

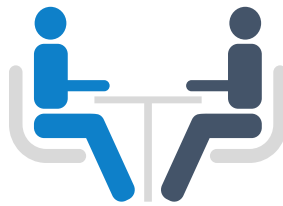
# EIA for the Proposed Secure Landfill for Industrial Sludge and Boiler Ash at OCIM Plant in Samalaju Industrial Park, Bintulu Division, Sarawak



**Proponent:**



OCIM  
Sdn. Bhd.



**Qualified Persons:**



**CHEMSAIN**

Chemsain Konsultant  
Sdn. Bhd.

## Legislative Requirement



### Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order, 2015

ACTIVITY 14. WASTE TREATMENT AND DISPOSAL

- (a) Scheduled Waste:
- (iv) Construction of secure landfill facility

## Statement of Need

- To provide a new secure landfill for OCIM to store sludge, fly and bottom ash to maintain its normal operation;
- To provide OCIM with temporary waste storage while OCIM works on research projects and engage with industrial stakeholders to utilise these wastes as alternative raw materials;
- To continue to enhance sludge quality and minimise sludge generation while simultaneously constructing and utilising the new landfill, aiming to reduce reliance on landfill;
- No other readily available and feasible secure landfill options in the region; and
- OCIM has the support from Regional Corridor Development Authority (RECODA) and Bintulu Development Authority (BDA) to heed instruction from DOE to conduct EIA for the secure landfill.



# Project Description

## Proposed New Secure Landfill at OCIM

- **Location:** at existing OCIM Plant at Samalaju Industrial Park, Bintulu Division, Sarawak (refer to **Figure ES-1**)
- **Size:** 17.05 ha



## Project Size and Capacity

- The new secure landfill will feature a two (2)-phase development with each phase consisting of new sub-cells for sludge, fly and bottom ash. Phase 1 and 2 landfill will cover areas of 8.53 ha and 8.52 ha, respectively.

# Project Concept and Components

## Type of Landfill Sub-cell



**Sludge (SW204)**



**Fly Ash (SW104)**



**Bottom Ash (SW104)**

## Components

### Secure Landfill

- Phase 1
  - ❖ Sub-cell 4: Fly ash (0.52 ha)
  - ❖ Sub-cell 5: Bottom ash (1.49 ha)
  - ❖ Sub-cell 6: Sludge (3.11 ha)
- Phase 2
  - ❖ Sub-cell 7: Fly ash (0.53 ha)
  - ❖ Sub-cell 8: Bottom ash (1.67 ha)
  - ❖ Sub-cell 9: Sludge (3.50 ha)

### Leachate Conveyor System

### Equalisation Pond

### Leachate Treatment Plant (LTP)

### Internal Access Road

### Surface run-off drainage system

## Environmental Pollution Control

### Emission to Air

- Generator set usage- Adhere to Environmental Quality (Clean Air) Regulations, 2014
- Fugitive dust (operation)- levelling, spreading and compaction during landfilling

