EXECUTIVE SUMMARY

SECOND SCHEDULE ENVIRONMENTAL IMPACT ASSESSMENT (S2EIA) FOR THE PROPOSED MASTERPLAN DEVELOPMENT OF MAHARANI ENERGY GATEWAY, MUAR, JOHOR DARUL TAKZIM

INTRODUCTION

The Maharani Energy Gateway is the development of an energy hub and deep-sea port. This will be industrial based development comprising a wide variety of maritime related businesses including oil and gas storage and trading, ship to ship operations, bunker trading, petrochemical industries, deep sea port operation, marine repair & maintenance, marine logistics services, ship & offshore fabrication yard and marine equipment manufacturing

PROJECT INFORMATION

PROJECT PROPONENT :

Maharani Energy Gateway Sdn. Bhd.
No. 10-03, Jalan Tun Abdul Razak,
Susur 1/1, 80000 Johor Bahru,
Johor Darul Takzim

Tn. Hj. Razif Bin Ahmad
Director
Tel No. : 07-226 9133
Fax No. : 07-221 8223
HP No. : 019-239 2121
Email : razif@maharani-gateway.com

EIA CONSULTANT :

Golden Ecosystem Sdn. Bhd.
D-16-05 – D-16-07, Menara Mitraland,
No. 13A, Jalan PJU 5/1, PJU 5,
Kota Damansara, 47810 Petaling Jaya,
Selangor Darul Ehsan.

Wazfarina Binti Abdul Wahid
EIA Study Team Leader
Tel No. : 03-7629 4112
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STATEMENT OF NEED

Economic development specifically for the district of Muar.

Boosting the country's economy.

Investment value over RM72 billion in 10 years.

Creation of employment opportunities.

A good investment because:
- Ample deep water & area for development;
- Strategic location within the straits of Malacca;
- Dedicated Energy Hub & Gateway;
- Attractive incentives & facilitation;
- Low entry cost;
- Be partners building a sustainable socio eco-system;
- Digital operating platform; and
- Dedicated & Commited Team.

LEGISLATIVE REQUIREMENT

Environmental Quality (Prescribed Activity) (Environmental Impact Assessment) Order 2015 under:

Second Schedule Activity 7 (b):
Coastal reclamation or land reclamation along river banks within or adjacent or near or near to environmentally sensitive areas.

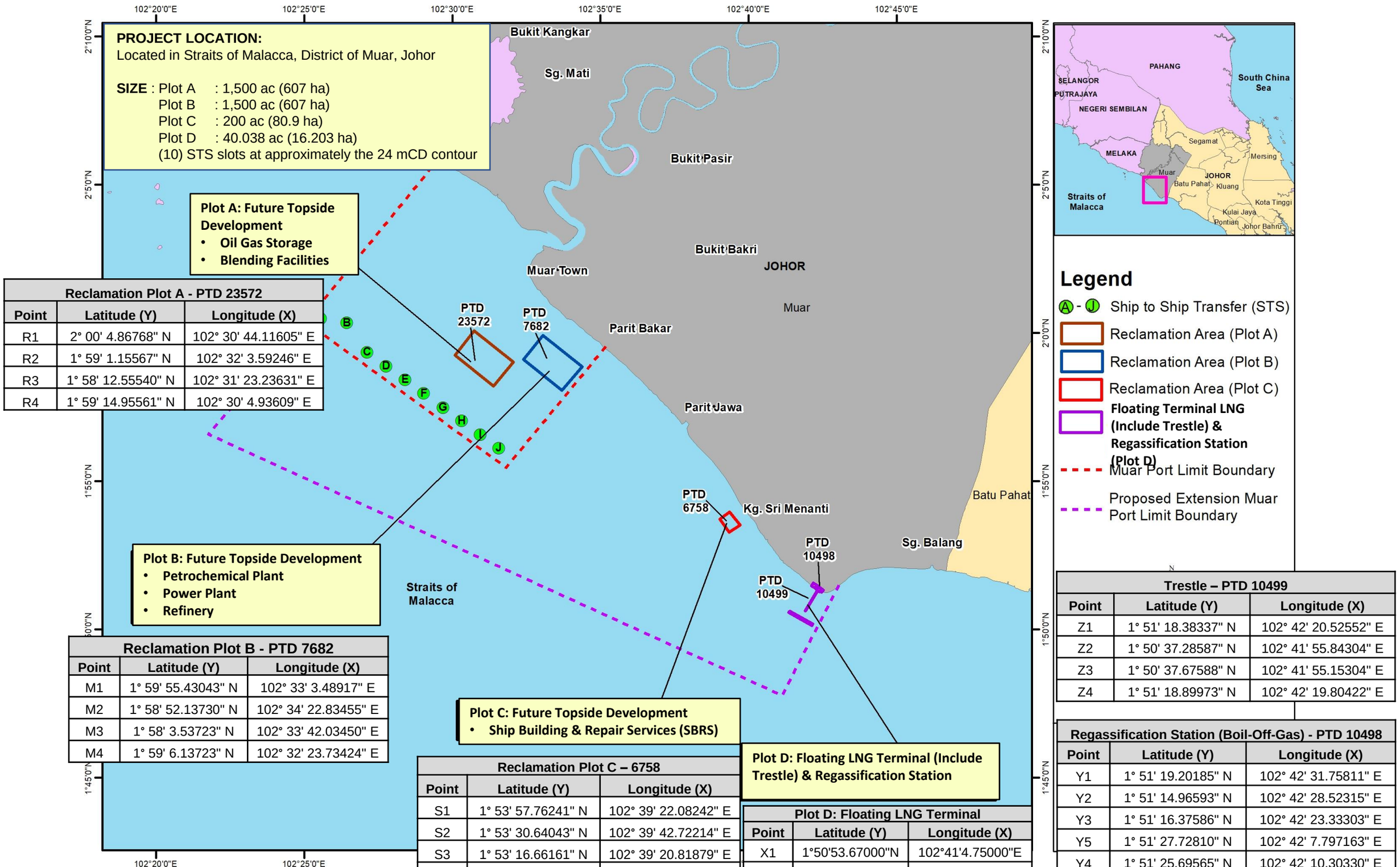
Second Schedule Activity 7 (c):
Reclamation for man-made island.

