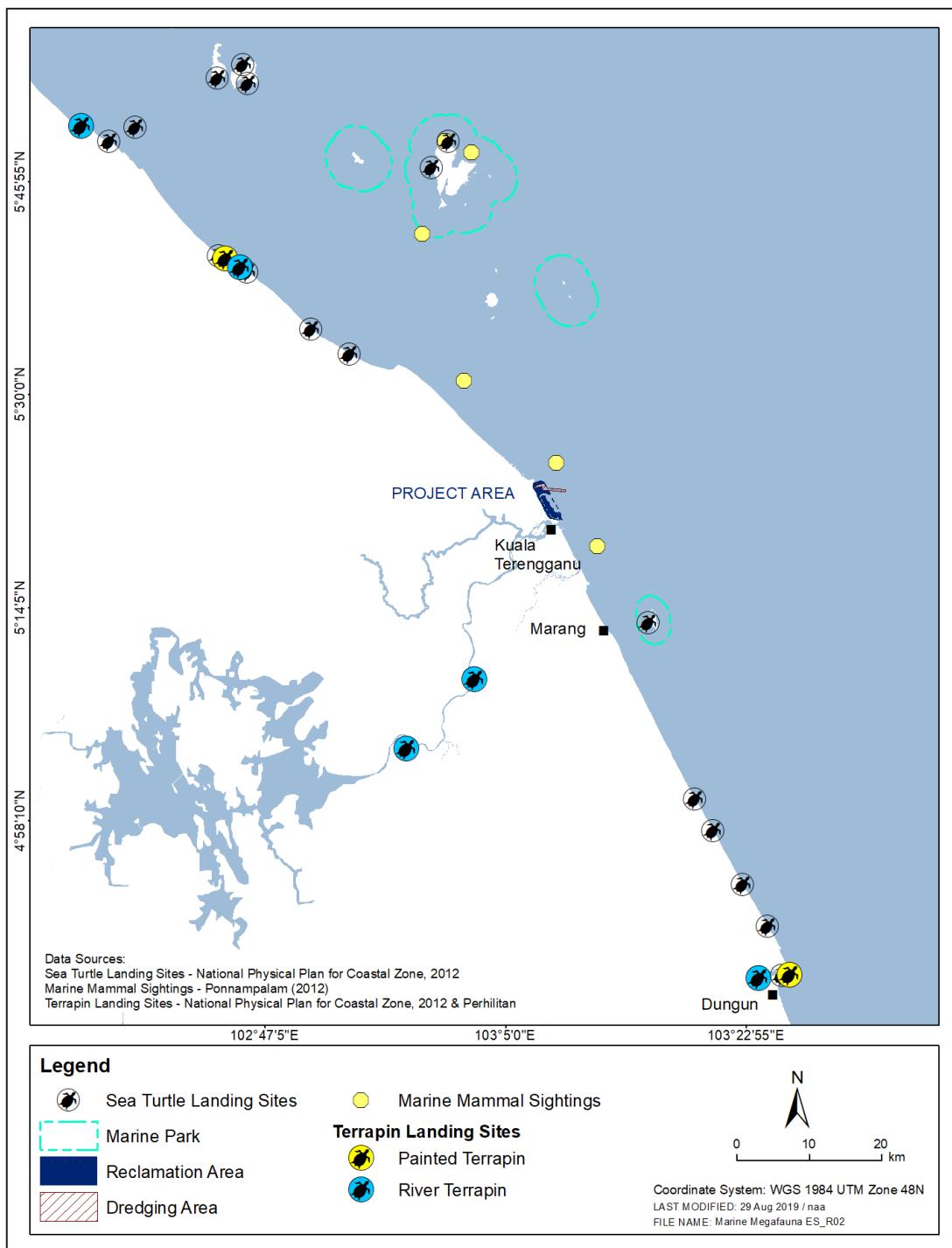


Figure 1.8 Locations of marine parks, marine mammal sightings, sea turtle landing sites and terrapin landing sites.

1.3.5 Human Environment

1.3.5.1 Administrative Setting and Land Use

The Project is located within the Kuala Nerus District which encompasses four mukims (Kuala Nerus, Batu Rakit, Pulau Redang, and Pakoh). The Kuala Nerus District has an estimated total population of 200,000 in 2016 with a predominantly Malay ethnic composition (95% in Terengganu).

Based on the Kuala Terengganu District Local Plan 2010, land use within 5 km of the Project consists of unplanned and planned residential areas along the coast, urban land uses within the Kuala Terengganu town area and less developed areas further inland with plots of unused land. There are 97 villages within this study area, of which 12 villages are fishing villages.

Along the shoreline within 1 km of the Project, the land use is dense residential (with 13 villages in the area) and tourism-based facilities (e.g. hotel and homestays) (FIGUREXX). Kg. Baru Seberang Takir and Taman Permintaan Perdana have the largest population.

Three key land uses near the Project site are the Sultan Mahmud Airport (~176 ha), the army camp (~87 ha) and Universiti Malaysia Terengganu campus (~74 ha). Community facilities such as hospitals, clinics, mosque, church and temple are scattered within the residential areas.

Air quality and noise levels in the area reflect these land uses, with no significant industrial or other sources of air pollution. Noise levels recorded in the study area were generally typical to high compared to the guideline levels for urban and suburban residential land uses, with aircraft noise contributing to peaks due to the proximity of the airport.

The beach stretch of Pantai Teluk Ketapang, Seberang Takir is popular for recreational activities, with food stalls and amenities such as public toilets and picnic huts concentrated in the northern part of the beach. This area is also lined with stands of *Casuarina* (rhu), offering shade and aesthetic amenity, whereas the rest of the shoreline towards Seberang Takir has only sparse vegetation, comprising mainly landscape trees planted during the Jalan Pantai Teluk Ketapang upgrading project.

Farther afield, Pantai Tok Jembal to the north of the Project site and Pantai Batu Buruk to the south are also popular recreational beaches. A survey of beach users was carried out at these beaches as well as Pantai Teluk Ketapang, with 104 respondents, including tourists (57) and locals (47).

In general, the key attractions of these beach areas as reported by the respondents were scenic view (42%), recreational activities (23%), affordable / low cost place for vacation (16%), cultural uniqueness (8%) as well as historical attraction (1%).

The historical and cultural sites along Pantai Teluk Ketapang include Telaga Daing and Makam Tok Panjang (Tok Panjang tomb) as shown in Figure 1.9. Telaga Batin is said to be where Batin, the captain of a Johor warrior's boat, died. Telaga Daing is said to be one of the earliest Bugis settlements in Terengganu with the two wells (both shown in Figure 1.9) being all that is left of the settlements. Makam (tomb) Tok Panjang was gazetted as a Heritage Site in August 1980.

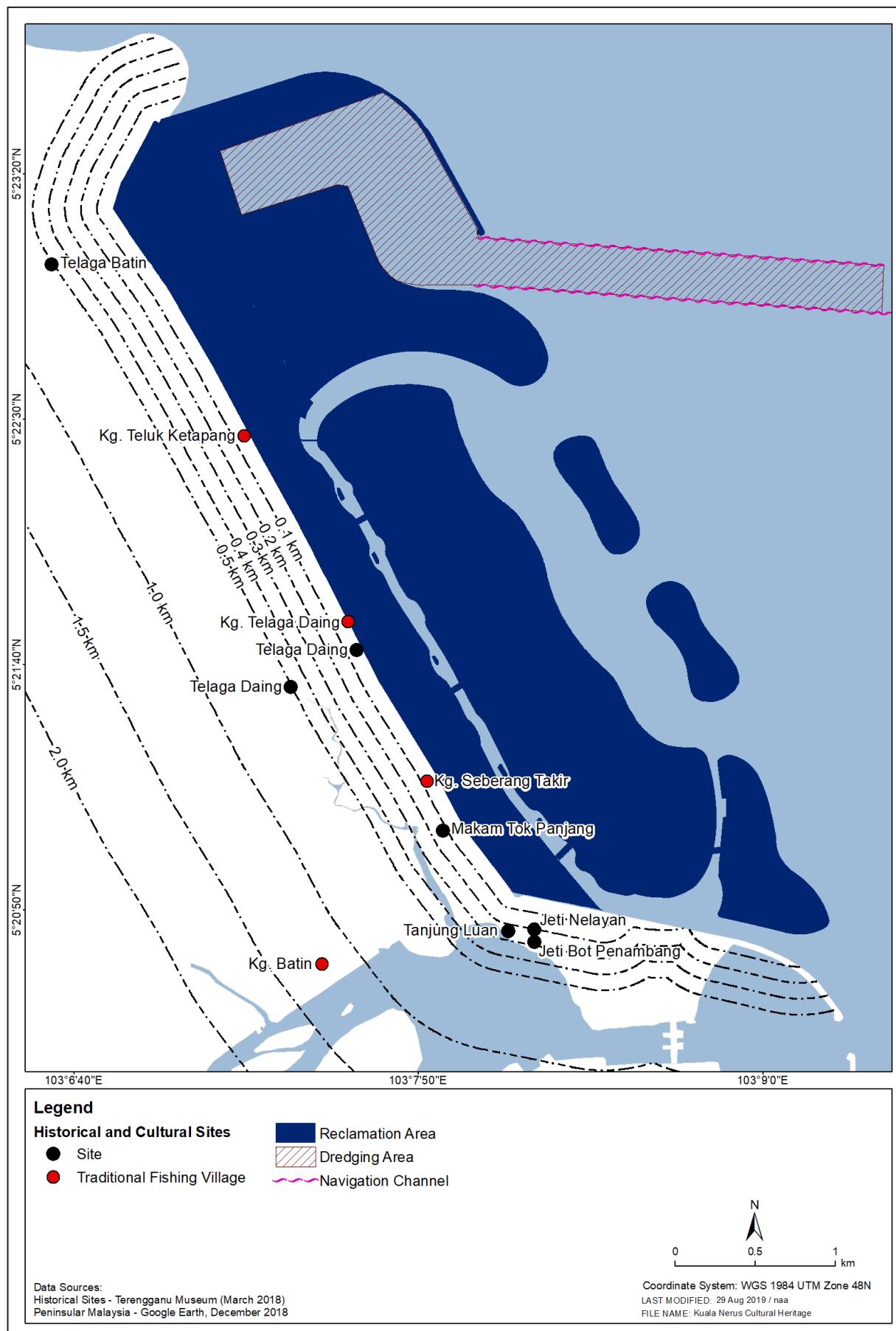


Figure 1.9 Locations of the historical and cultural heritage sites provided by the Terengganu Museum (March 2018).

1.3.5.2 Socioeconomic Survey

A socioeconomic survey was carried out covering the area within 5 km from the Project, sampling 343 respondents between the ages of 18 to 60 years old. The key demographic characteristics of the respondents are summarised in Table 1.2.

Table 1.2 Socio-cultural profile of the survey respondents in the study area (343 respondents).

Profile	Description
Ethnicity	83.4% (n = 286) of respondents are of Malay ethnicity, followed by Chinese (9.9%) and Indian (6.7%).
Gender	<ul style="list-style-type: none"> 241 are male and the rest (102) are females. This gap is due to the focus of the questionnaire on the fishermen community which is dominantly occupied by the male gender.
Age	<ul style="list-style-type: none"> The dominant age group is between 41-50 years.
Education	<ul style="list-style-type: none"> Highest educational attainment for respondents was SPM Level (39.8%), followed by Primary level (26%). Five respondents (0.6%) had no formal education.
Marital status	<ul style="list-style-type: none"> The respondents are predominantly married (257 people or 75%). 21.9% (n = 75) are single. 3.2% are divorced.
Occupation	<ul style="list-style-type: none"> A total of 73 respondents (21.3%) are employed under private sector. 75 respondents are business owners such as food stall and selling tourism product such as keropok lekor Losong. Fishing is the third highest type of occupation of the respondents, with a total of 64 respondents (18.7%). 39 (11.4%) respondents are unemployed.
Household income	<ul style="list-style-type: none"> Average monthly household income was reported to be in the range of RM1,501 – RM2,000 This is lower than the national average (2012) of RM2,883.
Residency period	<ul style="list-style-type: none"> Up to 269 (78.4%) respondents have stayed in the area for more than 20 years.
Property ownership	<ul style="list-style-type: none"> Majority (306 people or 89.2%), own their house and land. 37 respondents (10.8%) rent their home.

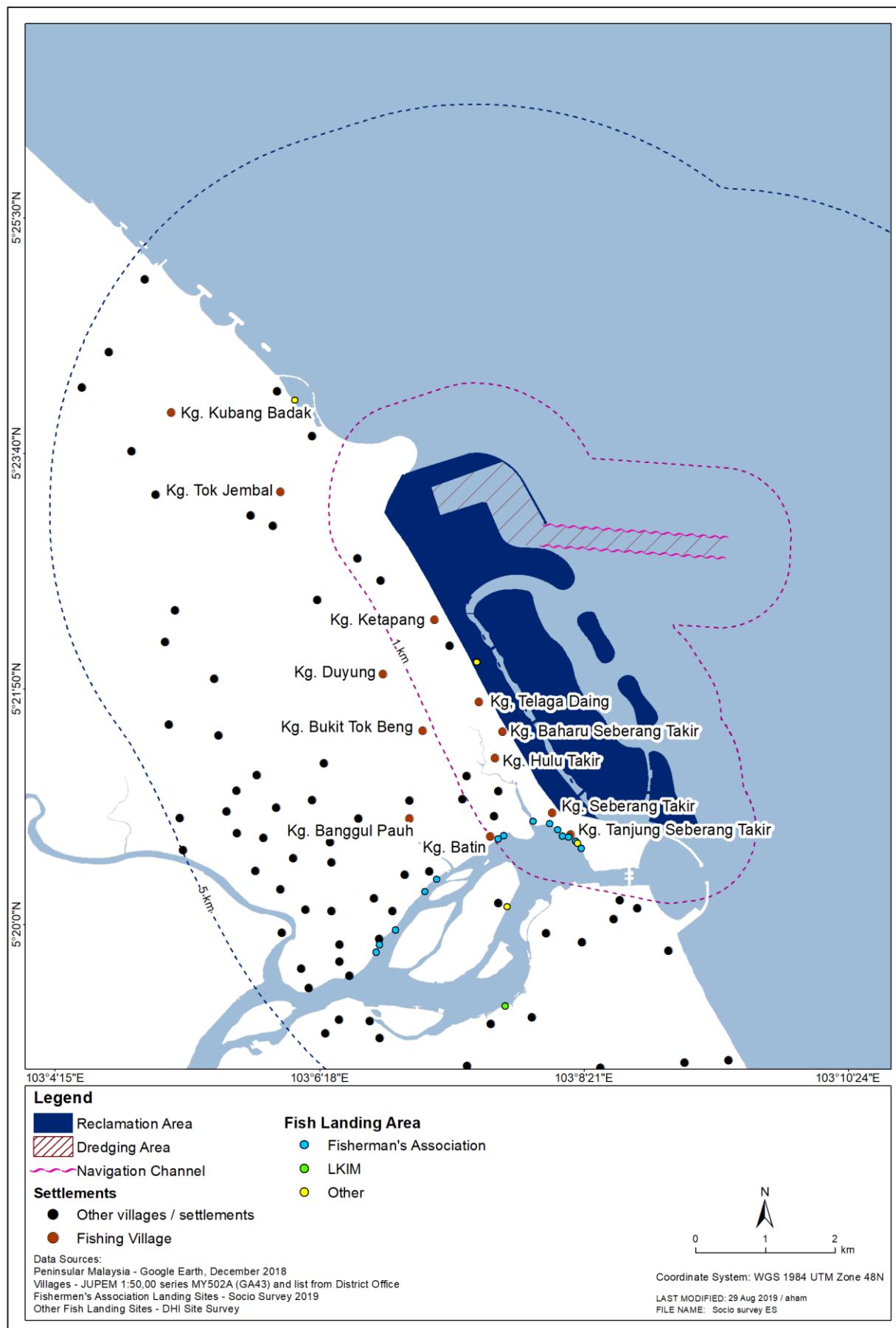


Figure 1.10 Locations of villages within 5 km of the Project and the nearby fish landing areas.

Community Perception of the Project

Based on the socioeconomic survey, only 47% of the respondents were aware of the Project.

Based on the zone of impact (ZOI), only 43% (47 respondents out of 109) within 1 km of the Project were aware of the Project proposal.

Approximately 82% of the total respondents have no objection to the Project, and this was similar for the immediately affected areas along the Project boundary (0 – 1 km from the Project).

Overall, the respondents were receptive to the Project as they believed the Project would add more land area and reduce the chance of flooding at the residential areas near the sea. Meanwhile, the respondents who disagreed with the Project mainly cited possible negative environmental impacts, loss of recreational area and decreasing income for the fishermen.

1.3.5.3 Public Engagement

Two focus group discussion (FGD) sessions and one townhall session were carried out to engage stakeholders and the wider public on the issues and potential impacts identified during the study. The two FGD sessions were carried out on 12 June 2019 for the Village Community Management Council (*Majlis Pengurusan Komuniti Kampung*, MPKK) and the fishermen community respectively.

The MPKK voiced concerns regarding the funding source of the Project, availability of reclaimed land for bumiputera, impacts of Project to upstream and downstream ecosystems, and beach erosion. They also emphasised the need for a detailed study of erosion.

The fishermen were concerned with the impact of the Project to their income, loss of Pantai Teluk Ketapang, impact of the Project to their movement (navigation) and requested consideration towards the interests of the affected fishermen through consultation with the directly affected fishermen, and compensation for the potential loss of income, FADs, and affected fishing ground.

The townhall session was carried out on 28 June 2019 at the TH Hotel & Convention Centre Kuala Terengganu with a total of 45 participants. The participants comprised of a Member of Parliament (MP), State Exco (ADUN), representatives of the MPKK, academia (from Universiti Malaysia Terengganu), private sector, government servants, government agencies like LKIM and DOE Terengganu, and the general public. Issues were mainly raised by academicians which include the Project area as an important nursery ground for commercially important juvenile fish, compatibility of the project with existing developmental policies and sustainability issues. They also raised the need for a comprehensive monitoring programme during implementation due to the size of the Project. Ecological and flooding impacts as well as erosion issues were brought up. The importance of the heritage and tourism values of Pantai Teluk Ketapang and aesthetic impacts were also raised.

1.3.5.4 Fisheries Activities

The fishermen community in the study area falls under the Fishermen's Association of Kuala Terengganu Selatan and Kuala Terengganu Utara, with a total membership of 1,796 fishermen. In the Kuala Nerus district, outboard-powered vessels are the most common followed by Zone A, with a total of 85 and 52 respectively in 2018. The total number of registered vessels has been reducing over the past several years, from 458 down to 157 from 2014 to 2018.

Within the study area of 5 km radius from the Project, there are twelve fishing villages, of which six are located within 1 km of the Project (Figure 1.10). Most fishermen in the area use the landing areas inside Sg. Terengganu and the Tok Jembal breakwater, however a number also access the sea from the beach at Pantai Teluk Ketapang (Figure 1.10).

As mentioned above, a socioeconomic survey was carried out in the Project area, which included 64 fishermen (~19%) out of the 343 respondents. The majority of the fishermen interviewed were over 60 years of age, with very few fishermen less than 30 years of age. More than half of the fishermen interviewed have been working in this occupation for more than 20 years, followed by 6 – 10 years (23 %).