### Sewage

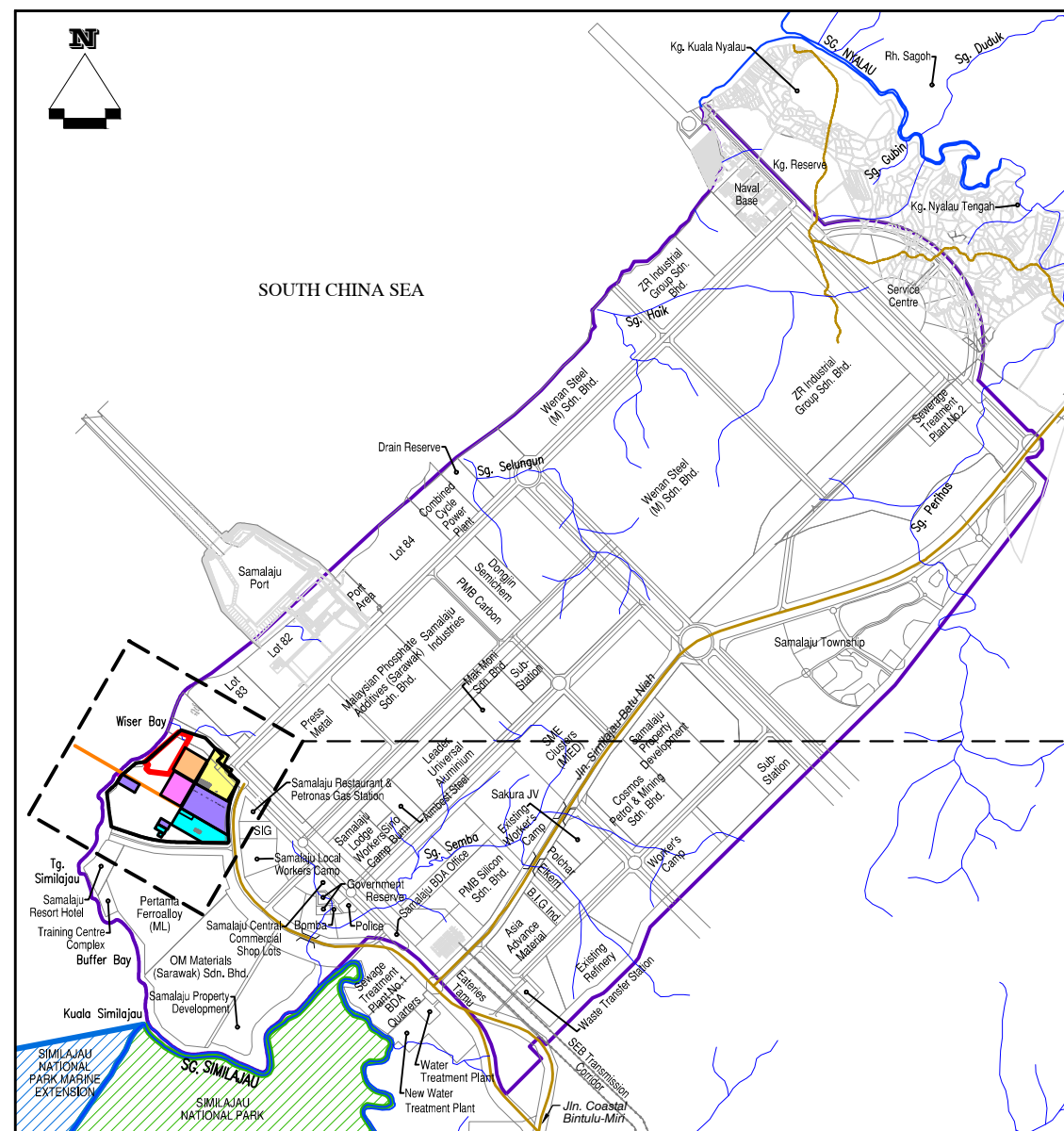
- Construction- portable toilets with self-contained tanks
- Operation- 6PE septic tank

### Leachate

- Treated with equalisation pond and LTP
- Adhere to Environmental Quality (Control of Pollution from Solid Waste Transfer Station and Landfill) Regulations, 2009