Second Schedule Activity 10(a):
Construction of new port.

First Schedule Activity 9(c)(ii):
Petroleum: Construction of - gas separation, processing, handling and storage.

First Schedule Activity 17:
Industrial Estate Development:
Development of industrial estate covering an area of 20 hectares or more.

PROJECT LOCATION AND GEOGRAPHICAL COORDINATES



Reclamation Plot A - PTD 23572		
Point	Latitude (Y)	Longitude (X)
R1	2° 00' 4.86768" N	102° 30' 44.11605" E
R2	1° 59' 1.15567" N	102° 32' 3.59246" E
R3	1° 58' 12.55540" N	102° 31' 23.23631" E
R4	1° 59' 14.95561" N	102° 30' 4.93609" E

Reclamation Plot B - PTD 7682		
Point	Latitude (Y)	Longitude (X)
M1	1° 59' 55.43043" N	102° 33' 3.48917" E
M2	1° 58' 52.13730" N	102° 34' 22.83455" E
M3	1° 58' 3.53723" N	102° 33' 42.03450" E
M4	1° 59' 6.13723" N	102° 32' 23.73424" E

Reclamation Plot C – 6758		
Point	Latitude (Y)	Longitude (X)
S1	1° 53' 57.76241" N	102° 39' 22.08242" E
S2	1° 53' 30.64043" N	102° 39' 42.72214" E
S3	1° 53' 16.66161" N	102° 39' 20.81879" E
S4	1° 53' 42.69519" N	102° 39' 1.72108" E

Plot D: Floating LNG Terminal		
Point	Latitude (Y)	Longitude (X)
X1	1°50'53.67000"N	102°41'4.75000"E
X2	1°50'50.26000"N	102°41'2.81000"E
X3	1°50'16.77000"N	102°42'6.59000"E
X4	1°50'13.86000"N	102°42'4.79000"E

Trestle – PTD 10499		
Point	Latitude (Y)	Longitude (X)
Z1	1° 51' 18.38337" N	102° 42' 20.52552" E
Z2	1° 50' 37.28587" N	102° 41' 55.84304" E
Z3	1° 50' 37.67588" N	102° 41' 55.15304" E
Z4	1° 51' 18.89973" N	102° 42' 19.80422" E

Regassification Station (Boil-Off-Gas) - PTD 10498		
Point	Latitude (Y)	Longitude (X)
Y1	1° 51' 19.20185" N	102° 42' 31.75811" E
Y2	1° 51' 14.96593" N	102° 42' 28.52315" E
Y3	1° 51' 16.37586" N	102° 42' 23.33303" E
Y5	1° 51' 27.72810" N	102° 42' 7.797163" E
Y4	1° 51' 25.69565" N	102° 42' 10.30330" E
Y6	1° 51' 33.46570" N	102° 42' 11.26715" E
Y7	1° 51' 29.22387" N	102° 42' 17.80668" E