Fishing rods were the most commonly used fishing equipment, followed by trawlers, fishing nets, *tukun*, *bubu*, and fishing cage. Most of the fishermen indicated their fishing grounds as further than 5 km from the Project area with the majority of them travelling more than 10 km from the shoreline to fish.

While the fishermen go out to sea all year round, the survey respondents reported the high season to be during the months of March and April which is after the Northeast monsoon. Majority of the respondents reported an income of between RM600 – RM1,000 per month and 21 % reported their income to be RM1,600 – RM2,000.

LKIM Terengganu also noted that shrimp season starts after the end of the Northeast monsoon whereby fishermen fish in the shallow waters right up to the shore of Pantai Teluk Ketapang using seine nets, while September to October (before Northeast monsoon) is also a high season for fish.

1.3.5.5 Marine Traffic

The Project is partially located within the Kuala Terengganu Port Limit, with a chartered anchorage area located and partially overlapping the southern part of the reclamation area. The anchorage area was designated for use by cruise ships transporting passengers to and from Kuala Terengganu but is rarely utilised due to adverse weather conditions outside of the breakwaters.

The five categories of vessels which ply the Project area are ferries, fishing boats, offshore supply vessels, patrol and marine boats (Malaysian Maritime Enforcement Agency, Marine Department, and Marine Police), and research vessels and leisure yachts.

A ferry route between Shahbandar Jetty at Kuala Terengganu and Pulau Redang passes approximately 4.3 km away from the Project site while the nearest established commercial traffic route is approximately 3 km away (see Figure 1.11).

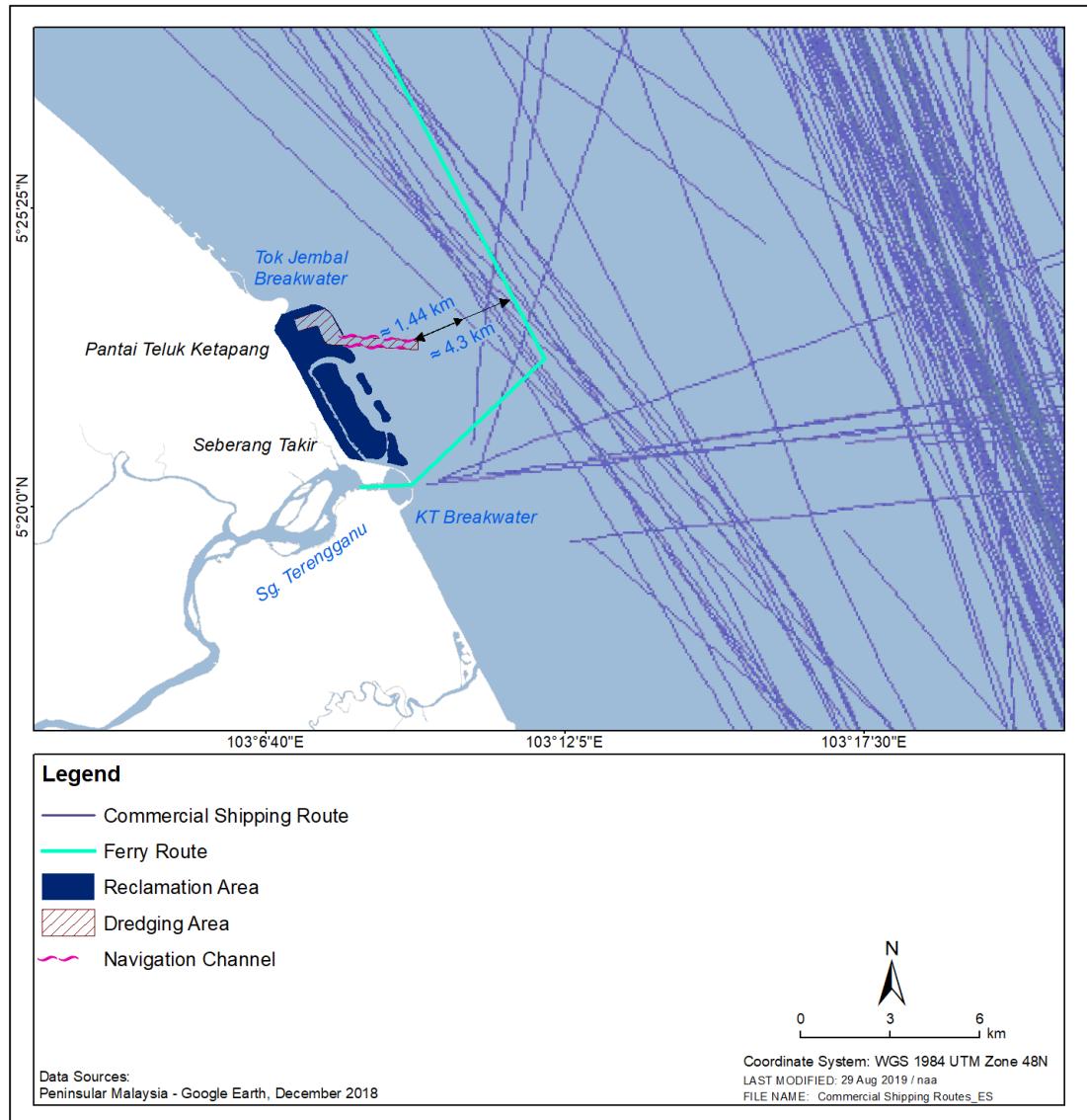


Figure 1.11 Distance of ferry and commercial shipping routes the Project site.

1.4 Impact Assessment and Mitigation Measures

The impacts and mitigation measures for the construction and post-construction phases are summarised in Table 1.3 and Table 1.4 respectively. These include the residual impact significance, that is, the anticipated level of impact that remains after the implementation of the recommended mitigation measures.

Table 1.3 Summary of impact assessment during construction.

Component	Potential Impact	Magnitude of significant potential impacts		Pollution Prevention and Mitigation Measures	Reference Pages (Volume II EIA report)
		Without mitigation	With mitigation (Residual Impact)		
Water Quality	Suspended sediment	Minor negative	Minor negative	<ul style="list-style-type: none"> Use of perimeter bunding and installation of silt curtain. Implementation of Best Management Practices (BMPs) throughout construction stage. 	7-8; 8-1; 8-5
Coastal Morphology	Sedimentation	Minor negative	Minor negative	Use of perimeter bunding and installation of silt curtain.	7-30; 8-6; 8-6
Hydrology and Drainage	Airport drainage outlet blockage	Minor negative	Slight negative	<ul style="list-style-type: none"> Construction of permanent drain connecting to airport outlet to the discharge outlet in parallel with commencement of reclamation work in Phase 1. Mitigation measures related to control of suspended sediments to reduce impacts of sedimentation. 	7-40; 8-6; 8-7
Air Quality	Airborne dust	Minor negative	Slight negative	Application of general good practice measures during the construction stage,	7-44; 8-7; 8-8
Ambient Noise	Increased noise exposure	Minor negative	Slight negative	<ul style="list-style-type: none"> Avoidance of high noise emitting activities at night proper maintenance and servicing of vehicles fitting of manufacturer recommended supplemental noise suppressors; and 	7-48; 8-8; 8-8

Component	Potential Impact	Magnitude of significant potential impacts		Pollution Prevention and Mitigation Measures	Reference Pages (Volume II EIA report)
		Without mitigation	With mitigation (Residual Impact)		
				<ul style="list-style-type: none"> • installation of acoustic hoarding barrier at project boundary 	
Primary Producer Benthic Habitats	Suspended sediment impact and siltation to FADs	Minor negative	Minor negative	No specific mitigation measures.	7-59; 8-8; 8-9
	Sedimentation impact to FADs	Minor negative	Minor negative	No specific mitigation measures.	7-64; 8-8; 8-9
	Risk of damage to FADs	Slight negative	No change	Establishment of 100 m exclusion zone around FADs to be demarcated with buoys.	7-67; 8-8; 8-9
Macrobenthos	Suspended sediment	Minor negative	Minor negative	No specific mitigation measures.	7-69; 8-10; 8-10
	Sedimentation	Slight negative	Slight negative	No specific mitigation measures.	7-71; 8-10; 8-10
	Loss of Habitat	Slight negative	Slight negative	No mitigation measures available	7-73; 8-10; 8-10
Plankton	Change to water quality	Minor negative	Slight negative	Adherence to relevant international regulations and guidelines for management of sewage and oil pollution according to Annex IV and Annex I of MARPOL respectively.	7-75; 8-10; 8-11
	Release of trace metals and foreign planktonic organism from ship ballast water	Moderate negative	Slight negative	Adherence to ballast water management plan as per the International Convention for the Control and Management of Ships' Ballast Water and Sediments. <ul style="list-style-type: none"> • Ships to record taking in, circulation, treatment, and discharge of ballast water • Ballast water exchange conducted at least 200 nautical miles from nearest 	7-76; 8-10; 8-11

Component	Potential Impact	Magnitude of significant potential impacts		Pollution Prevention and Mitigation Measures	Reference Pages (Volume II EIA report)
		Without mitigation	With mitigation (Residual Impact)		
				<p>land at minimum depth of 200 m</p> <ul style="list-style-type: none"> • Uptake of ballast water to be avoided in darkness, very shallow water, or other areas identified by local authorities 	
	Sediment plume	Slight negative	Slight negative	No specific measures	7-77; 8-11; 8-11
Fish Fauna	Suspended sediment	Minor negative	Minor negative	No specific measures	7-79; 8-12; 8-12
Marine Megafauna	Boat strikes	Minor negative	Minor negative	<ul style="list-style-type: none"> • Any sighting of marine megafauna to be recorded. • Accidental strike or injury of any marine megafauna shall be covered under the contractor's emergency response plan. • Installation of tickler chains or other methods should strike or injury to marine megafauna occurs. 	7-81; 8-12; 8-12
Mangrove	Sedimentation	No change	No change	No mitigation measures required	7-84; 8-12;
Terrestrial Ecology	Not applicable	No change	No change	<ul style="list-style-type: none"> • No mitigation measures required • Compensatory steps including re-vegetating open spaces wherever available • Preservation or reuse of existing trees; and new beach vegetation should include similar species as the existing 	7-86; 8-13; 8-13

Component	Potential Impact	Magnitude of significant potential impacts		Pollution Prevention and Mitigation Measures	Reference Pages (Volume II EIA report)
		Without mitigation	With mitigation (Residual Impact)		
				ones to create a similar environment.	
Socio-economy	Health and social wellbeing	Minor negative	Slight negative	As per recommended mitigation measures for air quality and ambient noise.	7-90; 8-13;
	Aesthetic value	Minor negative	Minor negative	Establishment of art decorated hoarding along the Project site boundary and Jalan Teluk Ketapang. Height of hoarding to follow local council guidelines and consider optimum height for noise attenuation.	7-91; 8-13
	Public safety	Slight negative	Slight negative	<ul style="list-style-type: none"> • Installation of proper and suitable warning signages. • Reinstatement and repairment of any damage to public and private roads • Compliance with traffic rules 	7-91; 8-13
	In-migration	Moderate negative	Minor negative	<ul style="list-style-type: none"> • Labour management plan to be prepared; and • Siting of workers' quarters to consider sensitivity of neighbouring residential area. 	7-92; 8-14
	Job opportunities	Slight positive	Slight positive	Prioritisation of employment opportunities to locals.	7-92; 8-14
	Economic activity	Slight negative	No change	<ul style="list-style-type: none"> • Establishment of area for existing hawkers near development area • Utilisation of existing accommodation within 1 km for the construction workers 	7-93; 8-14

Component	Potential Impact	Magnitude of significant potential impacts		Pollution Prevention and Mitigation Measures	Reference Pages (Volume II EIA report)
		Without mitigation	With mitigation (Residual Impact)		
Fisheries	Decrease in fish catch	Minor negative	Slight negative	Installation of additional FADs at alternate area.	7-99; 8-15; 8-17
	Increase navigation risk and loss of access to sea	Moderate negative	Minor negative	Adherence to mitigation measures recommended for fishing vessel navigation.	7-101; 8-11; 8-17
Tourism and Recreational Activities	Loss of recreational areas	Minor negative	Slight negative	Promotion of alternative sites for tourism and recreational activities.	7-104; 8-17; 8-17
Cultural Heritage / Archaeology	Impacts to cultural heritage facilities or function	No change	No change	Not applicable.	7-106; 8-17; 8-17
Marine Traffic	Risk of collisions	Minor negative	Slight negative	<ul style="list-style-type: none"> • Installation of Aids to Navigation (AtoNs) • Engagement with stakeholders to inform of Project schedule • Report to Lima Tango Reporting Authority (Kuala Terengganu, Jabatan Laut) 	7-108; 8-18

Table 1.4 Summary of impact assessment and mitigation measures during post-construction.

Component	Potential Impact	Magnitude of significant potential impacts		Pollution Prevention and Mitigation Measures	Reference Page (Impact; Mitigation Measures; Residual Impact)
		Without mitigation	With mitigation (Residual Impact)		
Water Quality	Flushing capacity	Minor negative	Minor negative	<ul style="list-style-type: none"> • Management of watercourses to ensure no pollutants are discharged into the waterways. • Detailed design and development planning, including EIA, for the future 	7-25; 8-5; 8-6

Component	Potential Impact	Magnitude of significant potential impacts		Pollution Prevention and Mitigation Measures	Reference Page (Impact; Mitigation Measures; Residual Impact)
		Without mitigation	With mitigation (Residual Impact)		
				topside developments shall focus on prevention of pollutant discharges into the waterways to safeguard the watercourses from pollution loading.	
Coastal Morphology	Changes of coastline morphology due to Project footprint.	Slight negative	Slight negative	No mitigation measures required. Monitoring is recommended.	7-35; 8-6; 8-6
Hydrology and Drainage	Blockage of the airport drainage outlet within the Project area	Slight negative	No change	<ul style="list-style-type: none"> Integration of the new drainage system with the airport drain during post-development to be planned at project design stage. Drainage plan shall comply with DID MSMA Guidelines 2nd Edition. 	7-42; 8-7; 8-7
	Flooding risk	No change	No change	No mitigation measures required	7-42
Air Quality	Not applicable	No change	No change	Not applicable	7-48
Ambient Noise	No applicable	No change	No change	Not applicable	7-58
Macrobenthos	Loss of habitat due to Project footprint	Minor negative	Minor negative	No mitigation measures available	7-74; 8-10; 8-10
Primary Producer Benthic Habitats	Eutrophication, Sedimentation and Erosion	No change	No change	No mitigation measures required	7-67
Plankton	Impact of eutrophication due to change in flushing capacity	Slight negative	Slight negative	No mitigation measures required	7-77; 8-11; 8-11
Fish Fauna	Permanent habitat loss	Minor negative	Minor negative	No mitigation measures available	7-80; 8-12; 8-12
Marine Megafauna	No applicable	No change	No change	Not applicable	7-84
Mangrove	No impact	No change	No change	No mitigation measures required	7-85; 8-12

Component	Potential Impact	Magnitude of significant potential impacts		Pollution Prevention and Mitigation Measures	Reference Page (Impact; Mitigation Measures; Residual Impact)
		Without mitigation	With mitigation (Residual Impact)		
Terrestrial Ecology	Loss of habitat	Slight negative	Slight negative	<ul style="list-style-type: none"> Compensatory steps including re-vegetating open spaces wherever available Preservation or reuse of existing trees; and new beach vegetation should include similar species as the existing ones to create a similar environment. 	7-86; 8-13; 8-13
Socio-Economy	Aesthetic value	Moderate negative	Moderate negative	Local authority to ensure agreement with Project proponent is enforced for free and unlimited access to new beaches at the reclaimed land for the locals	7-94; 8-14
	Property value	Moderate negative	Moderate negative	No mitigation measures available.	7-94; 8-14
	Social differences and social network	Moderate negative	Minor negative	<ul style="list-style-type: none"> Project Proponent and local authority to coordinate outreach programmes such as festivals/events, focus group discussion/workshop, to allow better integration between local communities and newcomers. Refer to mitigation measures proposed for aesthetic value. 	7-95; 8-15
	Job opportunities	Significant positive	Significant positive	No mitigation measures required.	7-96;
	Economic activity	Major positive	Major positive	No mitigation measures required.	7-96;
	Transportation and rural accessibility	Significant positive	Significant positive	No mitigation measures required.	7-97
Fisheries	Loss of direct access for some fishermen along Pantai Teluk Ketapang for some fishermen	Moderate negative	Minor negative	<ul style="list-style-type: none"> Provision of permanent fish landing jetty. Some form of compensation should be provided to affected fishermen. 	7-102; 8-16; 8-17

Component	Potential Impact	Magnitude of significant potential impacts		Pollution Prevention and Mitigation Measures	Reference Page (Impact; Mitigation Measures; Residual Impact)
		Without mitigation	With mitigation (Residual Impact)		
Tourism and Recreational Activities	Loss of attraction of Pantai Teluk Ketapang	Minor negative	Slight negative	<ul style="list-style-type: none"> Introduction of new recreational activities prepared within a new township or the new beach; and Promotion of new beach in the Project footprint as the new tourism attraction area. 	7-104; 8-17; 8-17
Cultural Heritage / Archaeology	Effect on value of existing cultural heritage features	Slight negative	No change	Incorporation of heritage elements in the future development by taking into account the original identity and urban design of Seberang Takir or Terengganu as a whole.	7-106; 8-17; 8-17
Land Use	Compatibility	No change	No change	No mitigation measures required	7-107
Marine Traffic	Change in current patterns	No change	No change	No mitigation measures required	7-111; 8-18; 8-18

1.5 Environmental Management Plan (EMP) and Environmental Monitoring

This Environmental Management Plan (EMP) is prepared as a preliminary EMP specification. The final EMP will be prepared post-EIA approval based on the conditions specified by DOE and before the commencement of any construction works. This allows comments during the DOE review stage to be taken into consideration in the final EMP together with the details of the appointed contractor and final, detailed construction methodology.

The EMP outlines both compliance and impact monitoring. In the present case, the compliance monitoring for all pollution prevention and mitigation measures (P2M2) identified in the EIA largely focuses on the implementation status of these P2M2 that have been summarised in Section 1.4, Table 1.3 and Table 1.4 above, given that specific discharge or emission standards are not applicable for this Project.

The main components of the impact monitoring programmes are summarised in Table 1.5. A figure showing the locations of the proposed monitoring stations is shown in Figure 1.12.