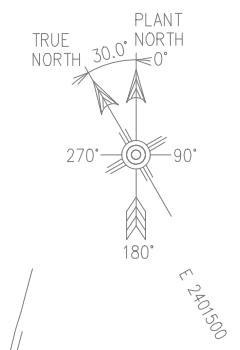
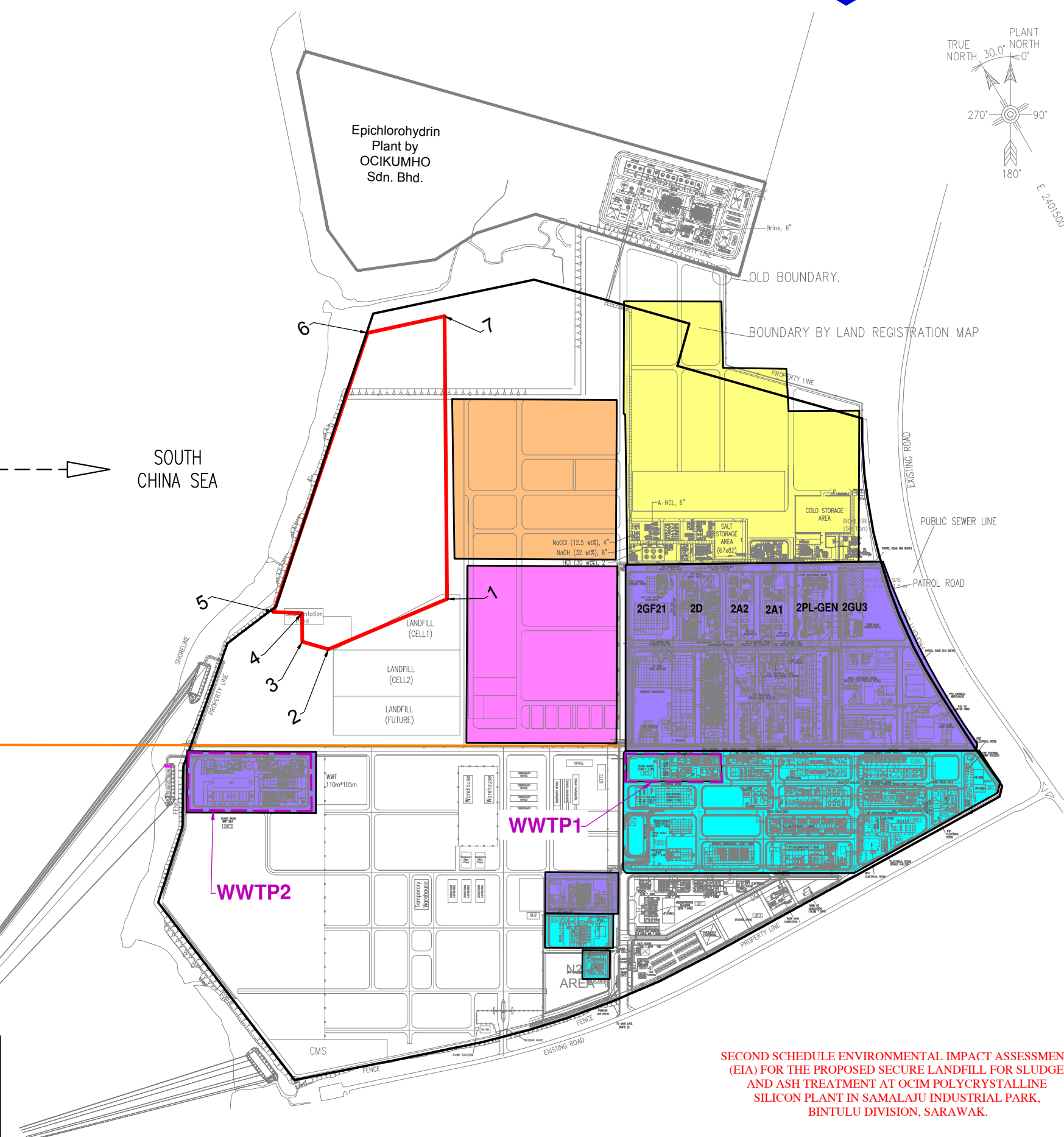
### Waste Management

- Solid waste- disposed off at BDA approved dumpsite
- Scheduled waste- managed as per Environmental Quality (Scheduled Wastes) Regulations, 2005



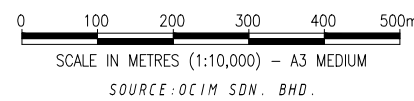
LOCALITY PLAN

SOUTH CHINA SEA



- LEGEND:**
- PROJECT BOUNDARY
  - OCIM PLANT BOUNDARY
  - MARINE OUTFALL
  - SAMALAJU INDUSTRIAL PARK BOUNDARY
  - PHASE 1
  - PHASE 2
  - PHASE 3
  - PHASE 4
  - PHASE 5
  - EXISTING WASTE WATER TREATMENT PLANT 1 (WWTP1)
  - EXISTING WASTE WATER TREATMENT PLANT 2 (WWTP2)

Coordinates of the Project site		
Point	Coordinates	
	Longitude/Easting	Latitude/Northing
1.	113°18'18.42"	3°32'55.94"
2.	113°18'09.77"	3°32'56.99"
3.	113°18'08.72"	3°32'58.35"
4.	113°18'09.61"	3°33'00.07"
5.	113°18'07.35"	3°33'01.51"
6.	113°18'19.36"	3°33'12.90"
7.	113°18'27.65"	3°33'11.54"



SECOND SCHEDULE ENVIRONMENTAL IMPACT ASSESSMENT (EIA) FOR THE PROPOSED SECURE LANDFILL FOR SLUDGE AND ASH TREATMENT AT OCIM POLYCRYSTALLINE SILICON PLANT IN SAMALAJU INDUSTRIAL PARK, BINTULU DIVISION, SARAWAK.

PROJECT LOCATION

FIGURE: ES-1

# Project Activities

Boundary survey, soil investigation, topographical survey, approval from local authorities, Environmental Impact Assessment, finalisation of design work and agencies approvals



**Pre-  
construction**

**Construction**

- Phase 1 construction is expected to commence in Q4, 2024 (Oct 2024)
- Phase 2 construction is expected to commence in Q1 of 2030



- Phase 1 landfill operation to last from Q2 2026 till Q2 2031
- Phase 2 landfill operation to last from Q2 2031 till Q2 2036