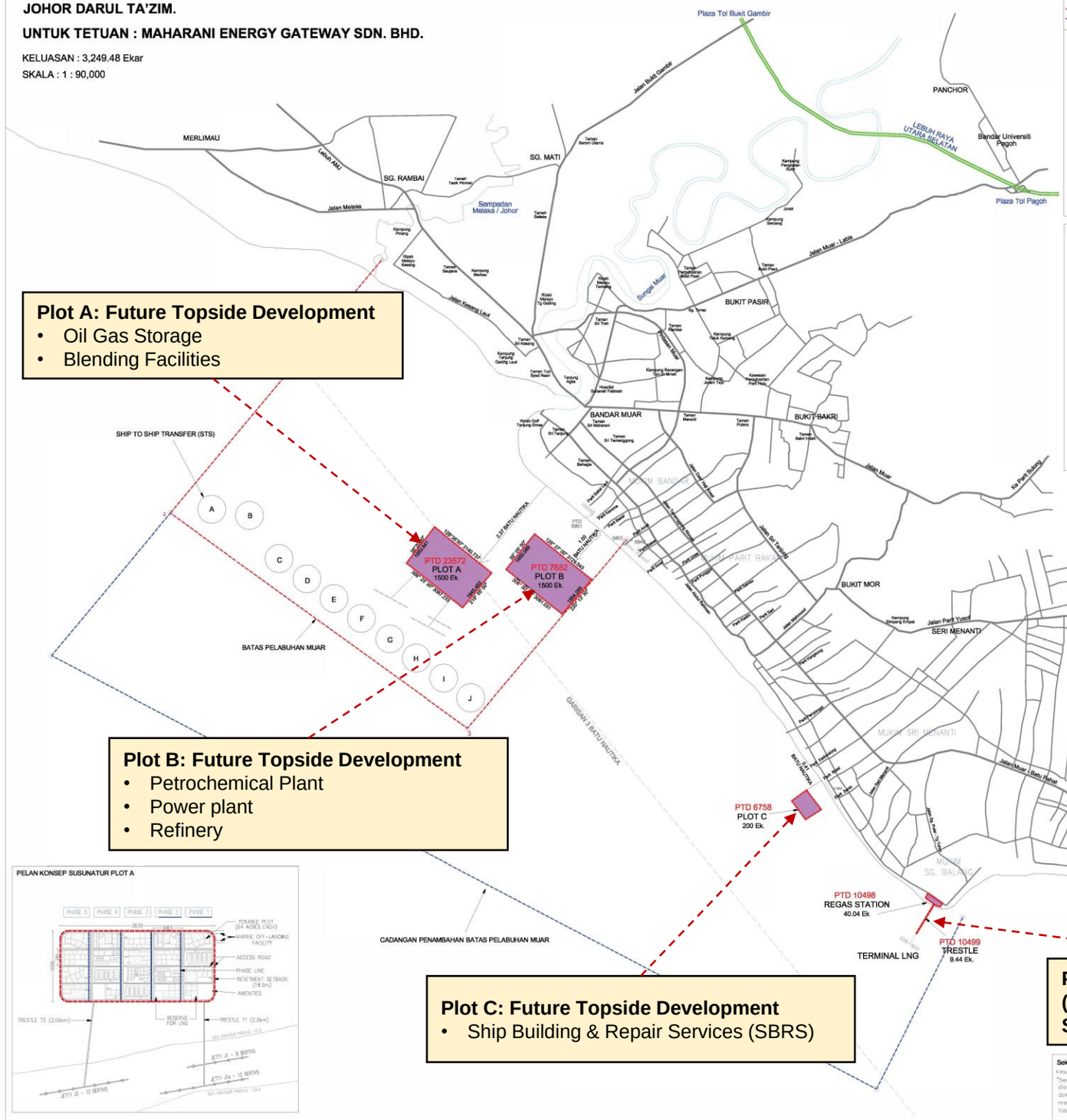
LAYOUT PLAN

PERMOHONAN KEBENARAN MERANCANG MENGIKUT SEKSYEN 21, AKTA PERANCANGAN BANDAR DAN DESA 1976 (AKTA 172) BAGI CADANGAN PEMBANGUNAN MAHARANI ENERGY GATEWAY (MEG) DI ATAS LOT PTD 23572 MUKIM BANDAR, PTD 7682 MUKIM PARIT BAKAR, PTD 6758 MUKIM SRI MENANTI, PTD 10498 DAN PTD 10499 MUKIM SUNGAI BALANG, DAERAH MUAR, JOHOR DARUL TA'ZIM.

UNTUK TETUAN : MAHARANI ENERGY GATEWAY SDN. BHD.

KELUASAN : 3,249.48 Ekar

SKALA : 1 : 90,000

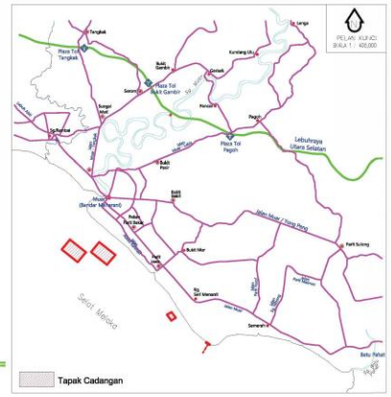


Plot A: Future Topside Development
- Oil Gas Storage
- Blending Facilities

Plot B: Future Topside Development
- Petrochemical Plant
- Power plant
- Refinery

Plot C: Future Topside Development
- Ship Building & Repair Services (SBRS)

Plot D: Floating Terminal LNG (Include Trestle) & Regassification Station



PETUNJUK :

Komponen Pembangunan	Unit	%	Luas (Ekar)	%
Plot A (Oil Gas Storage / Blending Facilities)	1		1,500.00	46.16
Plot B (Petrochemical Plant / Power Plant / Refinery)	1		1,500.00	46.16
Plot C (Ship Building & Repair Services)	1		200.00	6.15
Regas Station & Trestle	1		49.48	1.53
Jumlah	4		3,249.48	100.00

PEMILIK & PEMAJU :

"SAYA / KAMI SESUNGGUH TUNPUNYA TANAH BAGI LOT TERSEBUT TELAH BERSETUJU TERHADAP KESEMUA KOMPONEN DAN SUSUNAN YANG TERKANDUNG DALAM PELAN INI"

"SAYA / KAMI BERJANJI BAHAWA SAYA / KAMI AKAN MEMATUHI KEHENDAK-KEHENDAK AKTA KESELAMATAN DAN KESIHATAN PEKERJAAN 1994 SEPANJANG PERLAKSANAAN PROJEK INI DAN SAYA / KAMI AKAN MENERIMA TANGGUNGJAWAB PENUH DENGAN SEWAJARNYA"

MAHARANI ENERGY GATEWAY SDN. BHD.
No. 10-03, Jalan Tun Abdul Razak, Susur 1/1
80000 Johor Bahru, Johor Darul Takzim.
Tel : 07-226 9133 Fax : 07-221 8223

DATO' DAING A MALEK BIN DAING A RAHAMAN
NO KP : 560128-01-5101
PENGARAH

JURURANCANG BANDAR:

RA PLANNING AND MANAGEMENT SERVICES
Company Reg No. JM 0434117 - W
6-1, Jalan Padi Ria 13, Bandar Baru Uda
81200 Johor Bahru, Johor Darul Takzim.
Tel : 07-2365020 Fax : 07-2382445
E-Mail : rapleanning@yahoo.com / rapleanningjb@gmail.com

PERAKUAN PRAKTIS
TPr. RATNAWATI BINTI AMAN
RA PLANNING AND MANAGEMENT SERVICES
A 0310
BC 0130 / CDP 0140
CERTIFICATE OF PRACTICE

TPr. RATNAWATI BINTI AMAN
No. KP : 720430-01-6404, No. HP : 019 750 1700
B. Sc. (Hons). URP (Planning) UTM,
Ahli Korporat Pertushkan Perancang Malaysia
MMPP / 402 / 2009
Ahli Lembaga Perancang Bandar Malaysia
No.Sijil Pendaftaran LPBM : A 0310
No. Sijil Pendaftaran Perekaan Praktis : CDP 0140

Seksyen 18, Akta SPRM (Akta 694) 2009 :

Kesalahan Dengan Maksud Untuk Memperdayakan Prinsipal Oleh Ejen.