Table 1.5 Proposed impact monitoring

Component	Monitoring Parameters	Monitoring Frequency	Monitoring Stations
Water Quality	TSS	<ul style="list-style-type: none"> Daily for two weeks upon commencement of dredging works Dredging and Reclamation – Weekly 	5 stations, three depths
	TSS Oil and Grease Mercury, Cadmium, Chromium, Copper, Cyanide, Zinc, Arsenic, Lead, Aluminium	Dredging and Reclamation – Monthly	5 stations, three depths
	TSS Oil and Grease	Reclamation – Monthly	5 stations, three depths
Coastal Morphology	Beach profile	<ul style="list-style-type: none"> Pre-construction – Once Construction – Biannually Post-construction – Biannually for first three years 	4 transects
Air Quality	Particulate matter <ul style="list-style-type: none"> PM₁₀ PM_{2.5} 	Construction – Quarterly	3
Ambient Noise	<ul style="list-style-type: none"> Equivalent Continuous Sound (L_{eq}) Maximum sound pressure level over monitoring period (L_{max}) 	<ul style="list-style-type: none"> Construction – Quarterly Post-construction – Biannually 	3

Component	Monitoring Parameters	Monitoring Frequency	Monitoring Stations
	<ul style="list-style-type: none"> • Statistical indices (L₉₀, L₁₀) 		
Macrobenthos	Species identification with: <ul style="list-style-type: none"> • Abundance • Diversity 	Post-dredging – Biannually	4
Fish Fauna	Species identification with: <ul style="list-style-type: none"> • Abundance • Weight • Length 	Construction – Quarterly	3
Social Impact	Establishment of; <ul style="list-style-type: none"> • Suggestion / feedback centre • Community working group 	Pre-construction	Not applicable
	<ul style="list-style-type: none"> • Suggestion / feedback centre 	Construction <ul style="list-style-type: none"> • Entries into complaints register summarised in the Environmental Monitoring Reports 	Not applicable
	<ul style="list-style-type: none"> • Community Awareness Plan 	Quarterly dialogue with the community working group	Not applicable
Fish Aggregation Devices (FADs)	Damage due to; <ul style="list-style-type: none"> • working vessels • turbidity; and/or • sedimentation 	<ul style="list-style-type: none"> • Pre-construction • Construction – Quarterly • Post-construction – Biannual for one year after completion of construction works 	3
Fisheries	Discussion on; <ul style="list-style-type: none"> • Progress update of FADs and other form of compensation • Progress update on project development • Managing of displaced fishermens' landing sites or sea access 	<ul style="list-style-type: none"> • Construction – Biquarterly • Post-construction – Annually for first two years 	-

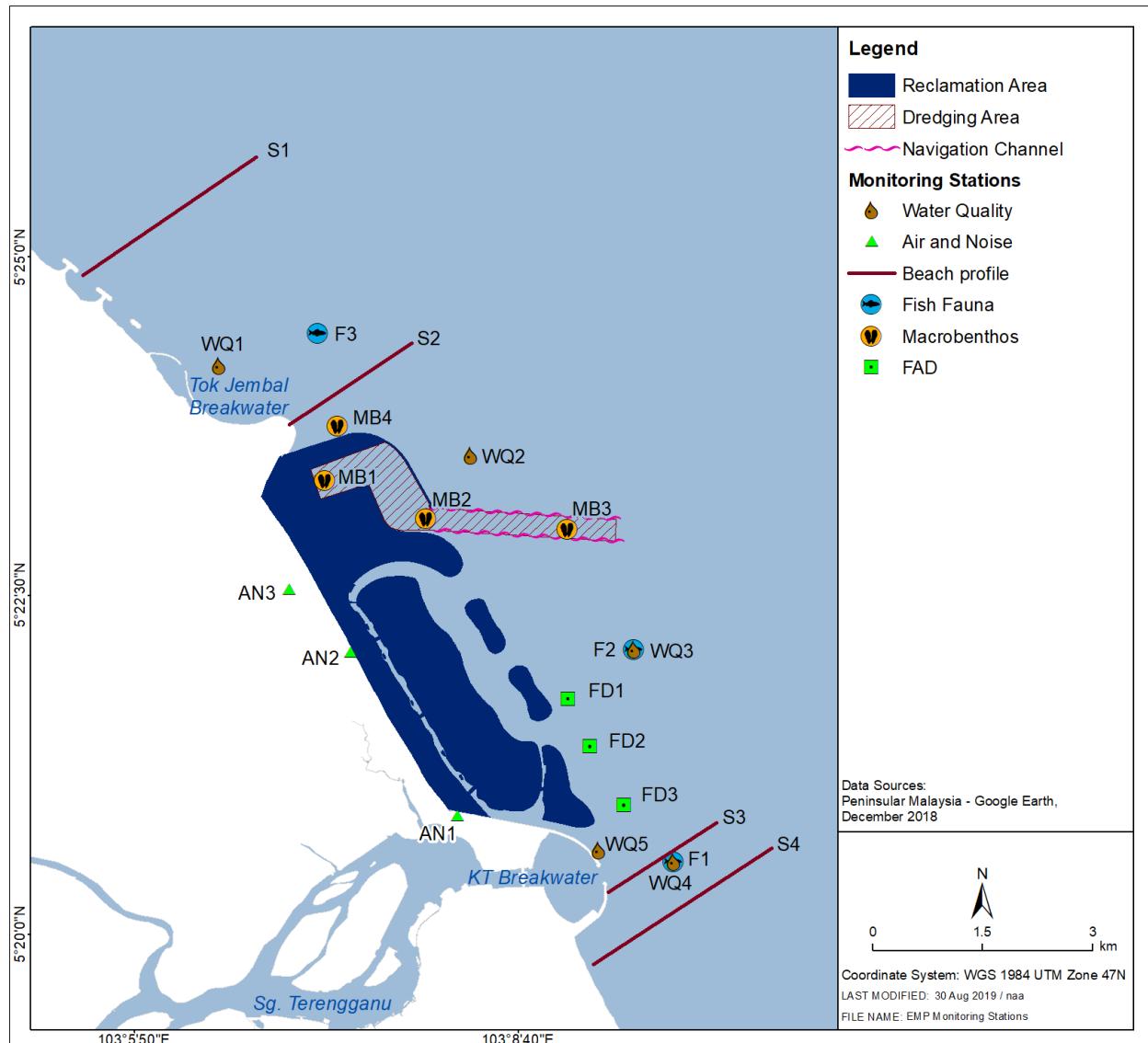


Figure 1.12 Locations of proposed monitoring stations.

1.6 Summary of Study

This EIA study has assessed the potential environmental impacts associated with the Proposed Reclamation and Capital Dredging for the Sunrise City Mixed Development at Mukim Kuala Nerus, District of Kuala Nerus, Terengganu, Malaysia. The assessment has covered the impacts arising during the construction and post-construction phases of the Project, including the reclamation of land, capital dredging, and construction of breakwater, bridges, roads and piled platforms. The assessment acknowledges that any development will have effects on the biophysical and socioeconomic environment of both a negative, and in some cases, a positive nature.

Of the environmentally sensitive receptors identified in the assessment, the shoreline areas adjacent to the Project, and in particular to the north of the Project site, were highlighted as particularly sensitive due to the severe erosion experienced in these. As such, detailed numerical modelling assessments were carried out focusing on the potential impacts of the Project on currents, waves and associated sediment transport patterns and has demonstrated that the Project will not have any appreciable impacts on sediment transport and as such will not exacerbate erosion in these sensitive areas.

The coastal area directly adjacent to the Project site, Pantai Teluk Ketapang, is densely populated with 13 villages within 1 km of the shoreline, including six fishing villages. The beach is a valued landscape and recreational amenity for both the local community and visitors. The nature of the reclamation is such that it will lead to an irreversible change in the natural landscape which will be replaced by the Sunrise City development. It is however noted that new beaches will be created in the Sunrise City development along with a channel with promenades and other spaces for public use. Particularly for tourists, said areas will provide an alternative attraction to offshore island tourism during the monsoon period.

With respect to the fishing community, a small number of fishermen who utilise the beach to access the sea will be directly affected and will need to use alternative jetties or landing areas.

Apart from this the other key impact identified is the permanent loss of the subtidal sandy marine habitat within the Project area. The biological resources and productivity within the Project footprint will be lost permanently, representing a loss of habitat and fishery resource for the local fishermen.

A range of mitigation measures have been proposed, including installation of additional FADs to offset the loss of fish fauna habitat, monetary compensation for the affected fishermen and provision of alternative landing sites during construction.

Other impacts to the wider community have been shown to be minor - the air quality, and noise impact assessments carried out for the Project has determined that the mitigation measures are sufficient to prevent impacts to human health in the surrounding areas, while the employment and entrepreneurial opportunities proffered by the Project is expected to result in significant benefits to the local community as well as the state and national economy.

In conclusion, the EIA study has found that, with the incorporation of the recommended mitigation measures and implementation of an Environmental Management Plan, the Project can be implemented with acceptable environmental impacts and risk.

2 Ringkasan Eksekutif

2.1 Pengenalan

2.1.1 Tajuk Projek

Kajian Penilaian Kesan Alam Sekeliling Jadual Kedua ini adalah untuk projek yang bertajuk **Proposed Reclamation and Capital Dredging for the Sunrise City Mixed Development at Mukim Kuala Nerus, District of Kuala Nerus, Kuala Terengganu, Terengganu, Malaysia** (dirujuk sebagai Projek).

2.1.2 Pemaju Projek

Pemaju bagi Projek ini ialah Elcca Properties Sdn. Bhd. (dirujuk sebagai pemaju). Butiran pemaju projek adalah seperti di bawah:

Pemaju Projek	ELCCA Properties Sdn. Bhd. M602, Blok Mawar, Pangsapuri Permint Harmoni, Jalan Batas Baru, 20300 Kuala Terengganu, Terengganu Darul Iman, Malaysia Tel.: 609 – 6666 6431 Fax.: 609 – 6622 430
Pegawai yang dihubungi: Jawatan:	Mr Liew Ah Yong Pengarah

2.1.3 Perunding Alam Sekitar

Perunding Alam Sekitar ialah DHI Water & Environment (M) Sdn. Bhd. Butiran perunding alam sekitar adalah seperti di bawah:

DHI Water & Environment (M) Sdn. Bhd. (592006-K)
3A01 & 3A02, Block G
Phileo Damansara 1
No. 9 Jalan 16/11
46350 Petaling Jaya
Selangor

Tel.: 03 7958 8160
Fax: 03 7958 1162

Pegawai yang dihubungi: Tania Golingi, *Ketua Pasukan EIA* (Tel.: 088 260 780)
Mohamad Hafiz bin Yahya, *Koordinator* (Tel.: 03 7958 8160)

2.1.4 Skop

Kajian EIA Jadual Kedua ini meliputi kesan yang timbul daripada aktiviti-aktiviti utama berikut:

- Penambakan tanah
- Pengorekan induk
- Pembinaan struktur pemecah ombak
- Pembinaan jalan dan jambatan; dan
- Pembinaan platform bercerucuk

Ia harus ditekankan bahawa kajian EIA ini tidak menilai impak daripada pembangunan peringkat pembinaan dan pasca-pembinaan. Seperti yang telah digariskan dalam TOR, perancangan bagi komponen tersebut masih di dalam peringkat konsep maka akan dinilai dalam EIA(s) berasingan.

Sumber bahan penambakan ialah pasir laut dari Kawasan pesisir pantai yang telah diluluskan. Oleh yang demikian, aktiviti pengorekan dari tapak tersebut tidak termasuk dalam penilaian ini. Bahan pengorekan daripada aktiviti pengorekan induk adalah sesuai untuk digunakan sebagai bahan untuk penambakan dan akan digunakan semasa kerja penambakan. Oleh itu, tiada penilaian diperlukan untuk sisa bahan pengorekan.

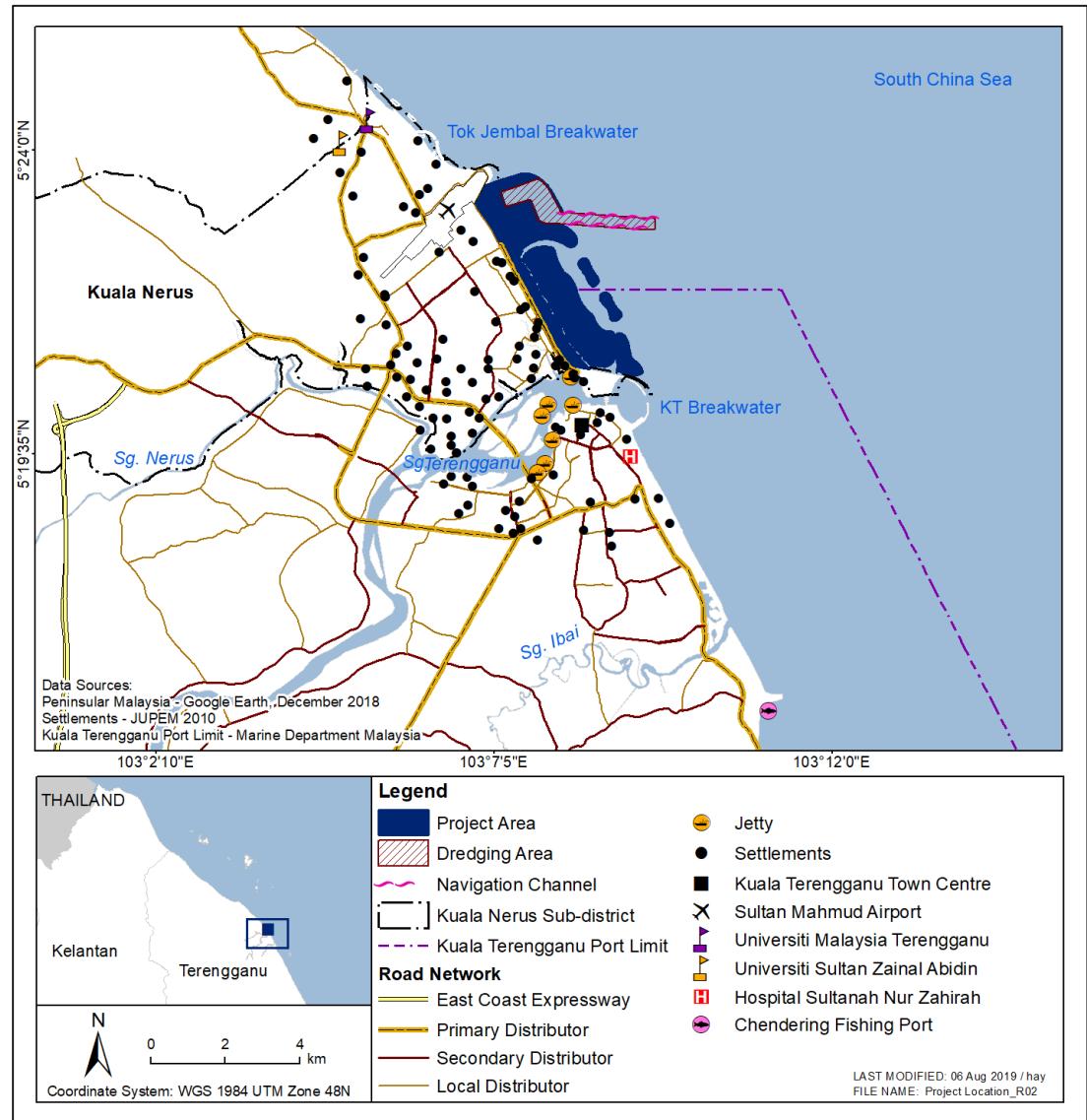
Fokus penilaian impak adalah berdasarkan skop yang telah disenaraikan dalam Terma Rujukan yang telah diluluskan. Komponen-komponen utama adalah:

- Kesan hidrodinamik dan morfologi kawasan pantai akibat daripada projek ini;
- Kualiti air, secara khususnya kesan daripada serakan sedimen terampai semasa kerja penambakan dan pengorekan induk;
- Kesan sosio-ekonomik; dan
- Kesan terhadap ekologi marin, terutamanya kehilangan habitat marin akibat daripada projek ini.

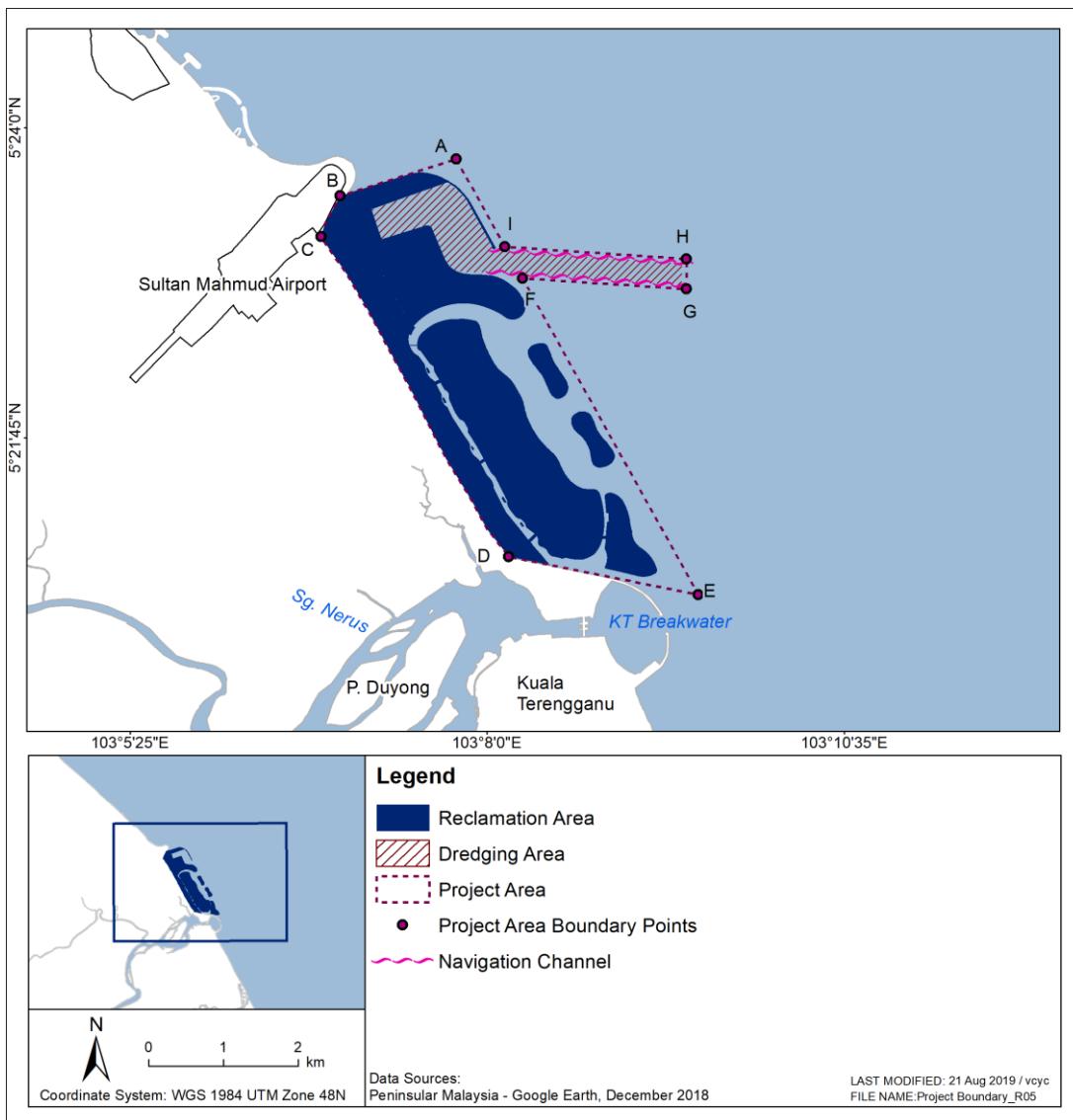
2.2 Huraian Projek

2.2.1 Lokasi Projek

Projek ini terletak di sepanjang garis pantai selatan negeri Terengganu di antara Lapangan Terbang Sultan Mahmud dan Pemecah Ombak Kuala Terengganu yang dikenali sebagai Pantai Teluk Ketapang (Rajah 2.1). Secara pentadbirannya, Projek ini terletak dalam Mukim Kuala Nerus, Daerah Kuala Nerus. Sempadan Projek adalah seperti yang ditunjuk dalam Rajah 2.2. Koordinat-koordinat point-point sempadan seperti yang disenaraikan dalam Jadual 2.1.



Rajah 2.1 Lokasi projek di daerah Kuala Nerus.



Rajah 2.2 Kawasan projek yang merangkumi kawasan penambakan, pengorekan dan laluan air dalam.

Jadual 2.1 Koordinat sempadan Projek (WGS84 – darjah, minit, saat).

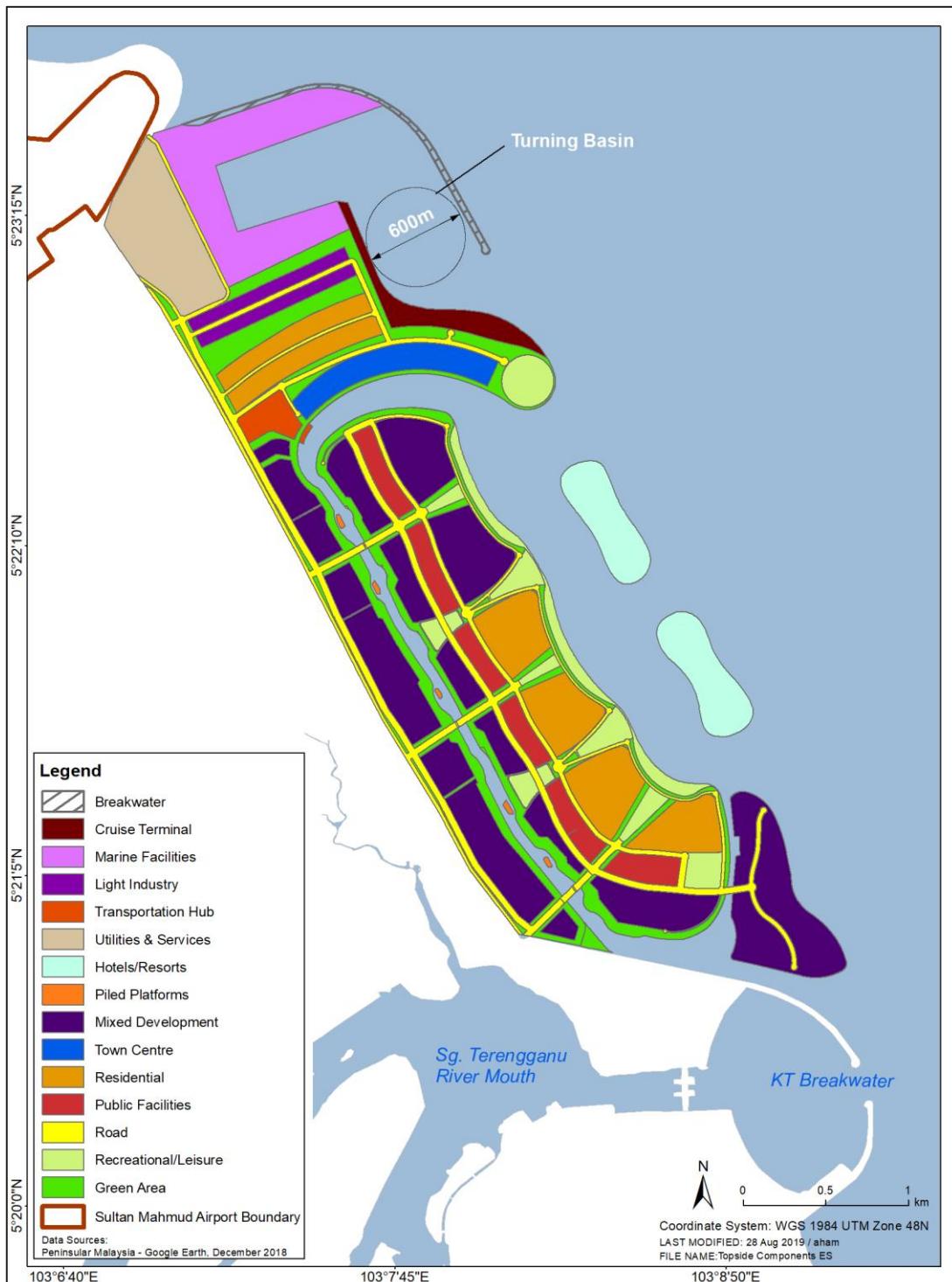
Point	Latitud (N)	Longitud (E)
A	5° 23' 46.93"	103° 7' 45.94"
B	5° 23' 30.76"	103° 6' 55.67"
C	5° 23' 13.00"	103° 6' 47.37"
D	5° 20' 53.86"	103° 8' 09.18"
E	5° 20' 37.57"	103° 9' 31.60"
F	5° 22' 55.08"	103° 8' 14.87"
G	5° 22' 50.67"	103° 9' 25.97"
H	5° 23' 3.72"	103° 9' 25.93"
I	5° 23' 8.85"	103° 8' 7.19"

2.2.2 Konsep Projek

Projek ini melibatkan kerja-kerja penyediaan tanah (pembinaan pemecah ombak, penambakan, dan pengorekan induk) untuk pembangunan projek Sunrise City yang akan menyusul. Sunrise City merupakan pembangunan bercampur yang mengandungi kediaman, pelancongan, kemudahan-kemudahan marin (termasuk terminal vessel persiaran), 2-5endidik ringan, kemudahan-kemudahan awam (termasuk pantai-pantai awam dan kawasan rekreasi), dan hab budaya dan hub makanan untuk komuniti tempatan. Pembangunan Sunrise City bertujuan untuk meningkatkan pembangunan ekonomi di Terengganu, khususnya sektor pelancongan, selaras dengan polisi-polisi Kerajaan Persekutuan dan Kerajaan Negeri.

Pelan induk konseptual untuk pembangunan Sunrise City adalah seperti yang ditunjukkan di Rajah 2.3. Seperti yang dijelaskan dalam Seksyen 2.1.4 di atas, kajian EIA berasingan akan dijalankan untuk komponen-komponen pembinaan diatas tapak penambakan dan tidak akan dinilai dalam EIA ini.

Susun atur penambakan telah dibangunkan berdasarkan kajian *numerical modelling*, untuk memastikan pembangunan ini adalah mampu bagi pembinaan infrastruktur dan kemudahan marin seperti laluan navigasi dan *turning basin*. Pada masa yang sama, tiada kesan signifikan terhadap garis pantai bersebelahan dan kawasan daratan dari segi hakisan pantai atau banjir telah dipastikan.



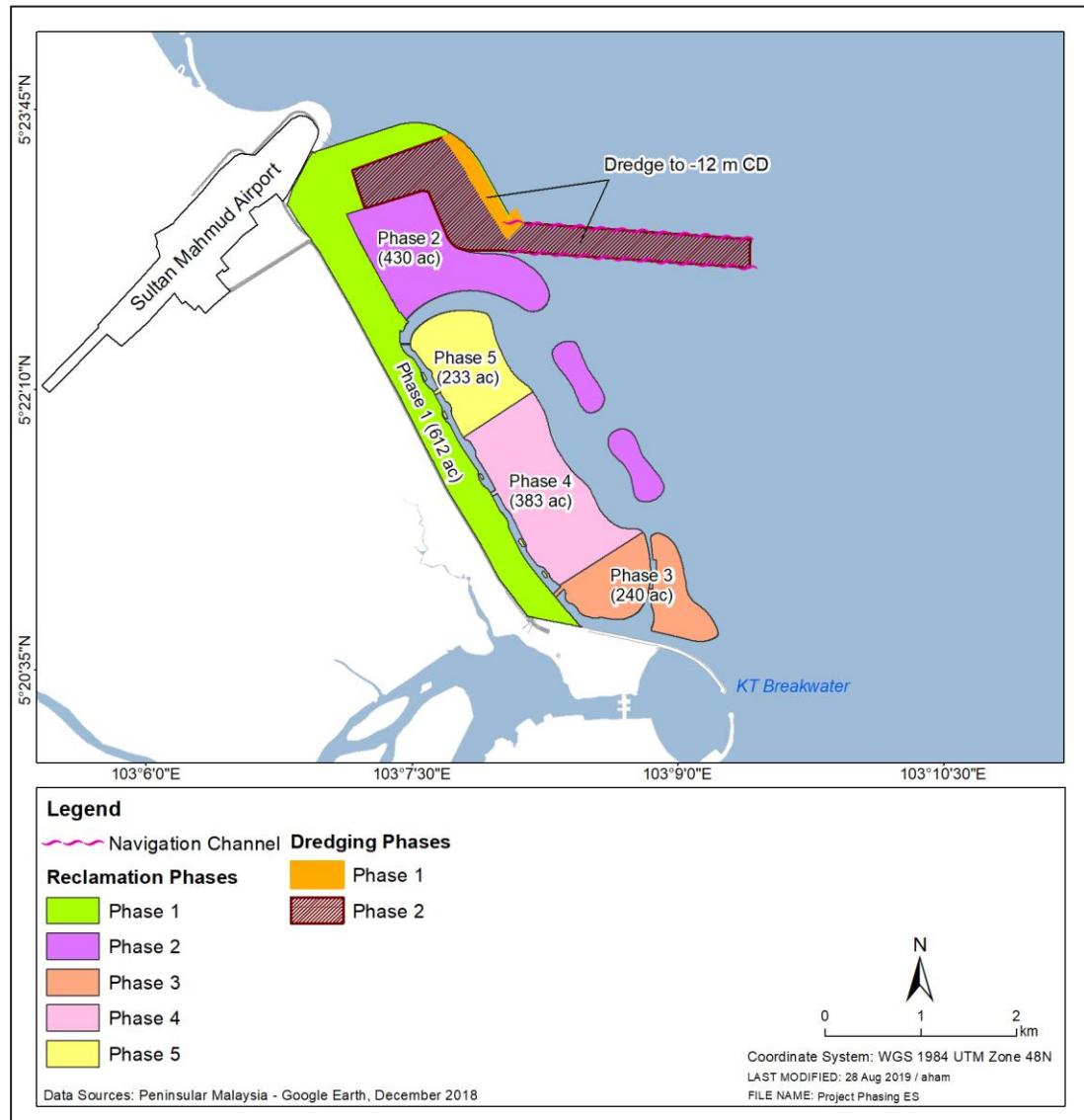
Rajah 2.3 Komponen konseptual pembangunan bagi projek Sunrise City.

2.2.3 Komponen Projek

Komponen utama Projek adalah seperti yang dirumuskan di bawah (sila lihat Rajah 2.4):

- Penambakan sebanyak 768 hektar (1,898 ekar) sepanjang lima fasa, memerlukan 62 juta m³ pasir.
- Pengorekan induk sebanyak 8.3 juta m³ untuk pembinaan pemecah ombak, laluan navigasi, dan *turning basin* sehingga kedalaman -12 m CD. Semua bahan pengorekan akan digunakan semula dalam penambakan.

Pasir untuk penambakan akan diambil dari tapak laut yang telah diluluskan di luar pesisir Kijal, lebih kurang 124 km barat daya dari tapak Projek.



Rajah 2.4 Fasa-fasa penambakan dan kawasan pengorekan.

2.2.4 Aktiviti-aktiviti dan Jadual Perlaksanaan Projek

Projek ini akan dijalankan dalam lima fasa secara berturut-turut. Permulaan kerja disasarkan dalam suku tahun pertama 2020 dan dijangka siap kira-kira enam tahun kemudian.

Pemecah ombak di bahagian utara Projek akan dibina dahulu semasa Fasa 1 dan akan melibatkan kerja pengorekan induk selama kira-kira 1.6 bulan. Kerja-kerja Fasa 1 juga melibatkan penambakan sepanjang garis pantai di dalam kawasan Projek.

Fasa 2 melibatkan penambakan untuk menghasilkan lembangan untuk kemudahan-kemudahan marin di bahagian utara, pengorekan induk laluan navigasi dan lembangan, dan penambakan dua buah pulau menghadap laut. Durasi kerja-kerja Fasa 2 dijangkakan akan mengambil masa 17.5 bulan (termasuk tiada kerja pembinaan semasa monsun), termasuk kerja-kerja pengorekan selama 8.1 bulan (tidak termasuk masa tiada kerja dijalankan kerana monsun).

Fasa 3 hingga 5 melibatkan kerja-kerja penambakan sahaja dengan Fasa 3 melibatkan pembinaan platform bercerucuk di bahagian selatan dan Fasa 4 dan 5 untuk pulau-pulau bahagian dalam. Jangkamasa yang dijangkakan untuk Fasa 3, 4 dan 5 ialah masing-masing selama 11.1, 15.6, dan 8.3 bulan.

Jadual keseluruhan Projek adalah selama enam tahun dengan mengambil kira pemberhentian kerja kerana cuaca di mana dijangkakan tiada kerja akan dijalankan sepanjang musim tengkujuh (monsoon timur laut) untuk Fasa 1 dan 2. Dijangkakan bahawa kerja-kerja dalam Fasa 3 hingga 5 boleh dijalankan sepanjang tahun kerana dilindungi kawasan yang telah ditambak semasa Fasa 1 dan 2.

2.3 Persekutaran Sedia Ada

2.3.1 Kawasan Sensitif Alam Sekitar (KSAS)

Kawasan Sensitif Alam Sekitar (KSAS)² yang berdekatan dengan tapak Projek termasuk empat taman laut, kawasan bakau, dan kawasan pantai:

- Kawasan Pantai (KSAS Tahap 3): Garis pantai sepanjang kawasan Projek dikategorikan sebagai KSAS Tahap 3 dalam NPP-CZ.
- Bakau (KSAS Tahap 2): Kawasan bakau terdekat terletak 1km dari sempadan selatan projek sepanjang sebuah anak sungai Sg. Terengganu. Beberapa kawasan bakau kecil juga wujud di sebelah hulu Sg. Terengganu dan bertaburan sepanjang garis pantai Kuala Terengganu, Pulau Wan Man, Pulau Duyong, dan Pulau Sekati.
- Taman Laut (KSAS Tahap 1): Empat taman laut telah diwartakan di perairan Terengganu iaitu Pulau Kapas, Pulau Bidong, Pulau Redang, dan Pulau Perhentian Besar. Projek terletak lebih dari 10 km dari taman-taman laut tersebut.

2.3.2 Reseptor Sensitif

Antara reseptor-reseptor 2-8endidika berdekatan dengan Projek yang telah dikenal pasti termasuk kawasan-kawasan perkuburan, kemudahan-kemudahan pendidikan dan perubatan, kawasan-kawasan rekreatif, istana-istana, unjam-unjam ikan, kawasan-kawasan pendaratan ikan, dan kawasan-kawasan penempatan. Rajah 2.5 menunjukkan KSAS dan reseptor-reseptor sensitif yang berdekatan dengan tapak Projek. Kawasan terumbu karang yang terdekat terletak di taman laut Pulau Kapas, lebih kurang 15 km dari kawasan Projek.

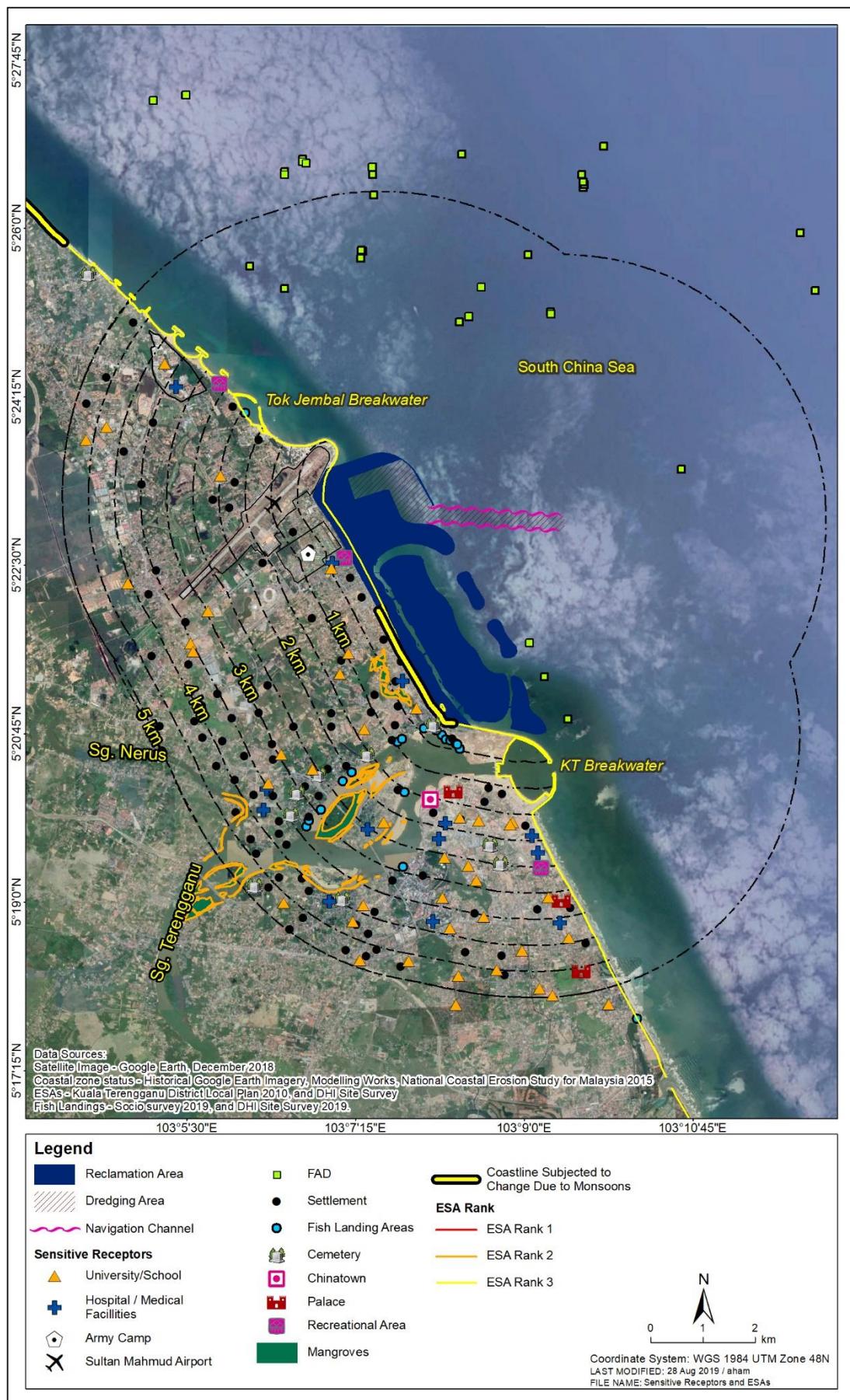
2.3.3 Konteks Fisiografi

Kawasan pantai Terengganu secara umumnya terbentuk dari pantai berpasir yang bersifat dinamik hasil daripada variasi angin, ombak dan arus disebabkan oleh monsun timur laut dan barat daya. Semasa tempoh monsun barat daya (Mei hingga September), angin bertiup ke arah barat daya dan secara umumnya bertiup ke luar pesisir atau selari dengan pantai, menghasilkan keadaan yang agak tenang. Sebaliknya, semasa musim monsun timur laut (November hingga Mac), angin adalah lebih kuat dan sebahagian besarnya bertiup ke arah timur laut, menghasilkan ombak yang lebih tinggi seperti yang ditunjukkan dalam Rajah 2.6.

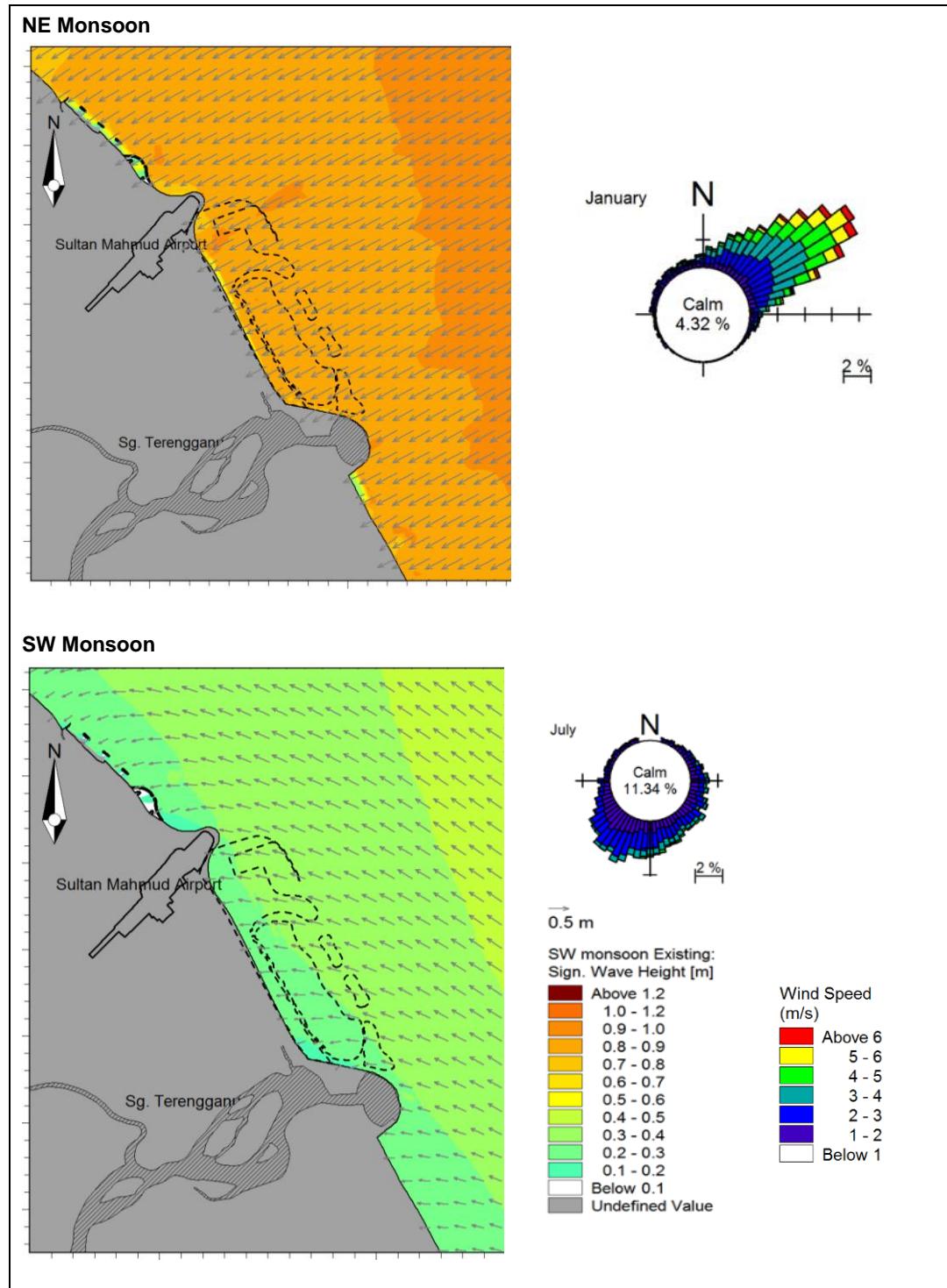
Aliran arus adalah ke arah selatan pada waktu air pasang dan ke arah utara pada waktu air surut. Kelajuan arus adalah serupa ketika kedua-dua monsun timur laut dan barat daya, tetapi lebih rendah ketika tempoh perantaraan monsun. Secara umumnya, kelajuan arus di kawasan

² KSAS telah dikenal pasti berdasarkan definisi dalam Garispanduan Perancangan Pemuliharaan dan Pembangunan Kawasan Sensitif Alam Sekitar (GPPPP) oleh PLANMalaysia (2017).

projek adalah dengan kelajuan purata sehingga 0.16 m/s dan kelajuan maksima sehingga 0.4 m/s.



Rajah 2.5 KSAS dan reseptor-reseptor sensitif berdekatan dengan Projek.



Rajah 2.6 Perbandingan model ombak (kiri), dan arah dan kelajuan angin (kanan) antara dua musim monsun. *Wind rose* adalah anggaran bulanan dari data angin CFSR selama 10 tahun.

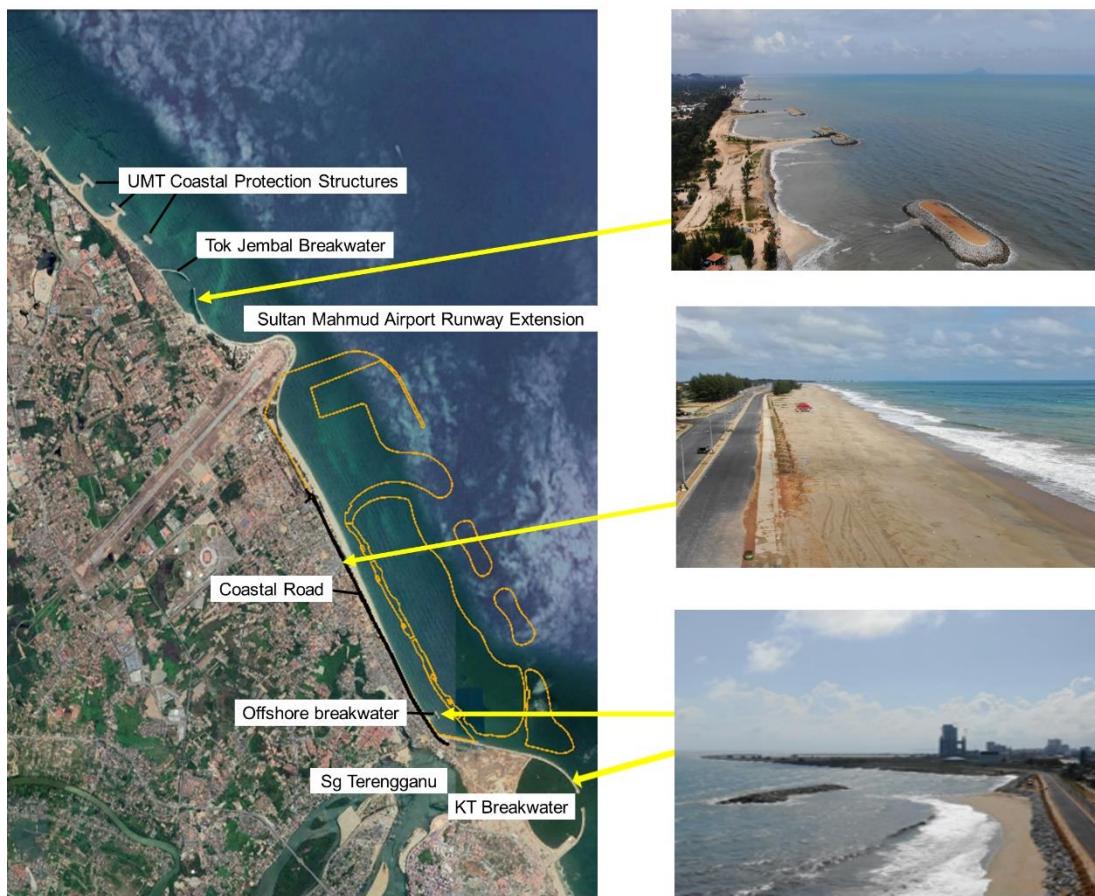
Projek terletak di kawasan yang cetek (antara -1 hingga -8 m CD) di Pantai Teluk Ketapang, iaitu sebuah pantai berpasir yang terletak antara tanjung tiruan yang dibentuk oleh penambakan landasan lapangan terbang di sebelah utara dan benteng pemecah ombak Kuala Terengganu di sebelah selatan (Rajah 2.1). Dasar laut di kawasan Projek adalah berpasir dan bebas daripada bahan logam berat yang mencemarkan dan dari bahan pencemaran organik.

Dari segi morfologi pantai, keseluruhan kawasan ini adalah stabil terutamanya di bahagian utara. Bentang pemecah ombak luar pesisir pantai telah dibina di bahagian selatan (Rajah

2.7) dan telah menstabilkan kebanyakan kawasan di bahagian selatan. Namun demikian, perubahan bermusim masih boleh berlaku ketika musim-musim monsun.

Jalan pantai (Jalan Pantai Teluk Ketapang) sepanjang garis pantai baru-baru ini telah dinaik taraf (sebahagian daripada projek Wilayah Ekonomi Pantai Timur (ECER)) dan dilindungi oleh struktur batu berserta dengan kerja-kerja penambahan pasir yang sedang dijalankan.

Di utara dari landasan lapangan terbang, kerja-kerja perlindungan kawasan pantai telah dijalankan baru-baru ini termasuk Struktur Perlindungan Garis Pantai Universiti Malaysia Terengganu (UMT) oleh Jabatan Pengairan dan Saliran (2008) dan pemecah ombak Tok Jembal yang dibina pada tahun 2016 untuk menyediakan satu kawasan terlindung bagi pendaratan bot-bot kecil dan menyokong aktiviti-aktiviti rekreasi. Kerja-kerja perlindungan pantai telah dijalankan untuk menangani hakisan signifikan yang telah berlaku di kawasan ini selepas siap pembinaan sambungan landasan Lapangan Terbang Sultan Mahmud pada tahun 2008. Walaupun kawasan pantai yang dilindungi kini stabil, hakisan masih berlaku ke utara dari kawasan yang dilindungi.



Rajah 2.7 Gambar satelit (Google Earth) pesisir pantai dalam kawasan Projek menunjukkan struktur perlindungan pantai sedia ada.

Had selatan kawasan Projek dibatasi oleh muara Sg. Terengganu yang telah diubahsuai bagi tujuan pengairan yang lebih baik. Sungai Terengganu merupakan sungai utama bagi lembangan Sg. Terengganu yang berpunca dari kawasan tадahan air (sekitar 5,000 km²) dari Tasik Kenyir. Hujan dan aliran keluar sungai menunjukkan corak bermusim yang jelas yang juga terhasil daripada musim monsun-monsun di mana kadar pelepasan bagi Sg. Terengganu paling tinggi adalah pada bulan September hingga Mac, selari dengan monsun timur laut. Banjir juga berlaku terutamanya dalam tempoh tersebut akibat daripada kenaikan paras air Sg. Terengganu dan anak-anak sungai yang selari dengan garis pantai.

Tiada sungai yang mengalir keluar ke kawasan pantai sepanjang kawasan Projek. Satu salur keluar parit yang mengalirkan air larian dari sebelah selatan dari sambungan landasan lapangan terbang ke kawasan Projek. Tiga *soakaway* terletak sepanjang Pantai Teluk Ketapang bagi membantu untuk mengeringkan kawasan pedalaman dari kawasan Projek.

Secara umumnya, kualiti air di kawasan Projek pada masa kaji selidik dijalankan (September dan Oktober 2017, semasa tempoh perantaraan monsun) adalah baik dengan bacaan pepejal terampai yang rendah. Tiada serakan boleh dilihat keluar dari sungai pada masa tinjauan, manakala kawasan berhampiran pantai berdekatan dengan muara sungai dan dalam kawasan Projek boleh dilihat lebih keruh berbanding dengan kawasan luar pesisir pantai.

Namun demikian, paras ammonia yang tinggi dikesan di muara Sg. Terengganu berserta dengan bilangan *faecal coliform* yang tinggi di dalam sungai dan di kawasan sekeliling muara sungai. Pencemaran bakteria di stesen-stesen lain dalam kawasan Projek adalah rendah, menunjukkan *rapid die-off* dan / atau *flushing* air lepasan sungai, dan tiada sumber pencemar lain di sepanjang garis pantai.

Paras minyak dan gris lebih rendah dari had pengesanan makmal di semua kawasan, menunjukkan pencemaran minyak dan gris yang rendah di kawasan perairan pantai walaupun stesen-stesen persampelan terletak dalam kawasan dengan kadar aktiviti navigasi yang tinggi.

2.3.4 Ekologi Marin

Seperti yang disebut di atas, Projek terletak di kawasan *subtidal*/cetek dengan kedalam antara -1 hingga -8 m CD dan secara umumnya merupakan kawasan *high energy* area bercirikan pasir sederhana. Tinjauan yang telah dilakukan tidak menjumpai sebarang habitat primer seperti terumbu karang dan rumpai laut dalam kawasan tersebut kecuali hanya beberapa tompok-tompok alga. Tiga unjam ikan dikesan kira-kira 250 m dari tapak projek di bahagian selatan (sila rujuk Rajah 2.5 di atas). Lebih dari 30 unjam ikan dijumpai dan / atau dilaporkan berdekatan dengan tapak projek yang terdiri daripada tukun tayar, vessel tenggelam, dan konkrit. Hasil tinjauan menunjukkan karang lembut dan organisme epibentos seperti teritip hidup di unjam-unjam tersebut.

Walaupun kawasan *subtidal* pantai secara umumnya berfungsi sebagai kawasan nurseri untuk fauna ikan, habitat berstruktur (seperti bakau, karang, rumpai laut, dan sebagainya) kebiasaannya mempunyai ketumpatan anak ikan yang lebih tinggi berbanding habitat tidak berstruktur. Muara sungai dianggap sebagai kawasan yang sesuai untuk ikan bertelur, berkembang dan membesar pada peringkat awal kehidupan. Kewujudan bakau di tebing sungai juga meningkatkan nilai habitat ikan. Kawasan bakau yang terdekat dengan kawasan Projek terletak sepanjang cabang Sg. Terengganu yang mengalir selari dengan garis pantai kira-kira 300 m dari pantai. Kawasan-kawasan bakau tersebut secara utamanya terdiri daripada pokok nipah.

Persampelan fauna ikan di kawasan Projek yang telah dijalankan pada pasang surut anak dan pasang surut besar sebanyak dua kali (semasa musim antara-monsun sebelum dan selepas monsun timur laut) menyokong perkara di atas dengan bilangan tangkapan ikan yang agak rendah. Tangkapan terendah adalah tiga individu dan tertinggi adalah 55 individu bagi satu jam tempoh persampelan. Julat bilangan spesis yang tertangkap adalah dua hingga 17 individu.

Secara keseluruhannya, spesis dengan bilangan tangkapan tertinggi ialah Ikan Kekek (*Leiognathus brevirostris*) diikuti oleh Ikan Cencaru (*Megalaspis cordyla*). Kebanyakan daripada fauna ikan yang tertangkap telah dikenal pasti sebagai induk dewasa dengan hanya tiga dan satu spesis anak ikan tertangkap semasa pasang surut anak dan pasang surut besar bagi pra-monsun timur laut dan sepuluh spesis semasa pasca-monsun timur laut.

Tinjauan makrobentik di kawasan kajian menunjukkan komposisi spesis yang biasa dijumpai bagi kawasan pasir *subtidal* sepanjang pantai timur Semenanjung Malaysia, dengan lebih dari separuh daripada jumlah organisma makrobentos terdiri daripada *polychaete*. Seterusnya adalah moluska (46.5%) sebahagian besar terdiri daripada gastropod, dengan bilangan kecil bivalve dan *scaphopod*, Kesemua filum lain hanya 3.0% dari jumlah ketumpatan.

Ketumpatan makrobentos di kawasan Projek adalah tinggi, dengan nilai purata 1,067 dan julat antara 320 hingga 2,500 individu/m². Kajian yang lebih terkini (Mac 2019, musim inter-monsun antara monsun timur laut dan barat daya) di kawasan Projek telah menjumpai ketumpatan yang lebih tinggi antara 168 hingga 16,375 individu/m².

Komuniti plankton di kawasan Projek adalah berubah-ubah dan bertompok-tompok dengan julat ketumpatan antara 14 hingga 1,210 sel/L (tinjauan pra-monsun timur laut) sehingga hampir 22,000 sel/L (tinjauan pasca-monsun timur laut). Ketumpatan zooplankton adalah rendah (3 hingga 16 individu/L). Lapan filum zooplankton telah dikenal pasti dan sebahagian besarnya terdiri daripada arthropod (terutamanya *copepod*). Filum lain termasuk *cnidaria* (18%), annelida (14%), *radiozoan* (11.6%), manakala yang lain hanya kurang dari 1% jumlah ketumpatan. Ketumpatan lebih tinggi untuk plankton (zoo- dan fitoplankton) dapat dilihat di kawasan laut berbanding di dalam muara Sg. Terengganu.

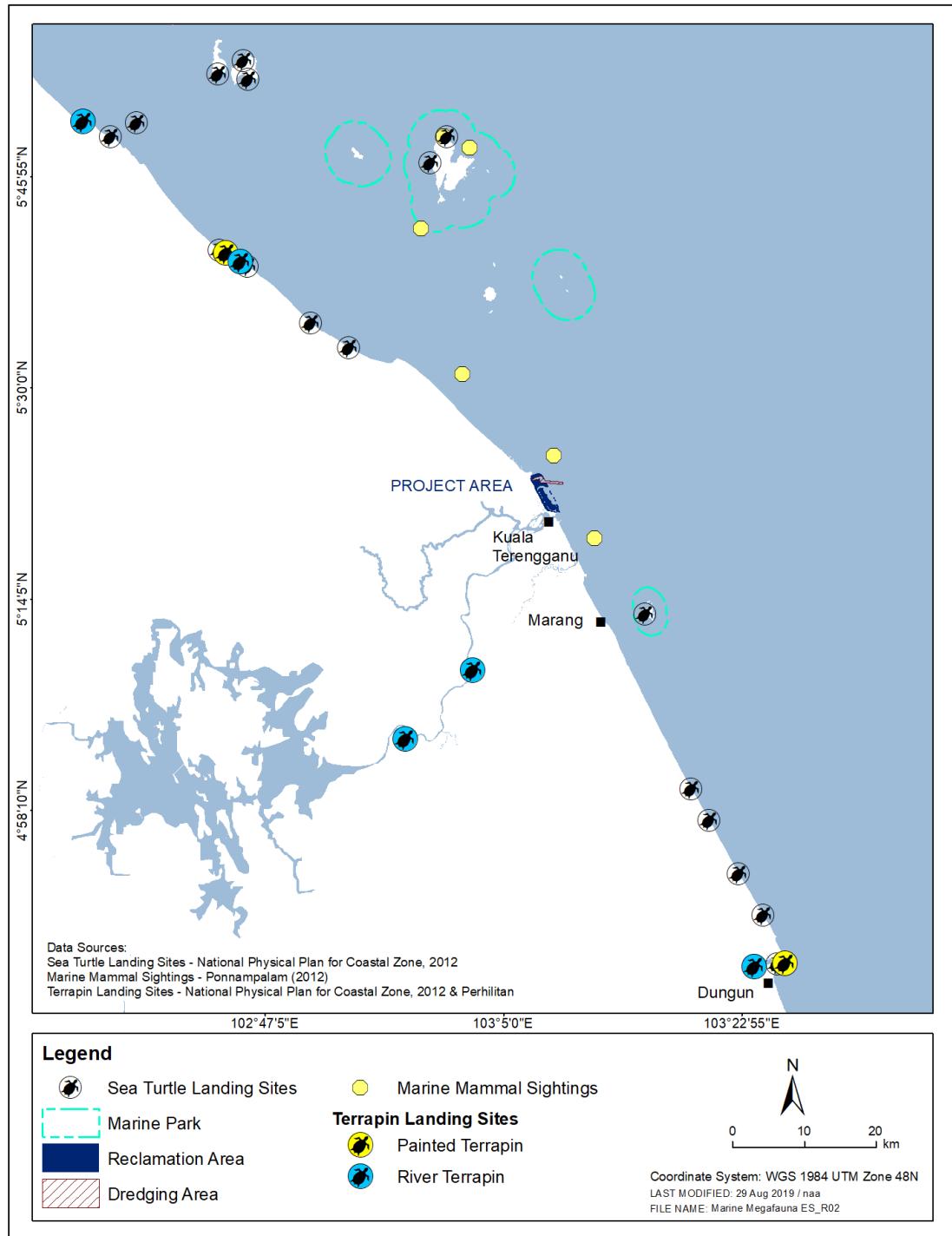
Beberapa kawasan taman laut terletak lebih dari 10 km dari kawasan Projek seperti yang ditunjukkan dalam Rajah 2.8

Dua spesis penyu laut (penyu agar dan penyu karah) bertelur sepanjang pantai-pantai Terengganu. Namun demikian, tiada tapak bertelur penyu-penyu tersebut yang dilaporkan terletak berdekatan dengan tapak Projek. Pejabat Perikanan Daerah Kuala Terengganu telah mengesahkan bahawa tapak bertelur yang terdekat dengan Projek adalah di Pulau Kapas, kira-kira 17 km dari Projek.

Diperhatikan terdapat beberapa kes kecil penyu bertelur di Pantai Seberang Takir, dengan satu kes direkodkan pada tahun 2018. Namun begitu, Jabatan Perikanan (Pusat Penyu Rantau Abang) tidak memantau atau mengurus tapak-tapak tersebut kerana bilangan penyu yang bertelur adalah sangat rendah dan tidak konsisten.

Tutung laut adalah spesis terancam lain yang boleh dijumpai di Semenanjung Malaysia yang membuat sarang di kawasan pantai di mana boleh terkesan oleh projek-projek penambakan kawasan pantai. Namun begitu, tiada kawasan sarang tuntung laut dilaporkan berdekatan dengan tapak Projek. Kawasan sarang yang terdekat terletak lebih dari 50 km dari tapak Projek. Tuntung sungai juga boleh dijumpai di Sg. Terengganu dengan kawasan sarang yang diketahui terletak lebih dari 30 km ke hulu Sg. Terengganu.

Beberapa spesis cetacean juga boleh dijumpai dalam perairan Terengganu seperti dugong, paus, dan ikan lumba-lumba. Secara umumnya, spesis-spesis tersebut pernah dilihat dalam perairan 10 km dari pesisir pantai.



Rajah 2.8 Lokasi taman-taman laut, penampakan mamalia laut, tapak bertelur penyu, dan tapak pendaratan tuntung.

2.3.5 Persekitaran Manusia

2.3.5.1 Latar Belakang Pentadbiran dan Guna Tanah

Tapak Projek terletak dalam daerah Kuala Nerus yang merangkumi empat mukim (Kuala Nerus, Batu Rakit, Pulau Redang, dan Pakoh). Anggaran jumlah penduduk bagi daerah Kuala Nerus ialah 200,000 pada tahun 2016 dengan majoriti penduduk terdiri daripada orang Melayu (95% di Terengganu).

Berdasarkan Rancangan Tempatan Daerah Kuala Nerus 2010, guna tanah dalam lingkungan 5 km dari Projek terdiri daripada kawasan perumahan terancang dan tidak terancang sepanjang pantai, guna tanah bandar dalam kawasan bandar Kuala Terengganu dan kawasan kurang maju di bahagian pedalaman berserta plot-plot tanah yang tidak terguna. Terdapat 97 perkampungan dalam lingkungan kawasan kajian, di mana 12 daripadanya adalah kampung nelayan.

Sepanjang garis pantai (dalam lingkungan 1km dari Projek) terdapat kawasan perumahan padat dan kemudahan-kemudahan berasaskan pelancongan (seperti hotel dan *homestay*) (RAJAH). Kg. Baru Seberang Takir dan Taman Permintaan Perdana mempunyai bilangan penduduk terbesar.

Tiga ciri guna tanah utama berdekatan dengan tapak Projek adalah Lapangan Terbang Sultan Mahmud (~176 hektar), pengkalan tentera (~87 hektar), dan Universiti Malaysia Terengganu (~74 hektar). Kemudahan-kemudahan komuniti seperti hospital, klinik, masjid, gereja, dan kuil bertaburan di dalam kawasan perumahan

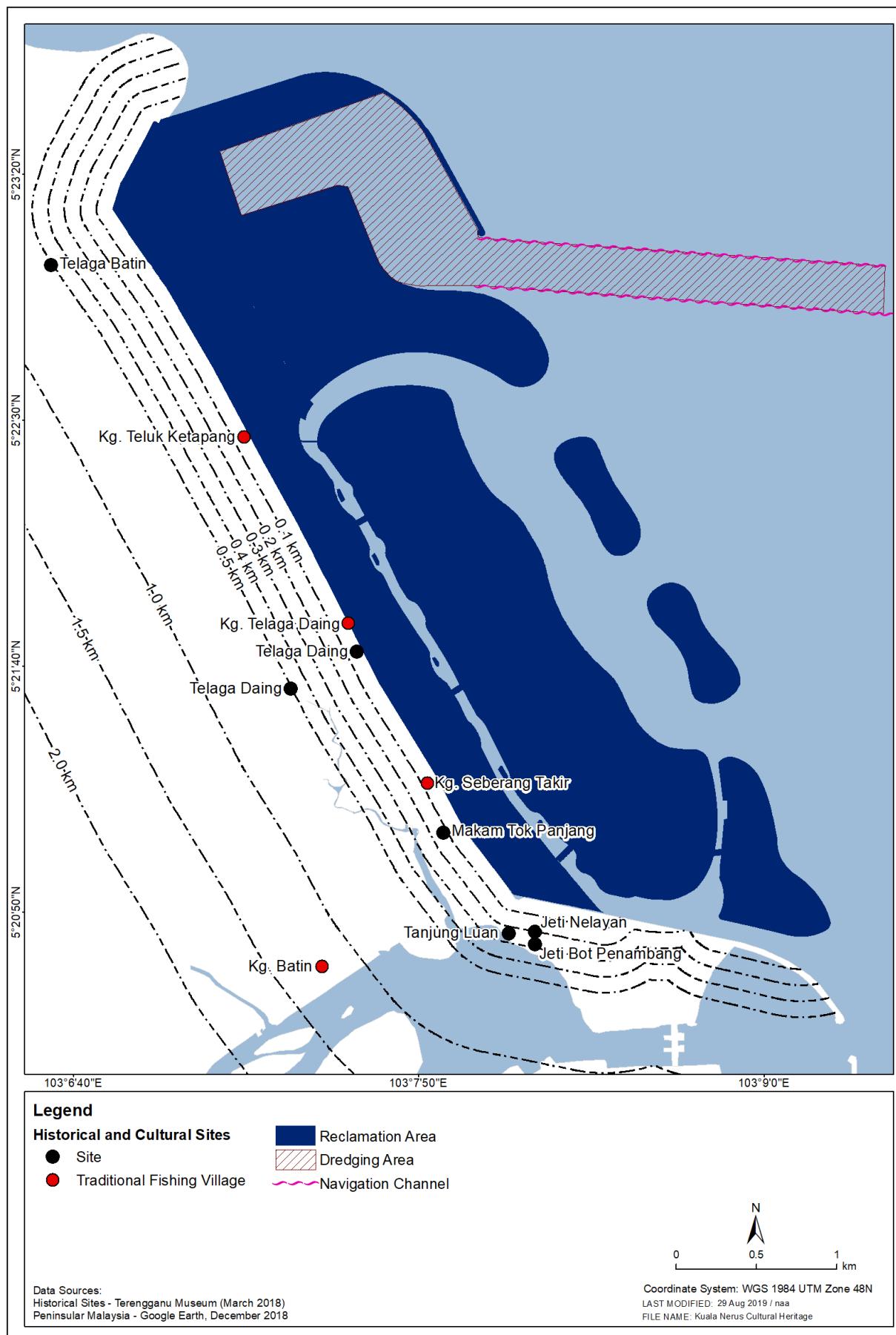
Kualiti udara dan tahap bunyi mencerminkan ciri-ciri guna tanah di kawasan tersebut, dengan tiada aktiviti industri yang signifikan atau sumber pencemaran udara lain. Tahap bunyi yang direkodkan di kawasan kajian secara umumnya pada tahap biasa ke tinggi berbanding tahap garis panduan bagi kawasan guna tanah perumahan pinggir bandar dan bandar, dengan bunyi dari kapal terbang menyumbang kepada bacaan tertinggi kerana jarak lapangan terbang yang berhampiran.

Pesisir Pantai Teluk Ketapang di Seberang Takir terkenal sebagai tempat rekreasi dengan gerai-gerai makanan dan kemudahan-kemudahan seperti tandas awam dan pondok berkelah yang tertumpu di bahagian utara pantai. Kawasan ini juga mempunyai deretan pokok *Casuarina* (rhu) yang menyediakan teduhan daripada matahari dan kemudahan estetika. Garis pantai selebihnya adalah ke arah Seberang Takir hanya mempunyai tumbuhan-tumbuhan yang jarang, terdiri terutamanya dari pokok-pokok landskap yang ditanam semasa projek naik taraf Jalan Pantai Teluk Ketapang.

Bagi kawasan lebih jauh, Pantai Tok Jembal yang terletak utara dari tapak Projek dan Pantai Batu Burok yang terletak ke selatan dari tapak projek juga merupakan pantai rekreasi yang terkenal. Satu tinjauan pengguna pantai telah dijalankan di pantai-pantai tersebut dan Pantai Teluk Ketapang dengan 104 orang responden termasuk 57 orang pelancong dan 47 orang penduduk tempatan.

Secara umumnya, tarikan utama pantai-pantai tersebut seperti yang disebut oleh responden adalah pemandangan indah (42%), aktiviti rekreasi (23%), tempat percutian kos rendah / berpatutan (16%), keunikan budaya (8%), dan tarikan bersejarah (1%).

Tapak-tapak bersejarah dan budaya sepanjang Pantai Teluk Ketapang termasuk Telaga Daing dan Makam Tok Panjang seperti yang ditunjukkan dalam RAJAH. Telaga Batin dikatakan tempat Batin, nakhoda perahu seorang pahlawan Johor, meninggal. Telaga Daing dikatakan antara penempatan Bugis terawal di Terengganu dengan dua buah telaga (kedu-duanya ditunjuk dalam RAJAH) menjadi hasil tinggalan penempatan tersebut. Makam Tok Panjang telah diwartakan sebagai Tapak Warisan pada Ogos 1980.



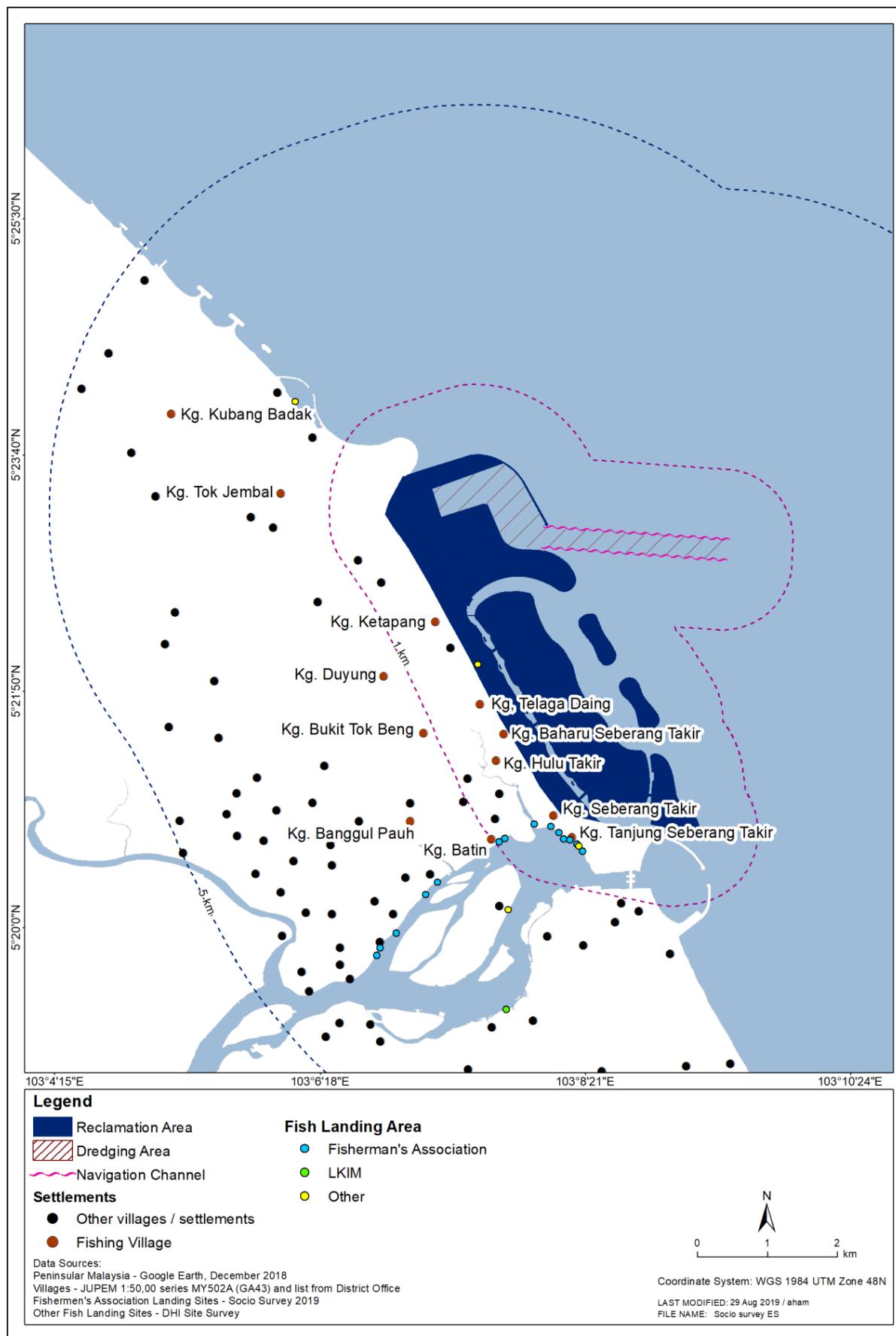
Rajah 2.9 Lokasi tapak bersejarah dan budaya yang telah diberikan oleh Muzium Terengganu (Mac 2018).

2.3.5.2 Tinjauan Sosio-ekonomik

Satu kajian sosio-ekonomik telah dijalankan meliputi kawasan dalam lingkungan 5 km dari Projek dengan bilangan responden sebanyak 343 orang yang berumur antara 18 dan 60 tahun. Ciri-ciri utama demografik responded adalah seperti yang dirumuskan dalam Jadual 2.2.

Jadual 2.2 Profil sosio-budaya responden kaji selidik dalam kawasan kajian (343 orang responden).

Profil	Keterangan
Etnik	83.4% (n = 286) daripada responden adalah Melayu, diikuti oleh Cina (9.9%) dan India (6.7%).
Jantina	<ul style="list-style-type: none"> 241 orang adalah lelaki dan selebihnya (102 orang) adalah perempuan Jurang perbezaan ini adalah kerana fokus borang soal selidik kepada komuniti nelayan yang majoritinya terdiri daripada lelaki.
Umur	<ul style="list-style-type: none"> Kumpulan umur terbesar adalah golongan berumur 41-50 tahun
Tahap pendidikan	<ul style="list-style-type: none"> Tahap pendidikan tertinggi bagi responden adalah peringkat SPM (39.8%), diikuti oleh peringkat sekolah rendah (26%). Lima orang responden (0.6%) tidak pernah mendapat Pendidikan formal.
Status Perkahwinan	<ul style="list-style-type: none"> Majoriti responden adalah berkahwin (257 orang atau 75%). 21.9% (n = 75) adalah bujang. 3.2% telah bercerai.
Pekerjaan	<ul style="list-style-type: none"> 73 orang responden (21.3%) bekerja dalam sektor swasta. 75 orang responden adalah pemilik perniagaan seperti gerai makanan dan penjual produk-produk pelancongan seperti keropok lekor Losong. Nelayan adalah jenis pekerjaan ketiga tertinggi dalam kalangan responden, dengan jumlah 64 orang (18.7%). 39 orang responden (11.4%) tidak bekerja.
Pendapatan Isi rumah	<ul style="list-style-type: none"> Purata pendapatan isi rumah dilaporkan dalam julat RM1,501 – RM2,000 Purata tersebut lebih rendah dari purata kebangsaan (2012) iaitu RM2,883.
Tempoh bermastautin	<ul style="list-style-type: none"> Seramai 269 orang (78.4%) responden telah tinggal di kawasan tersebut lebih dari 20 tahun.
Pemilikan harta tanah	<ul style="list-style-type: none"> Majoriti (306 orang atau 89.2%) memiliki tanah dan rumah sendiri. 37 orang (10.8%) menyewa.



Rajah 2.10 Kedudukan kampung-kampung dalam lingkungan 5 km dari Projek dan kawasan pendaratan ikan berdekatan.

Persepsi Komuniti Terhadap Projek

Berdasarkan kajian sosio-ekonomik, hanya 47% daripada keseluruhan responden mengetahui tentang Projek. Didalam kasan zon impak, hanya 43% (47 orang daripada 109 responden) dalam lingkungan 1 km dari Projek mengetahui tentang cadangan projek.

Lebih kurang 82% daripada responden tiada sebarang bantahan terhadap Projek dan ini adalah serupa bagi kawasan yang terlibat secara langsung sepanjang sempadan Projek (0 – 1 km dari Projek).

Secara keseluruhannya, responden-responden menerima cadangan Projek kerana dipercayai akan menambahkan kawasan tanah dan mengurangkan kemungkinan berlakunya banjir di kawasan perumahan berdekatan dengan laut. Responden yang membantah Projek memberikan alasan seperti kesan negatif terhadap alam sekitar, kehilangan kawasan rekreasi, dan pengurangan pendapatan bagi nelayan.

2.3.5.3 Dialog Awam

Dua sesi perbincangan kumpulan focus (FGD) dan satu sesi *townhall* telah dijalankan untuk menyampaikan isu-isu dan kesan-kesan berpotensi yang telah dikenal pasti semasa kajian kepada kumpulan berkepentingan dan orang awam.

Dua sesi FGD yang telah dijalankan pada 12 Jun 2019 untuk Majlis Pengurusan Komuniti Kampung (MPKK) dan komuniti nelayan.

MPKK telah menyampaikan kebimbangan mengenai sumber pembiayaan Projek, ketersediaan tanah yang ditambak untuk bumiputera, kesan Projek terhadap ekosistem hulu dan hilir, dan hakisan pantai. Mereka juga menekankan keperluan untuk kajian yang terperinci mengenai hakisan.

Nelayan bimbang akan kesan projek terhadap pendapatan mereka, kehilangan Pantai Teluk Ketapang, kesan projek terhadap pergerakan mereka dan memohon agar kepentingan nelayan-nelayan yang bakal menerima kesan dari cadangan projek di beri perhatian melalui rundingan dan pampasan bagi kehilangan sumber pendapatan.

Sesi *townhall* telah diadakan pada 28 Jun 2019 di TH Hotel & Convention Centre Kuala Terengganu dan dihadiri oleh 45 peserta. Peserta terdiri daripada Ahli Parlimen (MP), Exco Negeri (ADUN), wakil-wakil MPKK, warga akademik (dari Universiti Malaysia Terengganu), sektor swasta, pekerja kerajaan, agensi-agensi kerajaan seperti LKIM dan JAS Terengganu, dan orang awam. Isu-isu yang dibangkitkan oleh golongan akademik adalah berkenaan dengan. Kepentingan kawasan projek sebagai kawasan nurseri bagi anak-anak ikan yg penting dan kesesuaian projek dengan polisi-polisi pembangunan dan kelestarian sedia ada. Mereka juga menyatakan keperluan program pemantauan yang menyeluruh semasa pelaksanaan projek kerana saiznya yang besar. Kesan ekologi, banjir, dan isu-isu hakisan juga dibangkitkan. Kepentingan nilai warisan dan pelancongan Pantai Teluk Ketapang dan kesan estetik juga dibangkitkan.

2.3.5.4 Aktiviti Perikanan

Komuniti nelayan dalam kawasan kajian adalah di bawah Persatuan Nelayan Kuala Terengganu Selatan dan Kuala Terengganu Utara dengan bilangan ahli seramai 1,796 nelayan. Dalam daerah Kuala Nerus, bot enjin sangkut adalah yang paling banyak, diikuti oleh bot Zon A (masing-masing berjumlah 85 dan 52 buah pada tahun 2018). Jumlah bilangan bot berdaftar semakin berkurangan sejak beberapa tahun yang lepas, dari 458 buah bot (2014) kepada 157 buah (2018).

Dalam kawasan kajian lingkungan 5 km dari Projek, terdapat 12 kampung nelayan di mana enam daripadanya terletak kurang dari 1 km dari Projek (Rajah 2.10). Kebanyakan nelayan di kawasan tersebut menggunakan kawasan pendaratan ikan di dalam Sg. Terengganu dan

pemecah ombak Tok Jembal. Namun demikian, ada nelayan yang pergi ke laut dari pesisir Pantai Teluk Ketapang (Rajah 2.10).

Seperti yang disebut di atas, satu kajian sosio-ekonomik telah dijalankan di kawasan Projek yang melibatkan 64 orang nelayan (~19%) daripada jumlah responden 343 orang. Kebanyakan daripada nelayan yang ditemubual berusia lebih dari 60 tahun dan hanya sedikit yang berumur kurang dari 30 tahun. Lebih dari separuh nelayan yang ditemubual telah bekerja sebagai nelayan melebihi 20 tahun, diikuti oleh 6 – 10 tahun (23%).

Joran merupakan alat memancing yang paling biasa digunakan, diikuti oleh pukat tunda, jaring, tukun, bubi, dan perangkap ikan. Kebanyakan nelayan menyatakan kawasan memancing mereka lebih dari 5 km dari kawasan Projek dengan kebanyakan daripada mereka bergerak lebih dari 10 km dari garis pantai untuk memancing.

Walaupun nelayan keluar ke laut sepanjang tahun, responden kajian mendapati musim kemuncak pada bulan Mac dan April (selepas monsun timur laut). Majoriti daripada responden melaporkan pendapatan antara RM600 – RM1,000 sebulan dan 21% melaporkan pendapatan antara RM1,600 – RM2,000 sebulan.

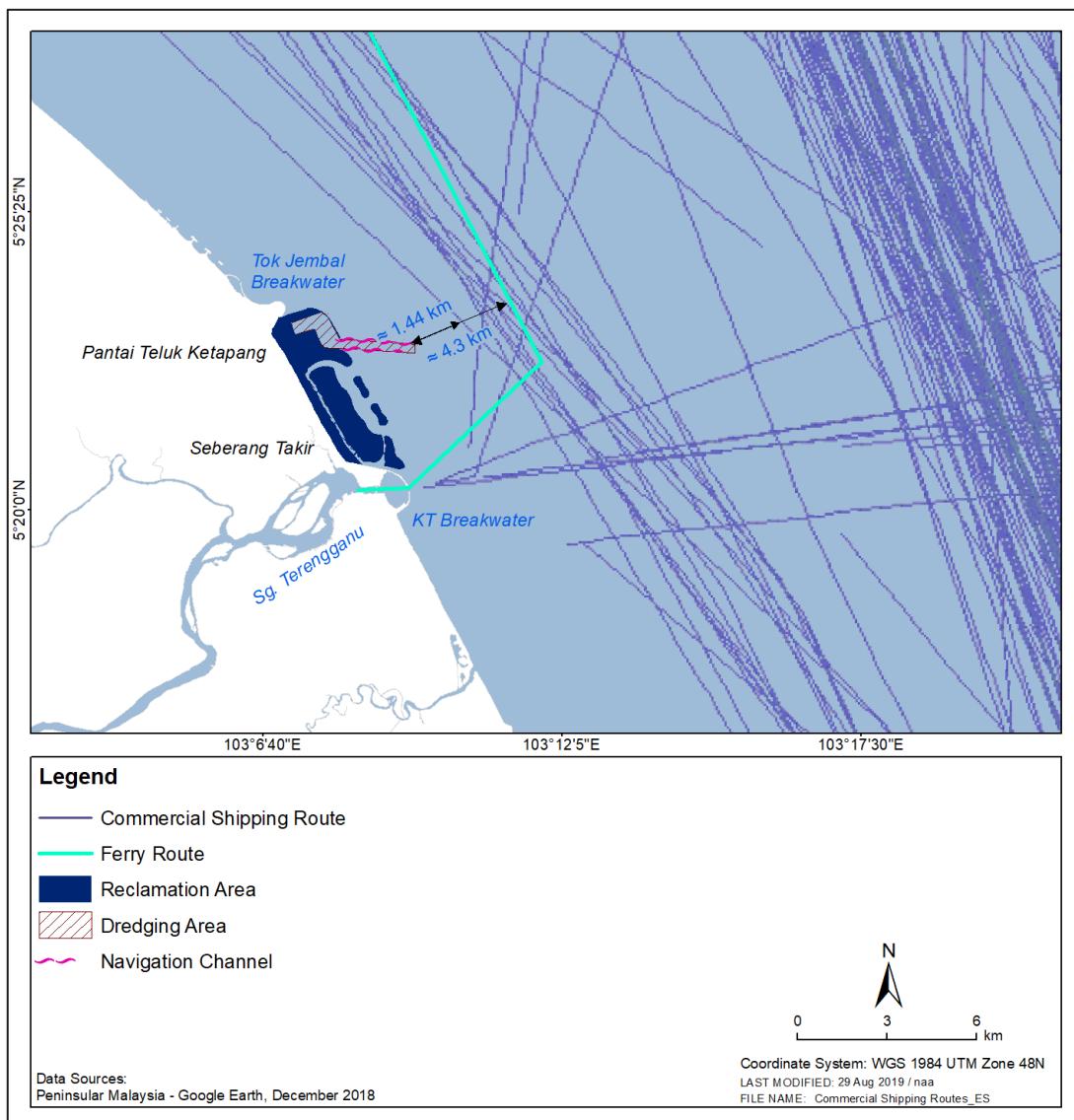
LKIM Terengganu menyatakan bahawa musim udang bermula sejurus berakhirnya monsun timur laut di mana nelayan akan keluar ke laut yang cetek sehingga ke pesisir Pantai Teluk Ketapang menggunakan pukat jerut. September dan Oktober (sebelum monsun timur laut) juga merupakan musim kemuncak ikan.

2.3.5.5 Trafik Laut

Sebahagian daripada Projek terletak dalam Had Pelabuhan Kuala Terengganu di mana sebuah kawasan berlabuh terletak di dalamnya dan sebahagiannya bertindih dengan bahagian selatan kawasan penambakan. Kawasan berlabuh tersebut telah ditetapkan untuk kegunaan vessel-vessel persiaran yang membawa penumpang ke dan dari Kuala Terengganu tetapi jarang digunakan kerana keadaan cuaca buruk di luar pemecah ombak.

Lima kategori vessel yang sering dijumpai di kawasan Projek adalah feri, bot nelayan, vessel bekalan luar pesisir, bot peronda dan marin (Agenzia Pengawas Maritim Malaysia, Jabatan Laut, dan Polis Marin), vessel kajian, dan vessel layar.

Satu laluan feri antara Jeti Shahbandar di Kuala Terengganu dan Pulau Redang melintasi lebih kurang 4.3 km di hadapan tapak Projek. Laluan trafik komersial yang terdekat pula terletak kira-kira 3 km dari tapak Projek (sila lihat Rajah 2.11).



Rajah 2.11 Jarak laluan feri dan perkalan komersial dari tapak Projek.

2.4 Penilaian Kesan dan Langkah Mitigasi

Kesan-kesan dan langkah-langkah mitigasi bagi fasa pembinaan dan operasi adalah seperti yang telah dirumuskan dalam Jadual 2.3 dan Jadual 2.4.

Jadual 2.3 Rumusan penilaian kesan dan langkah-langkah mitisai semasa pembinaan.

Komponen	Kesan Berpotensi	Magnitude Kesan		Pencegahan Pencemaran dan Langkah Kawalan	Muka surat Rujukan (Kesan; Langkah Mitigasi; Kesan Residual)
		Tanpa Mitigasi	Dengan Mitigasi (Kesan Residual)		
Kualiti Air	Sedimen terampai	Minor negatif	Minor negatif	<ul style="list-style-type: none"> Penggunaan ban perimeter dan pemasangan tirai kelodak Pelaksanaan Amalan Pengurusan Terbaik (APT) sepanjang peringkat pembinaan. 	7-8; 8-1; 8-5
Morfologi Pantai	Pemendapan kelodak	Minor negatif	Minor negatif	Penggunaan ban perimeter dan pemasangan tirai kelodak.	7-30; 8-6; 8-6
Hidrologi dan Perparitan	Penyumbatan saliran lapangan terbang	Minor negatif	Kecil negatif	<ul style="list-style-type: none"> Pembinaan parit kekal yang bersambung dengan outlet lapangan terbang ke outlet pelepasan selari dengan permulaan kerja penambakan dalam Fasa 1 Langkah-langkah mitigasi berkaitan dengan pengawalan sedimen terampai untuk mengurangkan kesan pemendapan kelodak 	7-40; 8-6; 8-7
Kualiti Udara	Habuk udara	Minor negatif	Kecil negatif	Pelaksanaan amalan pengurusan terbaik sepanjang peringkat pembinaan.	7-44; 8-7; 8-8
Bunyi	Penghasilan bunyi	Minor negatif	Kecil negatif	<ul style="list-style-type: none"> Mengelakkan aktiviti yang berbunyi bising pada waktu malam Penyelenggaraan dan servis kenderaan yang sesuai Pemasangan alat penindas bunyi yang disyorkan pengilang; dan pemasangan <i>acoustic hoarding barrier</i> di sempadan projek 	7-48; 8-8; 8-8
Habitat Dasar Pengeluar Primer	Kesan sedimen terampai kepada unjam	Minor negatif	Minor negatif	Tiada langkah mitigasi khusus.	7-59; 8-8; 8-9
	Kesan pemendapan terhadap unjam	Minor negatif	Minor negatif	Tiada langkah mitigasi khusus.	7-64; 8-8; 8-9

Komponen	Kesan Berpotensi	Magnitude Kesan		Pencegahan Pencemaran dan Langkah Kawalan	Muka surat Rujukan (Kesan; Langkah Mitigasi; Kesan Residual)
		Tanpa Mitigasi	Dengan Mitigasi (Kesan Residual)		
	Risiko kerosakan pada unjam	Kecil negatif	Tiada perubahan	Penubuhan zon pengecualian 100 m sekeliling unjam yang akan ditanda dengan boyo.	7-67; 8-8; 8-9
Makrobentos	Sedimen terampai	Minor negatif	Minor negatif	Tiada langkah mitigasi tersedia.	7-69; 8-10; 8-10
	Pemendapan kelodak	Kecil negatif	Kecil negatif	Tiada langkah mitigasi tersedia.	7-71; 8-10; 8-10
	Kehilangan habitat	Kecil negatif	Kecil negatif	Tiada langkah mitigasi tersedia.	7-73; 8-10; 8-10
Plankton	Perubahan kualiti air	Minor negatif	Kecil negatif	Pematuhan kepada peraturan-peraturan dan garis panduan antarabangsa berkaitan pengurusan kumbahan dan pencemaran minyak berdasarkan Annex IV dan Annex I MARPOL.	7-75; 8-10; 8-11
	Pelepasan logam surihan dan organisma planktonik asing dari air balast vessel	Sederhana negatif	Kecil negatif	<p>Pematuhan kepada pelan pengurusan air balast seperti dalam <i>International Convention for the Control and Management of Ships' Ballast Water and Sediments</i>.</p> <ul style="list-style-type: none"> Vessel akan merekod sebarang pengambilan, peredaran, rawatan dan pelepasan air balast Pertukaran air balast akan dilakukan sekurang-kurangnya 200 batu nautika dari daratan yang terdekat pada kedalaman minima 200 m Pengambilan air balast hendaklah dielakkan dalam keadaan gelap, air cetek, atau mananya kawasan lain yang ditetapkan oleh pihak berkuasa tempatan 	7-76; 8-10; 8-11
	Serakan sedimen terampai	Kecil negatif	Kecil negatif	Tiada langkah mitigasi khusus	7-77; 8-11; 8-11
Fauna Ikan	Sedimen terampai	Minor negatif	Minor negatif	Tiada langkah mitigasi khusus	7-79; 8-12; 8-12

Komponen	Kesan Berpotensi	Magnitude Kesan		Pencegahan Pencemaran dan Langkah Kawalan	Muka surat Rujukan (Kesan; Langkah Mitigasi; Kesan Residual)
		Tanpa Mitigasi	Dengan Mitigasi (Kesan Residual)		
Megafauna Marin	Pelanggaran bot	Minor negatif	Minor negatif	<ul style="list-style-type: none"> Sebarang pemerhatian megafauna marin hendaklah direkodkan Pelanggaran atau kecederaan kepada mana-mana megafauna marin hendaklah termasuk dalam pelan tindak balas kecemasan kontraktor Pemasangan <i>tickler chains</i> atau apa-apa langkah lain sekiranya pelanggaran atau kecederaan pada megafauna marin berlaku 	7-81; 8-12; 8-12
Bakau	Pemendapan kelodak	Tiada perubahan	Tiada perubahan	Tiada langkah mitigasi diperlukan	7-84; 8-12;
Ekologi Daratan	Tidak berkaitan	Tiada perubahan	Tiada perubahan	<ul style="list-style-type: none"> Langkah-langkah pampasan termasuk penanaman semula kawasan-kawasan yang terbuka Pemeliharaan atau menggunakan semula pokok-pokok sedia ada; dan Tumbuhan pantai baru hendaklah terdiri daripada spesis yang sama dengan spesis-spesis sedia ada untuk menghasilkan persekitaran yang serupa 	7-86; 8-13; 8-13
Sosio-ekonomi	Kesihatan dan kesejahteraan social	Minor negatif	Kecil negatif	Seperti langkah-langkah mitigasi yang dicadangkan bagi kualiti udara dan bunyi.	7-90; 8-13;
	Nilai estetik	Minor negatif	Minor negatif	Pemasangan <i>hoarding</i> dihiasi seni sepanjang sempadan Projek dan Jalan Teluk Ketapang. Ketinggian <i>hoarding</i> berdasarkan garis panduan majlis tempatan dan mempertimbangkan ketinggian yang optimum untuk pelarasan bunyi.	7-91; 8-13
	Keselamatan awam	Kecil negatif	Kecil negatif	<ul style="list-style-type: none"> Pemasangan papan tanda amaran yang sesuai Pembaikan semula sebarang kerosakan pada jalan awam dan persendirian Pematuhan pada undang-undang jalan raya 	7-91; 8-13

Komponen	Kesan Berpotensi	Magnitude Kesan		Pencegahan Pencemaran dan Langkah Kawalan	Muka surat Rujukan (Kesan; Langkah Mitigasi; Kesan Residual)
		Tanpa Mitigasi	Dengan Mitigasi (Kesan Residual)		
	Imigrasi	Sederhana negatif	Minor negatif	<ul style="list-style-type: none"> Penyediaan pelan pengurusan tenaga kerja; dan Penyediaan kuarters yang mencukupi untuk pekerja asing 	7-92; 8-14
	Peluang pekerjaan	Kecil positif	Kecil positif	Keutamaan peluang pekerjaan kepada penduduk tempatan.	7-92; 8-14
	Aktiviti ekonomi	Kecil negatif	Tiada perubahan	<ul style="list-style-type: none"> Penubuhan kawasan bagi pengendali gerai sedia ada berdekatan dengan kawasan pembangunan Penggunaan penginapan sedia ada dalam lingkungan 1 km bagi pekerja pembinaan 	7-93; 8-14
Perikanan	Pengurangan tangkapan ikan	Minor negatif	Kecil negatif	Pemasangan unjam-unjam tambahan di kawasan alternatif.	7-99; 8-15; 8-17
	Risiko navigasi dan kehilangan akses ke laut	Sederhana negatif	Minor negatif	Pematuhan pada navigasi vessel nelayan.	7-101; 8-11; 8-17
Pelancongan dan Aktiviti Rekreasi	Kehilangan tempat rekreasi	Minor negatif	Kecil negatif	Mempromosikan kawasan-kawasan alternatif bagi pelancongan dan aktiviti rekreasi.	7-104; 8-17; 8-17
Warisan Budaya / Arkeologi	Kesan kepada kemudahan atau fungsi warisan kebudayaan	Tiada perubahan	Tiada perubahan	Tidak berkenaan.	7-106; 8-17; 8-17
Trafik Laut	Peningkatan trafik perkapalan	Minor negatif	Kecil negatif	<ul style="list-style-type: none"> Pemasangan <i>aids to navigation</i> (AtoNs) Melibatkan pihak berkepentingan untuk memaklumkan jadual Projek. Lapor kepada Pihak Berkuasa Pelaporan Lima Tango (Kuala Terengganu, Jabatan Laut) 	7-108; 8-18

Jadual 2.4 Rumusan penilaian kesan dan langkah-langkah mitigasi semasa pasca-pembinaan.

Component	Potential Impact	Magnitude of significant potential impacts		Pollution Prevention and Mitigation Measures	Reference Page (Impact; Mitigation Measures; Residual Impact)
		Without mitigation	With mitigation (Residual Impact)		
Kualiti Air	Perubahan pada kapasiti <i>flushing</i>	Minor negatif	Minor negatif	<ul style="list-style-type: none"> Pengurusan laluan air untuk memastikan tiada bahan-bahan pencemar dilepaskan ke dalam laluan air Rekaan terperinci dan perancangan pembangunan, termasuk EIA, bagi pembangunan bahagian atas akan datang hendaklah fokus pada pencegahan pelepasan bahan-bahan pencemar ke dalam laluan air untuk menjaga laluan air daripada dicemari 	7-25; 8-5; 8-6
Morfologi Pantai	Perubahan pada morfologi garis pantai akibat daripada tapak projek	Kecil negatif	Kecil negatif	Tiada langkah mitigasi diperlukan. Pemantauan disyorkan.	7-35; 8-6; 8-6
Hidrologi dan Perparitan	Penyumbatan perparitan lapangan terbang dalam tapak projek	Kecil negatif	Tiada perubahan	<ul style="list-style-type: none"> Integrasi sistem perparitan baru dengan parit lapangan terbang semasa pasca-pembangunan hendaklah dirancangkan pada fasa perancangan projek Pelan perparitan hendaklah mematuhi garis panduan JPS MSMA Edisi 2. 	7-42; 8-7; 8-7
	Risiko banjir	Tiada perubahan	Tiada perubahan	Tiada langkah mitigasi diperlukan	7-42
Kualiti Udara	Tidak berkaitan	Tiada perubahan	Tiada perubahan	Tiada langkah mitigasi diperlukan	7-48
Bunyi	Tidak berkaitan	Tiada perubahan	Tiada perubahan	Tiada langkah mitigasi diperlukan	7-58
Habitat Dasar Pengeluar Primer	Kesan kepada kualiti air akibat daripada pengurangan kapasiti <i>flushing</i> , pemendapan kelodak, dan hakisan	Tiada perubahan	Tiada perubahan	Tiada langkah mitigasi diperlukan	7-74; 8-10; 8-10

Component	Potential Impact	Magnitude of significant potential impacts		Pollution Prevention and Mitigation Measures	Reference Page (Impact; Mitigation Measures; Residual Impact)
		Without mitigation	With mitigation (Residual Impact)		
Makro bentos	Kehilangan habitat akibat daripada tapak projek	Minor negatif	Minor negatif	Tiada langkah mitigasi tersedia	7-67
Plankton	Kesan eutrofikasi akibat daripada perubahan kapasiti <i>flushing</i>	Kecil negatif	Kecil negatif	Tiada langkah mitigasi diperlukan	7-77; 8-11; 8-11
Fauna Ikan	Kehilangan habitat kekal	Minor negatif	Minor negatif	Tiada langkah mitigasi tersedia	7-80; 8-12; 8-12
Megafauna Marin	Tidak berkaitan	Tiada perubahan	Tiada perubahan	Tidak berkaitan	7-84
Bakau	Tiada kesan	Tiada perubahan	Tiada perubahan	Tiada langkah mitigasi diperlukan	7-85; 8-12
Ekologi Daratan	Kehilangan habitat	Kecil negatif	Kecil negatif	<ul style="list-style-type: none"> Langkah-langkah pampasan termasuk penanaman semula kawasan-kawasan yang terbuka Pemeliharaan atau menggunakan semula pokok-pokok sedia ada; dan Tumbuhan pantai baru hendaklah terdiri daripada spesis yang sama dengan spesis-spesies sedia ada untuk menghasilkan persekitaran yang serupa 	7-86; 8-13; 8-13
Sosio-ekonomi	Nilai estetik	Sederhana negatif	Sederhana negatif	Pihak berkuasa tempatan akan memastikan persetujuan dengan Pemaju bagi akses percuma dan tidak terhad ke pantai-pantai baru di tanah yang ditebus untuk penduduk tempatan	7-94; 8-14
	Nilai harta tanah	Sederhana negatif	Sederhana negatif	Tiada langkah mitigasi tersedia	7-94; 8-14
	Perbezaan sosial dan rangkaian social	Sederhana negatif	Minor negatif	<ul style="list-style-type: none"> Pemaju dan pihak berkuasa tempatan hendaklah mengadakan program-program <i>outreach</i> seperti acara-acara dan perbincangan kumpulan focus untuk membolehkan integrasi yang lebih baik antara komuniti setempat dan pendatang baru 	7-95; 8-15

Component	Potential Impact	Magnitude of significant potential impacts		Pollution Prevention and Mitigation Measures	Reference Page (Impact; Mitigation Measures; Residual Impact)
		Without mitigation	With mitigation (Residual Impact)		
				<ul style="list-style-type: none"> Rujuk pada langkah-langkah mitigasi yang disyorkan untuk nilai estetik 	
	Peluang pekerjaan	Signifikan positif	Signifikan positif	Tiada langkah mitigasi diperlukan	7-96;
	Aktiviti ekonomi	Utama positif	Utama positif	Tiada langkah mitigasi diperlukan	7-96;
	Pengangkutan dan akses luar bandar	Signifikan positif	Signifikan positif	Tiada langkah mitigasi diperlukan	7-97
Perikanan	Kehilangan akses secara langsung ke laut bagi nelayan-nelayan tertentu sepanjang Pantai Teluk Ketapang	Sederhana negatif	Minor negatif	<ul style="list-style-type: none"> Peruntukan jeti pendaratan ikan yang kekal Satu bentuk pampasan hendaklah disediakan kepada nelayan-nelayan yang terjejas 	7-102; 8-16; 8-17
Pelancongan dan Aktiviti Rekreasi	Kehilangan tarikan Pantai Teluk Ketapang	Minor negatif	Kecil negatif	<ul style="list-style-type: none"> Pengenalan aktiviti-aktiviti rekreasi baru dalam perbandaran atau pantai baru; dan Mewartakan pantai baru dalam tapak Projek sebagai kawasan tarikan pelancongan baru 	7-104; 8-17; 8-17
Warisan Budaya / Arkeologi	Kesan terhadap nilai kemudahan-kemudahan sedia ada yang mempunyai nilai warisan budaya	Kecil negatif	Tiada perubahan	Penggabungan unsur-unsur warisan budaya dalam pembangunan akan datang dengan mangambil kira identiti asal dan reka bentuk bandar Seberang Takir atau Terengganu secara keseluruhannya.	7-106; 8-17; 8-17
Gunatanah	Keserasian	Tiada perubahan	Tiada perubahan	Tiada langkah mitigasi diperlukan	7-107
Marine Traffic	Perubahan corak arus	Tiada perubahan	Tiada perubahan	Tiada langkah mitigasi diperlukan	7-111; 8-18; 8-18

2.5 Pelan Pengurusan Alam Sekeliling (EMP) dan Pemantauan Alam Sekeliling

Pelan Pengurusan Alam Sekeliling (EMP) ini disediakan sebagai spesifikasi EMP awal. EMP akhir akan disediakan selepas kelulusan, sebelum sebarang kerja-kerja pembinaan bermula berdasarkan syarat-syarat kelulusan EIA yang akan ditentukan oleh JAS. Ini membolehkan ulasan-ulasan semasa peringkat ulasan diambil kira dalam EMP akhir bersama maklumat kontraktor terlantik dan metodologi pembinaan yang akhir dan terperinci.

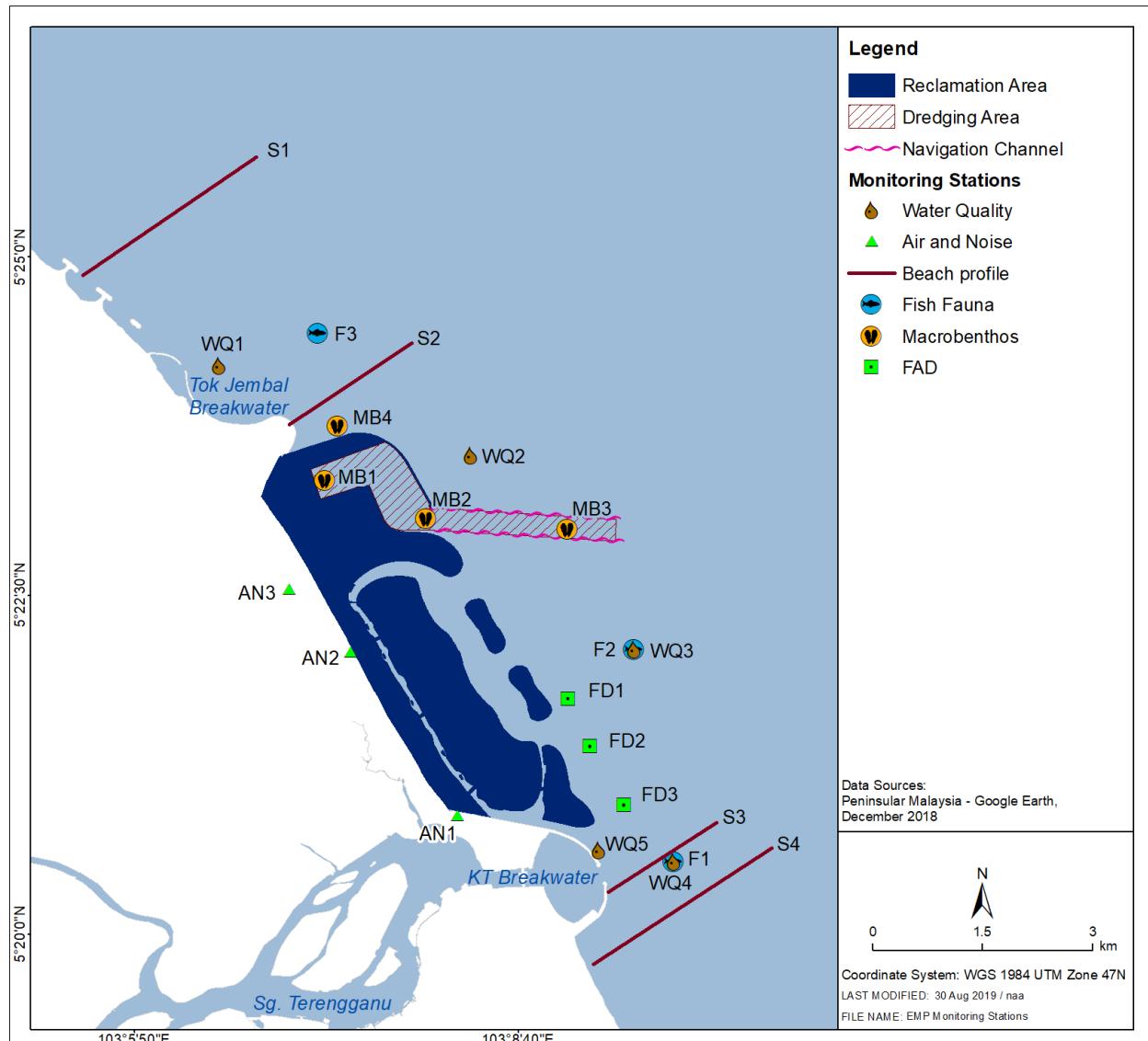
EMP menggariskan kedua-dua pemantauan pematuhan dan kesan. Bagi kes ini, pemantauan pematuhan bagi semua langkah-langkah pencegahan dan mitigasi kesan (P2M2) yang dikenalpasti dalam EIA secara besarnya fokus pada status pelaksanaan P2M2 tersebut yang telah dirumuskan dalam Seksyen 1.4, Jadual 2.3 dan Jadual 2.4 di atas, kerana standard pelepasan khusus adalah tidak berkenaan bagi Projek.

Komponen-komponen utama EMP adalah seperti yang dirumuskan dalam Jadual 2.5. Rajah menunjukkan lokasi-lokasi stesen-stesen pemantauan adalah seperti Rajah 2.12.

Jadual 2.5 Rumusan komponen-komponen EMP.

Komponen	Parameter Pemantauan	Frekuensi Pemantauan	Stesen Pemantauan
Kualiti Air	Jumlah pepejal terampai	<ul style="list-style-type: none"> Setiap hari untuk dua minggu setelah bermula kerja-kerja pengorekan Pengorekan dan penambakan – setiap minggu 	5 stesen, 3 kedalaman
	Jumlah Pepejal Terampai Minyak dan Gris Merkuri, Kadmium, Kromium, Kuprum, Sianida, Zink, Arsenik, Plumbum, dan Aluminium	Pengorekan dan penambakan – setiap bulan	5 stesen, 3 kedalaman
	Jumlah pepejal terampai Minyak dan Gris	Penambakan – bulanan	5 stesen, 3 kedalaman
Morfologi Pantai	Profil pantai	<ul style="list-style-type: none"> Pra-pembinaan – sekali Pembinaan – dua kali setahun Pasca-pembinaan – dua kali setahun untuk tiga tahun pertama 	4 transek
Kualiti Udara	Zarahan terampai <ul style="list-style-type: none"> PM₁₀ PM_{2.5} 	Pembinaan – setiap tiga bulan	3
Bunyi	<ul style="list-style-type: none"> L_{eq} L_{max} 	<ul style="list-style-type: none"> Pembinaan – setiap tiga bulan 	3

	<ul style="list-style-type: none"> • L_{90}, L_{10} 	<ul style="list-style-type: none"> • Operasi – dua kali setahun 	
Makrobentos	Pengenalpastian spesis dengan: <ul style="list-style-type: none"> • Jumlah • Kepelbagaiaan 	Pasca-pengorekan – dua kali setahun	4
Fauna Ikan	Pengenalpastian spesis dengan: <ul style="list-style-type: none"> • Jumlah • Berat • Panjang 	Pembinaan – setiap tiga bulan	3
Kesan Sosial	Penubuhan; <ul style="list-style-type: none"> • Pusat cadangan / maklum balas • Kumpulan Kerja Komuniti 	Pra-pembinaan	-
	<ul style="list-style-type: none"> • Pusat cadangan / maklum balas • Pelan Kesedaran Komuniti 	Pembinaan <ul style="list-style-type: none"> • Dialog bersama Kumpulan Kerja Komuniti dua kali setahun 	-
Perikanan	Perbincangan berkenaan; <ul style="list-style-type: none"> • Kemas kini status unjam-unjam dan lain-lain bentuk pampasan • Kemas kini status pembangunan projek • Pengurusan nelayan yang teralih tapak pendaratan atau akses laut 	<ul style="list-style-type: none"> • Pembinaan – dua kali setiap tiga bulan • Pasca-pembinaan – sekali setahun untuk dua tahun pertama 	-



Rajah 2.12 Lokasi stesen-stesen pemantauan yang dicadangkan.

2.6 Ringkasan Kajian

Kajian EIA ini telah menilai kesan-kesan kepada alam sekitar terhasil daripada *Proposed Reclamation and Capital Dredging for the Sunrise City Mixed Development at Mukim Kuala Nerus, District of Kuala Nerus, Terengganu, Malaysia*. Penilaian ini merangkumi kesan-kesan daripada fasa-fasa pembinaan dan pasca-pembinaan Projek, termasuk penambakan tanah, pengorekan induk, dan pembinaan struktur pemecah ombak, jambatan, jalan, dan platform bercerucuk. Penilaian ini mengiktiraf bahawa apa-apa pembangunan akan memberi kesan terhadap persekitaran biofizikal dan sosio-ekonomik secara negatif, dan bagi kes-kes tertentu, secara positif.

Dari reseptor-reseptor sensitif yang telah dikenal pasti dalam penilian ini, kawasan garis pantai bersebelahan dengan Projek, khususnya ke utara dari Projek, telah ditekankan sebagai kawasan yang sensitive akibat daripada hakisan teruk di kawasan tersebut. Kerana hal ini, penilaian *numerical modelling* terperinci telah dijalankan (berfokuskan kesan terhadap arus, ombak, dan corak pengangkutan sedimen) dan telah menunjukkan bahawa Projek tidak akan memberikan kesan yang ketara kepada pengangkutan sedimen, maka tidak akan memburukkan lagi hakisan di kawasan sensitif tersebut.

Kawasan pantai bersebelahan dengan tapak Projek, Pantai Teluk Ketapang, mempunyai kepadatan penduduk yang tinggi dengan 13 buah perkampungan dalam 1 km dari pesisir pantai, termasuk enam perkampungan nelayan. Pantai tersebut merupakan landskap yang bernilai dan kemudahan rekreasi untuk penduduk tempatan dan pengunjung. Sifat penambakan yang akan dijalankan akan menyebabkan perubahan yang kekal kepada landskap semula jadi yang akan digantikan dengan pembangunan Sunrise City. Namun demikian, dinyatakan bahawa pantai-pantai baru akan dibangunkan dalam Sunrise City termasuk satu saluran yang akan ada persiaran dan lain-lain kawasan untuk kegunaan orang awam. Khususnya untuk pelancong, kawasan tersebut akan menyediakan tarikan alternatif selain pelancongan pulau luar pesisir semasa musim monsun.

Mengenai komuniti nelayan, sebilangan kecil daripada mereka yang menggunakan pantai untuk akses ke laut akan terkesan dan perlu menggunakan jeti-jeti atau kawasan pendaratan lain.

Selain di atas, kesan utama lain yang dikenal pasti ialah kehilangan kekal habitat laut berpasir *subtidal* dalam kawasan Projek. Sumber biologi dan produktiviti dalam tapak Projek akan hilang, merupakan kehilangan habitat dan sumber perikanan bagi nelayan tempatan.

Beberapa langkah-langkah mitigasi telah dicadangkan, termasuk pemasangan unjam-unjam ikan tambahan untuk mengimbangi kehilangan habitat fauna ikan, pampasan kewangan bagi nelayan yang terjejas, dan penyediaan kawasan pendaratan alternatif semasa pembinaan.

Kesan-kesan lain terhadap komuniti secara meluas adalah minor – penilaian kesan kualiti udara dan bunyi telah mendapati bahawa langkah-langkah mitigasi yang dicadangkan memadai untuk mencegah kesan terhadap kesihatan manusia di kawasan sekeliling. Peluang pekerjaan dan ekonomi yang diperuntukkan Projek dijangkakan akan membawa kesan positif yang signifikan kepada komuniti tempatan, serta ekonomi negeri dan nasional.

Kesimpulannya, kajian EIA ini telah menunjukkan bahawa dengan pelaksanaan langkah-langkah mitigasi yang telah disyorkan dan Pelan Pengurusan Alam Sekeliling, Projek ini boleh dilaksanakan dengan kesan dan risiko terhadap alam sekeliling yang boleh diterima.