**Operation**

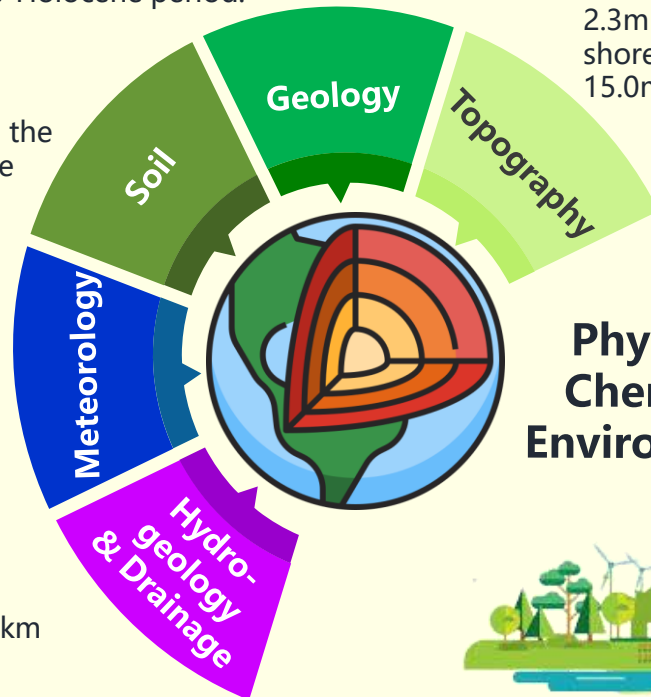
# Existing Environment

- The Project site is underlain generally by the geological deposit from the Pleistocene-Holocene period.

- The proposed Project site has elevation levels in the range of 2.3m (at shoreline) to 15.0m

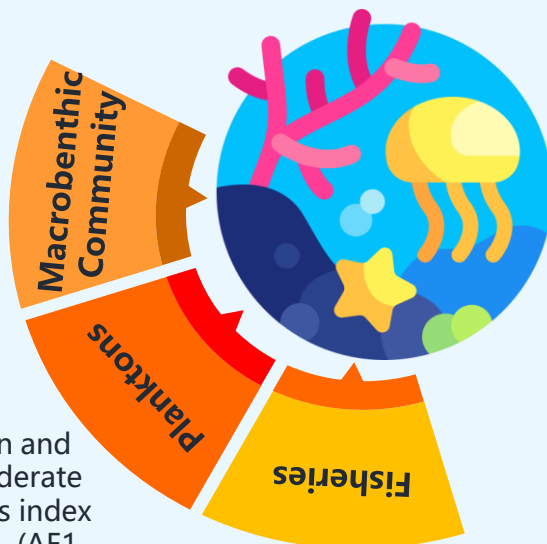
- The Silantek/Miri Soil Series is the dominant soil at the Project site

- Generally, an equatorial type of climate characterised by hot and humid weather all year round
- No river or stream is located within the Project site. The nearest is an unnamed stream at the northeast boundary of the Project site.
- Water catchment- not within 8 km radius of intake points
- Three (3) distinctive aquifers are identified namely medium-potential alluvial aquifer, shallow aquifer atop bedrock and deeper aquifer within fresher bedrock



## Physico-Chemical Environment

- The sampling sites (AE1, AE2, AE3) near to the existing marine outfall show comparable number of abundances and diversity to control sampling site (AE4).



## Marine Ecology

- Plankton community (phytoplankton and zooplankton) was studied to be moderate to high in species richness, evenness index and diversity at the sampling points (AE1, AE2, AE3), similar to control sampling site (AE4).

- AE2 recorded the highest catch with a total of 79 fish and 9 crustacean
- AE4 recorded the second lowest catch with a total of 48 fish and 2 crustacean

# Existing Environment

## Environmental Baseline Sampling

### Surface Water Quality

- Three (3) surface water samples, BR1-BR3, were collected.
- The water quality results were compared against Class IIB of the National Water Quality Standards for Malaysia (NWQSM).
- Most of the water quality parameters tested are within the Class IIB limits except for DO, COD, Ammoniacal-Nitrogen and Iron.



### Marine Water Quality

- Three (3) marine water quality samples were collected. BMW1 - BMW3 each have 2 samples (high and low tide).
- The marine water quality results were compared against Class 2 of the Marine Water Quality Standards (MMWQS) for Fisheries (and Mariculture).
- No exceedance was recorded when compared with the stipulated limits of Class 2 of the MMWQS.



### Marine Water Samples for Water Modelling

- Eight (8) sampling stations were established and one (1) sampling station situated at the nearest stream.
- The samples (M1-M4, M6-M8, R1) were collected during ebbing and flooding. Continuous samples were collected at M5 at 6-hour intervals for 24 hours.
- The results were used in the coastal water quality modelling.