"Seseorang melakukan kesalahan jika dia memberi seseorang ejen, atau sebagai seorang ejen dia menggunakan, dengan niat hendak memperdayakan prinsipalnya, apa-apa resit, akaun atau dokumen lain yang berkenaan dengannya prinsipal itu mempunyai kepentingan, dan yang dia mempunyai rasa tak untuk mengetahui mengandungi apa-apa pernyataan yang palsu atau silap atau tidak lengkap tentang apa-apa butir matan, dan yang dimaksudkan untuk mengelirukan prinsipalnya"

LUAS RIZAB MUKTAMAD BAGI SEMUA LOT DI DALAM PELAN TATATUR INI TERTAKLUK KEPADA R.S YANG AKAN DISEDIAKAN OLEH JURUKUR BERLESEN SELEPAS KELULUSAN PELAN TATATUR INI.

DILUKIS OLEH	: BAHRUDDIN
DISEMAK OLEH	: PN. RATNAWATI
TARIKH	: 12 Jan 2022
NO. FAIL KOMP :E :	ODEN/MPM/MEG/Pelan Induk MEG_120122_1s.dwg
NO.PELAN :	RA/MU/23/21 – 1s

PROJECT COMPONENT

Plot Identification	Description of Component	Unit	Area (Acre)	%
Plot A	Oil & Gas storage and blending facilities	1	1,500	46.16
	Deep sea port			
	- Jetties (2 nos)			
Plot B	Petrochemical plant/power plant. Refinery facility	1	1,500	46.16
Plot C	Marine repair & maintenance, marine logistics services, ship & offshore fabrication yard and marine equipment manufacturing	1	200	6.15
Plot D	Construction of Floating Terminal LNG and Regasification Station	1	49.48	1.53
Total		**4**	**3,249.48**	**100**

The topside development of Plot A, Plot B and Plot C is reserved for future development and the details are not included in this EIA. A separate EIA will be prepared for the topside development of Plot A, Plot B, and Plot C.

PROJECT ACTIVITY

PLOT A, PLOT B AND PLOT C FOR RECLAMATION OF THE MAN-MADE ISLAND

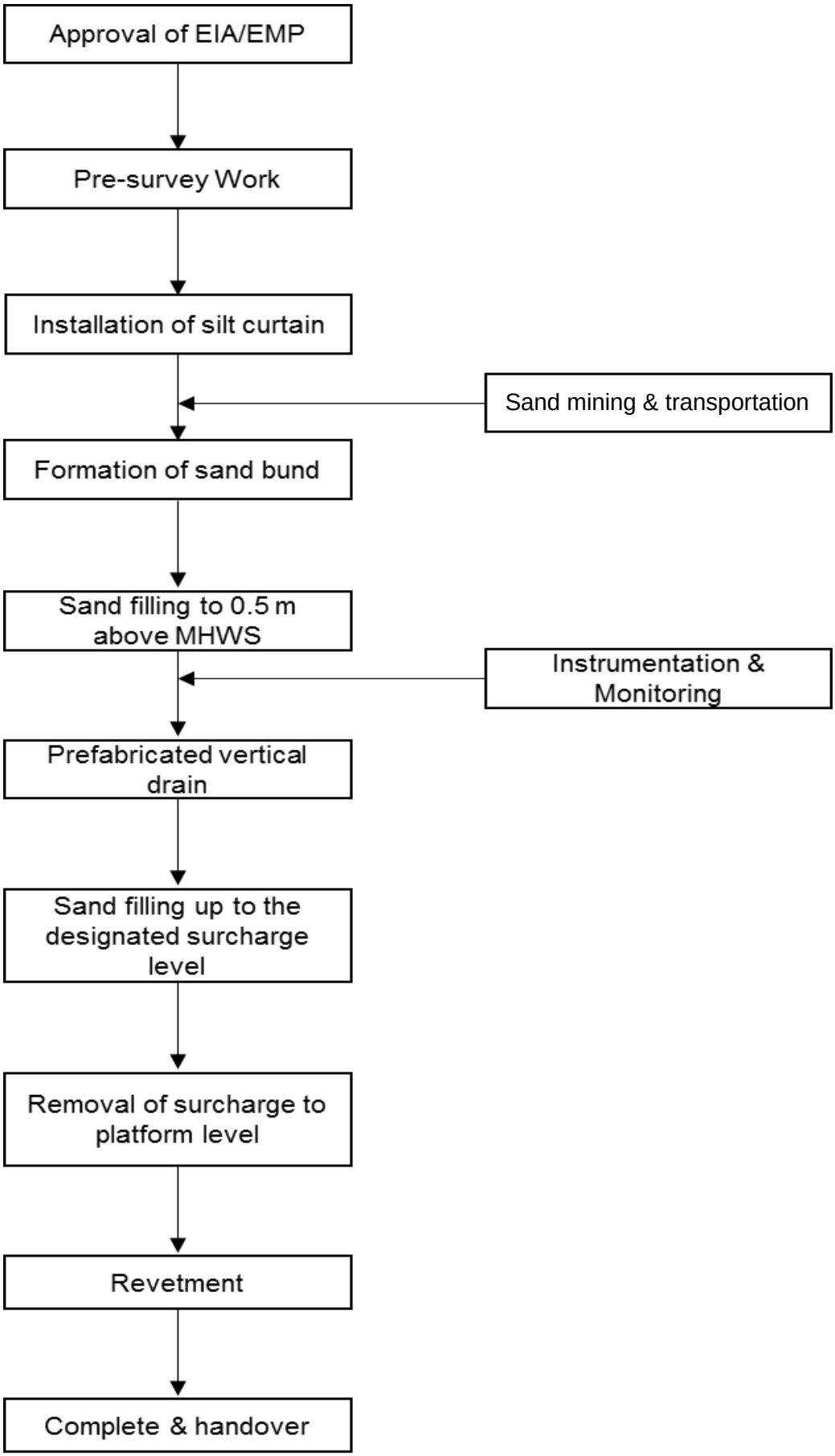
- Pre-Survey Work;
- Installation of Silt Curtain;
- Sand Mining & Transportation;
- Formation Sand Bund;
- Sand Filling Work;
- Prefabricated Vertical Drain;
- Revetment Works;
- Trimming of the Slope to the Design Profile;
- Laying of the Geofabric;
- Placing of Rock;
- Construction of Stone Revetment;
- Instrumentation;
- Geotechnical Design Considerations;
- Reclamation Platform;
- Shore Protection Structures; and
- Post Survey (As Built).