### Groundwater Quality

- GW1-GW3 are existing groundwater wells installed in 2016 before this EIA. GW4-GW6 are new groundwater wells installed to study the baseline for this EIA.
- The groundwater quality samples were collected and compared with Groundwater Quality Standards for Conventional Raw Water Treatment (Drinking Water). The groundwater level were also monitored.



### Ambient Air Quality

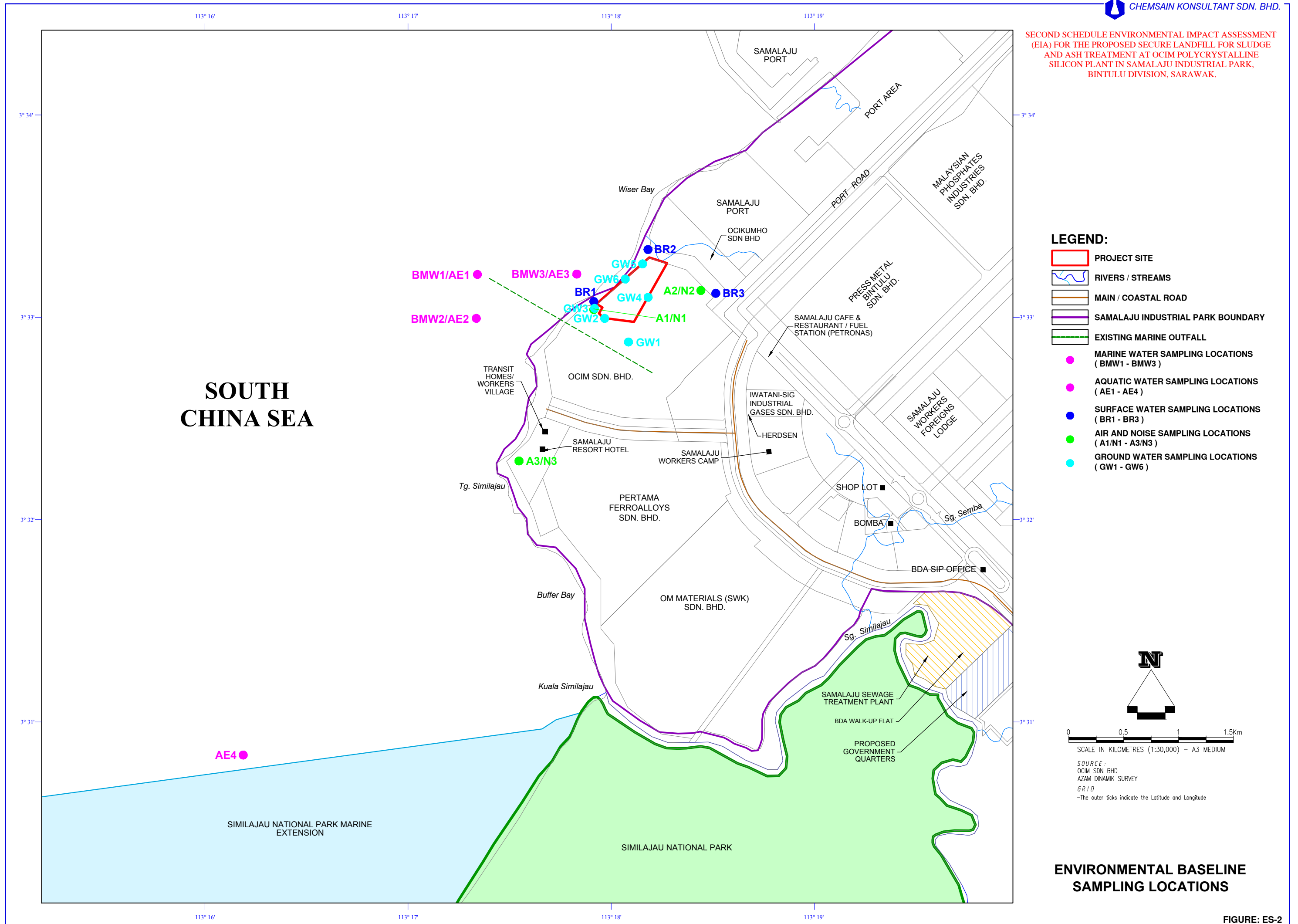
- Three (3) ambient air quality samples were collected.
- All parameters for all sampling locations show level below the threshold limit of Malaysian Ambient Air Quality Standards (MAAQS).



### Ambient Noise Level

- Three (3) ambient noise levels were collected.
- The noise levels for all sampling points were within the stipulated limit Schedule 1 of The Guidelines for Environmental Noise Limits and Control, 2019 for Industrial Zones except for during night time at N1. (Refer to Figure ES-2/3 for Sampling Locations)





- LEGEND:**
- PROJECT SITE
  - RIVERS / STREAMS
  - MAIN / COASTAL ROAD
  - SAMALAJU INDUSTRIAL PARK BOUNDARY
  - EXISTING MARINE OUTFALL
  - MARINE WATER SAMPLING LOCATIONS (BMW1 - BMW3)
  - AQUATIC WATER SAMPLING LOCATIONS (AE1 - AE4)
  - SURFACE WATER SAMPLING LOCATIONS (BR1 - BR3)
  - AIR AND NOISE SAMPLING LOCATIONS (A1/N1 - A3/N3)
  - GROUND WATER SAMPLING LOCATIONS (GW1 - GW6)

**N**

0      0.5      1      1.5Km

SCALE IN KILOMETRES (1:30,000) - A3 MEDIUM

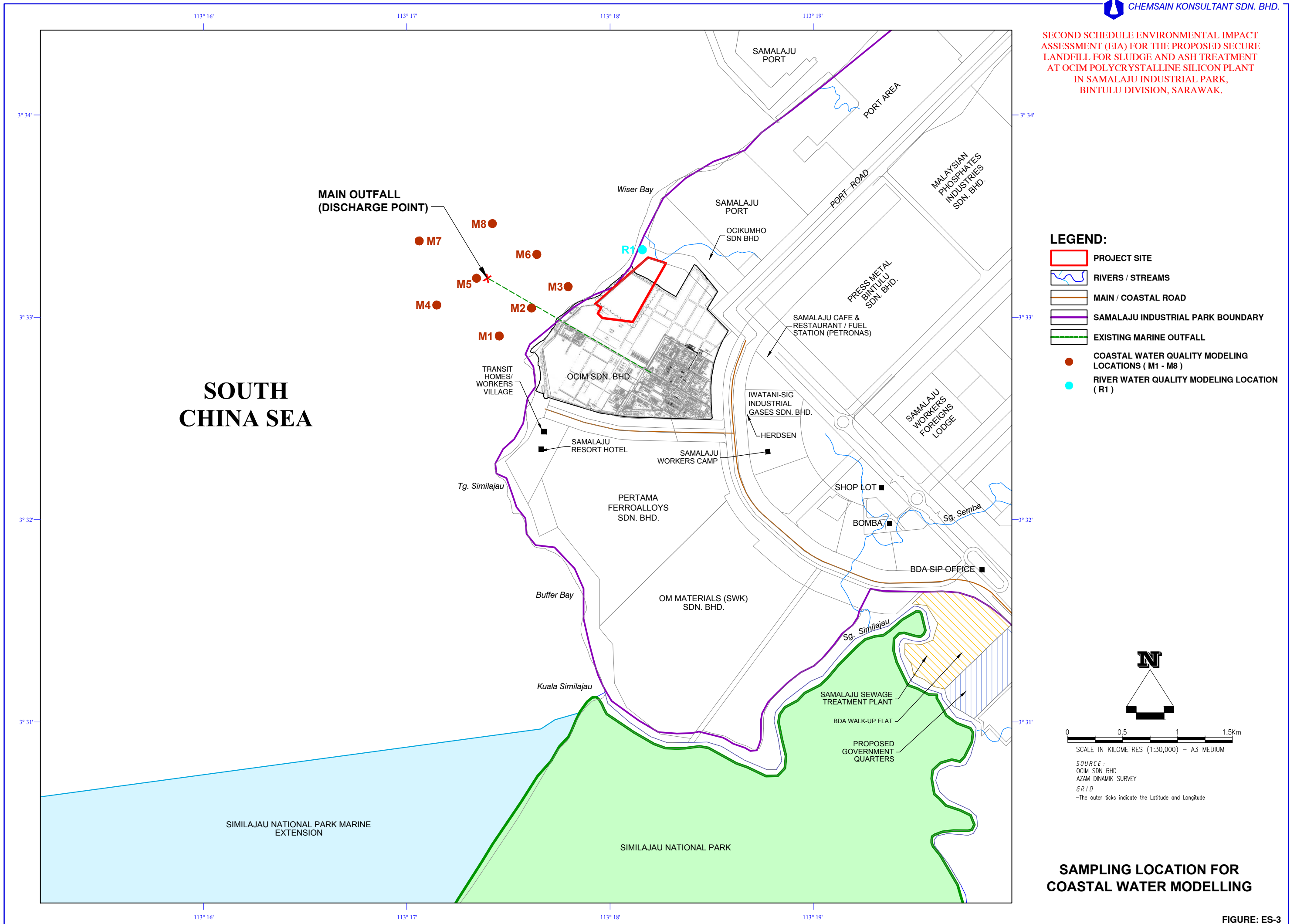
*SOURCE:*  
OCIM SDN. BHD.  
AZAM DINAMIK SURVEY

*GRID*  
-The outer ticks indicate the Latitude and Longitude

**ENVIRONMENTAL BASELINE SAMPLING LOCATIONS**

**FIGURE: ES-2**

SECOND SCHEDULE ENVIRONMENTAL IMPACT ASSESSMENT (EIA) FOR THE PROPOSED SECURE LANDFILL FOR SLUDGE AND ASH TREATMENT AT OCIM POLYCRYSTALLINE SILICON PLANT IN SAMALAJU INDUSTRIAL PARK, BINTULU DIVISION, SARAWAK.





## Socio-Economic Environment



### Regional Population

The population of Bintulu District, one of the two (2) districts within Bintulu Division was recorded at 226,200 in 2020 as compared to 223,200 in 2018 (DOSM, 2020).



### Sensitive Receptors

Minimal residential and commercial set ups such as Samalaju Local Workers Camp and Samalaju Resort Hotel are located 1.1km and 1.3km away. The nearest village, Kpg. Nyalau is 14km east of Project site.



### Existing Land Uses

Located within a designated industrial area, the Project is surrounded by multiple industrial plants. The nearest industrial plants such as Press Metal Bintulu Sdn. Bhd. and Iwatani- SIG Industrial Gases Sdn. Bhd. are located 0.51km southeast and 0.56km southwest of the Project site.



### Social Survey Findings

Various feedback and perspectives of the community in Kpg. Nyalau regarding the industrial activities within SIP were taken into account. Most of the community members were worried about the potential impact on fishing as fishing serves as the primary source of income for most villagers.



# Evaluation of Impacts & Mitigation Measures



## Hydrogeology and Groundwater

### Moderate

- Groundwater contamination can occur if the liner is punctured or not correctly installed

### Mitigation Measures

- Incorporate environmental protection into the design, siting, layout of facilities and other associated infrastructures into the landfill site.
- Establish groundwater monitoring programme.