PLOT D FOR FLOATING LIQUEFIED NATURAL GAS TERMINAL & REGASSIFICATION STATION FOR BOIL-OFF-GAS

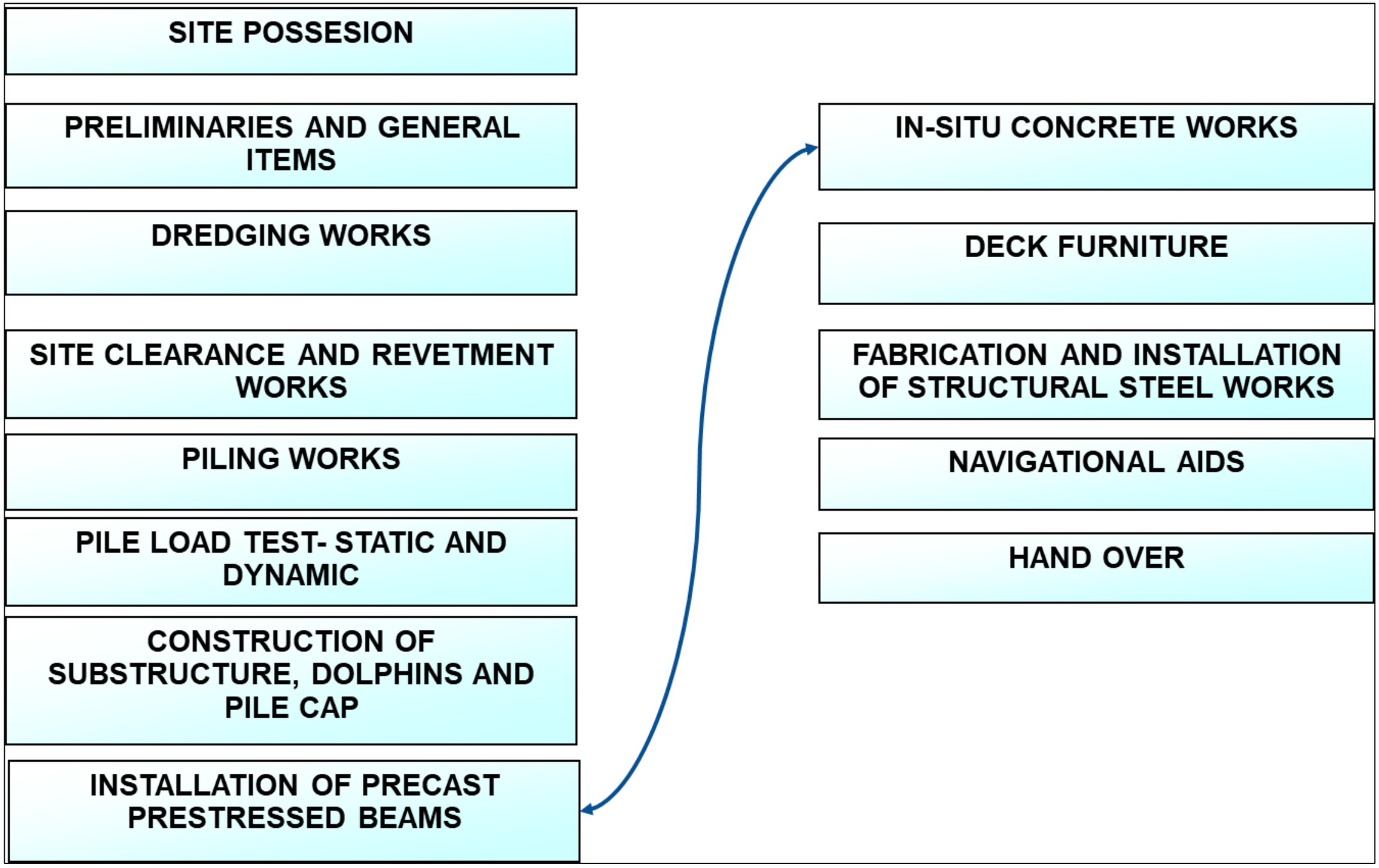
- **Part 1**
  - Mooring berths for Floating Storage Units (FSU) 2 nos and LNGCs 3 nos;
  - Subsea BOG pipeline 2 km to shore; and
  - Onshore facility.
- **Part 2**
  - Causeway with pipe rack filling skid; and
  - Subsea LNG pipeline to causeway.

10 SLOT STS (SHIP-TO-SHIP) TRANSFER OPERATION

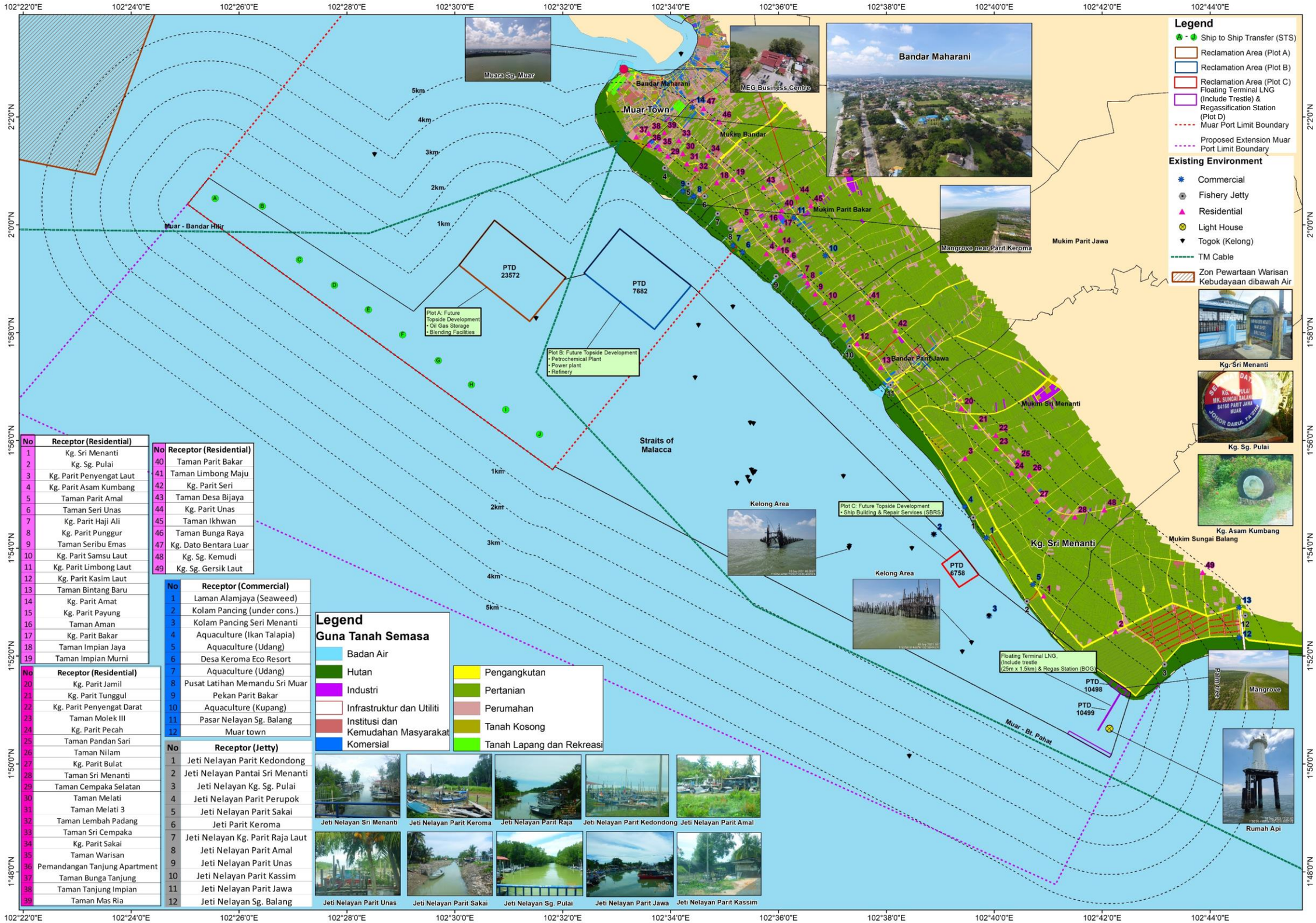
OVERALL FLOW OF THE RECLAMATION PROCESS



FLOW OF THE DEEP SEA PORT CONSTRUCTION PROCESS



THE EXISTING LANDUSE AND SENSITIVE RECEPTOR WITHIN 5 KM RADIUS FROM PROPOSED PROJECT



No	Receptor (Residential)
1	Kg. Sri Menanti
2	Kg. Sg. Pulai
3	Kg. Parit Penyengat Laut
4	Kg. Parit Asam Kumbang
5	Taman Parit Amal
6	Taman Seri Unas
7	Kg. Parit Haji Ali
8	Kg. Parit Punggur
9	Taman Seribu Emas
10	Kg. Parit Samsu Laut
11	Kg. Parit Limbong Laut
12	Kg. Parit Kasim Laut
13	Taman Bintang Baru
14	Kg. Parit Amat
15	Kg. Parit Payung
16	Taman Aman
17	Kg. Parit Bakar
18	Taman Impian Jaya
19	Taman Impian Murni