## Water Quality



### Mitigation Measures

- Install sediment basin, check dams, silt fence, temporary earth drain and wash trough facilities at proposed locations before commencement of earthwork and construction.
- Sewage generation from the Project site will be treated to Environmental Quality (Sewage) Regulations, 2009. During operation, septic tank will be installed. The discharge shall comply with Standard B.
- All scheduled wastes shall be handled, stored and disposed of in accordance with the Environmental Quality (Scheduled Wastes) Regulations, 2005. The Project Proponent shall refer to the Guidelines for Packaging, Labelling and Storage of Scheduled Wastes in Malaysia.
- Leachate generation from the Project will be treated by LTP to meet Second Schedule, Regulation 13, Environmental Quality (Control of Pollution from Solid Waste Transfer Station and Landfill) Regulations 2009.

### Moderate

- Deterioration of water quality of the nearby waterbodies due to sediment runoff, sewage, accidental spillage and leakage, and release of treated leachate from LTP.
- Potential contamination of marine water during LTP failure.



## Air Quality

### Moderate

- Emission during construction stage and operation stage (dust emission during transportation, fugitive emission during handling of wastes at landfill and airborne transport of particles due to wind erosion.

### Mitigation Measures

- Implement dust suppression techniques such as watering exposed area during construction stage.
- Carry out levelling, spreading and compaction during the landfilling of wastes.
- Transport ashes from the source to the landfill in jumbo bags.
- Cover the transport vehicles with canvas or tarpaulin.
- Empty jumbo bags individually to reduce fall height.
- Enforce vehicle speed limit at maximum of 15km/h at the landfill.

# Evaluation of Impacts & Mitigation Measures



## Noise

### Moderate

- Elevated noise level associated with construction activities and landfill operation (machinery and vehicles)

### Mitigation Measures

- Limit construction activities to 7.00am – 7.00pm.
- Provide proper Hearing Protection Devices (HPD) such as earplug and earmuff.
- Establish periodical maintenance for all motorized machineries and equipment



## Soil Erosion and Sedimentation

### Mitigation Measures

- Install sediment basin, check dams, silt fence, temporary earth drain and wash trough facilities at proposed locations before commencement of earthwork and construction.
- In the event whereby BMPs cannot achieve water quality of 50 mg/l of TSS and 250 NTU of turbidity, chemical application is recommended.
- Rehabilitate finished working areas with suitable final ground contour and revegetate the site with suitable vegetation cover.

### Minor

- Deterioration of water quality of the nearby waterbodies due to sediment runoff

## Flooding



### Minor

- Ponding of water in the landfill during construction stage can halt construction progress.
- Flooding during the operation stage is unlikely.

### Mitigation Measures

- Construct temporary drain/ perimeter drain prior to earthwork.
- Maintain drainage from time to time and inspect regularly for blockages.

# Evaluation of Impacts & Mitigation Measures



## Ecology

### Insignificant

- Clearing of Project site
- Sediment runoff affects aquatic ecology during construction stage

### Mitigation Measures

- Site clearing is only limited to Project site.
- Monitoring of marine water quality and marine ecology to be carried out periodically.



## Qualitative Risk Assessment

### Mitigation Measures

- Update the existing emergency response plan (ERP) to include new possible emergency scenarios.
- Provide suitable Personal Protective Equipment (PPE) to limit exposure towards dust inhalation.

### Minor

- The hazard score originating from handling and storage of SW104 and SW204 is likely to pose air quality and water quality impacts (score 6; medium).
- The potential impacts are all deemed to be onsite and limited to health hazards only.

## Waste Management



### Insignificant

- Indiscriminate waste management will contaminate surface water

### Mitigation Measures

- Scheduled wastes shall be managed and handled in accordance with the Environmental Quality (Scheduled Waste) Regulations 2005.
- Enforce good housekeeping practices.
- Develop and implement spill prevention and response plans to minimise the risk of accidental release of sludge and boiler ash.

## Social Economic Impacts



### Positive

- Generate temporary employment opportunities during the construction stage

### Mitigation Measures

- Embark on policy of giving priority of employment to qualified locals.
- Recruitment of foreign workers should be through the legal channel.
- Establish a workforce code of conduct



## Abandonment

### Mitigation Measures

- All waste material should be properly disposed of by the existing Project Proponent after abandonment.
- All excavated landfill cells will need to be backfilled to prevent water ponding.
- Cover vegetation to be established on cleared/exposed areas to minimise soil erosion.
- Abandonment/closure plan need to be submitted to DOE prior to project abandonment. Environmental Site Assessment (ESA) need to be carried out and the report shall be submitted to DOE upon completion of project abandonment/closure.

### Minor

- Abandonment during the construction stage can leave with exposed land surface, unsightly incomplete structures, encouraging suitable habitat for harbouring pests and disease vectors.

# Proposed Monitoring Locations

## Proposed Monitoring During Construction

### Surface Water



- 3 samples
- **Compliance standard:** Baseline data, Class IIB of NWQSM
- **Frequency:** Monthly

- 3 samples
- **Compliance standard:** Malaysia Ambient Air Quality Standard (MAAQS), 2013
- **Frequency:** Monthly

### Ambient Air



- 3 samples
- **Compliance standard:** Baseline data, Guidelines for Environmental Noise Limits and Control, Third Edition, 2019
- **Frequency:** Monthly

### Noise



### Marine Water



- 3 samples (high and low tides)
- **Compliance standard:** Baseline data, Class 2 of MMWQS for Fisheries (and Mariculture)
- **Frequency:** Monthly

### Sedimentation Pond



- Final Discharge Point
- **Compliance standard:** TSS < 150 mg/L & Turbidity < 250 NTU
- **Frequency:** Monthly

## Proposed Monitoring During Operation

### Surface Water



- 3 samples
- **Compliance standard:** Baseline data, Class IIB of NWQSM
- **Frequency:** Monthly

- 3 samples
- **Compliance standard:** Malaysia Ambient Air Quality Standard (MAAQS), 2013
- **Frequency:** Monthly

### Ambient Air



- 3 samples
- **Compliance standard:** Baseline data, Guidelines for Environmental Noise Limits and Control, Third Edition, 2019
- **Frequency:** Monthly

### Noise



### Marine Water



- 3 samples (high and low tides)
- **Compliance standard:** Baseline data, Class 2 of MMWQS for Fisheries (and Mariculture)
- **Frequency:** Monthly

## Proposed Monitoring During Operation

### Ground water



- 6 samples
- **Compliance standard:** Baseline data, Groundwater Quality Standard for Conventional Raw Water Treatment (Drinking Water)
- **Frequency:** Monthly

- 4 samples
- **Compliance standard:** Baseline data
- **Frequency:** Semi-annually

### Benthic Community



### Leachate Treatment Plant



- Leachate Discharge Pumping Chamber (Final Discharge Point) before marine outfall
- **Compliance standard:** Second schedule, Regulation 13, Environmental Quality (Control of Pollution from Solid Waste Transfer Station and Landfill) Regulations, 2009
- **Frequency:** Weekly