No	Receptor (Residential)
40	Taman Parit Bakar
41	Taman Limbong Maju
42	Kg. Parit Seri
43	Taman Desa Bijaya
44	Kg. Parit Unas
45	Taman Ikhwan
46	Taman Bunga Raya
47	Kg. Dato Bentara Luar
48	Kg. Sg. Kemudi
49	Kg. Sg. Gersik Laut

No	Receptor (Residential)
20	Kg. Parit Jamil
21	Kg. Parit Tunggul
22	Kg. Parit Penyengat Darat
23	Taman Molek III
24	Kg. Parit Pecah
25	Taman Pandan Sari
26	Taman Nilam
27	Kg. Parit Bulat
28	Taman Sri Menanti
29	Taman Cempaka Selatan
30	Taman Melati
31	Taman Melati 3
32	Taman Lembah Padang
33	Taman Sri Cempaka
34	Kg. Parit Sakai
35	Taman Warisan
36	Pemandangan Tanjung Apartment
37	Taman Bunga Tanjung
38	Taman Tanjung Impian
39	Taman Mas Ria

No	Receptor (Commercial)
1	Laman Alamjaya (Seaweed)
2	Kolam Pancing (under cons.)
3	Kolam Pancing Seri Menanti
4	Aquaculture (Ikan Talapia)
5	Aquaculture (Udang)
6	Desa Keroma Eco Resort
7	Aquaculture (Udang)
8	Pusat Latihan Memandu Sri Muar
9	Pekan Parit Bakar
10	Aquaculture (Kupang)
11	Pasar Nelayan Sg. Balang
12	Muar town

No	Receptor (Jetty)
1	Jeti Nelayan Parit Kedondong
2	Jeti Nelayan Pantai Sri Menanti
3	Jeti Nelayan Kg. Sg. Pulai
4	Jeti Nelayan Parit Perupok
5	Jeti Nelayan Parit Sakai
6	Jeti Parit Keroma
7	Jeti Nelayan Kg. Parit Raja Laut
8	Jeti Nelayan Parit Amal
9	Jeti Nelayan Parit Unas
10	Jeti Nelayan Parit Kassim
11	Jeti Nelayan Parit Jawa
12	Jeti Nelayan Sg. Balang

Legend
Guna Tanah Semasa

- Badan Air
- Hutan
- Industri
- Infrastruktur dan Utiliti
- Institusi dan Kemudahan Masyarakat
- Komersial
- Pengangkutan
- Pertanian
- Perumahan
- Tanah Kosong
- Tanah Lapang dan Rekreasi

EXISTING ENVIRONMENT

EXISTING ENVIRONMENT

LANDUSE

- Dominated by residential and marine area
- Nearest sensitive receptor:
  - ✓ Kg. Sri Menanti (1km)
  - ✓ Markas PGA (Kompeni Tektikal) (1km)

HYDROGRAPHY & HYDROLOGY

- Lies on Straits of Malacca.
- Depths ranging from -2mCD to -52 mCD

GEOLOGY

- Located on offshore of Straits of Malacca which underlain by alluvium with Quaternary age.

METEOMARINE

- Annual dominant wave propagating from the northeast and southeast.
- Northeast monsoon: max. wave height up to 1.0 m generally from 30 - 60 and 300 degree.
- Southeast monsoon: max. wave height up to 0.8 m from 140 degree.
- Transition period, wave is dominant from the northeast with the max. wave height reach to 1 m.

METEOROLOGY

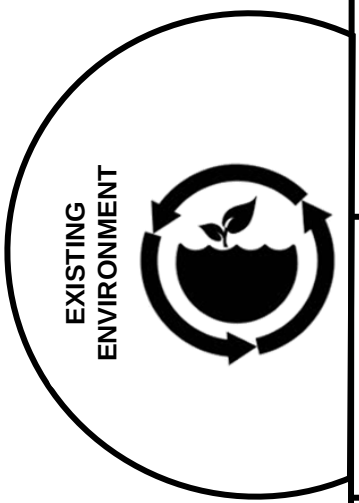
- Climatic data is based on Batu Pahat station.
- The proposed Project site experiences a typical tropical climate with uniform temperature (between 26.6°C and 28.0°C) and average annual rainfall (2130.7 mm annually). The climate is strongly influenced by the Southwest and Northeast monsoon. The percentage of calm wind is 24.6%.

BASELINE DATA

- **Ambient Air** (Comply with Malaysian Ambient Quality Standard (MAAQS) 2020
- **Noise Level** (Comply with Urban Residential (High Density), Mixed Development and Suburban Residential (Medium Density), Recreational))
- **Vibration Level** (Comply with Schedule 6: Recommended Limits for Human Response and Annoyance from Short Term Vibrations (Residential) during Day Time & Night Time)

  Estuarine Water Quality Most of the parameters fall within the limit of Malaysian Marine Water Quality Standard (MMWQS), Class E1 except TSS and Fecal Coliform.
- **Marine Water Quality** compared with Malaysia Marine Water Quality Standard Class 2, (MWQI : Moderate)

EXISTING ENVIRONMENT (CONT'D)



MARINE BIOLOGY

- **Phytoplankton:**
  Diversity within range 0.53 - 2.51; 4 to 18 taxa
- **Zooplankton:**
  Diversity within range 1.91– 2.83; 13 to 25 taxa
- **Macroinfauna:**
  Diversity within range 1.7 – 3.57; 6 to 64 taxa

FISHERIES

- **Fish**
  19 families with 28 species
- **Aquaculture activities**
  Mussels seeds, cockles, mussels. white shrimp, tiger prawns, blackish water tilapia, seaweed

TERRESTRIAL ECOLOGY

- **Flora**
  The vegetation types at 0-1 km radius from project site were dominated with mangrove area.
- **Fauna**
  The mangrove forest along Sg. Muar estuary is supported by intertidal life form including crustaceans, water birds (mangrove avian) and some mammals.

SOCIO ECONOMIC

- Findings in the field survey indicated that the project development would bring positive impacts such as increase of employment, income and good logistic of networks.

HEALTH IMPACT ASSESSMENT

- HIA study showed the disease burden of the exposed communities within the 5 km radius of the proposed project is relatively small.

MARINE TRAFFIC

- The study showed that the project is suitable for development as there is no hindrance posed on the maritime traffic and navigation of the area with proper measures taken into consideration.

POTENTIAL IMPACTS AND PROPOSE MITIGATION MEASURES

POTENTIAL IMPACTS AND PROPOSE MITIGATION MEASURES

Reclamation

Ambient Air Quality
- Emission sources to the atmosphere during the reclamation activities are mainly from Suction Hopper Dredger 3 in 1 and heavy machinery.

Noise Level
- Expected from the sand carrier vessels discharging the sand at site, vehicular movement at reclamation site and heavy machineries used during compaction and bank revetment activities.

Estuarine / Marine Water Quality
- Increase the TSS and turbidity levels of the receiving waterways
- Wastewaters generated by reclamation vessels and support vessels
- Sediment transport plume during reclamation process

Benthic Organism
- Based on hidarulik study the increase of TSS due to the proposed reclamation activities will not have significant negative impacts on the phytoplankton population around the area. Consequently, the impacts on the zooplankton will also not be significant.

Hydraulic
- Alter the hydrodynamic regime in terms of water level, currents speeds and direction
- Flooding

Socio Economic
- Mixed perceptions from the locals toward the proposed Project
- Provide employment and commercial opportunity to the local community

Ambient Air Quality
- All vessels and machineries used must be well maintained to ensure complete combustion of fuel to reduce or eliminate black smoke emission.

Noise Level
- Machineries and equipment used during the reclamation activities must be well maintained

Estuarine / Marine Water Quality
- Sewage will be appropriately treated prior to discharge to the sea based on Regulation IV of MARPOL
- Deploy of silt curtain around reclamation area to reduce sediment transport to neighbouring areas

Marine Biology
- Dispersion of sand can be mitigated with proper installation of silt curtains
- Anchoring position should avoid areas of soft seabed where anchors are likely to drag.

Hydraulic
- Shoreline and Coastal Monitoring.
- To conduct the monitoring of suspended sediment plume concentration every month.

Socio Economic
- Engagement with Surrounding Communities
- Priorities employment to the local community

FLNG Construction

Ambient Air Quality
- Dust generation from vehicle movement at unpaved access road
- Stockpiles of construction materials such as sand and cement could become a source of airborne particulate

Estuarine / Marine Water Quality
- Sediment runoff from the topsoil filling may increase TSS and turbidity

Noise Level
- Sources of noise pollution are expected from heavy vehicles and machinery operating within the site

Scheduled and Solid Waste
- Generated from maintenance work of equipment machinery
- Solid waste will be generated by the workers on site

Social & Health
- Enhancement of employment opportunities.
- Improper housekeeping and waste management provides breeding ground for mosquitoes, flies and rats that will result in health hazards to the workers

Ambient Air Quality
- Site-spraying with water shall be carried out to minimize fugitive dust emission along access routes

Estuarine / Marine Water Quality
- Silt traps and silt curtains be implemented as measures against siltation of the waterways sediment transport

Noise Level
- Construction activities involving heavy machinery and heavy vehicle movement should be confined to the daytime.

Scheduled and Solid Waste
- Storage and handling of scheduled waste is to be carried out according to the Environmental Quality (Scheduled Wastes) Regulations, 2005

Social & Health
- Job preference should be given to the local population and not to foreigners
- All foreign workers are to be screened for health and security purposes

Operation

- The impacts during operation will mainly be in relation to wastewater discharge and solid waste management due to Increase in waste generation. Traffic would be higher due to transportation of construction machinery and materials

- To minimise the impacts within the Strait, the water quality of the discharge effluent may have to be better than Standard A;

Abandonment

- It is envisaged that the project will not be abandoned. However, in the event due to some unforeseen reasons the project must be abandoned, then all mitigation measures will be taken to ensure the site is left in a safe and environmentally sound manner.

- Prepare and submit the abandonment plan to DOE

PROPOSED MONITORING PROGRAMME

PERFORMANCE MONITORING :

Reclamation Phase
- Marine Water Quality – Sand Bund / Silt Curtain (Daily)

Top Side Construction Phase (Plot D)
- Marine Water Quality – Silt Curtain (Daily)
- Sediment Basin (Weekly or After Rain Event)

COMPLIANCE MONITORING :

Reclamation Stage & Top Side Construction Phase (Plot D)
- Marine Water Quality (Monthly) – 12 stations
- Estuarine Water Quality (Monthly) – 12 stations
- Seabed Sediment (Monthly) – 12 stations
- Marine Biology (Quarterly) – 10 stations
- Sediment Basin (Monthly) – TSS & turbidity

Operational Phase
- Air Quality (Monthly) – 4 stations
- Noise Level (Monthly) – 4 stations
- Marine Water Quality (Monthly) – 12 stations
- Estuarine Water Quality (Monthly) – 12 stations
- Seabed Sediment (Monthly) – 12 stations
- Marine Biology (Monthly) – 12 stations

IMPACT MONITORING :

Project Implementation & Top Side Construction Phase
- Shoreline Monitoring
- TSS Monitoring – 7 stations
- Sea Mammal – within project site

Proposed Sampling Stations For Compliance Monitoring: