FIRST SCHEDULE

ENVIRONMENTAL IMPACTS ASSESSMENT (EIA)
Schedule 1
FOR

THE CONSTRUCTION AND COMPLETION OF A METALS FROM SPENT CATALYST RECOVERY FACILITY (SCaRF)

AT

GEBENG INDUSTRIAL ESTATE (GIE),

KUANTAN, PAHANG, MALAYSIA

SUBMITTED TO:

JABATAN ALAM SEKITAR NEGERI PAHANG, MALAYSIA
September 2022

PREPARED BY:

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Executive Summary | THE CONSTRUCTION AND COMPLETION OF A METALS FROM SPENT CATALYST RECOVERY FACILITY (SCaRF) AT GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

Project Proponent and Landowner

TAIYO KOKO CO.,LTD.

TAIYO KOKO CO., LTD
1-1-39 Isobe-dod, Chuo-ku, Kobe-city, Hyogo,
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EIA Consultant

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Overview

Project aim :
To recover highly valuable metals, i.e., Molybdenum & Vanadium from spent catalyst to create sustainable supply while reducing mining and landfill for spent catalyst disposal.

Location :
Lot 29132, Gebeng Industrial Estate, Kuantan. (partial of 809.37 sq.m)

Legislative requirement

Environmental Quality Act (EQA, 1974), Environmental Impact Assessment (EIA, 2015): First Schedule, Activity 14(a): Waste Treatment and Disposal, a(i): Construction of recovery plant (off-site)

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Location: neighbours

Landowner

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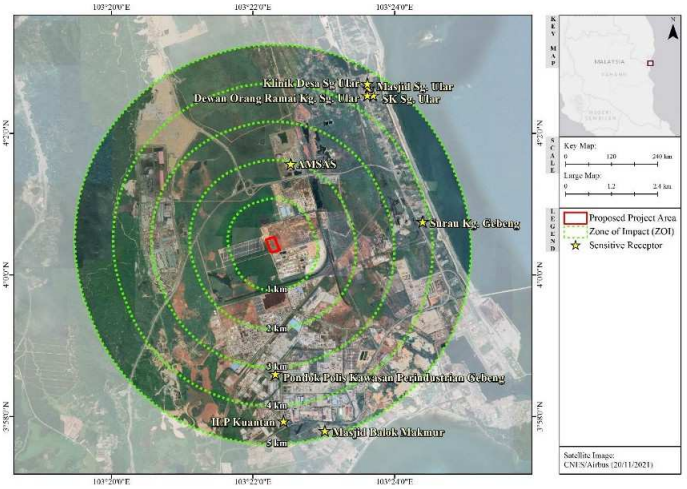
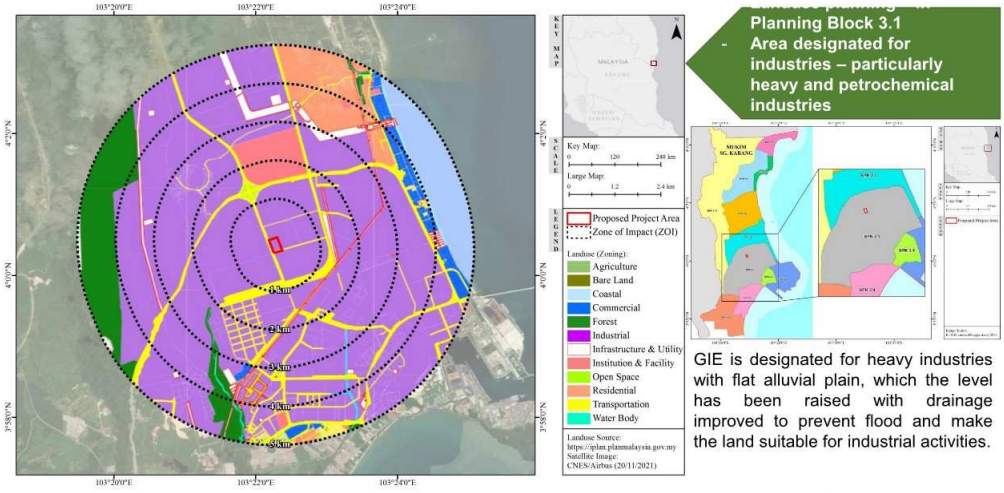
Location in Gebeng 5km Zone of Impact and Landuse



Sensitive areas:

- The coastal settlements of Kg. Baluk, Kg. Gebeng and Kg. Sg. Ular are about 4 to 5 km from proposed site;
- Except for AMSAS, at about 2km away.



Planning Block 3.1
- **Area designated for industries – particularly heavy and petrochemical industries**

GIE is designated for heavy industries with flat alluvial plain, which the level has been raised with drainage improved to prevent flood and make the land suitable for industrial activities.

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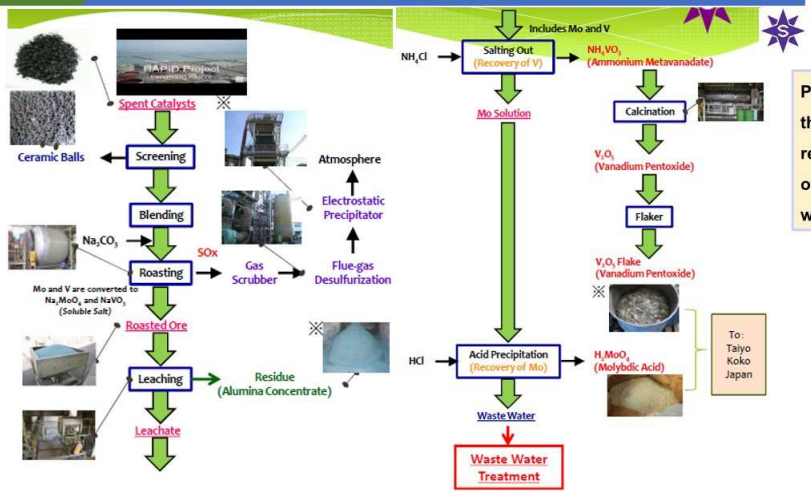
Production process



Process similar to those used in metal recoveries from other wastes, e.g. e-wastes

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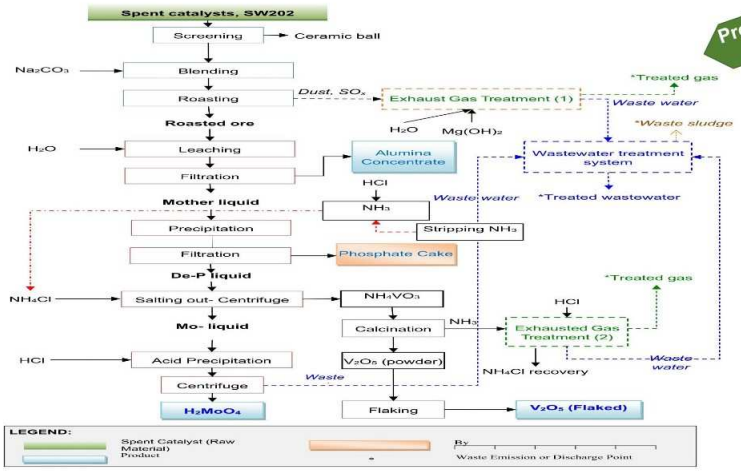
Process Flow Diagram



Same SCaRF process being operated by Taiyo Koko in Ako City in Japan; this gives Taiyo Koko confidence of its:

- Viability economically and technically;
- Technical operations;
- Environmental performances of its APCS and IETS.

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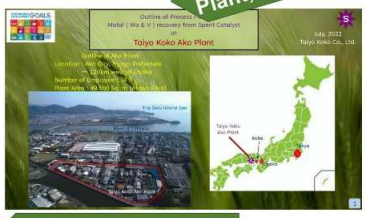
Taiyo Koko Ako Plant, JAPAN



SCaRF Process at Taiyo Koko Ako Plant, JAPAN

Sketch of Taiyo Koko SCaRF plant at Gebeng, MALAYSIA

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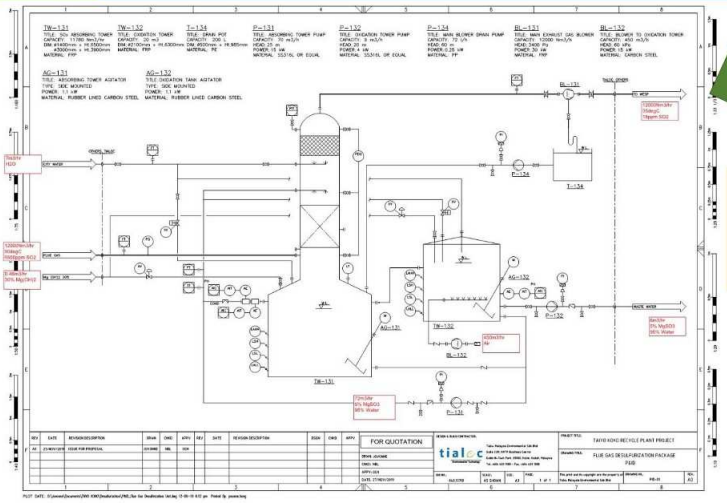
Process Flow Diagram for Desulphurisation system



Scrubbing by Mg(OH)2 solution, with sulphite oxidation, followed by wet Electrostatic Precipitator (wet EP)

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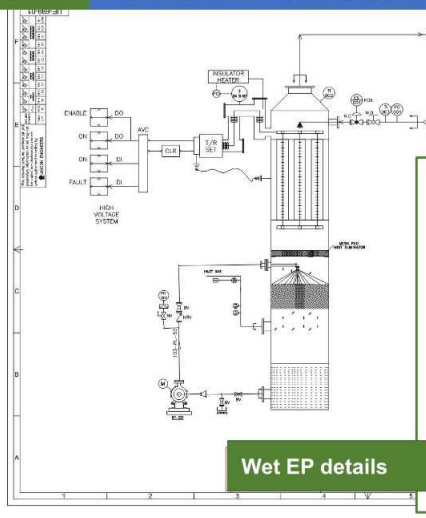
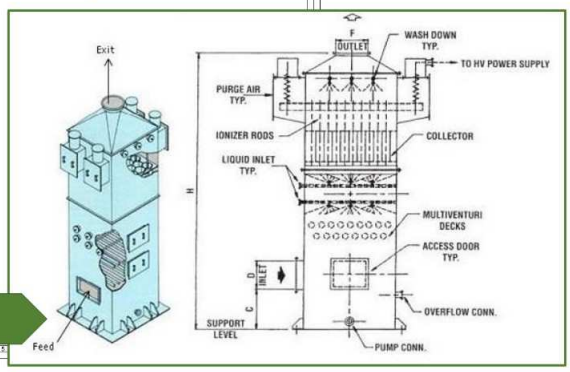
Wet Electrostatic Precipitator (Wet EP)

Process Flow Diagram for Desulphurisation plant Wet EP





Wet EP details

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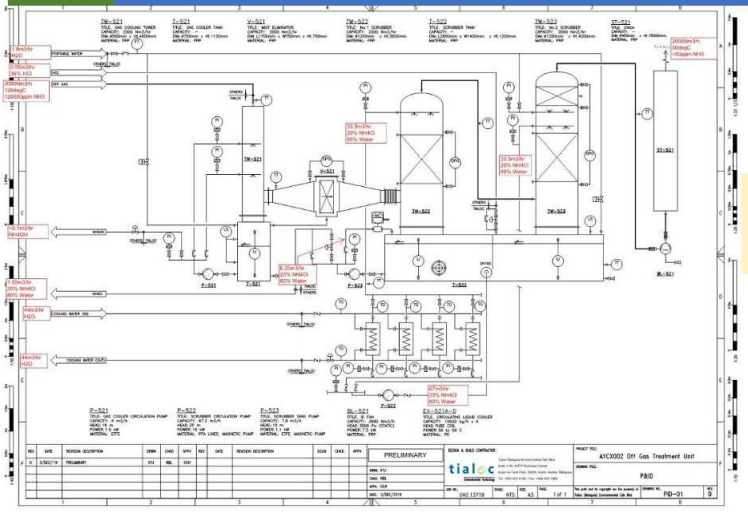
Calcination Off-gas Treatment System



Cooling via Scrubbing followed by 2 stage HCl Scrubbing that converts NH3 to NH4Cl.

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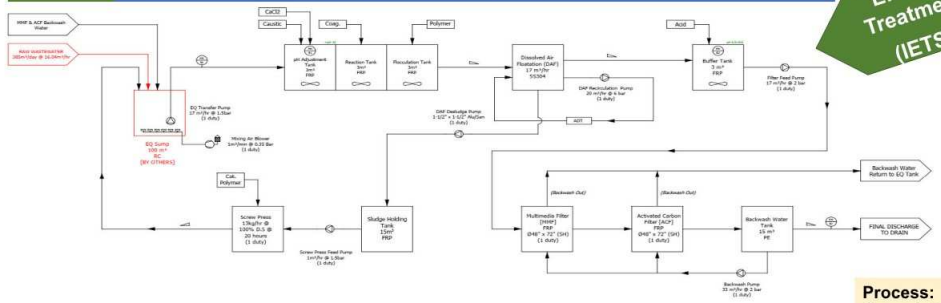
Effluent Treatment (IETS)



Process: Coagulation → Flocculation → DAF → MMF → ACF

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THE CONSTRUCTION AND COMPLETION OF A METALS FROM SPENT CATALYST RECOVERY FACILITY (SCaRF) AT GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

IETS Mass Balance

Incoming Wastewater		
Flowrate	385	m3/day
Parameter	Conc. mg/l	Loading kg/d
COD	225	86.6
BOD	115	44.3
TSS	20	7.7
As	0.51	0.2
B	9.22	3.5
Mn	1.59	0.6
Ni	1.05	0.4
Se	0.58	0.2
F	9.65	3.7

EQ			
Flowrate	Rem.Eff	385	m3/day
Parameter		Conc. mg/l	Loading kg/d
COD	0%	225.00	86.6
BOD	0%	115.00	44.3
TSS	0%	20.00	7.7
As	0%	0.51	0.2
B	0%	9.22	3.5
Mn	0%	1.59	0.6
Ni	0%	1.05	0.4
Se	0%	0.58	0.2

Chemical Reaction Tank + DAF			
Flowrate	Rem.Eff	385	m3/day
Parameter		Conc. mg/l	Loading kg/d
COD	30%	157.50	60.6
BOD	30%	80.50	31.0
TSS	0%	20.00	7.7
As	80%	0.10	0.0
B	60%	3.69	1.4
Mn	80%	0.32	0.1
Ni	60%	0.42	0.2
Se	80%	0.12	0.0
F	80%	1.93	0.7

MMF + ACF			
Flowrate	Rem.Eff	385	m3/day
Parameter		Conc. mg/l	Loading kg/d
COD	50%	78.75	30.3
BOD	50%	40.25	15.5
TSS	50%	10.00	3.9
As	0%	0.10	0.0
B	0%	3.69	1.4
Mn	0%	0.32	0.1
Ni	0%	0.42	0.2
Se	0%	0.12	0.0
F	0%	1.93	0.7

Final Discharge				DOE DISCHARGE LIMIT
Flowrate	Rem.Eff	385	m3/day	
Parameter		Conc. mg/l	Loading kg/d	Std. B, mg/l
COD	0%	78.75	30.3	200
BOD	0%	40.25	15.5	50
TSS	0%	10.00	3.9	100
As	0%	0.10	0.0	0.1
B	0%	3.69	1.4	4
Mn	0%	0.32	0.1	1
Ni	0%	0.42	0.2	1
Se	0%	0.12	0.0	0.5
F	0%	1.93	0.7	5

Chemical Sludge Generation		
Total D.S.	15.63 m3/d	1.5% D.S.
Component	Conc. mg/l	Loading kg/d
Total Solid	16,500.00	257.95
SS	20	7.70
PAC	300	115.50
A.Polymer	5	1.93
Others	245	94.33
CaCl2	100	38.50

Sludge Holding Tank		
Flowrate	15.63 m3/day	
TSS	15,000 mg/l	258.0 kg/day

Screw Press		
Flowrate	15.63	m3/day

Sludge Cake				
Sludge	1289.75	kg/d	80%	% M.C.

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Scheduled Wastes Management

All scheduled wastes (SW) shall be managed in compliance to the Environmental Quality (Scheduled Wastes) Regulations 2005, EQ(SW)R 2005, particularly wrt:

- ❑ **Container types, labelling and secure storage;**
- ❑ **Secure storage site has to be constructed in accordance to the EQ(SW)R 2005, to ensure that people and premise are safe from possible fire, waste spillage, reactions, etc.**
- ❑ **SW can only be collected and transported by licensed collectors and transporters, to be sent to prescribed premises with the matching WAC.**
- ❑ **Fuel and waste oil storage bases have to be bunded, with bunded volume at 110% of maximum tank volume. Any spillage shall be promptly collected and managed as SWs.**
- ❑ **All wastes have to be accounted for and audited against the raw materials (lubricants, etc.) brought in.**

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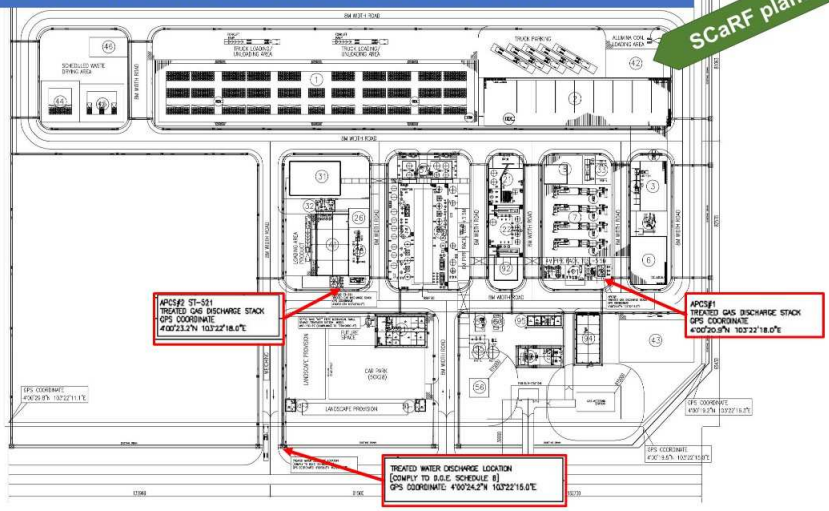
SCaRF plant site



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Sanitary Wastes Management:
- Sewage
- Garbage

Sewage Management:
- **Using small sewage treatment system (SSTS)**
- **Buried underground**
- **Standard A treated effluent**

- **Otherwise during construction mobile toilets are provided, until the SSTS is ready.**

Both are Malaysian products

Garbage management:
sufficient number of covered garbage bins at required locations to be provided and garbage to be regularly collected and disposed by a licenced commercial collector.

In-situ composting of biodegradables in BioComposters:
- **Reduces collection and transportation frequency.**
- **Dry wastes may be collected once a fortnight.**
- **Avoids leachate, odour and pests such as rats, flies, etc.**

Construction schedule

Construction Schedule

WBS	Discipline	Dur (Mths)	2022 Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	2023 July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	2024 July	Aug	Sep	Oct
			-3	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
	CONSTRUCTION SCHEDULE																										
1	**BOTH PLANT**											21 Months															
1.1	Major Milestone																										
1.1.1	Mobilisation to Site					Mob																					
1.1.2	Construction Start											LLI (check)															
1.1.3	Mechanical Completion																									M/C	
1.2	Temporary Facilities	2.0																									
1.3	C&S Works																										
1.3.1	Piling Works	3.0																									
1.3.2	Concrete	4.0																									
1.3.3	P/Rack Structure	4.0																									
1.3.4	General Civil & Others	6.0																									
1.4	Building Works																										
1.4.1	Building & Shelter Works	14.0																									
1.4.2	HVAC	4.0																									
1.5	Eqpt Installation Works																										
1.5.1	Equipment	6.0																									
1.5.2	Vendor Pkge	6.0																									
1.6	Piping Works																										
1.6.1	Shop Fabrication	3.0																									
1.6.2	Field Installation	7.0																									
1.7	Painting Works	6.0																									
1.8	E & I Works																										
1.8.1	Electrical Works	7.0																									
1.8.2	Instrumentation Works	7.0																									
1.9	Scaffolding Works	13.0																									
1.10	Precommisioning & Comm	4.0																									

NOTE :
1) To reconfirm LLI Site ETA
2) To reconfirm Mob and MC date for Construction

CONSTRUCTION ACTIVITY
PARTIAL ACTIVITY

TAIYO KOKO RECYCLE PLANT PROJECT
TOYO ENGINEERING AND CONSTRUCTION SDN BHD

Rev	Date	Description	by	chk	app	autho
R2	3 Aug'22	For EIA Submission	Lim			
R1	23 Jul'15	Split by Cases	Jason			
R0	7 Jul'15	Draft	Jason			

Note: (O: No significant Impacts; ✪: Less significant/Insignificant Impacts; ●Potentially Significant Impacts)

Project Activities & Potential Impacts

Project Activities

Potential impacts

		O	✪	●
Project phase: Pre-Construction and Preliminaries				
Surveys, Investigations and Preliminaries	Project Planning	√		
	Preparation and submission of EMP for approval by DOE	√		
	Application for Written Permission for Setting-up of Scheduled Waste Off-Site Recovery Facility (Section 19 of EQA1974)	√		
	Application for Licence for Setting-up of Scheduled Waste Off-Site Recovery Facility (Section 18 of EQA1974)	√		
	Preparation and submission of Written Permission for APCS and IETS for approval by DOE	√		
	Access to Project Site	√		
	Surveys/ Site Investigations	√		
	Technical and Engineering Feasibility Investigations	√		
Project phase: Construction				
Stage 1: Site clearing and erosion control measures	Marking of areas to be cleared	√		
	Digging up and completion of runoff retention pond (RP) and earth drains feeding to the RP, as per ESCP designs, with silt trap(s) and silt fence(s) to avoid surface run-off flow directly to the water body.			√
	Stockpiling of excavated earth at an area near to the site for future backfilling.			√
	Clearing of vegetation and manual chopping of branches for easier handling			√
	Loading of green wastes into roro bins and transporting the wastes to nearest landfill	√		
	Clearing off wastes dumped onto site and hauling to nearest landfill	√		
	Mobilization of Land Surveyor for setting out of proposed site and the existing platform level.	√		
	Covering of slopes of earth stockpile with plastic sheets to prevent soil erosion.	√		
Stage 2: Foundation Works	Mobilization of Land Surveyor for setting out of foundation points and layouts at site	√		
	Construction of onsite roads and drains			√
	Construction of foundations for various equipment as per structural design			√
Stage 3:Construction of Structures	On site steel bars cutting and bending works at required schedules; commenced at fabrication yard and completed concurrently upon completion of lean concreting.		√	
	Formwork placed layer by layer, maintained by 1.2m (plywood) or 0.6m (metal formwork) each to prevent occurrence of any cold joint.	√		
	Water stop will be placed along the horizontal and vertical construction joints.	√		
	Concreting works using approved concrete from permitted sources upon inspection by COW. High Alumina cement applied at all internal surfaces of structures.	√		
	Installation of electricity supply system	√		
	Installations and Testing of each equipment	√		
	Commissioning of plant			√
	Monitoring to ensure designed performance and emission compliance.	√		
Project phase: Operation				
SCaRF Operation	Operation of SCaRF and IETS			√
	Operation of SCaRF and APCS			√
	Traffic movement		√	
	Maintenance work	√		
	Amenities	√		

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Assessment standard

No	Environmental Component	Assessment Standard
1	Water Quality	• Environment Quality Act, 1974 (EQA,1974) • Environment Quality (Industrial Effluent) Regulation 2009 • Environment Quality (Schedule Wastes Treatment and Disposal Facilities) Regulations 2005 • National Water Quality Standards for Malaysia (NWQS) • Environmental Quality (Control of Pollution from Solid Waste Transfer Station and Landfill) Regulation 2009.
2	Air Quality	• Environmental Quality (Clean Air) Regulations 2019 (CAR 2019) • Malaysian Ambient Air Quality Standards, 2020
3	Noise & Vibration	• Guidelines for Environmental Noise Limits and Control 3rd Edition 2019 • The Planning Guidelines for Vibration Limits and Control in the Environment 2nd Edition 2007
4	Hydrology	• Urban Storm Water Management Manual for Malaysia 2nd Edition (DID, 2012). • Hydrological Procedure No. 15, Bahagian Parit dan Taliair, Kementerian Pertanian Malaysia (DID, 1976).
5	Soil Erosion and LD-P2M2	• Prevention and Control of Soil Erosion and Siltation, Department of Environment, 1999 • Guidance Document for Addressing Soil Erosion and Sediment Control Aspects in EIA Report • Guidelines for Erosion and Sediment Control in Malaysia (DID, 2010). • Urban Storm water Management Manual for Malaysia 2nd Edition (2012).
6	Terrestrial Flora	• Malaysian Plant Red List • IUCN's Red List of Threatened Species
7	Terrestrial Fauna	• Wildlife Conservation Act 2010 (Amendment 2012) for Peninsular Malaysia • IUCN's Red List of Threatened Species
9	Land Use	• Garis Panduan Perancangan Pemuliharaan dan Pembangunan KSAS • Rancangan Tempatan Daerah Kuantan 2035 (Penggantian)
10	Traffic	• Road Traffic Volume Malaysia, JKR 2019

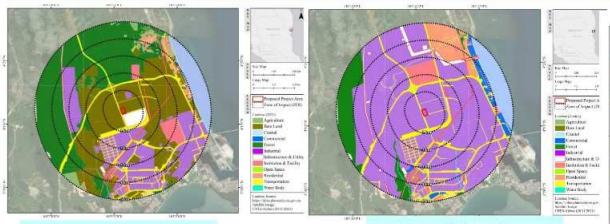
Assessment methodology

Land Use Survey	• **Obtain land use data from Local Plan/ Structure Plan** • **Verification of the land use during field study and GIS images** • **Use existing data available from previous studies and historical records**
Geology and Soils	• Assess existing conditions, with secondary information from geological map of the area and studies in the area as reference.
Soil Erosion & LD-P2M2	• Soil investigation (SI) data shall be provided by the client. • The existing soil loss during current condition will be predicted based on RUSLE estimation.
Hydrology	• The hydrological study shall establish the preliminary baseline information on hydrological characteristics of the study area, including any flood record upstream and downstream of the project site from JPS and other studies in the area as references.
Water Quality	• Preliminary survey was carried out to assess water quality based on assessment of water appearance and sources of pollution. • Sampling and analysis will be carried by an accredited laboratory. • Parameters to be analysed are: Temperature, Turbidity, pH, Dissolved Oxygen (DO), SS, BOD, COD, Ammonia and heavy metals (Mo and V) • Sampling will be carried out at 8 points at a single depth of about one (1) meter below the water surface, where possible, at predetermined coordinates, at appropriate points. • Secondary data will also be used as reference to describe existing water quality. • All analysis will follow Standard Methods (APHA) or USEPA Approved Methods for the whole 30 parameters as per EQ(S)R 2009 and EQ(IE)R2009, • Calculation of WQI will be based on 6 parameters (Chemical Oxygen Demand, Biochemical Oxygen Demand, Dissolved Oxygen, Suspended Solids, pH and Ammoniacal Nitrogen) • Water Quality Modelling will be carried out with the existing water quality obtained as baseline, for normal and worst case scenarios. • Modelling will use the QUAL2K model developed by the United State Environmental Protection Agency (USEPA) which is suitable for small rivers such as Sg. Baluk where the waters can be assumed to be completely mixed as it travels.
Air Quality	• Ad-hoc Ambient Air Quality Monitoring (AAQM) will be carried out by accredited laboratory at identified Air Sensitive Receptors (ASRs) namely at Project Site (A1) and nearest settlement, such as Kg Gebeng, Kg. Sg. Ular, Institut Latihan Perindustrian Kuantan (ILP Kuantan) and AMSAS (Akademi Maritim Sultan Ahmad Shah). • Air quality sampling and analysis will be carried out by an accredited lab at 6 points: on-site and at nearest public areas. • The criteria air pollutants to be monitored are the Malaysian Ambient Air Quality Standards (MAAQS) namely PM_{10}, $PM_{2.5}$, NO_2, SO_2, CO and O_3. In addition, Volatile Organic Compounds (VOCs) will be also monitored; • The Project stack emission complying to the prescribed limits of the Environmental Quality (Clean Air) Regulations 2019 (CAR 2019) will be simulated using the AERMOD air quality model with 3-years (2018 to 2020) WRF AERMET ready hourly meteorological data; • The predicted appropriate Maximum Average Incremental Concentration (MAIC) averaging time for the identified criteria air pollutants will be added to the Baseline Level (BL) for the calculation Ground Level Concentration (GLC) at the identified ASRs; • The iso-contour overlay with the appropriate basemap will be produced for the simulated averaging time; and • The calculated GLCs will be compared against mainly the prescribed limits in the MAAQS. In addition, the MAIC from the Project will be compared against the adopted 25% threshold as recommended by the International Finance Corporation (IFC) for sustainable airshed. • Land clearing is of secondary vegetation of low bushes, with disposal of green wastes to the nearest landfill (the Jabor landfill). Construction is in a fairly small area and involves mainly installations of readymade equipment and tanks onto a prepared platform, thus any increase in particulates is expected to be limited to the site, and will be captured by the air quality monitoring.
Noise level	• Noise measurements will be carried out at 3 points nearest to the project site. Processes during construction and operation of this plant is expected to be relatively quiet. • The existing noise level parameters, i.e., L10, L50, L90, Lmin, Lmax, LAeq, will be measured at the identified sampling locations using calibrated sound level meter.

Assessment methodology - cont.

Socio Economy and public health	• **The human environment shall focus on communities and land use located within the proposed Project ZOI of 5 km radius to assess the demographic socio-economic characteristics of the ZOI area and their relevance to the proposed project.** • **Socioeconomic and public health surveys will be based on questionnaires and data from institutions in the Gebeng area.** • **Informal group discussions with the surrounding population will be carried out to:** – **inform of the project (thus potential for their involvement during construction and operation);** – **gauge their acceptance or otherwise of the project.** • **Secondary data will be employed based on other studies, to assess the implications of the proposed project.** • **The following departments will be sought, where required, for the above data and information: JPBD, Statistic Department, and the Local Government.**
Traffic	• This traffic study will be through the following stages: a) Inventory review and data collection; A review will be made of existing data and the need for further collection of any additional traffic will be identified. This is to enable assessment of the situation within the study area. a) Assessment of Existing Conditions The existing traffic conditions at and surrounding the project will be established. These will form the base conditions against which future impact from the proposed projects may then be assessed. a) Evaluation of Traffic Impact The estimated traffic volume on the surrounding road network will be compared with the road capacity to evaluate the impact of the traffic generated from the proposed project. If the traffic volume is higher than the estimated road capacity, then remedial measures have to be recommended. a) Recommendation of Remedial Measures • Recommendation of remedial measures shall include road network improvement program, access to the development, temporary traffic management plan and traffic circulation and parking development activities • Recommended conceptual drawing for remedial measures to assist the other consultant/s team member (i.e. civil & structure engineer, etc.)
Flora and Fauna	• To assess existing conditions within the ZOI • To survey flora fauna by observations, where there are still plants, eg., along Sg. Baluk river banks; • To access possibility of maintaining a contiguous river reserve based on JPS guideline along Sg. Baluk: – as a form of enhancing the flora fauna of the area and the river, – as river banks protection along Sg. Baluk. – as water biofilters to protect water quality of Sg. Baluk in the face of rapid development of the Gebeng Industrial Area.

Executive Summary THE CONSTRUCTION AND COMPLETION OF A METALS FROM SPENT CATALYST RECOVERY FACILITY (SCaRF) AT GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG



Current landuse **Zoned landuse**

Source: Rancangan Tempatan Daerah Kuantan 2035 (Penggantian)

KIA and its metropolis

ECRL station at Kuantan Port

Figure 6.2(5) Among near future developments in Gebeng

Among Upcoming Mega projects in Gebeng

Landuse

Housing in Baluk Makmur | Housing in Baluk Makmur | Rooms in Baluk Makmur

Sekolah Kebangsaan Balok Makmur | Masjid Kg Baluk Makmur | Kids Nursery, Baluk Makmur

Petrol Station in Baluk Makmur | Eating shop in Baluk Makmur | Clinic in Baluk Makmur

Facilities in GIE at Baluk Makmur

Nearest township (Baluk Makmur) has sufficient basic facilities

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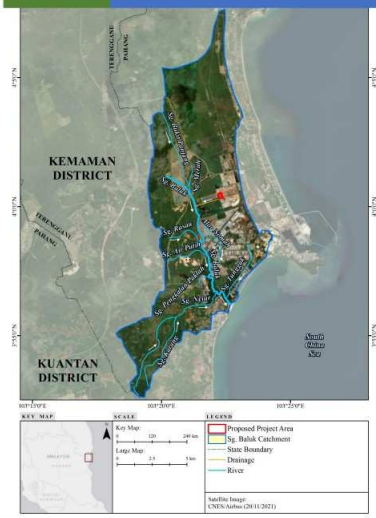
Drainage & Flood

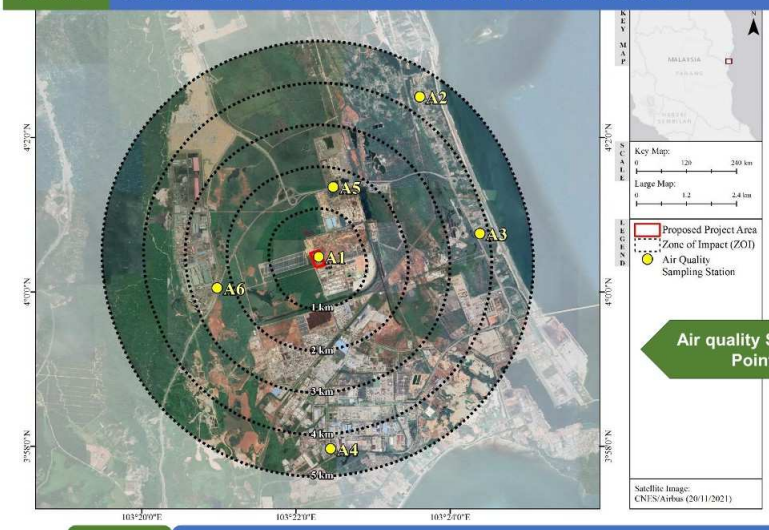


Drainage and Flood

- ❑ **Sg. Baluk is about 10km long and without any potable water intake point (WIP) on it.**
- ❑ **Being a short river that discharges to the South China Sea, any large flow due to heavy rain can be expected to rapidly flow out to the sea if the drainage in the occupied areas is well designed.**
- ❑ **The platform for the industrial lots of Gebeng has been raised in 2011 since the monsoon flood experienced in 2010.**
  - **➔Ever since then no flood had occurred on the raised industrial lots.**
  - **➔Thus, it may be concluded that flooding at the proposed site is highly unlikely since the platform was raised and drainage improved in 2011, and will remain so provided the drainage is well maintained.**
- ❑ **However, rapid developments of the Gebeng area will impose more load on existing drainage.**
  - **➔ Flash floods could occur after each heavy rain, unless drainage is improved.**

Executive Summary | THE CONSTRUCTION AND COMPLETION OF A METALS FROM SPENT CATALYST RECOVERY FACILITY (SCaRF) AT GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

Air quality Assessment



Air Quality
- **Air Quality sampled**
- **Dispersion modelling of gases emitted carried out.**

Air quality Sampling Points

Executive Summary | THE CONSTRUCTION AND COMPLETION OF A METALS FROM SPENT CATALYST RECOVERY FACILITY (SCaRF) AT GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

Air quality Results

Air quality sampling

Baseline Air Quality Results									
Para-meter	Unit	A1	A2	A3	A4	A5	A6	MAAQS, 2020	...ment
TSP	µg/m³	46	12	54	121	75	112	NS	Low
PM10	µg/m³	38	9	46	63	57	54	100 µg/m³	Clear air, not dusty
PM2.5	µg/m³	23	7	27	30	28	25	35 µg/m3	Fine dust still low
SO2	µg/m³	24	18	27	34	36	38	80 µg/m³	No noticeable acidic SO_2
NO2	µg/m³	29	21	32	37	39	42	70µg/m³	No noticeable acidic NO_2
CO	mg/m³	6	2	6	10	7	9	10 mg/m³	CO still within limit
VOC	mg/m³	0.31	0.22	0.39	0.75	0.47	0.68	NS	As baseline data
H2S	mg/m³	0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NS	As baseline data
CH4	mg/m³	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	NS	As baseline data

Note: NS: Not Stated

Methodology for Air Quality Measurement	
Parameter	Test Method
TSP	USEPA 40 Part 50, Appendix B
PM10	USEPA 40 Part 50, Appendix J
SO2	ISC 704 A
NO2	ISC 408
CO	EC-IAQ-01
VOC	NIOSH 2549
H2S	NIOSH 6013
CH4	USEPA Method 3C

Conclusion on Air Quality

All ambient air quality parameters measured at all points had recorded concentrations that were below the limits set by the MAAQS (2020), indicating that the existing air quality is still very good.

Executive Summary THE CONSTRUCTION AND COMPLETION OF A METALS FROM SPENT CATALYST RECOVERY FACILITY (SCaRF) AT GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

Air quality Modelling

Air Quality Modelling to Evaluate Potential Impacts of Gas Emission from SCaRF

Sensitive Receptors

Point	Description	UTM Coordinates (x, y) (m, m)
On-site Air Sensitive Receptor		
ASR1	Within the Project Site	319211.05, 443135.07
Off-site Air Sensitive Receptors		
ASR2	At Coastal Residential Village, Kg. Sungai Ular	321649.94, 446957.22
ASR3	At Seaside Residential Area, East of the Project Site	323097.90, 443681.55
ASR4	Institut Latihan Perindustrian Kuantan (ILPK), South of the Project Site	319492.60, 438558.64
ASR5	Akademi Maritim Sultan Ahmad Shah (AMSAS), North of the Project Site	319565.42, 444808.7
ASR6	Malaysia China Kuantan Industrial Park (MCKIP), West of the Project Site	316771.72, 442404.58

Executive Summary THE CONSTRUCTION AND COMPLETION OF A METALS FROM SPENT CATALYST RECOVERY FACILITY (SCaRF) AT GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

Air quality Modelling

During Construction Phase	
Criteria Air Pollutants	Fugitive Dust from: • Construction related activities • Transportation activities Dust pollution due to the construction activities is temporary and the local air quality is expected to return to its normal ambient levels when the construction ceases. Exhaust emissions from the diesel engine driven equipment is also expected to result in insignificant impacts on air quality.
Mitigating Measure	Best Management Practices (BMPs) for Fugitive Dust During Construction
During Operation Phase	
Criteria Air Pollutants	Air emission sources i.e. stacks as point sources are mainly from the proposed Scrubbers System. Parameters: • PM_{10} & $PM_{2.5}$ (24-hour & annual average MAIC) • SO_2 (1-hour & 24-hour average MAIC) • NO_2 (1-hour & 24-hour average MAIC) • NH_3 (8-hour & 24-hour average MAIC)
Air Quality Model	USEPA AERMOD
Criteria	Environmental Quality (Clean Air) Regulations 2014 **(CAR 2014)** Malaysian Ambient Air Quality Standards at Standard 2020 **(MAAQS [Standard (2020)]**
Mitigating Measure	Department of Environment (DOE)'s Technical Guidance on Performance Monitoring of Air Pollution Control System (APCS). Guidance Document on Fuel Burning Equipment and Air Pollution Control Systems for the design of the Fuel Burning Equipment, Bio-scrubber System and Chimney. Certified Environmental Professional in Scrubber Operation (CePSO)

Modelling Scenarios:
Normal Operation

- **The predicted appropriate Maximum Average Incremental Concentration (MAIC) averaging time for the identified criteria air pollutants will be added to the Baseline Level (BL) for the calculation Ground Level Concentration (GLC) at the identified ASRs**
- **The iso-contour overlay with the appropriate basemap will be produced for the simulated averaging time; and**
- **The calculated GLCs will be compared against mainly the prescribed limits in the MAAQS. In addition, the MAIC from the Project will be compared against the adopted 25% threshold as recommended by the International Finance Corporation (IFC) for sustainable airshed.**

Based on the air pollution control system (different APCS in place) to be adopted by the Project Proponent, it could be safely assessed that abnormal situation would be low and hence, not modelled in this exercise.

During Operation Phase

Findings

Parameter: PM_{10}

The predicted 24-hours MAICs:
Within the MAAQS (Standard [2020]) limit

The 24-hours GLC:
Within the (Standard [2020]) limit for all receptors

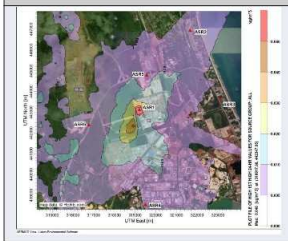
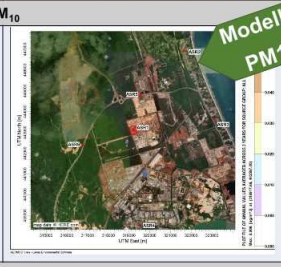
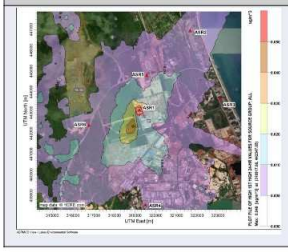
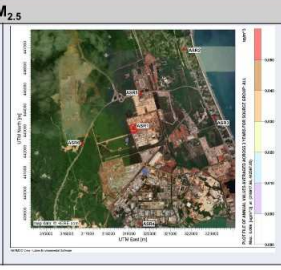
The predicted annual MAICs:
Within the (Standard [2020]) limits for all receptors

Parameter: $PM_{2.5}$

The predicted 24-hours MAICs:
Within the (Standard [2020]) limit

The predicted annual MAICs:
Within the (Standard [2020]) limits for all receptors

Modelling results: PM10 & PM2.5

24-hours Averaging Time	Annual Average
PM_{10}	
	
$PM_{2.5}$	
	

During Operation Phase

Findings

Parameter: SO_2

The predicted 1-hour MAICs:
Within the MAAQS 2020 limit

The predicted 24-hours MAICs:
Within the MAAQS 2020 limits for all receptors

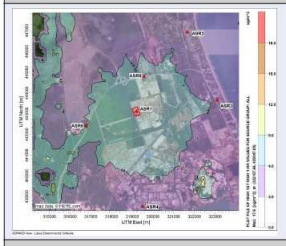
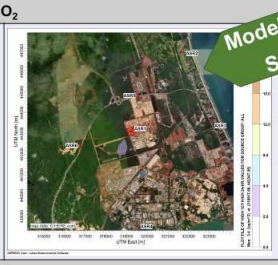
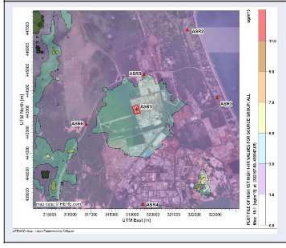
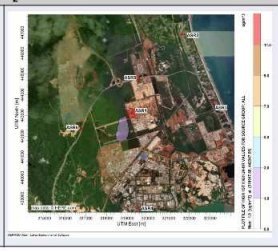
The 24-hours GLC:
Within the MAAQS 2020 limits for all receptors

Parameter: NO_2

The predicted 1-hour MAICs:
Within the MAAQS 2020 limit

The predicted 24-hours MAICs:
Within the MAAQS 2020 limits for all receptors

The 24-hours GLC:
Within the MAAQS 2020 limits for all receptors

1-hour Averaging Time	24-hours Averaging Time
SO_2	
	
NO_2	
	

Modelling results: SO2 & NO2

During Operation Phase

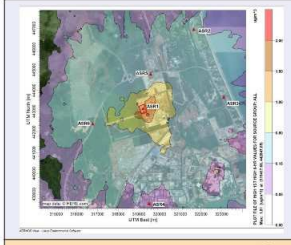
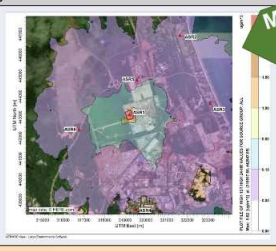
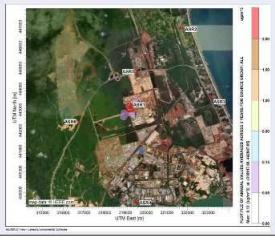
Findings

Parameter: NH_3

The predicted 8-hours MAICs:
No exceedance was predicted at all identified ASRs

The predicted 24-hours MAICs:
Within the prescribed 24-hour limit of 100 µg/m³ of the Ontario's Ambient Air Quality Criteria 2012.

The predicted annual MAICs:
No exceedance was predicted at all identified ASRs

8-hours Averaging Time	24-hours Averaging Time
NH_3	
	
Annual Average	
	

Modelling result NH3

During Operation Phase

Findings

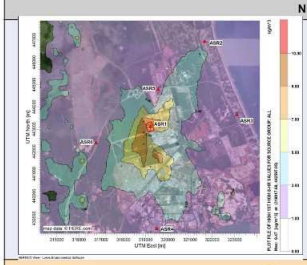
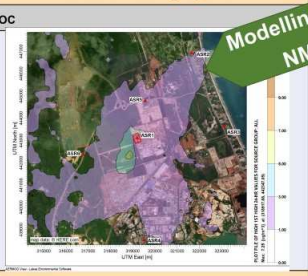
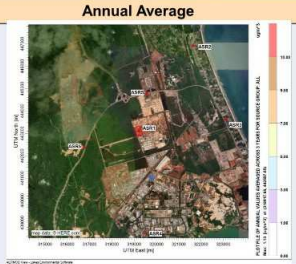
Parameter: NMVOC

Currently, there is no prescribed limit in the MAAQS 2013 for this pollutant.

The predicted 8-hours MAICs:
Highest was 9.47 µg/m³

The predicted 24-hours MAICs:
Highest was 7.25 µg/m³

The predicted annual MAICs:
Highest was 1.13 µg/m³

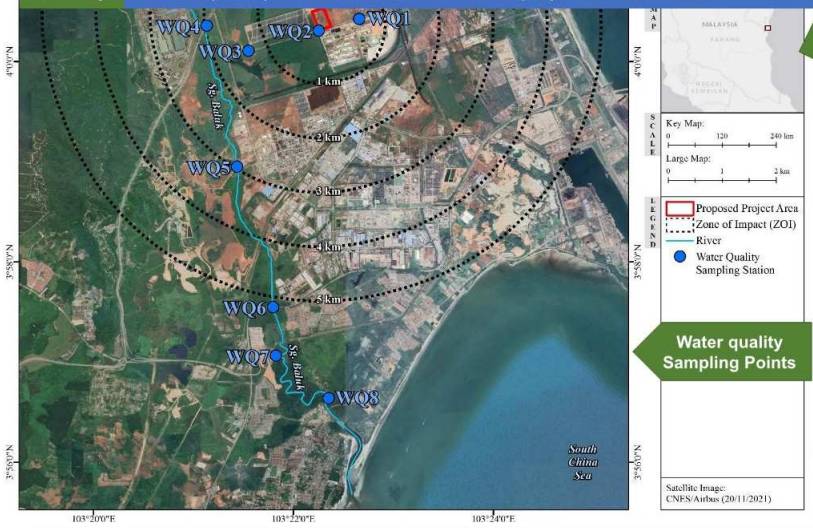
8-hours Averaging Time	24-hours Averaging Time
NMVOC	
	
Annual Average	
	

Modelling results: NMVOC

Air quality Potential Impacts & Mitigating Measures

POTENTIAL IMPACTS	MITIGATION MEASURES
Construction Stage ▪ Dust pollution due to the construction activities is temporary. ▪ Exhaust emissions for the Project during construction will be minor.	• Fenced construction area to reduce wind-blown dust dispersion and dust clouds. • Ensure construction access or haulage route are kept damp. • All dusty materials should be sprayed with water prior to any loading, unloading or transfer operation. • Load carried by the vehicle off-site should be covered by clean impervious sheeting. • Wash trough to be constructed at the entrance of each access road. • Areas cleared for open spaces shall be turfed as soon as possible. • All vehicle within the Project site to adhere to the speed limit of 25 km/hr. • All stockpile construction material that could generate fugitive dust during high wind speed to be covered when not in used or during high wind speed. • Undertake immediate repairs of any malfunctioning construction vehicles and equipment. • Develop a good housekeeping checklist for managing construction dust. • Installation and operation of portable generator set or other fuel burning equipment should comply with the requirements of the Environmental Quality (Clean Air) Regulations 2014 (CAR 2014).
Operation Stage ▪ During normal operation, the calculated GLCs for identified criteria pollutants at the identified off-site air sensitive receptors (ASRs) met the MAAQS 2020. ▪ Further assessment on the contribution based on 25% threshold of the adopted IFC standard indicates that the predicted MAICs for all identified pollutants were in compliance with the 25% threshold value at all sensitive receptors i.e. ASR1, ASR2, ASR3, ASR4, ASR5 and ASR6	Operation Stage • Comply to relevant schedules of CAR 2014 for the proposed stacks emission limits. • Conduct regular inspections, monitoring and maintenance of raw material handling areas.

Water quality Assessment



Water quality Sampling Points

Water Quality Assessments:
- **Water Quality sampled**
- **Dispersion modelling of IETS effluent emitted.**
- **Modelling for:**
  - **Compliance to Std. B, EQ(IE)R2009**
  - **Worst case scenario, without treatment**
  - **Normal river flow**
  - **River low flow**

Water quality Sampling & Evaluation

Table 6.5(1): Sampling Locations for Water Quality and River Appearances

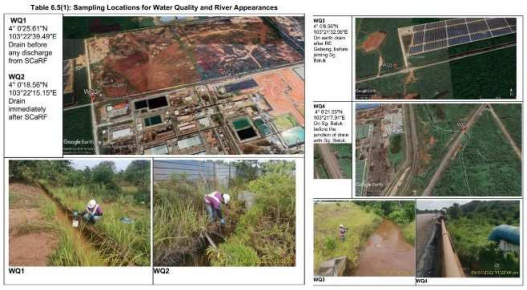


Table 6.5(6): Water Quality Index (WQI) and Class for Sg. Baluk

WQ Point	WQI VALUE	WQ CATEGORY	WQ CLASS
WQ1	66.99	Slightly Polluted	Class III
WQ2	66.48	Slightly Polluted	Class III
WQ3	69.02	Slightly Polluted	Class III
WQ4	55.29	Polluted	Class III
WQ5	61.04	Slightly Polluted	Class III
WQ6	64.58	Slightly Polluted	Class III
WQ7	66.40	Slightly Polluted	Class III
WQ8	61.95	Slightly Polluted	Class III

Water quality data

Table 6.5(5): Water Quality Results for Sg. Baluk

Parameter	Unit	WQ1	WQ2	WQ3	WQ4	WQ5	WQ6	WQ7	WQ8	NWQS Class IIB	WQ in brief
pH (in-situ)	-	8.37	6.68	4.01	5.45	5.91	6.35	6.48	6.77	6-9	
DO (in-situ)	mg/L	6.3	5.5	5.3	5.6	5.0	5.8	5.1	5.3	5-7	Fairly high DO, all aerobic
T (in-situ)	°C	26.8	26.1	27.1	27.3	28.2	28.5	28.7	29.5	Norm±2 C	Normal temperatures, no hot discharges
Turb (in-situ)	NTU	93	101	101	65	43	24	27	18		Moderately clear waters, except at WQ1, WQ2 and WQ3.
*Total SS	mg/L	88	96	18	24	50	56	14	38	50	Low SS, except at WQ1 and WQ2.
*BOD(5,20)	mg/L	6	5	3	13	5	12	8	13	3	Low BOD except at WQ4, WQ6 and WQ13
*COD	mg/L	42	56	28	61	98	61	42	20	25	Low COD except moderate at WQ5
*Amm-N	mg/L	1.526	1.063	0.880	3.872	1.388	0.981	1.910	3.465	0.3	Low NH3-N, except at WQ4 and WQ8
Oil & Grease	mg/L	ND(<1)	ND(<1)	ND(<1)	ND(<1)	ND(<1)	ND(<1)	ND(<1)	ND(<1)	ND	Non-detectable at all points
*Mercury Hg	mg/L	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)		Non-detectable at all points
*Cd	mg/L	ND(<0.002)	ND(<0.002)	ND(<0.002)	ND(<0.002)	0.002	ND(<0.002)	0.002	0.004	0.01	Very low at all points
*Cr 6+	mg/L	ND(<0.003)	ND(<0.003)	ND(<0.003)	ND(<0.003)	ND(<0.003)	ND(<0.003)	ND(<0.003)	ND(<0.003)	0.05	Non-detectable at all points
* As	mg/L	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	0.05	Non-detectable at all points
* CN-	mg/L	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	0.02	Non-detectable at all points
*Pb	mg/L	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	0.05	Non-detectable at all points
*Cr 3+	mg/L	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	-	Non-detectable at all points
* Cu	mg/L	ND(<0.01)	ND(<0.01)	0.16	0.02	0.01	0.02	0.02	0.01	0.02	All low; <NWQS IIB except WQ3
*Mn	mg/L	0.17	0.18	0.19	0.32	0.15	0.12	0.14	0.16	0.1	All low or about NWQS Class IIB
* Ni	mg/L	ND(<0.01)	0.02	0.37	0.01	0.07	0.04	0.08	0.11	0.05	All about NWQS IIB , except WQ3.
*Sn	mg/L	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	-	Non-detectable at all point
*Zn	mg/L	0.03	ND(<0.01)	0.03	0.13	0.08	0.05	0.06	0.01	5	All well below NWQS Class IIB limits.
* B	mg/L	ND(<0.10)	ND(<0.10)	ND(<0.10)	ND(<0.10)	ND(<0.10)	ND(<0.10)	ND(<0.10)	ND(<0.10)	1	Non-detectable at all points
*Fe	mg/L	0.56	0.71	0.83	1.04	2.10	0.77	0.55	0.36	1	All about NWQS Class IIB limits.
*Phenol	mg/L	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	0.01	Non-detectable at all points
*Free Cl	mg/L	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	-	Non-detectable at all points
* S2-	mg/L	ND(<0.10)	ND(<0.10)	ND(<0.10)	ND(<0.10)	ND(<0.10)	ND(<0.10)	ND(<0.10)	ND(<0.10)		Non-detectable at all points
*Cr Tot.	mg/L	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)		Non-detectable at all point
* Ag	mg/L	ND(<0.01)	0.25	0.07	ND(<0.01)	ND(<0.01)	ND(<0.01)	0.09	0.05	0.05	All about NWQS IIB , except WQ2
* Al	mg/L	0.036	0.027	0.738	0.174	0.041	0.028	0.077	0.075	-	All low; no limit in NWQS Class IIB.
*Se	mg/L	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	0.01	All low
*Barium	mg/L	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	1	All low
* F	mg/L	ND(<0.01)	ND(<0.01)	0.01	0.86	0.66	0.54	0.63	0.78		
*Formaldehyde	mg/L	0.029	0.034	0.045	0.19	0.008	0.003	0.022	0.020		
*Colour	ADMI	157	163	107	135	45	63	70	42		

Soil loss – Existing condition

- Existing Condition

- Partial of Lot 29132 – 8.1ha
- Site is generally flat (elev. ranged from 7.1 m to 8.8 m)
- The project site is consisted of Class I area (0˚ -15˚) - 100%
- Soil Series – graded to platform level with sandy loam soil.
- Scarcely covered with secondary vegetation i.e., trees, bushes, and scrubs.
- ERA – Pre-Development – The catchment area is categorized as moderate risk.

EXISTING CONDITION		
Catchment	A (t/ha/year)	Risk Category
C1	38.89	Moderate

LDP2M2 Erosion Assessment

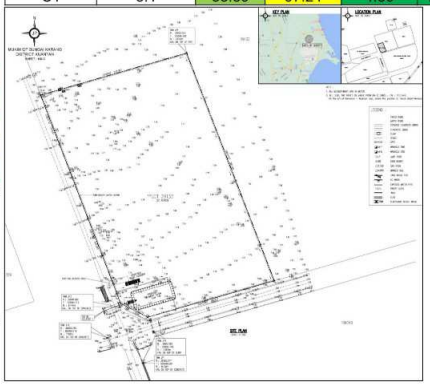
LD-P2M2
- Erosion Impact Assessment & Control Measures

Catchment	Area (ha)	A (Soil Loss)			
		BD	WC	DDWCM	PD
C1	8.1	38.89	97.24	4.86	2.92

- With the proposed control LD-P2M2, erosion risk shall be kept within low category throughout the development and operation.
- During Development – Sediment Basin (1 nos)
- Other BMPs: Temporary earth drain, mulching, vegetation strip (buffer) wash through, etc.

Soil Loss (ton/ha/yr)	Classification	Color Code
<10	Low	
10 - 50	Moderate	
50 -100	Moderate High	
100 - 150	High	
>150	Very High	

No	Label	Dimension, Length x Width x Depth	Contributing Area (ha)
1	SB-1	61.4 x 26.2 x 1.9	8.0937



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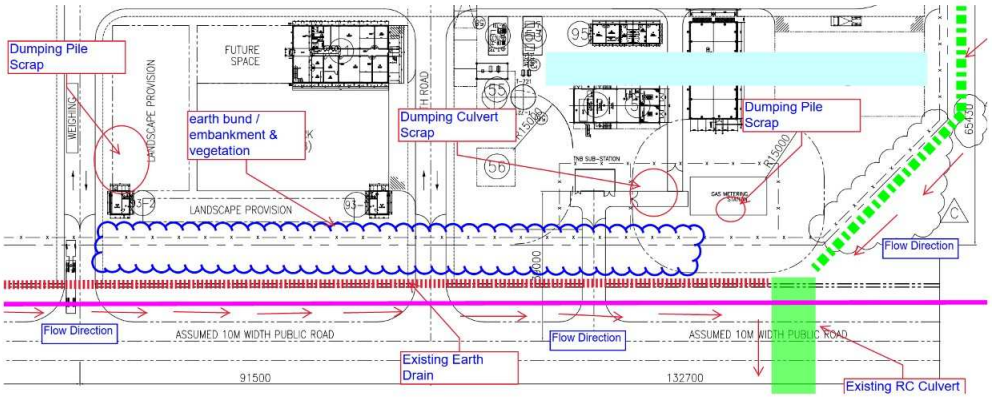
Site LDP2M2 measures



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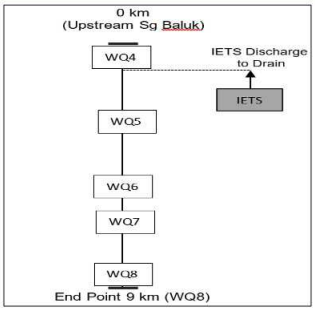
Water quality Modelling

- **Simulation was conducted in Sg Baluk.**
- **About 9 km distance, from W4 to W8.**
- **Selected Scenario, Worst-Case and With Mitigation (Std B and LDP2M2) for both Normal Flow and Low Flow.**
- **Flow from the IETS is about 17 m^3/s or 0.0047 m^3/s.**
- **No Water Intake downstream.**



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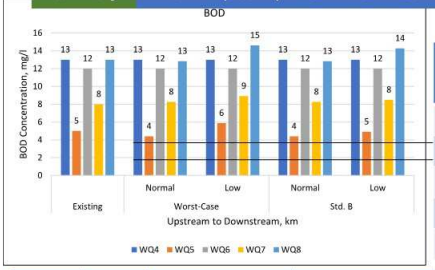
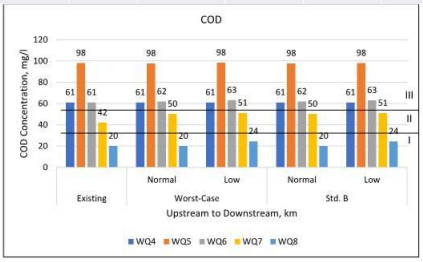
Summary of Water Quality Modelling Results

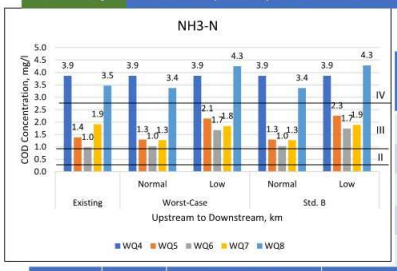


WQ Point	BOD	Worst		LDP2M2	
		Normal	Low	Normal	Low
WQ4	13	13	13	13	13
WQ5	5	4	6	4	5
WQ6	12	12	12	12	12
WQ7	8	8	9	8	8
WQ8	13	13	15	13	14

WQ Point	COD	Worst		LDP2M2	
		Normal	Low	Normal	Low
WQ4	61	61	61	61	61
WQ5	98	98	98	98	98
WQ6	61	62	63	62	63
WQ7	42	50	51	50	51
WQ8	20	20	24	20	24

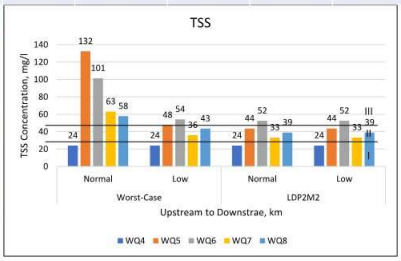


Summary of Water Quality Modelling Results



WQ Point	NH3-N	Worst		LDP2M2	
		Normal	Low	Normal	Low
WQ4	3.872	3.9	3.9	3.9	3.9
WQ5	1.388	1.3	2.1	1.3	2.3
WQ6	0.981	1.0	1.7	1.0	1.7
WQ7	1.91	1.3	1.8	1.3	1.9
WQ8	3.465	3.4	4.3	3.4	4.3

WQ Point	TSS	Worst		LDP2M2	
		Normal	Low	Normal	Low
WQ4	24	24	24	24	24
WQ5	50	132	48	44	44
WQ6	56	101	54	52	52
WQ7	14	63	36	33	33
WQ8	38	58	43	39	39



Water quality summary and river protection

Conclusion on Water Quality

- The water quality is moderate with respect to organics and nutrients, mostly due to peaty soils in the area;
- With respect to industrial contribution in terms of pH, temperature and heavy metals, it is still not visible.
- Due to moderate values of DO, BOD and ammonia-N, the water quality index in shows the river as slightly polluted at all points and polluted at WQ4, which is upstream of the SCaRF location.
- The water quality modelling indicates that due to the very small flowrate from the proposed SCaRF project as compared to the Sg. Baluk river flowrate, the proposed SCaRF discharge is well dissipated upon reaching Sg. Baluk and has insignificant contribution to the water quality of Sg. Baluk.

As shown by the riverine views and the flora and fauna, the river is still unspoilt, with:

- ➔ Lush riverine vegetation all along the river
- ➔ Good concentrations of zooplanktons
- ➔ High fish diversity, although they are of least concerned (i.e. commonly found) species.
- ➔ Sg. Baluk is popular for angling.

These are in line with recommendation for Sg. Baluk riverine to be protected for ecotourism, as a means of uplifting economic activities of locals, as expected by respondents during socioeconomic survey for this study.


Upstream


Downstream

Figure 6.9(2) Sg. Baluk vegetation on riverbanks

IETS Monitoring Program

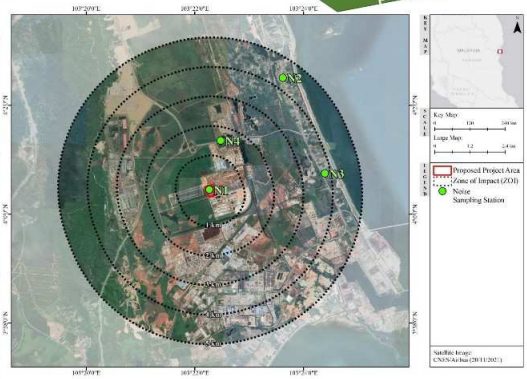
Recommendations for discharge from project

- With IETS discharge complying with the Standard B at all times, the simulations have shown that the potential impacts of the discharge to Sg. Baluk water quality would be insignificant.
- The LDP2M2 measures should be implemented during construction stage. Maintenance of LDP2M2 component must be conducted when necessary, i.e. for sediment traps and perimeter drains.
- Regular maintenance should be conducted to ensure the efficiency of the IETS.
- The operator should apply the Guided Self-Regulation, GSR, to ensure discharge from the IETS complies with the Standard B requirements at all times during the operational stage.
- Performance monitoring should be conducted to ensure the IETS is working at its best capacity.

No	Monitoring	Parameters of concern	Frequency	Range of values
1	EQ Sump	Flowrate	Continuous (Online)	16m3/hr(<385m3/day)
		COD	Daily (Lab)	<230ppm
		TSS		< 50ppm
		As		< 0.51ppm
		B		< 9.3ppm
		Mn		< 1.6ppm
		Ni		< 1.05ppm
		Se		< 0.58ppm
		F		< 9.65ppm
		NH3		< 10 ppm
		BOD	Weekly (Lab)	<115 ppm
2	pH Adjustment Tk	pH	Continuous (Online)	9-10
3	Reaction Tk	Nil	Nil	Nil
4	Flocculation Tk	pH	Daily (Lab)	9-10
5	DAF	COD	Daily (Lab)	< 200 ppm
		TSS		< 100 ppm
		As		< 0.1 ppm
		B		< 4.0 ppm
		Mn		< 1.0 ppm
		Ni		< 1.0 ppm
		Se		< 0.5 ppm
		F		< 5.0 ppm
		BOD	Weekly (Lab)	< 80 ppm
6	Buffer Tk	pH	Continuous (Online)	5.5-9.0
7	Multimedia Filter	TSS	Daily (Lab)	< 100ppm
8	Activated Carbon Filter	COD	Daily (Lab)	< 200 ppm
		BOD	Weekly (Lab)	< 50 ppm
9	Final Discharge	Flowrate	Continuous (Online)	16m3/hr(<385m3/day)
		pH	Daily (Lab)	5.5-9.0
		COD		<200ppm
		TSS		< 100ppm
		As		< 051ppm
		B		< 4ppm
		Mn		< 1.0ppm
		Ni		< 1.0ppm
		Se		< 0.5ppm
		F		< 5.0ppm
		NH3		< 10 ppm
		BOD	Weekly (Lab)	<50 ppm

Noise sampling

Noise sampling points



Noise Level

Noise level measurements were conducted on 5th July 2020 using sound level meter Type 1 ((ESF/N/01) based on ISO 1996-1:2016 (E)) continuously for:
7 am to 10 pm: >15 hours for day time noise
10 pm to 7 am: 9 hours for night time noise, for L_{Aeq}, L_{10}, L_{90}, L_{min} and L_{max}

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Noise Level results

Results of noise level measurements								
Station	N1		N2		N3		N4	
	Date and time							
Parameters	(05/07/2022) 0700 – 2200 hrs	(05 - 06/07/2022) 2200 – 0700 hrs	(05/07/2022) 0700 – 2200 hrs	(05 - 06/07/2022) 2200 – 0700 hrs	(05/07/2022) 0700 – 2200 hrs	(05 - 06/07/200 – 0700 hrs	(05/07/2022) 0700 – 2200 hrs	(05 - 06/07/2022) 2200 – 0700 hrs
Leq dB(A)	50.7	49.2	66.0	62.9	66.0	62.9	72.3	68.8
Lmax dB(A)	78.2	70.8	107.5	89.9	107.5	89.9	108.8	92.2
Lmin dB(A)	38.4	42.2	38.7	36.7	38.7	36.7	40.4	41.9
L10 dB(A)	52.7	50.6	66.3	61.3	66.3	61.3	76.0	72.1
L90 dB(A)	45.5	45.8	52.2	43.9	52.2	43.9	57.0	54.9
Reference	E		B		B		E	
dB(A)	70	65	60	55	60	55	70	65

Conclusion on Noise Level

Measured values gave low to moderate levels, the higher values most probably due to vehicular traffic, such as motor bikes, due to locations next to roads. Nevertheless, none of the values measured at all points were of category Noisy or ≥ 80 dBA (Occupational Safety and Health (Noise Exposure) Regulations 2019.

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Flora & Fauna in Sg. Baluk catchment

Figure 6.9(1) Secondary vegetation at the site

Flora fauna at site not significant as its a filled site

Fauna in Sg. Baluk catchment none in IUCN red list, most are common species.

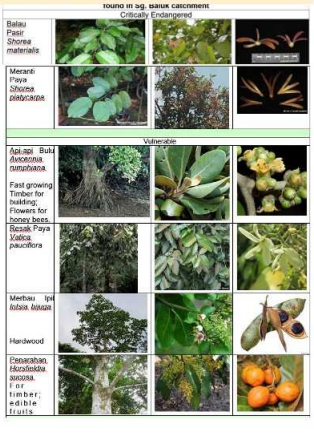
Table 6.9(3) Near threatened and vulnerable birds in the area

Near threatened species		Vulnerable species
Green Iora (*Aegithina viridissima*)	Black-bellied Malkoha (*Phaenicophaeus diardi*)	Javan Myna (*Acridotheres javanicus*)

Summary on findings

- Proposed site being industrial area, the flora & fauna is not notable at site.
- Nevertheless, the area is close to the Baluk forest area and the river reserve is still largely intact.
- Sg. Baluk is still healthy in terms of phytoplankton, zooplankton and fish life, with reasonable varieties of fishes.
- Thus, the importance of protecting the river reserve as a protection barrier against pollution and as nesting sites for fish juveniles

Flora in Sg. Baluk catchment – there are several significant species, but none in IUCN red list.



Aquatic life diversity and abundance in a river are dependent on several correlated factors the most prominent of which are:

- **water quality which determines aquatic life survival and abundance of planktons;**
- **Plankton density: zooplanktons feed on phytoplanktons**
- **Phytoplankton requires sunlight to grow and are hindered by turbidities;**
- **Shelters such as wetland plants for juveniles.**

Phytoplankton is a primary producer photosynthesising carbon dioxide to oxygen; thus, generates oxygen in water (measured as D.O.) essential for aquatic life

- **Phytoplankton densities, were relatively low, ~ 40 - 800 cells/l.**
- **Zooplanktons densities ~130 - 1200 ind/m^3 → zooplankton populations were in good condition, all along Sg. Baluk.**

Upstream

Downstream

Figure 6.9(2) Sg. Baluk vegetation on riverbanks

Sg. Baluk river reserve still healthy and good for protection of aquatic life

Fishes in Sg. Baluk

Table 6.9(4) Fishes caught in Sg. Baluk west of project site (at about location of

Fish Group	Fish	IUCN Category
*Barbonymus gonionitus**		Least Concern
Lampan jawa		
*Barbodes banki**		Least Concern
Tebal sisik		
*Rasbora sumatrana**		Least Concern
Seluang bada		
*Rasbora vulgaris**		Least Concern
Seluang		
Cyclocheilichthys apogon		Least Conc
Temperas		
Barbonymus schwanefeldi		Least Concern
Lampam sungai		
*Osteochilus vittatus**		Least Concern
Terbul		

Fishes at point near WQ4 (in 2021)
→ Good diversity.
→ Due to relatively high zooplankton density
→ all of Least Concern

Socioeconomics

Respondents Distribution in the Study Area

No.	Radius from Project Area (km)	Town and Residential Area	Number of Respondents
1.	3 – 4	Kampung Darat Sungai Ular	30
2.	3 – 4	Kampung Gebeng	20
3.	4 – 5	Kampung Sungai Ular	30
4.	5 – 6	Kampung Selamat	10
5.	5 – 6	Taman Balok Makmur	20
6.	6	Jeti Seberang Sungai Ular	5
7.	8	Jeti Sungai Balok	5
TOTAL			120

Respondents in the ZOI

Kampung Selamat

Kampung Selamat

Jeti Sungai Balok

Jeti Sungai Balok

Kampung Gebeng

Kampung Gebeng

Kampung Sungai Ular

Kampung Sungai Ular

Kampung Darat Sungai Ular

Kampung Darat Sungai Ular

Socioeconomic findings

Summary of findings:

- **The largest age groups are 30 – 39 years at 23.3% and 40 – 49 years at 28.3% that is the employable age groups, thus in-line with the proposed project's aim to employ locals, and for them to recide in the local areas.**
- **Most have a certain degree of formal education, with most up to secondary school (74.2%) and tertiary education at 1.7%.**
- **Family size is mostly small with 2-3/family at 50%, indicating that a family house may still accommodate additional members and housing is not critically short.**
- **Employment wise, a large % is working as fishermen, which is an informal work category (35%) opening them to employment at work sites, etc, in-line with the proposed project's aim of employing locals and not importing foreign workers.**
- **Accounting for the small household, level of education and large work group being fishermen, the majority of households (49.2%) has household income of RM2,001 and RM3,000, which is regarded as moderately low;**
- **Respondents hold onto high expectations of new jobs and infrastructural improvement.**

Project Acceptability

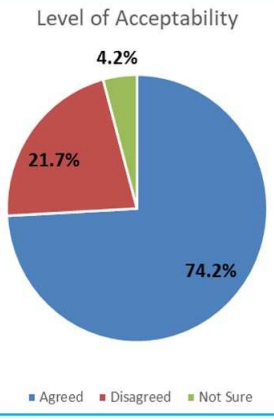
High acceptability of the project, with expectations of employment and economic growth.

An option is protection of Sg. Baluk riverine zone into an eco park by GIE management
→ Ecotourism enterprises, e.g., angling, boating, etc.
→ River protection, including aquatic life protection;
→ Recreational park for locals;

This initiative may be taken up by GIE Park Management; with participations from the industries in the area as part of their Corporate Social Responsibility (CSR).

Reason to Agreed
- Located in the industrial zone area
- Help grow the local economy
- Job opportunities – unemployed graduate or loses their jobs

Reason for Not Sure
- Located in the industrial zone area
- Far from their houses



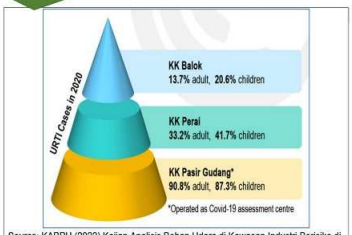
Reason to Disagreed
- Have the perception it would negatively impact the existing environmental condition
- They experienced river pollution, air pollution and the risk of a road accidents due to heavy vehicle movements
- Worried it will be worse with addition new development

Living conditions

Existing living conditions are relatively poor with: high % of non-flush toilets and high % garbage burning as indicators.

Health conditions

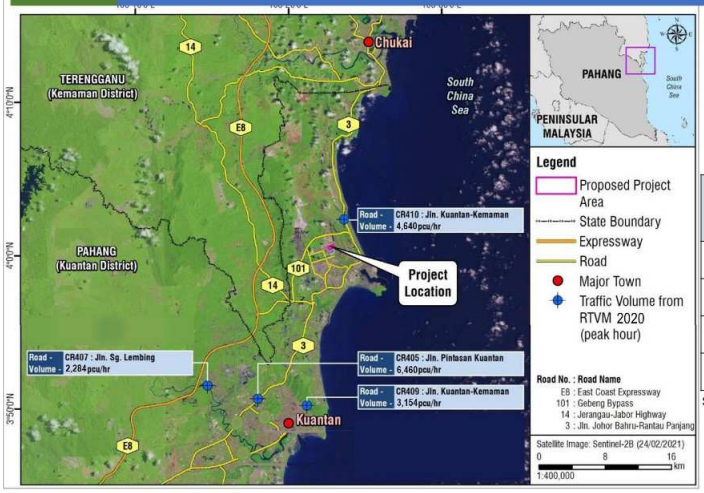
- **Health conditions are normal without prevalence of serious or strange illnesses;**
- **Studies by KABPU (2022) on air quality in 5 biggest industrial areas in Malaysia have shown Gebeng as having lowest URTI compared to others.**



Source: KABPU (2022) Kajian Analisis Beban Udara di Kawasan Industri Berisiko di Malaysia (KABPU), DOE Putrajaya, 2022.

Figure 6.10(6) Public Health due to Air Quality – Incidences of URTI

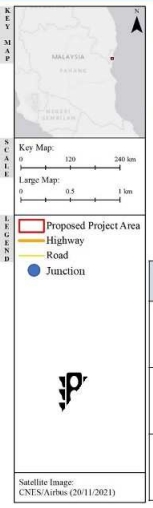
Traffic Assessment



TRAFFIC CONDITION BASED ON CENSUS DATA

Route	16-Hour Traffic	Peak Hour	LOS
CR410	30,615	3,613	F
CR409	30,640	2,876	A
CR407	22,088	1,890	F
CR405	57,753	5,073	E

Source: Road Traffic Volume Malaysia 2020, Ministry of Works Malaysia



The roads likely to have direct influence on traffic to/from the Project site are:

1. Jalan Gebeng 2/7;
2. Jalan Gebeng 1/11 (Jalan Qinzhou); and
3. Jalan 101 (Gebeng Bypass).

Traffic count survey done at 3 junctions, as per below:

Junction	Type of Junction
J1 (Gebeng Bypass – Jln Gebeng 1/11)	3-legged, channelized junction
J2 (Jln Gebeng 1/11 - Jln Gebeng 2/7)	3-legged, priority junction
J3 (Jln Gebeng 1/11 - Jln Gebeng 2/6)	3-legged, priority junction

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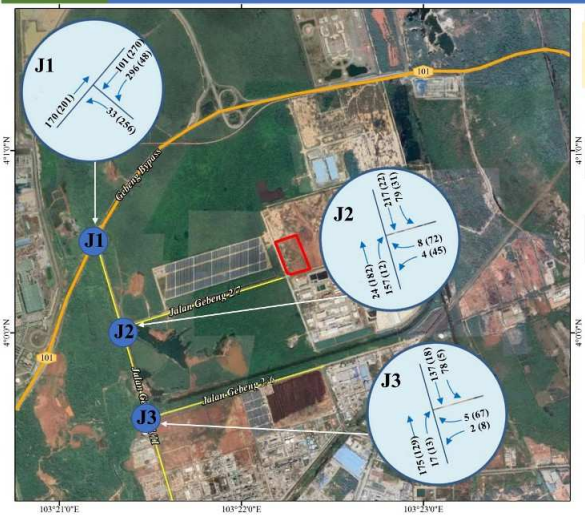

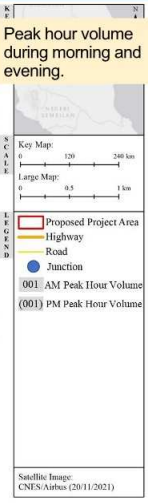

Peak hour volume during morning and evening.

Traffic

Existing Road Network

Main route:

- Jalan Gebeng 2/7
- Jalan Gebeng 1/11
- Jalan 101 (Gebeng Bypass)

Assessment through midblock and junction performance indicate the surrounding road network is currently performing at a very good LOS for both weekday and weekend.

During operation, the most frequent for ARDS catalyst at only about 4 active (transporting) weeks in 3 months, with about 8 trucks/day during the active weeks

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Traffic Assessment

Roadway midblock performance:

Route Name	Type of Carriageway	Maximum Hourly Capacity (pcu/hr/lane)	Volume (pcu/hr)		V/C Ratio (LOS)	
			AM	PM	AM	PM
Jalan 101 (Gebeng Bypass)	4-lane single carriageway	2000 (per lane)	397	526	0.20 (LOS A)	0.26 (LOS A)
Jln Gebeng 1/11 (Jln Qinzhou)	2-lane single carriageway	2800 (bothways)	402	307	0.14 (LOS A)	0.10 (LOS A)
Jln Gebeng 2/7	2-lane single carriageway	2800 (bothways)	244	160	0.09 (LOS A)	0.06 (LOS A)

Junction performance analysis:

Junction	Type of Junction	Level of Service	
		AM	PM
J2 (Jln Gebeng 1/11 - Jln Gebeng 2/7)	3-legged, priority junction	LOS A	LOS A
J3 (Jln Gebeng 1/11 - Jln Gebeng 2/6)	3-legged, priority junction	LOS A	LOS A

- From the roadway midblock performance and junction performance result, it clear that the surrounding road network is currently performing at a very good LOS for both weekday and weekend.

- The overall traffic in the Project Site is not constrained sufficiently to be of concern.

Impacts & Mitigating Measures

Summary of Potentially Significant Impacts and Mitigating measures

Earthworks and erosion control	**Earthworks for construction of access road, drains, onsite roads, process tanks and facilities expose soils and slopes to runoffs during rains, leading to increased suspended solids (SS) in Sg. Baluk.**	**a) Before site clearing, earthworks and site works begin, the erosion control measures, as designed by a qualified LDP2M2 expert are to be in place,** **b) The LDP2M2 features and facilities are to be regularly maintained and checked, particularly after a heavy rain, set as ≥ 12.5mm on a rain gauge to be installed at the site, all LDP2M2 structures must be checked within 24 hrs.** **c) Ensure that no turbid runoffs are discharged to the drain that flow to Sg. Baluk; these include sediment basin, silt traps, silt fences, etc.**
Effluent discharge during operation	**- IETS treated effluent contributes to the total flow entering Sg. Baluk. Although small compared to those from other sites in the GIE; it is beneficial during dry periods, for sustaining the wetland and aquatic life.** **- Malperformance of the IETS may lead to discharge of treated effluents not meeting the required Standard B, EQ(IE)R 2009.**	**Ensure that the treated effluent quality always the Standard B of the EQ(IE)R 2009 at all times; among essential measures are:** **- IETS is designed to release maximum of half the Standard B limit for each parameter;** **- The plant does not release more than the load designed for IETS feed load.** **- Should there be unusual loads from maintenance or process failure, the load should be contained in an emergency tank for slow dosing without upsetting the IETS conditions.** **- The treated effluent tank (also as Backwash water tank) may be used as a Check Pond, where at its inlet may be place online pH and ammonia meters; non-complying treated effluent may then be recycled for further treatment.**
Gaseous wastes	**Malperformance at any stage of the APCS may affect the performance of the overall system.**	**- Performance of each stage or unit operation of the APCS has to be carefully monitored and tracked so that the performance of the next unit is predictable.** **- the load to the final unit, e.g., the electrostatic precipitator (EP), should be maintained at all times, at levels calculated to comply to the emission limit as per EQ(CA)R 2014.** **- Each stage of the APCS should be operating and releasing gaseous effluent within a set envelope. Any exceedance beyond the envelope, at any stage in the APCS, not just at the stack, can be connected to trigger an alarm at the control room and at the mobile handphone of the person in charge (PIC).**

Conclusion

This project involves typical slow soda roasting of used catalyst to oxidise Molybdenum (Mo) and Vanadium (V) into soluble oxides so that they may be dissolved and separated from the main bulk of the used catalyst sediments. Thereafter the Mo and V solutions are enriched before the Mo and V are precipitated out. The whole process involves well known unit operations and should not pose significant environmental impacts if the processes are well managed at all times. The project proponent, Taiyo Koko, is a well established company in Japan and has been operating the same plant in Ako, Japan, thus is the best choice for this kind of project. The Mo and V are in increasingly high demands due to developments of high efficiency and capacity components for electric vehicles, wind turbines, etc., and are being mined, in China, South Africa, etc. causing environmental damages. This recovery by SCaRF from used catalyst available in Malaysia, using natural gas available on pipeline at the site (thus is a clean and safe process), will become a renewable source of these valuable metals. With mitigating measures as recommended in this report, it can be seen that the benefits will far outweigh the potential impacts.

Ringkasan Eksekutif PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

Pemaju Projek & Pemilik Tanah:

TAIYO KOKO CO.,LTD.

TAIYO KOKO CO., LTD
1-1-39 Isobe-dod, Chuo-ku, Kobe-city, Hyogo,
651-0084 Japan.
Malaysia office address : in progress
Mobile : +81 80 8946 9684 (Mr Masahiro Yamamoto)
Mobile : +6012 270 1815 (Ms Lim Kah Eng)

Juruperunding EIA

EnviroSource Sdn. Bhd.
Think high tech. Go bio.

EnviroSource Sdn. Bhd.
Wisma Envirosource,13A, Jalan Jernang Jaya 1,
Taman Jernang Jaya, 43650 Bdr Baru Bangi, Selangor.
Mobile: +6011 5501 9648 (Hj. Abdul Ghani)

Pengenalan

Tujuan projek :
Untuk pemerolehan logam bernilai tinggi: Molybdenum & Vanadium, daripada mangkin terpakai untuk mendapatkan bekalan lestari serta mengurangkan perlombongan serta keperluan tapak pelupusan sisa terjadual, iaitu mangkin terpakai..

Lokasi tapak :
Lot 29132, Gebeng Industrial Estate, Kuantan.
(sebahagian daripada 809.37 mtr per segi)

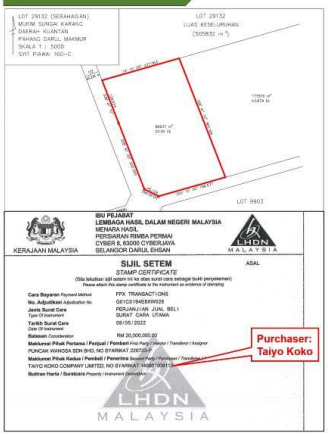
Keperluan Undang-undang

Environmental Quality Act (EQA, 1974), Environmental Impact Assessment (EIA, 2015): First Schedule, Activity 14(a): Waste Treatment and Disposal, a(i): Construction of recovery plant (off-site)

Ringkasan Eksekutif PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

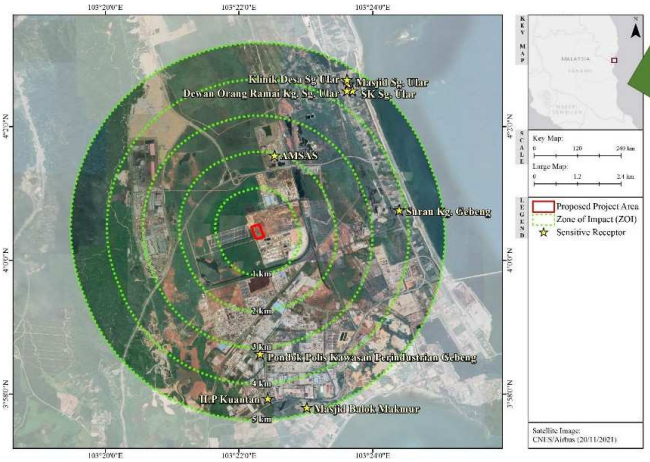
Lokasi: Lot Bersebelahan

Pemilik Tanah:



Ringkasan Eksekutif PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

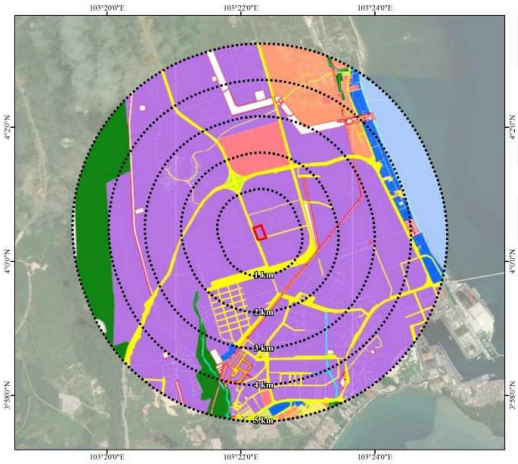
Lokasi di Gebeng & 5km Zon Impak (ZOI) serta Gunatanah

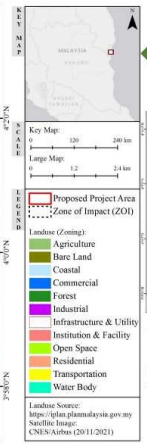


Kawasan sensitif:

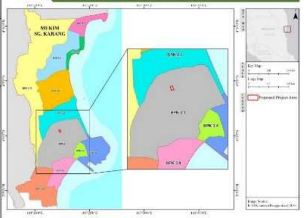
- **Kawasan persisiran pantai: Kg. Baluk, Kg. Gebeng dan Kg. Sg. Ular berada dalam 4 hingga 5 km daripada tapak;**
- **Melainkan AMSAS: pada ~ 2km dari tapak.**

Ringkasan Eksekutif PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG





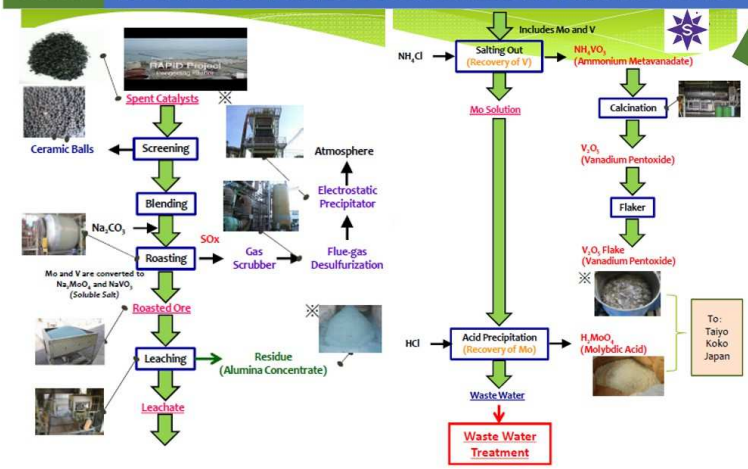
- Perancangan gunatanah – dalam Blok Gunatanah 3.1
- Kawasan dikhaskan untuk Industri, utamanya industri berat dan petrokimia.



GIE adalah dikhaskan untuk industri berat dengan paras tapak yang telah ditingkatkan serta penyaliran yang telah diperbaiki untuk mengelakkan banjir dan menyesuaikan tapak untuk industri.

Ringkasan Eksekutif PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

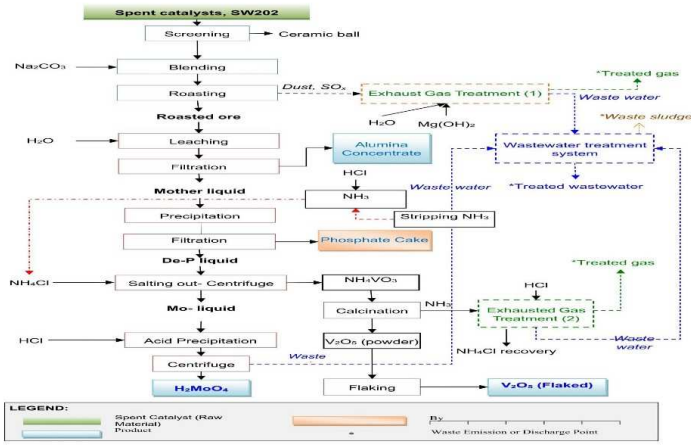
Proses pengeluaran



Proses serupa dengan proses-proses yang biasa diguna untuk memperolehi logam berharga dari sisa, e.g. e-sisa

Ringkasan Eksekutif PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

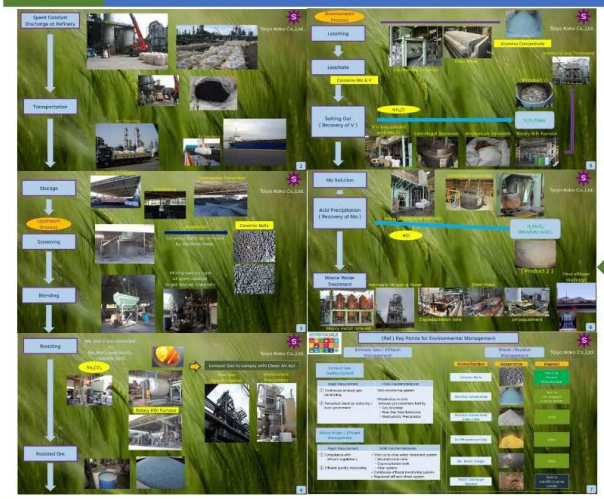
Rajah Alir Proses



Proses SCaRF yang sama sedang dioperasikan oleh Taiyo Koko di Ako City Jepun; ini memberikan Taiyo Koko keyakinan tentang:

- Kebolehan ekonomi serta teknikal projek;
- Operasi teknikal;
- Pencapaian proses kawalan pencemaran APCS dan IETS.

Ringkasan Eksekutif PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

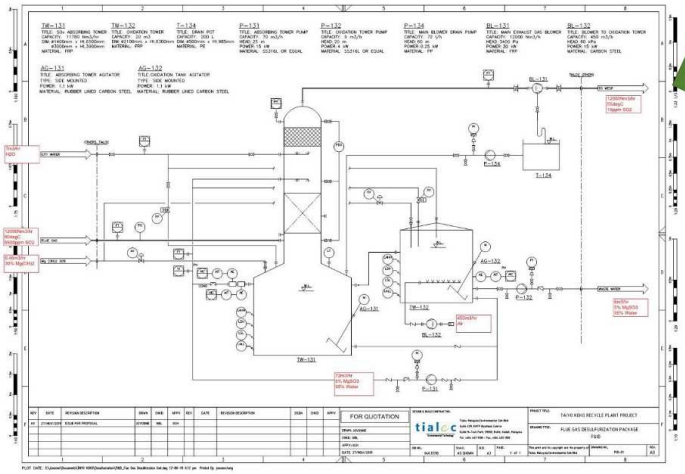


Loji Taiyo Koko di Ako, Jepun

Proses SCaRF di loji Taiyo Koko Ako, JAPAN

Lukisan loji SCaRF Taiyo Koko di Gebeng, MALAYSIA

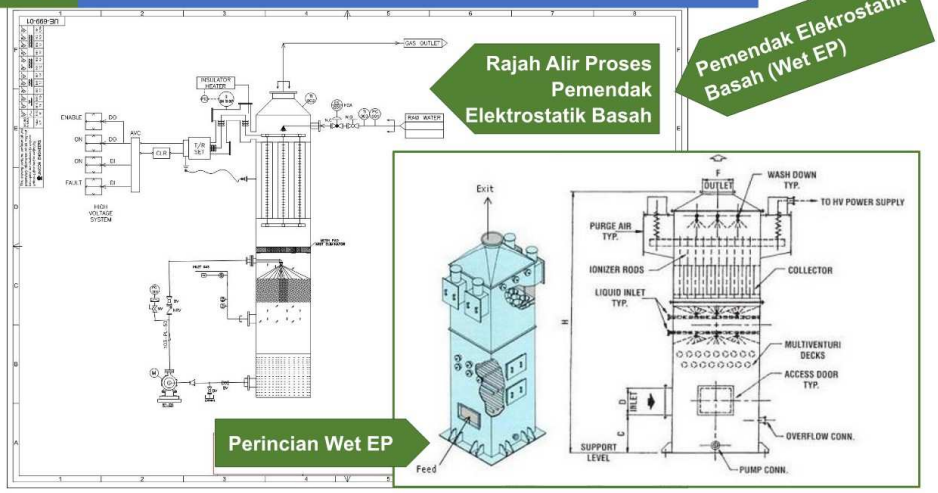
Ringkasan Eksekutif PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG



Rajah Alir Proses untuk Sistem NyahSulfur

Penggahalan mengguna larutan Mg(OH)2, dengan pengoksidaan sulfit, diikuti unit pemendak elektrostatik basah (wet Electrostatic Precipitator (wet EP))

Ringkasan Eksekutif PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG



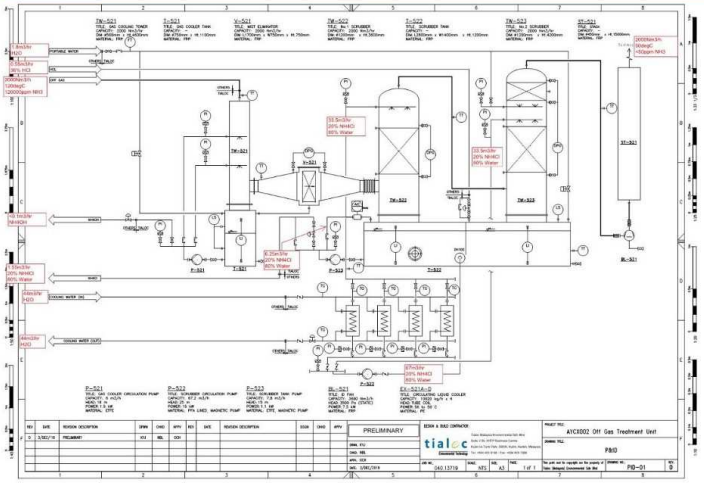
Rajah Alir Proses Pemendak Elektrostatik Basah

Pemendak Elekrostatik Basah (Wet EP)

Perincian Wet EP

Ringkasan Eksekutif PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

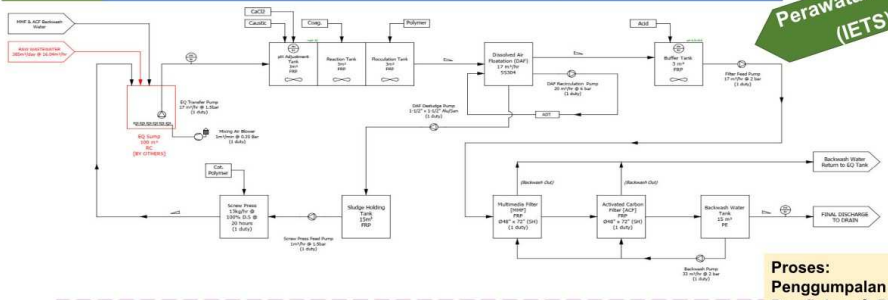
Sistem Perawatan Gas Pengkalsinan

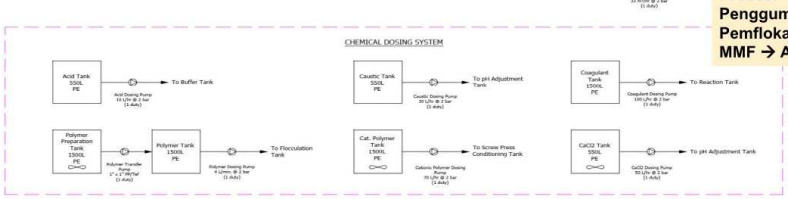


Penyejukan diikuti Penggahalan 2 peringkat mengguna larutan HCl yang menukar NH3 kepada NH4Cl.

Ringkasan Eksekutif PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

Perawatan Efluen (IETS)





Proses: Penggumpalan → Pemflokan → DAF → MMF → ACF

Ringkasan Eksekutif PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

Imbangan jisim IETS

Incoming Wastewater		
Flowrate	385	m3/day
Parameter	Conc. mg/l	Loading kg/d
COD	225	86.6
BOD	115	44.3
TSS	20	7.7
As	0.51	0.2
B	9.22	3.5
Mn	1.59	0.6
Ni	1.05	0.4
Se	0.58	0.2
F	9.65	3.7

EQ			
Flowrate	Rem.Eff.	385	m3/day
Parameter		Conc. mg/l	Loading kg/d
COD	0%	225.00	86.6
BOD	0%	115.00	44.3
TSS	0%	20.00	7.7
As	0%	0.51	0.2
B	0%	9.22	3.5
Mn	0%	1.59	0.6
Ni	0%	1.05	0.4
Se	0%	0.58	0.2

Chemical Reaction Tank + DAF			
Flowrate	Rem.Eff.	385	m3/day
Parameter		Conc. mg/l	Loading kg/d
COD	30%	157.50	60.6
BOD	30%	80.50	31.0
TSS	0%	20.00	7.7
As	80%	0.10	0.0
B	60%	3.69	1.4
Mn	80%	0.32	0.1
Ni	60%	0.42	0.2
Se	80%	0.12	0.0
F	80%	1.93	0.7

MMF + ACF			
Flowrate	Rem.Eff.	385	m3/day
Parameter		Conc. mg/l	Loading kg/d
COD	50%	78.75	30.3
BOD	50%	40.25	15.5
TSS	50%	10.00	3.9
As	0%	0.10	0.0
B	0%	3.69	1.4
Mn	0%	0.32	0.1
Ni	0%	0.42	0.2
Se	0%	0.12	0.0
F	0%	1.93	0.7

Final Discharge				DOE DISCHARGE LIMIT
Flowrate	Rem.Eff.	385	m3/day	Std. B, mg/l
Parameter		Conc. mg/l	Loading kg/d	
COD	0%	78.75	30.3	200
BOD	0%	40.25	15.5	50
TSS	0%	10.00	3.9	100
As	0%	0.10	0.0	0.1
B	0%	3.69	1.4	4
Mn	0%	0.32	0.1	1
Ni	0%	0.42	0.2	1
Se	0%	0.12	0.0	0.5
F	0%	1.93	0.7	5

Chemical Sludge Generation		
Total D.S.	15.63 m3/d	1.5% D.S.
Component	Conc. mg/l	Loading kg/d
Total Solid	16,500.00	257.95
SS	*20*	*7.70*
PAC	*300*	*115.50*
A.Polymer	*5*	*1.93*
Others	*245*	*94.33*
CaCl2	*100*	*38.50*

Sludge Holding Tank		
Flowrate	15.63 m3/day	
TSS	15,000 mg/l	258.0 kg/day

Screw Press		
Flowrate	15.63	m3/day

Sludge Cake				
Sludge	1289.75	kg/d	80%	% M.C.

Ringkasan Eksekutif | PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

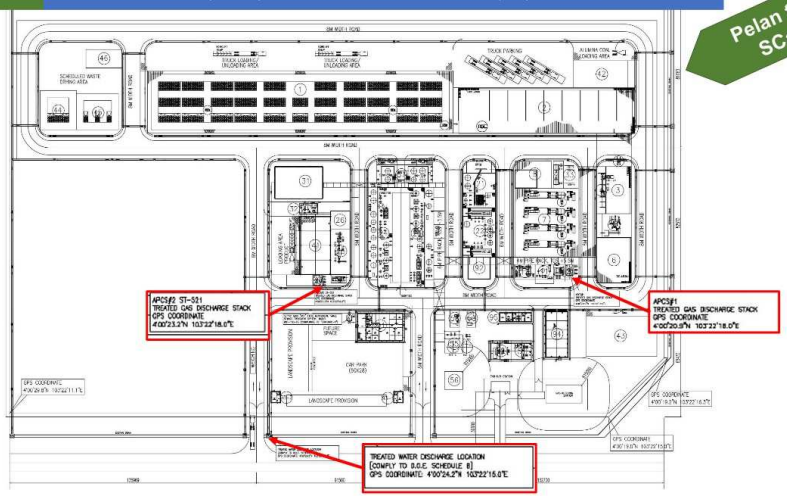
Pengurusan Sisa Terjadual

Semua Sisa Terjadual (SW) perlu diuruskan dengan mematuhi Environmental Quality (Scheduled Wastes) Regulations 2005, EQ(SW)R 2005, utamanya bagi:

- ❑ Jenis bekas, penglabelan dan penyimpanan selamat;
- ❑ Kemudahan penyimpanan selamat hendaklah dibina mengikut arahan EQ(SW)R 2005, untuk mempastikan ianya tidak membahayakan, akibat pembakaran, kebocoran, tindakbalas, dll.
- ❑ SW hanya boleh diangkut oleh yang berlesen, serta dihantar hanya ke premis berlesen, dengan kriteria penerimaan jenis sisa (WAC) yang sesuai.
- ❑ Penstoran minyak perlu dalam tapak bersekat, dengan isipadu tersekat pada 110% isipadu tangka terbesar. Sebarang tumpahan perlu dipungut serta merta, dengan pungutan diurus sebagai SW.
- ❑ Semua sisa adalah terjumlah dan dibandingkan dengan bahan mentah yang masuk.

Ringkasan Eksekutif | PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

Pelan tapak SCaRF



Ringkasan Eksekutif | PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

Pengurusan Sisa Sanitari:
- Kumbahan
- Sampah

Pengurusan kumbahan:
- Mengguna Sistem perawatan kecil (small sewage treatment system (SSTS))
- Tangki ditanam
- Efluen terawat mematuhi Standard A
- Semasa pembinaan, jamban boleh alih dibekalkan sehingga SSTS siap dipasang.

Pengurusan sampah:
Perlu dibekalkan tong sampah yang mencukupi, pada lokasi yang sesuai, dengan pemungutan berkala oleh kontraktor berlesen.

Keduanya adalah produk Malaysia

Sebaliknya sisa mudah reput boleh dikomposkan, dengan manfaat berikut:
- Mengurangkan frekuensi pemungutan dan pengangkutan
- Sisa kering seperti plastic, dll, boleh dipungut sekali setiap 2 minggu.
- Menghalang air luluhan, bau, serta tikus, lalat, dll.

Jadual pembinaan

TAIYO KOKO RECYCLE PLANT PROJECT

Construction Schedule

WBS	Discipline	Dur (Mths)	2022 Oct -3	Nov -2	Dec -1	2023 Jan 1	Feb 2	Mar 3	Apr 4	May 5	Jun 6	July 7	Aug 8	Sept 9	Oct 10	Nov 11	Dec 12	2024 Jan 13	Feb 14	Mar 15	Apr 16	May 17	Jun 18	July 19	Aug 20	Sep 21	Oct 22
	CONSTRUCTION SCHEDULE																										
1	**BOTH PLANT**											21 Months															
1.1	Major Milestone					◀																				▶	
1.1.1	Mobilisation to Site					▼ Mob																					
1.1.2	Construction Start											▼ LLI (check)															
1.1.3	Mechanical Completion																									▼ MC	
1.2	Temporary Facilities	2.0				▬	▬																				
1.3	C&S Works																										
1.3.1	Piling Works	3.0				▬	▬	▬																			
1.3.2	Concrete	4.0						▬	▬	▬	▬	▬															
1.3.3	P/Rack Structure	4.0										▬	▬	▬	▬												
1.3.4	General Civil & Others	6.0										▬	▬	▬	▬	▬	▬										
1.4	Building Works																										
1.4.1	Building & Shelter Works	14.0						▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬					
1.4.2	HVAC	4.0														▬	▬	▬	▬	▬	▬						
1.5	Eqpt Installation Works										▼																
1.5.1	Equipment	6.0										▬	▬	▬	▬	▬	▬										
1.5.2	Vendor Pkge	6.0										▬	▬	▬	▬	▬	▬										
1.6	Piping Works																										
1.6.1	Shop Fabrication	3.0												▬	▬	▬											
1.6.2	Field Installation	7.0														▬	▬	▬	▬	▬	▬	▬	▬				
1.7	Painting Works	6.0														▬	▬	▬	▬	▬	▬	▬	▬				
1.8	E & I Works																										
1.8.1	Electrical Works	7.0															▬	▬	▬	▬	▬	▬	▬	▬			
1.8.2	Instrumentation Works	7.0															▬	▬	▬	▬	▬	▬	▬	▬			
1.9	Scaffolding Works	13.0										▪	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪			
1.10	Precommisioning & Comm	4.0																					▬	▬	▬	▬		

NOTE :
1) To reconfirm LLI Site ETA
2) To reconfirm Mob and MC date for Construction

CONSTRUCTION ACTIVITY ▬
PARTIAL ACTIVITY ▪

TAIYO KOKO RECYCLE PLANT PROJECT
TOYO ENGINEERING AND CONSTRUCTION SDN BHD

Rev	Date	Description	by	chk	app	autho
R2	3 Aug'22	For EIA Submission	Lim			
R1	23 Jul'15	Split by Cases	Jason			
R0	7 Jul'15	Draft	Jason			

Note: (O: No significant Impacts; ✪: Less significant/Insignificant Impacts; ●Potentially Significant Impacts)

Aktiviti Projek & Impak yang mungkin

Aktiviti Projek

Impak yang mungkin

		O	✪	●
Project phase: Pre-Construction and Preliminaries				
Surveys, Investigations and Preliminaries	Project Planning	√		
	Preparation and submission of EMP for approval by DOE	√		
	Application for Written Permission for Setting-up of Scheduled Waste Off-Site Recovery Facility (Section 19 of EQA1974)	√		
	Application for Licence for Setting-up of Scheduled Waste Off-Site Recovery Facility (Section 18 of EQA1974)	√		
	Preparation and submission of Written Permission for APCS and IETS for approval by DOE	√		
	Access to Project Site	√		
	Surveys/ Site Investigations	√		
	Technical and Engineering Feasibility Investigations	√		
Project phase: Construction				
Stage 1: Site clearing and erosion control measures	Marking of areas to be cleared	√		
	Digging up and completion of runoff retention pond (RP) and earth drains feeding to the RP, as per ESCP designs, with silt trap(s) and silt fence(s) to avoid surface run-off flow directly to the water body.			√
	Stockpiling of excavated earth at an area near to the site for future backfilling.			√
	Clearing of vegetation and manual chopping of branches for easier handling			√
	Loading of green wastes into roro bins and transporting the wastes to nearest landfill	√		
	Clearing off wastes dumped onto site and hauling to nearest landfill	√		
	Mobilization of Land Surveyor for setting out of proposed site and the existing platform level.	√		
	Covering of slopes of earth stockpile with plastic sheets to prevent soil erosion.	√		
Stage 2: Foundation Works	Mobilization of Land Surveyor for setting out of foundation points and layouts at site	√		
	Construction of onsite roads and drains			√
	Construction of foundations for various equipment as per structural design			√
Stage 3:Construction of Structures	On site steel bars cutting and bending works at required schedules; commenced at fabrication yard and completed concurrently upon completion of lean concreting.		√	
	Formwork placed layer by layer, maintained by 1.2m (plywood) or 0.6m (metal formwork) each to prevent occurrence of any cold joint.	√		
	Water stop will be placed along the horizontal and vertical construction joints.	√		
	Concreting works using approved concrete from permitted sources upon inspection by COW. High Alumina cement applied at all internal surfaces of structures.	√		
	Installation of electricity supply system	√		
	Installations and Testing of each equipment	√		
	Commissioning of plant			√
	Monitoring to ensure designed performance and emission compliance.	√		
Project phase: Operation				
SCaRF Operation	Operation of SCaRF and IETS			√
	Operation of SCaRF and APCS			√
	Traffic movement		√	
	Maintenance work	√		
	Amenities	√		

Ringkasan Eksekutif
PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

Piawai bagi Kajian

No	Environmental Component	Assessment Standard
1	**Water Quality**	• **Environment Quality Act, 1974 (EQA,1974)** • **Environment Quality (Industrial Effluent) Regulation 2009** • **Environment Quality (Schedule Wastes Treatment and Disposal Facilities) Regulations 2005** • **National Water Quality Standards for Malaysia (NWQS)** • **Environmental Quality (Control of Pollution from Solid Waste Transfer Station and Landfill) Regulation 2009.**
2	**Air Quality**	• **Environmental Quality (Clean Air) Regulations 2019 (CAR 2019)** • **Malaysian Ambient Air Quality Standards, 2020**
3	**Noise & Vibration**	• **Guidelines for Environmental Noise Limits and Control 3rd Edition 2019** • **The Planning Guidelines for Vibration Limits and Control in the Environment 2nd Edition 2007**
4	**Hydrology**	• **Urban Storm Water Management Manual for Malaysia 2nd Edition (DID, 2012).** • **Hydrological Procedure No. 15, Bahagian Parit dan Taliair, Kementerian Pertanian Malaysia (DID, 1976).**
5	**Soil Erosion and LD-P2M2**	• **Prevention and Control of Soil Erosion and Siltation, Department of Environment, 1999** • **Guidance Document for Addressing Soil Erosion and Sediment Control Aspects in EIA Report** • **Guidelines for Erosion and Sediment Control in Malaysia (DID, 2010).** • **Urban Storm water Management Manual for Malaysia 2nd Edition (2012).**
6	**Terrestrial Flora**	• **Malaysian Plant Red List** • **IUCN's Red List of Threatened Species**
7	**Terrestrial Fauna**	• **Wildlife Conservation Act 2010 (Amendment 2012) for Peninsular Malaysia** • **IUCN's Red List of Threatened Species**
9	**Land Use**	• **Garis Panduan Perancangan Pemuliharaan dan Pembangunan KSAS** • **Rancangan Tempatan Daerah Kuantan 2035 (Penggantian)**
10	**Traffic**	• **Road Traffic Volume Malaysia, JKR 2019**

Metodologi Kajian

Land Use Survey	• **Obtain land use data from Local Plan/ Structure Plan** • **Verification of the land use during field study and GIS images** • **Use existing data available from previous studies and historical records**
Geology and Soils	• Assess existing conditions, with secondary information from geological map of the area and studies in the area as reference.
Soil Erosion & LD-P2M2	• Soil investigation (SI) data shall be provided by the client. • The existing soil loss during current condition will be predicted based on RUSLE estimation.
Hydrology	• The hydrological study shall establish the preliminary baseline information on hydrological characteristics of the study area, including any flood record upstream and downstream of the project site from JPS and other studies in the area as references.
Water Quality	• Preliminary survey was carried out to assess water quality based on assessment of water appearance and sources of pollution. • Sampling and analysis will be carried by an accredited laboratory. • Parameters to be analysed are: Temperature, Turbidity, pH, Dissolved Oxygen (DO), SS, BOD, COD, Ammonia and heavy metals (Mo and V) • Sampling will be carried out at 8 points at a single depth of about one (1) meter below the water surface, where possible, at predetermined coordinates, at appropriate points. • Secondary data will also be used as reference to describe existing water quality. • All analysis will follow Standard Methods (APHA) or USEPA Approved Methods for the whole 30 parameters as per EQ(S)R 2009 and EQ(IE)R2009, • Calculation of WQI will be based on 6 parameters (Chemical Oxygen Demand, Biochemical Oxygen Demand, Dissolved Oxygen, Suspended Solids, pH and Ammoniacal Nitrogen) • Water Quality Modelling will be carried out with the existing water quality obtained as baseline, for normal and worst case scenarios. • Modelling will use the QUAL2K model developed by the United State Environmental Protection Agency (USEPA) which is suitable for small rivers such as Sg. Baluk where the waters can be assumed to be completely mixed as it travels.
Air Quality	• Ad-hoc Ambient Air Quality Monitoring (AAQM) will be carried out by accredited laboratory at identified Air Sensitive Receptors (ASRs) namely at Project Site (A1) and nearest settlement, such as Kg Gebeng, Kg. Sg. Ular, Institut Latihan Perindustrian Kuantan (ILP Kuantan) and AMSAS (Akademi Maritim Sultan Ahmad Shah). • Air quality sampling and analysis will be carried out by an accredited lab at 6 points: on-site and at nearest public areas. • The criteria air pollutants to be monitored are the Malaysian Ambient Air Quality Standards (MAAQS) namely PM_{10}, $PM_{2.5}$, NO_2, SO_2, CO and O_3. In addition, Volatile Organic Compounds (VOCs) will be also monitored; • The Project stack emission complying to the prescribed limits of the Environmental Quality (Clean Air) Regulations 2019 (CAR 2019) will be simulated using the AERMOD air quality model with 3-years (2018 to 2020) WRF AERMET ready hourly meteorological data; • The predicted appropriate Maximum Average Incremental Concentration (MAIC) averaging time for the identified criteria air pollutants will be added to the Baseline Level (BL) for the calculation Ground Level Concentration (GLC) at the identified ASRs; • The iso-contour overlay with the appropriate basemap will be produced for the simulated averaging time; and • The calculated GLCs will be compared against mainly the prescribed limits in the MAAQS. In addition, the MAIC from the Project will be compared against the adopted 25% threshold as recommended by the International Finance Corporation (IFC) for sustainable airshed. • Land clearing is of secondary vegetation of low bushes, with disposal of green wastes to the nearest landfill (the Jabor landfill). Construction is in a fairly small area and involves mainly installations of readymade equipment and tanks onto a prepared platform, thus any increase in particulates is expected to be limited to the site, and will be captured by the air quality monitoring.
Noise level	• Noise measurements will be carried out at 3 points nearest to the project site. Processes during construction and operation of this plant is expected to be relatively quiet. • The existing noise level parameters, i.e., L10, L50, L90, Lmin, Lmax, LAeq, will be measured at the identified sampling locations using calibrated sound level meter.

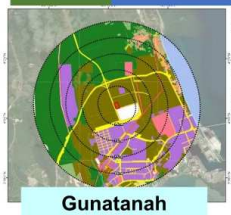
Metodologi kajian - samb.

Socio Economy and public health	• **The human environment shall focus on communities and land use located within the proposed Project ZOI of 5 km radius to assess the demographic socio-economic characteristics of the ZOI area and their relevance to the proposed project.** • **Socioeconomic and public health surveys will be based on questionnaires and data from institutions in the Gebeng area.** • **Informal group discussions with the surrounding population will be carried out to:** - **inform of the project (thus potential for their involvement during construction and operation);** - **gauge their acceptance or otherwise of the project.** • **Secondary data will be employed based on other studies, to assess the implications of the proposed project.** • **The following departments will be sought, where required, for the above data and information: JPBD, Statistic Department, and the Local Government.**
Traffic	• This traffic study will be through the following stages: a) Inventory review and data collection; A review will be made of existing data and the need for further collection of any additional traffic will be identified. This is to enable assessment of the situation within the study area. a) Assessment of Existing Conditions The existing traffic conditions at and surrounding the project will be established. These will form the base conditions against which future impact from the proposed projects may then be assessed. a) Evaluation of Traffic Impact The estimated traffic volume on the surrounding road network will be compared with the road capacity to evaluate the impact of the traffic generated from the proposed project. If the traffic volume is higher than the estimated road capacity, then remedial measures have to be recommended. a) Recommendation of Remedial Measures • Recommendation of remedial measures shall include road network improvement program, access to the development, temporary traffic management plan and traffic circulation and parking development activities • Recommended conceptual drawing for remedial measures to assist the other consultant/s team member (i.e. civil & structure engineer, etc.)
Flora and Fauna	• To assess existing conditions within the ZOI • To survey flora fauna by observations, where there are still plants, eg., along Sg. Baluk river banks; • To access possibility of maintaining a contiguous river reserve based on JPS guideline along Sg. Baluk: - as a form of enhancing the flora fauna of the area and the river, - as river banks protection along Sg. Baluk. - as water biofilters to protect water quality of Sg. Baluk in the face of rapid development of the Gebeng Industrial Area.

Ringkasan Eksekutif

PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

Gunatanah



Gunatanah semasa

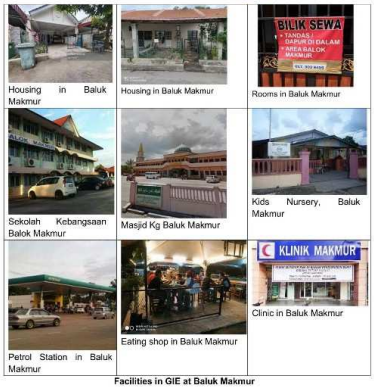
Gunatanah berzon

Sumber: Rancangan Tempatan Daerah Kuantan 2035 (Penggantian)

KIA and its metropolis

ECRL station at Kuantan Port

Antara projek mega akan datang di Gebeng



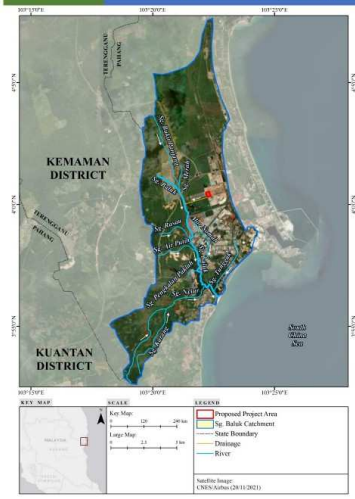
Housing in Baluk Makmur | Housing in Baluk Makmur | Rooms in Baluk Makmur
Sekolah Kebangsaan Balok Makmur | Masjid Kg Baluk Makmur | Kids Nursery, Baluk Makmur
Petrol Station in Baluk Makmur | Eating shop in Baluk Makmur | Clinic in Baluk Makmur

Facilities in GIE at Baluk Makmur

Bandar terdekat (Baluk Makmur) berkemudahan asas

Ringkasan Eksekutif PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

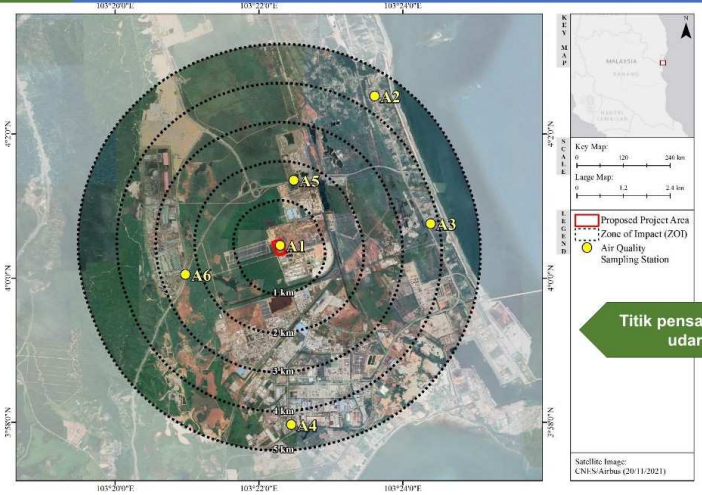
Penyaliran & Banjir



- ❑ Panjang Sg. Baluk adalah ~10km dan tiada terdapat sebarang takat pengambilan air (WIP) padanya.
- ❑ Sebagai sungai pendek yang mengalir ke Laut China Selatan, sebarang aliran besar kerana hujan akan terus ke laut sekiranya penyaliran yang cekap dibina.
- ❑ Tapak-tapak lot industri di Gebeng telah ditambak naik pada 2011 setelah berlakunya banjir tengkujuh pada 2010.
  - ➔ Sejak penambakan itu, lot-lot industri tidak lagi dibanjiri;
  - ➔ Dengan itu, boleh disimpulkan bahawa banjir di tapak cadangan tidak mudah berlaku sejak ianya ditambak pada 2011 dan penyaliran diperbaiki, selagi penyaliran sentiasa baik.
- ❑ Walaubagaimanapun, pembangunan pesat di Gebeng akan meningkatkan beban ke atas sistem saliran sediaada:
  - ➔ Banjir kilat boleh berlaku selepas hujan sangat lebat sekiranya penyaliran tidak sentiasa diperbaiki.

Ringkasan Eksekutif PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

Kajian kualiti Udara



Kajian kualiti udara:
- **Pensampelan udara;**
- **Pemodelan penyerakan gas sisa dari loji.**

Titik pensampelan udara

Ringkasan Eksekutif PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

Hasil kualiti udara

Baseline Air Quality Results

Para-meter	Unit	A1	A2	A3	A4	A5	A6	MAAQS, 2020	Comment
TSP	µg/m³	46	12	54	121	75	112	NS	Low
PM10	µg/m³	38	9	46	63	57	54	100 µg/m³	Clear air, not dusty
PM2.5	µg/m³	23	7	27	30	28	25	35 µg/m3	Fine dust still low
SO2	µg/m³	24	18	27	34	36	38	80 µg/m³	No noticeable acidic SO_2
NO2	µg/m³	29	21	32	37	39	42	70µg/m³	No noticeable acidic NO_2
CO	mg/m³	6	2	6	10	7	9	10 mg/m³	CO still within limit
VOC	mg/m³	0.31	0.22	0.39	0.75	0.47	0.68	NS	As baseline data
H2S	mg/m³	0.5	<0.1	<0.1	<0.1	<0.1	<0.1	NS	As baseline data
CH4	mg/m³	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	NS	As baseline data

Note: NS: Not Stated

Pensampelan udara

Methodology for Air Quality Measurement	
Parameter	Test Method
TSP	USEPA 40 Part 50, Appendix B
PM10	USEPA 40 Part 50, Appendix J
SO2	ISC 704 A
NO2	ISC 408
CO	EC-IAQ-01
VOC	NIOSH 2549
H2S	NIOSH 6013
CH4	USEPA Method 3C

Rumusan kualiti udara

Kesemua parameter kualiti udara yang diukur di kesemua titik mencatatkan kepekatan yang kurang daripada limit MAAQS (2020), menunjukkan kualiti udara semasa masih baik.

Ringkasan Eksekutif PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

Pemodelan kualiti udara

Penerima sensitif

Pemodelan kualiti udara untuk menilai kesan mungkin gas pelepasan dari SCaRF

Point	Description	UTM Coordinates (x, y) (m, m)
On-site Air Sensitive Receptor		
ASR1	Within the Project Site	319211.05, 443135.07
Off-site Air Sensitive Receptors		
ASR2	At Coastal Residential Village, Kg. Sungai Ular	321649.94, 446957.22
ASR3	At Seaside Residential Area, East of the Project Site	323097.90, 443681.55
ASR4	Institut Latihan Perindustrian Kuantan (ILPK), South of the Project Site	319492.60, 438558.64
ASR5	Akademi Maritim Sultan Ahmad Shah (AMSAS), North of the Project Site	319565.42, 444808.7
ASR6	Malaysia China Kuantan Industrial Park (MCKIP), West of the Project Site	316771.72, 442404.58

Ringkasan Eksekutif PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

Pemodelan kualiti udara

Semasa pembinaan	
Bahan Pencemar	Debu daripada: • Aktiviti pembinaan • Aktiviti pengangkutan Aktiviti serta debu di atas adalah sementara dan kualiti udara akan Kembali kepada sediakala apabila pembinaan selesai.
Langkah Mitigasi	Langkah Pengurusan Terbaik (Best Management Practices (BMPs)) diamalkan semasa pembinaan.
Semasa Operasi	
Bahan Pencemar	Punca pencemaran adalah cerobong yang melepaskan gas yang telah dibersihkan mengguna penggahal serta Pemendak Elektrostatik. Parameter tersebut adalah • PM_{10} & $PM_{2.5}$ (24-jam dan purata tahunan MAIC) • SO_2 (1-jam & 24-jam purata MAIC) • NO_2 (1-jam & 24-jam purata MAIC) • NH_3 (8-jam & 24-jam purata MAIC)
Model	USEPA AERMOD
Kriteria	Environmental Quality (Clean Air) Regulations 2014 **(CAR 2014)** Malaysian Ambient Air Quality Standards at Standard 2020 **(MAAQS [Standard (2020)]**
Langkah Mitigasi	Department of Environment (DOE)'s Technical Guidance on Performance Monitoring of Air Pollution Control System (APCS). Guidance Document on Fuel Burning Equipment and Air Pollution Control Systems for the design of the Fuel Burning Equipment, Bio-scrubber System and Chimney. Certified Environmental Professional in Scrubber Operation (CePSO)

Pemodelan keadaan:
Operasi normal/biasa

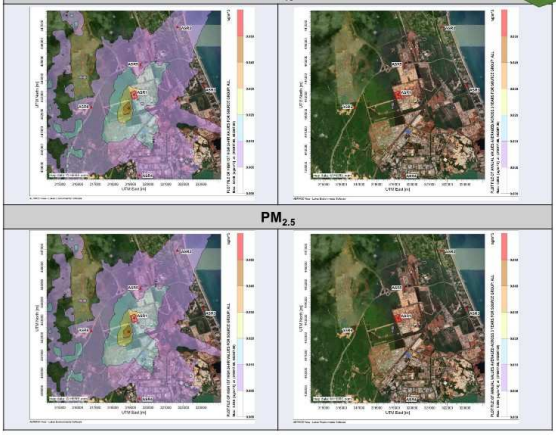
- **Nilai ramalan bagi Peningkatan Kepekatan Purata Maksimum (Maximum Average Incremental Concentration (MAIC)) akan ditambahkan kepada nilai asas (Baseline Level (BL)) daripada kepekatan di bumi (Ground Level Concentration (GLC)) di setiap ASRs;**
- **Iso-contour akan dihasilkan;**
- **Nilai GLCs yang dikira akan dibandingkan dengan limit MAAQS.**
- **Nilai MAIC akan dibandingkan dengan nilai 25% tahap ambang (threshold value) seperti yang disyorkan oleh International Finance Corporation (IFC) untuk udara yang lestari.**

Berasaskan rekabentuk sistem kawalan pencemaran udara yang akan dipasang, boleh dirumuskan bahawa keadaan abnormal amat tidak mungkin, dengan itu tidak dimodelkan di sini.

Ringkasan Eksekutif PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

Hasil Pemodelan: PM10 & PM2.5

Hasil Kajian	Masa Purata 24-jam	Purata Tahunan
Parameter: PM_{10} **Ramalan 24-jam MAICs:** Mematuhi MAAQS (Standard [2020]) limit **The 24-jam GLC:** Mematuhi (Standard [2020]) **Ramalan Tahunan MAICs:** Mematuhi (Standard [2020])	**PM_{10}**	
Parameter: $PM_{2.5}$ **Ramalan 24-jam MAICs:** Mematuhi (Standard [2020]) limit **Ramalan Tahunan MAICs:** Mematuhi (Standard [2020]) limit	**$PM_{2.5}$**	



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Hasil Pemodelan: SO2 & NO2

Hasil Kajian	Masa Purata 1-jam	Masa Purata 24-jam

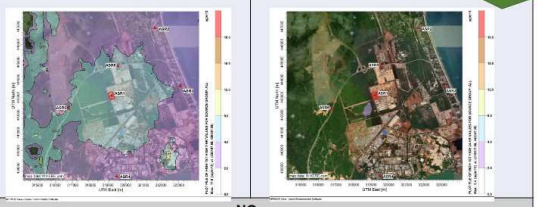
Parameter: SO_2

Ramalan 1-jam MAICs:
Mematuhi MAAQS 2020 limit

Ramalan 24-jam MAICs:
Mematuhi MAAQS 2020 limit

24-jam GLC:
Mematuhi MAAQS 2020

SO_2



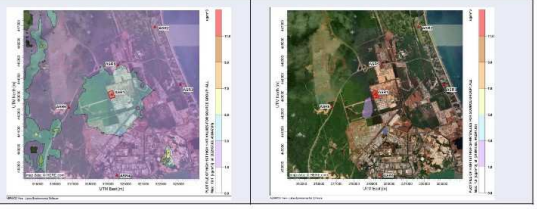
Parameter: NO_2

Ramalan 1-jam MAICs:
Mematuhi MAAQS 2020 limit

Ramalan 24-jam MAICs:
Mematuhi MAAQS 2020 limit

24-jam GLC:
Mematuhi MAAQS 2020

NO_2



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Hasil Pemodelan: NH3

Hasil Kajian	Masa purata 8-jam	Masa purata 24-jam

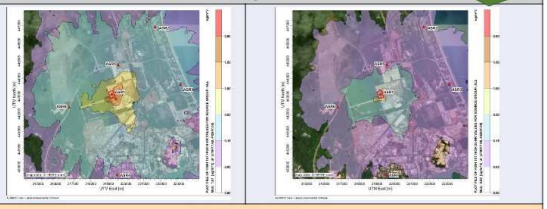
Parameter: NH_3

Ramalan 8-jam MAIC:
Tiada ketidakpatuhan di semua ASRs

Ramalan 24-jam MAIC:
Mematuhi limit 24-jam, iaitu 100 µg/m³ bagi Ontario's Ambient Air Quality Criteria 2012.

Ramalan Tahunan MAIC:
Tiada ketidakpatuhan di kesemua ASRs

NH_3



Purata Tahunan

Ringkasan Eksekutif PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

Hasil Pemodelan: NMVOC

Hasil Kajian	Masa purata 8-jam	Masa purata 24-jam

Parameter: NMVOC

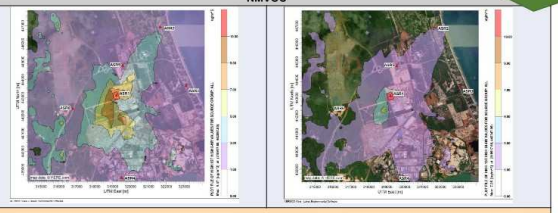
Belum ada limit dalam MAAQS 2013 bagi parameter ini.

Ramalan 8-jam MAIC:
Tertinggi ialah 9.47 µg/m³

Ramalan 24-hours MAIC:
Tertinggi ialah 7.25 µg/m³

Ramalan Tahunan MAIC:
Tertinggi ialah 1.13 µg/m³

NMVOC



Purata Tahunan

Ringkasan Eksekutif PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

Impak Mungkin & Langkah Mitigasi

IMPAK MUNGKIN	LANGKAH MITIGASI
Semasa Pembinaan ▪ Kesan debu adalah sementara	• Pagarkan kawasan pembinaan untuk mengurangkan penyerakan debu oleh angin. • Pastikan laluan pengangkutan lembab. • Lembabkan barangan berdebu • Muatan lori hendaklah ditutup kemas semasa dalam perjalanan. • Basuhan tayar dan kenderaan perlu disediakan dan diselenggara di setiap laluan keluar dari tapak binaan. • Kawasan yang tidak terlibat dengan pembinaan hendaklah ditutupi tanaman dengan segera. • Kesemua kenderaan perlu sentiasa dalam keadaan baik dan mematuhi kelajuan 25 km/jam. • Kesemua timbunan tanah dan lain-lain yang boleh menjana debu perlu di tutup. • Senarai pengurusan debu perlu disediakan dan digunapakai. • Kesemua genset atau alat diesel perlu mematuhi Environmental Quality (Clean Air) Regulations 2014 (CAR 2014).
Semasa Operasi ▪ Semasa operasi normal nilai ramalan GLCs bagi kesemua parameter kajian di ASRs adalah mematuhi limit MAAQS 2020. ▪ Kajian seterusnya mengguna 25% nilai ambang seperti yang diguna oleh IFC menunjukkan nilai ramalan MAIC mematuhi nilai ambang 25% di kesemua penerima sensitif i.e. ASR1, ASR2, ASR3, ASR4, ASR5 and ASR6	Semasa Operasi • Kesemua pelepasan perlu mematuhi CAR 2014 • Pemantauan berkala seluruh bahagian loji adalah perlu dan jadual pemantauan perlu disediakan

Ringkasan Eksekutif PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

Keadaan Sediaada

LD-P2M2
Kondisi Sediaada

- Sebahagian Lot 29132 – 8.1ha
- Tapak secara umumnya rata (Ketinggian dalam lingkungan 7.1m hingga 8.8m)
- Tapak projek merangkumi kawasan kelas I (0˚ -15˚) - 100%
- Siri tanah – digredkan kepada paras platform dengan tanah lempung berpasir.
- Dilitupi dengan tumbuh-tumbuhan sekunder iaitu pokok, semak dan tumbuhan renek.
- ERA – Pra pembinaan – Kawasan tadahan dikategorikan sebagai risiko sederhana.

KEADAAN SEMASA		
Kawasan	**A (t/ha/tahun)**	**Kategori risiko**
C1	**38.89**	**Sederhana**

Ringkasan Eksekutif PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

LDP2M2 Penilaian Hakisan

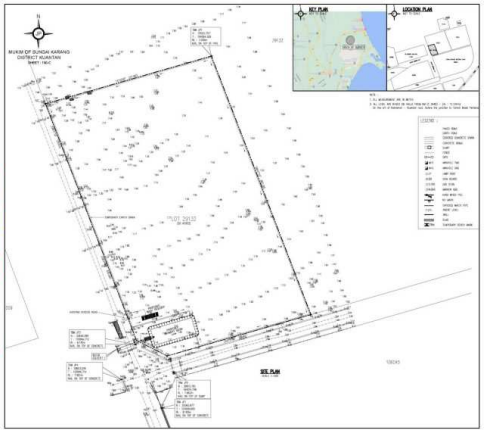
LD-P2M2
- Penilaian Impak Hakisan & Langkah Kawalan

- Dengan cadangan kawalan LD-P2M2, risiko hakisan dikekalkan dalam kategori rendah sepanjang tempoh pembangunan dan operasi
- Semasa pembangunan – Basin sedimen (1unit)
- BMP lain: Saliran tanah sementara, sungkupan, jalur tumbuh-tumbuhan (penampan) *wash through*, dsb.

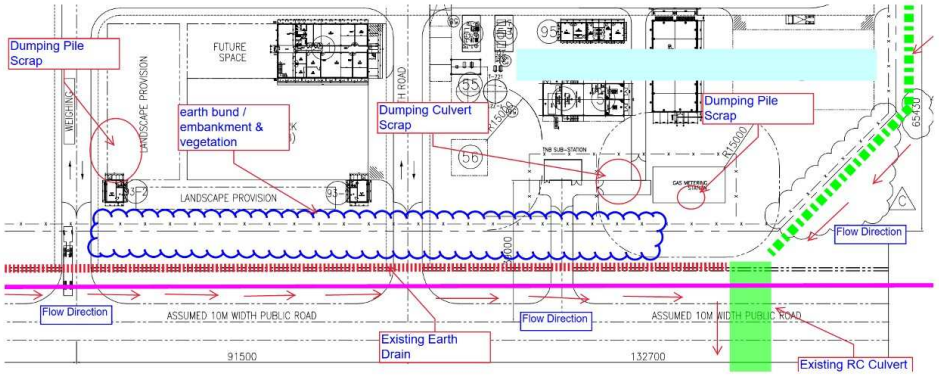
Soil Loss (ton/ha/yr)	Classification	Color Code
<10	Low	
10 - 50	Moderate	
50 -100	Moderate High	
100 - 150	High	
>150	Very High	

Catchment	Area (ha)	A (Soil Loss)			
		BD	WC	DDWCM	PD
C1	8.1	38.89	97.24	4.86	2.92

No	Label	Dimension, Length x Width x Depth	Contributing Area (ha)
1	SB-1	61.4 x 26.2 x 1.9	8.0937

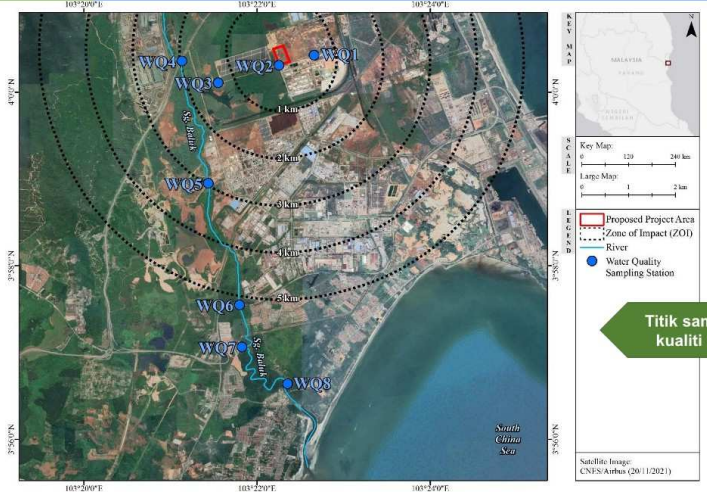


Langkah-langkah LDP2M2 di tapak



Ringkasan Eksekutif
PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

Penilaian Kualiti Air



Penilaian Kualiti Air:

- Sampel kualiti air diambil.
- Pemodelan serakan efluen IETS.
- Pemodelan bagi :
  - Pematuhan kepada Std. B, EQ(IE)R2009
  - Senario terburuk, tanpa rawatan. Aliran sungai normal Aliran sungai rendah.

Titik sampel kualiti air

Ringkasan Eksekutif
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Persampelan & Penilaian kualiti air

Table 6.5(6): Water Quality Index (WQI) and Class for Sg. Baluk

WQ Point	WQI VALUE	WQ CATEGORY	WQ CLASS
WQ1	66.99	Slightly Polluted	Class III
WQ2	66.48	Slightly Polluted	Class III
WQ3	69.02	Slightly Polluted	Class III
WQ4	55.29	Polluted	Class III
WQ5	61.04	Slightly Polluted	Class III
WQ6	64.58	Slightly Polluted	Class III
WQ7	66.40	Slightly Polluted	Class III
WQ8	61.95	Slightly Polluted	Class III

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Data Kualiti Air

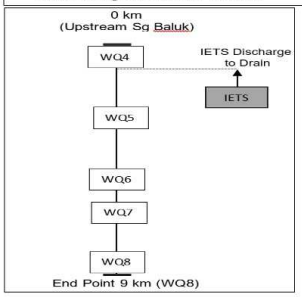
Table 6.5(5): Water Quality Results for Sg. Baluk

Parameter	Unit	WQ1	WQ2	WQ3	WQ4	WQ5	WQ6	WQ7	WQ8	NWQS Class IIB	WQ in brief
pH (in-situ)	-	8.37	6.68	4.01	5.45	5.91	6.35	6.48	6.77	6-9	
DO (in-situ)	mg/L	6.3	5.5	5.3	5.6	5.0	5.8	5.1	5.3	5-7	Fairly high DO, all aerobic
T (in-situ)	°C	26.8	26.1	27.1	27.3	28.2	28.5	28.7	29.5	Normal±2	Normal temperatures, no hot discharges
Turb (in-situ)	NTU	93	101	101	65	43	24	27	18		Moderately clear waters, except at WQ1, WQ2 and WQ3.
*Total SS	mg/L	88	96	18	24	50	56	14	38	50	Low SS, except at WQ1 and WQ2.
*BOD(5,20)	mg/L	6	5	3	13	5	12	8	13	3	Low BOD except at WQ4,WQ6 & WQ13
*COD	mg/L	42	56	28	61	98	61	42	20	25	Low COD except moderate at WQ5
*Amm-N	mg/L	1.526	1.063	0.880	3.872	1.388	0.981	1.910	3.465	0.3	Low NH3-N, except at WQ4 and WQ8
Oil & Grease	mg/L	ND(<1)	ND(<1)	ND(<1)	ND(<1)	ND(<1)	ND(<1)	ND(<1)	ND(<1)	ND	Non-detectable at all points
*Mercury Hg	mg/L	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)		Non-detectable at all points
*Cd	mg/L	ND(<0.002)	ND(<0.002)	ND(<0.002)	ND(<0.002)	0.002	ND(<0.002)	0.002	0.004	0.01	Very low at all points
*Cr 6+	mg/L	ND(<0.003)	ND(<0.003)	ND(<0.003)	ND(<0.003)	ND(<0.003)	ND(<0.003)	ND(<0.003)	ND(<0.003)	0.05	Non-detectable at all points
* As	mg/L	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	0.05	Non-detectable at all points
* CN-	mg/L	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	0.02	Non-detectable at all points
*Pb	mg/L	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	0.05	Non-detectable at all points
*Cr 3+	mg/L	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	-	Non-detectable at all points
* Cu	mg/L	ND(<0.01)	ND(<0.01)	0.16	0.02	0.01	0.02	0.02	0.01	0.02	All low; <NWQS IIB except WQ3
*Mn	mg/L	0.17	0.18	0.19	0.32	0.15	0.12	0.14	0.16	0.1	All low or about NWQS Class IIB
* Ni	mg/L	ND(<0.01)	0.02	0.37	0.01	0.07	0.04	0.08	0.11	0.05	All about NWQS IIB , except WQ3.
*Sn	mg/L	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	-	Non-detectable at all point
*Zn	mg/L	0.03	ND(<0.01)	0.03	0.13	0.08	0.05	0.06	0.01	5	All well below NWQS Class IIB limits.
* B	mg/L	ND(<0.10)	ND(<0.10)	ND(<0.10)	ND(<0.10)	ND(<0.10)	ND(<0.10)	ND(<0.10)	ND(<0.10)	1	Non-detectable at all points
*Fe	mg/L	0.56	0.71	0.83	1.04	2.10	0.77	0.55	0.36	1	All about NWQS Class IIB limits.
*Phenol	mg/L	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	0.01	Non-detectable at all points
*Free Cl	mg/L	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	-	Non-detectable at all points
* S2-	mg/L	ND(<0.10)	ND(<0.10)	ND(<0.10)	ND(<0.10)	ND(<0.10)	ND(<0.10)	ND(<0.10)	ND(<0.10)		Non-detectable at all points
*Cr Tot.	mg/L	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)		Non-detectable at all point
* Ag	mg/L	ND(<0.01)	0.25	0.07	ND(<0.01)	ND(<0.01)	ND(<0.01)	0.09	0.05	0.05	All about NWQS IIB , except WQ2
* Al	mg/L	0.036	0.027	0.738	0.174	0.041	0.028	0.077	0.075	-	All low; no limit in NWQS Class IIB.
*Se	mg/L	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	0.01	All low
*Barium	mg/L	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	1	All low
* F	mg/L	ND(<0.01)	ND(<0.01)	0.01	0.86	0.66	0.54	0.63	0.78		
*Formaldehyde	mg/L	0.029	0.034	0.045	0.19	0.008	0.003	0.022	0.020		
*Colour	ADMI	157	163	107	135	45	63	70	42		

Ringkasan Eksekutif — PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

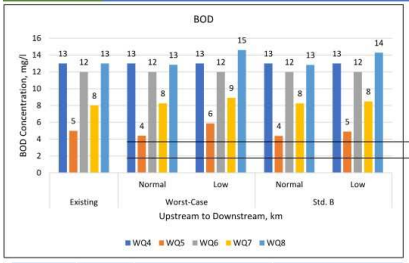
Pemodelan kualiti air

- **Simulasi telah dijalankan di Sg Baluk.**
- **Jarak kira-kira 9 km, dari W4 ke W8.**
- **Senario Terpilih, Senario Terburuk dan Dengan Mitigasi (Std B dan LDP2M2) untuk kedua-dua Aliran Biasa dan Aliran Rendah.**
- **Aliran dari IETS adalah kira-kira 17 m3/s atau 0.0047 m3/s.**
- **Tiada Pengambilan Air di hilir.**



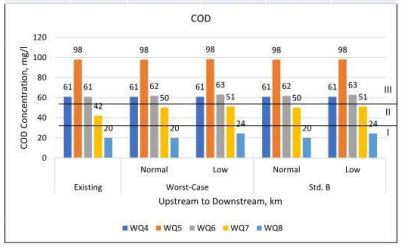
Ringkasan Eksekutif — PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

Ringkasan Keputusan Pemodelan Kualiti Air

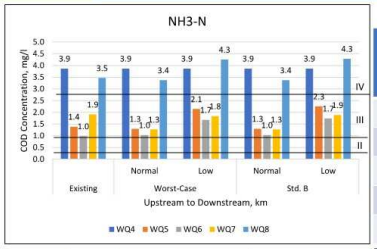


WQ Point	BOD	Worst		LDP2M2	
		Normal	Low	Normal	Low
WQ4	13	13	13	13	13
WQ5	5	4	6	4	5
WQ6	12	12	12	12	12
WQ7	8	8	9	8	8
WQ8	13	13	15	13	14

WQ Point	COD	Worst		LDP2M2	
		Normal	Low	Normal	Low
WQ4	61	61	61	61	61
WQ5	98	98	98	98	98
WQ6	61	62	63	62	63
WQ7	42	50	51	50	51
WQ8	20	20	24	20	24

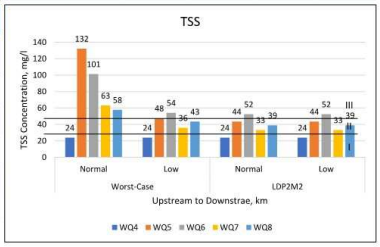


Ringkasan Keputusan Pemodelan Kualiti Air



WQ Point	NH3-N	Worst		LDP2M2	
		Normal	Low	Normal	Low
WQ4	3.872	3.9	3.9	3.9	3.9
WQ5	1.388	1.3	2.1	1.3	2.3
WQ6	0.981	1.0	1.7	1.0	1.7
WQ7	1.91	1.3	1.8	1.3	1.9
WQ8	3.465	3.4	4.3	3.4	4.3

WQ Point	TSS	Worst		LDP2M2	
		Normal	Low	Normal	Low
WQ4	24	24	24	24	24
WQ5	50	132	48	44	44
WQ6	56	101	54	52	52
WQ7	14	63	36	33	33
WQ8	38	58	43	39	39



Ringkasan Eksekutif
PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

Ringkasan Kualiti Air & Perlindungan Sungai

Kesimpulan Kualiti Air

- Kualiti air adalah sederhana kerana organik & nutrien, yang disebabkan oleh tanah bergambut di kawasan itu;
- Impak industri dari segi pH, suhu dan logam berat, masih tidak kelihatan.
- Disebabkan oleh nilai sederhana DO, BOD dan ammonia-N, indeks kualiti air menunjukkan sungai sedikit tercemar di semua titik dan tercemar di WQ4, iaitu di hulu lokasi SCaRF.
- Pemodelan kualiti air menunjukkan bahawa disebabkan oleh kadar alir yang sangat kecil daripada projek SCaRF yang dicadangkan berbanding dengan aliran Sg. Baluk, pelepasan SCaRF yang dicadangkan telah dihamburkan dengan baik apabila sampai ke Sg. Baluk dan mempunyai sumbangan yang tidak ketara kepada kualiti air Sg. Baluk.

Seperti yang kelihatan di persekitaran sungai serta flora dan fauna di kawasan ini, sungai itu masih belum tercemar, dengan:

- ➔ Tumbuhan sungai yang subur di sepanjang sungai.
- ➔ Kepadatan zooplankton yang baik
- ➔ Kepelbagaian ikan, walaupun mereka adalah spesies yang biasa ditemui.
- ➔ Sg. Baluk terkenal dengan aktiviti memancing.

Ini adalah selaras dengan saranan untuk Sg. Baluk dilindungi bagi ekopelancongan, sebagai satu cara untuk meningkatkan aktiviti ekonomi penduduk tempatan, seperti yang diharapkan oleh responden semasa tinjauan sosioekonomi untuk kajian ini.


Upstream


Downstream

Figure 6.9(2) Sg. Baluk vegetation on riverbanks

Ringkasan Eksekutif
PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

Langkah Pengurangan

Program Pemantauan IETS

Cadangan untuk pelepasan dari projek

- Dengan pelepasan IETS mematuhi Piawaian B pada setiap masa, simulasi telah menunjukkan bahawa potensi kesan pelepasan ke Sg. Baluk adalah tidak signifikan.
- Langkah-langkah LDP2M2 hendaklah dilaksanakan semasa peringkat pembinaan. Penyelenggaraan komponen LDP2M2 hendaklah dijalankan apabila perlu, iaitu untuk perangkap sedimen dan longkang perimeter.
- Penyelenggaraan tetap perlu dijalankan untuk memastikan kecekapan IETS.
- Pengendali harus menggunakan Peraturan Kendiri Berpandu, GSR, untuk memastikan pelepasan dari IETS mematuhi keperluan Standard B pada setiap masa semasa peringkat operasi.
- Pemantauan prestasi perlu dijalankan untuk memastikan IETS berfungsi pada kapasiti terbaiknya.

No	Monitoring	Parameters of concern	Frequency	Range of values
1	EQ Sump	Flowrate	Continuous (Online)	16m3/hr(<385m3/day)
		COD	Daily (Lab)	<230ppm
		TSS		< 50ppm
		As		< 0.51ppm
		B		< 9.3ppm
		Mn		< 1.6ppm
		Ni		< 1.05ppm
		Se		< 0.58ppm
		F		< 9.65ppm
		NH3		< 10 ppm
		BOD	Weekly (Lab)	<115 ppm
2	pH Adjustment Tk	pH	Continuous (Online)	9-10
3	Reaction Tk	Nil	Nil	Nil
4	Flocculation Tk	pH	Daily (Lab)	9-10
5	DAF	COD	Daily (Lab)	< 200 ppm
		TSS		< 100 ppm
		As		< 0.1 ppm
		B		< 4.0 ppm
		Mn		< 1.0 ppm
		Ni		< 1.0 ppm
		Se		< 0.5 ppm
		F		< 5.0 ppm
		BOD	Weekly (Lab)	< 80 ppm
6	Buffer Tk	pH	Continuous (Online)	5.5-9.0
7	Multimedia Filter	TSS	Daily (Lab)	< 100ppm
8	Activated Carbon Filter	COD	Daily (Lab)	< 200 ppm
		BOD	Weekly (Lab)	< 50 ppm
9	Final Discharge	Flowrate	Continuous (Online)	16m3/hr(<385m3/day)
		pH	Daily (Lab)	5.5-9.0
		COD		<200ppm
		TSS		< 100ppm
		As		< 051ppm
		B		< 4ppm
		Mn		< 1.0ppm
		Ni		< 1.0ppm
		Se		< 0.5ppm
		F		< 5.0ppm
		NH3		< 10 ppm
		BOD	Weekly (Lab)	<50 ppm

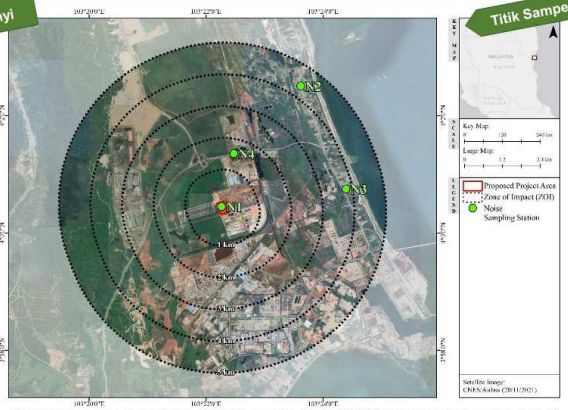
Ringkasan Eksekutif

PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

Aras Bunyi

Sampel Bunyi

Titik Sampel Bunyi



Pengukuran aras bunyi telah dijalankan pada 5 Julai 2020 menggunakan meter Jenis 1 ((ESF/N/01) berdasarkan ISO 1996-1:2016 (E)) secara berterusan pada:
7 pagi sehingga 10 malam: >15 jam bagi bunyi waktu siang manakala 10 malam hingga 7 pagi: 9 jam bagi bunyi waktu malam, untuk L_{Aeq}, L_{10}, L_{90}, L_{min} dan L_{max}

Ringkasan Eksekutif

PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

Keputusan Aras Bunyi

Results of noise level measurements

Station	N1		N2		N3		N4	
	Date and time							
Parameters	(05/07/2022) 0700 – 2200 hrs	(05 - 06/07/2022) 2200 – 0700 hrs	(05/07/2022) 0700 – 2200 hrs	(05 - 06/07/2022) 2200 – 0700 hrs	(05/07/2022) 0700 – 2200 hrs	(05 - 06/07/2200 – 0700 hrs	(05/07/2022) 0700 – 2200 hrs	(05 - 06/07/2022) 2200 – 0700 hrs
Leq dB(A)	50.7	49.2	66.0	62.9	66.0	62.9	72.3	68.8
Lmax dB(A)	78.2	70.8	107.5	89.9	107.5	89.9	108.8	92.2
Lmin dB(A)	38.4	42.2	38.7	36.7	38.7	36.7	40.4	41.9
L10 dB(A)	52.7	50.6	66.3	61.3	66.3	61.3	76.0	72.1
L90 dB(A)	45.5	45.8	52.2	43.9	52.2	43.9	57.0	54.9
Reference	E		B		B		E	
dB(A)	70	65	60	55	60	55	70	65

Nilai yang diukur memberikan tahap rendah hingga sederhana, nilai yang lebih tinggi kemungkinan besar disebabkan oleh trafik kenderaan, seperti motosikal, disebabkan lokasi bersebelahan jalan raya. Namun begitu, tiada nilai yang diukur pada semua titik dalam kategori Bising atau ≥ 80 dBA (Occupational Safety and Health (Noise Exposure) Regulations 2019.

Ringkasan Eksekutif

PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

Flora & Fauna di kawasan Sg. Baluk

Flora & Fauna di tapak adalah tidak ketara kerana kawasan yang telah ditambak

Figure 6.9(1) Secondary vegetation at the site

Fauna di Sg.Baluk tiada dalam senarai merah IUCN, kebanyakannya adalah spesies biasa.

Table 6.9(3) Near threatened and Vulnerable birds in the area

Near threatened species		Vulnerable species
Green Iora (*Aegithina viridissima*)	Black-bellied Malkoha (*Phaenicophaeus diardi*)	Javan Myna (*Acridotheres javanicus*)

Ringkasan penemuan

- Tapak cadangan ialah kawasan perindustrian, flora & fauna tidak ketara di tapak.
- Namun begitu, kawasan tersebut berhampiran dengan kawasan hutan Baluk dan rizab sungai masih sebahagian besarnya masih utuh.
- Sg. Baluk masih sihat dari segi fitoplankton, zooplankton dan kehidupan ikan, dengan kepelbagaian jenis ikan.
- Oleh itu, kepentingan melindungi rizab sungai sebagai perlindungan terhadap pencemaran dan sebagai tapak pembiakan untuk anak ikan.

Flora di Sg. Baluk – terdapat beberapa spesies penting, tetapi tiada satu yang berada di dalam senarai merah IUCN.

Table 6.9(1) Flora Species which are Endangered or Vulnerable or Near Threatened found in Sg. Baluk catchment

Kepelbagaian dan kepadatan hidupan akuatik di dalam sungai adalah bergantung kepada beberapa faktor berkorelasi, iaitu :

- **kualiti air yang menentukan kelangsungan hidupan akuatik dan kepadatan plankton;**
- **Kepadatan plankton: zooplankton memakan fitoplankton**
- **Fitoplankton memerlukan cahaya matahari untuk membesar dan terhalang oleh kekeruhan;**
- **Tempat perlindungan seperti tumbuhan tanah lembap untuk ikan kecil.**

Fitoplankton ialah pengeluar utama fotosintesis karbon dioksida kepada oksigen; dengan itu, menjana oksigen dalam air (diukur sebagai D.O.) yang penting untuk hidupan akuatik

- **Kepadatan fitoplankton, adalah agak rendah, ~ 40 - 800 cells/l.**
- **Kepadatan zooplanktons ~130 - 1200 ind/m^3 ➔ populasi zooplankton dalam keadaan baik di sepanjang Sg. Baluk.**

Upstream

Downstream

Figure 6.9(2) Sg. Baluk vegetation on riverbanks

Rizab sungai Sg. Baluk masih sihat dan baik untuk perlindungan hidupan akuatik

Jenis Ikan di Sg. Baluk

Table 6.9(4) Fishes caught in Sg. Baluk west of project site (at about location of WQ4)

Fish Group	Fish	IUCN Category
*Barbonymus gonionotus** Lampan jawa		Least Concern
*Barbodes banki** Tebal sisik		Least Concern
*Rasbora sumatrana** Seluang bada		Least Concern
*Rasbora vulgaris** Seluang		Least Concern
Cyclocheilichthys apogon Temperas		Least Concern
Barbonymus schwanenfeldii Lampam sungai		Least Concern
*Osteochilus vittatus** Terbul		Least Concern

Jenis ikan di titik sampel WQ4 (in 2021)
- **➔ Kepelbagaian yang baik.**
- **➔ Disebabkan kepadatan zooplankton yang agak tinggi**
- **➔ Kesemua spesies disenaraikan sebagai *"Least Concern"* atau biasa dijumpai.**

Ringkasan Eksekutif
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Sosioekonomi

Respondents Distribution in the Study Area

No.	Radius from Project Area (km)	Town and Residential Area	Number of Respondents
1.	3 – 4	Kampung Darat Sungai Ular	30
2.	3 – 4	Kampung Gebeng	20
3.	4 – 5	Kampung Sungai Ular	30
4.	5 – 6	Kampung Selamat	10
5.	5 – 6	Taman Balok Makmur	20
6.	6	Jeti Seberang Sungai Ular	5
7.	8	Jeti Sungai Balok	5
TOTAL			120

Responden di ZOI

Kampung Selamat | Kampung Selamat

Jeti Sungai Balok | Jeti Sungai Balok

Kampung Gebeng | Kampung Gebeng

Kampung Sungai Ular | Kampung Sungai Ular

Kampung Darat Sungai Ular | Kampung Darat Sungai Ular

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Hasil Kajian Sosioekonomi

Ringkasan penemuan:

- **Kumpulan umur terbesar ialah 30 – 39 tahun pada 23.3% dan 40 – 49 tahun pada 28.3% iaitu kumpulan umur boleh bekerja, dengan itu selaras dengan matlamat projek yang dicadangkan untuk memberi peluang pekerjaan pada penduduk tempatan, dan untuk mereka menetap di kawasan tempatan.**
- **Kebanyakannya mempunyai tahap pendidikan formal tertentu, dengan kebanyakannya sehingga sekolah menengah (74.2%) dan pendidikan tinggi pada 1.7%.**
- **Saiz keluarga kebanyakannya kecil dengan 2-3/keluarga pada 50%, menunjukkan bahawa rumah keluarga masih boleh menampung ahli tambahan justeru permintaan perumahan tidak kritikal.**
- **Dari segi pekerjaan, peratusan besar bekerja sebagai nelayan, yang merupakan kategori pekerjaan tidak formal (35%) membuka mereka kepada pekerjaan di tapak kerja, dan lain-lain, selaras dengan matlamat projek yang dicadangkan untuk menggaji penduduk tempatan dan tidak mengimport pekerja asing.**
- **Dengan mengambil kira isi rumah kecil, tahap pendidikan dan kumpulan kerja besar adalah nelayan, majoriti isi rumah (49.2%) mempunyai pendapatan isi rumah RM2,001 dan RM3,000, yang dianggap sebagai sederhana rendah;**
- **Responden berpegang kepada harapan tinggi dari projek ini untuk pekerjaan baharu dan penambahbaikan infrastruktur**

Kebolehterimaan Projek

Peerimaan projek yang tinggi, dengan jangkaan pekerjaan dan pertumbuhan ekonomi.

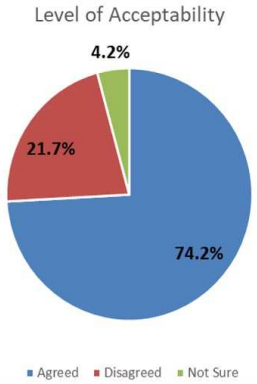
Satu pilihan adalah perlindungan Sg. Baluk menjadi taman eko oleh pengurusan GIE.

- Perusahaan ekopelancongan, cth., memancing, berperahu, dsb.
- Perlindungan sungai, termasuk perlindungan hidupan akuatik;
- Taman rekreasi untuk penduduk tempatan;

Inisiatif ini mungkin diambil oleh Pengurusan GIE; dengan penyertaan daripada industri di kawasan itu sebagai sebahagian daripada Tanggungjawab Sosial Korporat (CSR) mereka.

Reason to Agreed
- Located in the industrial zone area
- Help grow the local economy
- Job opportunities – unemployed graduate or loses their jobs

Reason for Not Sure
- Located in the industrial zone area
- Far from their houses



Reason to Disagreed
- Have the perception it would negatively impact the existing environmental condition
- They experienced river pollution, air pollution and the risk of a road accidents due to heavy vehicle movements
- Worried it will be worse with addition new development

Ringkasan Eksekutif
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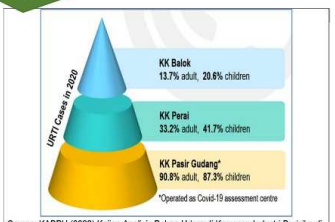
Kondisi Kehidupan

Keadaan hidup sedia ada agak miskin dengan % tinggi tandas bukan tekan-siram dan pembakaran sampah % tinggi sebagai penunjuk.

Kondisi Kesihatan

- **Keadaan kesihatan adalah normal tanpa penyakit serius atau pelik;**
- **Kajian KABPU (2022) mengenai kualiti udara di 5 kawasan perindustrian terbesar di Malaysia telah menunjukkan Gebeng mempunyai URTI paling rendah berbanding yang lain.**



Source: KABPU (2022) Kajian Analisis Beban Udara di Kawasan Industri Berisiko di Malaysia (KABPU), DOE Putrajaya, 2022.

Figure 6.10(6) Public Health due to Air Quality – Incidences of URTI

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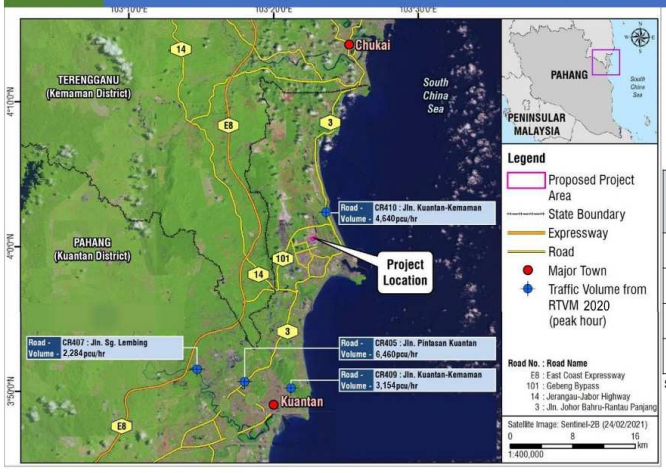
PEMBINAAN DAN PENYIAPAN LOJI PEMEROLEHAN LOGAM DARI SPENT CATALYST RECOVERY FACILITY (SCaRF) DI GEBENG INDUSTRIAL ESTATE (GIE), KUANTAN, PAHANG

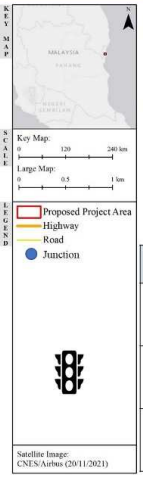
Penilaian Trafik



KEADAAN LALULINTAS BERDASARKAN DATA BANCI

Route	16-Hour Traffic	Peak Hour	LOS
CR410	30,615	3,613	F
CR409	30,640	2,876	A
CR407	22,088	1,890	F
CR405	57,753	5,073	E

Source: Road Traffic Volume Malaysia 2020, Ministry of Works Malaysia



Penilaian Trafik

Jalan-jalan yang mungkin mempunyai pengaruh langsung ke atas lalu lintas ke/dari tapak Projek ialah:

1. Jalan Gebeng 2/7;
2. Jalan Gebeng 1/11 (Jalan Qinzhou); and
3. Jalan 101 (Gebeng Bypass).

Tinjauan kiraan trafik dilakukan di 3 persimpangan, seperti di bawah :

Junction	Type of Junction
J1 (Gebeng Bypass – Jln Gebeng 1/11)	3-legged, channelized junction
J2 (Jln Gebeng 1/11 - Jln Gebeng 2/7)	3-legged, priority junction
J3 (Jln Gebeng 1/11 - Jln Gebeng 2/6)	3-legged, priority junction

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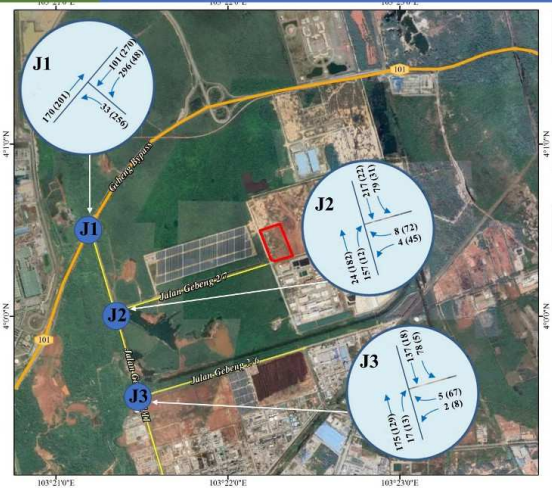

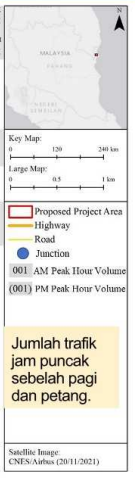

Jumlah trafik jam puncak sebelah pagi dan petang.

Penilaian Trafik

Data Trafik

Rangkaian Jalan Sedia Ada

Jalan Utama:

- Jalan Gebeng 2/7
- Jalan Gebeng 1/11
- Jalan 101 (Gebeng Bypass)

Penilaian melalui prestasi sekatan tengah dan simpang menunjukkan rangkaian jalan raya di sekeliling menunjukkan prestasi LOS yang sangat baik untuk kedua-dua hari bekerja dan hujung minggu.

Semasa operasi, dijangka paling kerap dijalankan hanya kira-kira 4 minggu aktif dalam 3 bulan, dengan kira-kira 8 trak/hari semasa minggu aktif

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Penilaian Trafik

Roadway midblock performance:

Route Name	Type of Carriageway	Maximum Hourly Capacity (pcu/hr/lane)	Volume (pcu/hr)		V/C Ratio (LOS)	
			AM	PM	AM	PM
Jalan 101 (Gebeng Bypass)	4-lane single carriageway	2000 (per lane)	397	526	0.20 (LOS A)	0.26 (LOS A)
Jln Gebeng 1/11 (Jln Qinzhou)	2-lane single carriageway	2800 (bothways)	402	307	0.14 (LOS A)	0.10 (LOS A)
Jln Gebeng 2/7	2-lane single carriageway	2800 (bothways)	244	160	0.09 (LOS A)	0.06 (LOS A)

Junction performance analysis:

Junction	Type of Junction	Level of Service	
		AM	PM
J2 (Jln Gebeng 1/11 - Jln Gebeng 2/7)	3-legged, priority junction	LOS A	LOS A
J3 (Jln Gebeng 1/11 - Jln Gebeng 2/6)	3-legged, priority junction	LOS A	LOS A

- Daripada prestasi sekatan jalan raya dan hasil prestasi persimpangan, jelas menunjukkan bahawa rangkaian jalan raya di sekeliling menunjukkan prestasi LOS yang sangat baik untuk kedua-dua hari bekerja dan hujung minggu.
- Trafik keseluruhan di Tapak Projek tidak dikekang sehingga perlu dibimbangkan.

Ringkasan Kesan Yang Berpotensi Ketara dan Langkah-langkah Pengurangan

Kerja tanah & kawalan hakisan	Kerja tanah untuk pembinaan jalan masuk, longkang, jalan di tapak, tangki proses dan kemudahan mendedahkan tanah dan cerun kepada air larian semasa hujan, yang membawa kepada peningkatan pepejal terampai (SS) di Sg. Baluk..	• Sebelum kerja tanah dan kerja tapak bermula, langkah-langkah kawalan hakisan yang direka oleh pakar LDP2M2 bertauliah hendaklah dilaksanakan, • Ciri dan kemudahan LDP2M2 hendaklah sentiasa diselenggara dan diperiksa, terutamanya selepas hujan lebat, ditetapkan sebagai ≥ 12.5mm pada tolok hujan yang akan dipasang di tapak, semua struktur LDP2M2 mesti diperiksa dalam masa 24 jam. • Pastikan tiada air larian keruh dilepaskan ke longkang yang mengalir ke Sg. Baluk; ini termasuk lembangan sedimen, perangkap kelodak, pagar kelodak, dsb.
Pelepasan efluen semasa operasi	• Efluen terawat IETS menyumbang kepada jumlah aliran yang memasuki Sg. Baluk. Walaupun kecil berbanding dengan kawasan lain dalam GIE; ia bermanfaat semasa musim kering, untuk mengekalkan tanah lembap dan hidupan akuatik. • Kepincangan prestasi IETS boleh menyebabkan pembuangan efluen terawat tidak memenuhi Standard B, EQ(IE)R 2009 yang diperlukan	Memastikan kualiti efluen yang dirawat sentiasa berada pada Standard B EQ(IE)R 2009 pada setiap masa; antara langkah penting ialah: • IETS direka bentuk untuk mengeluarkan maksimum separuh had Standard B untuk setiap parameter; • Loji tidak melepaskan lebih daripada beban yang direka untuk beban suapan IETS. • Sekiranya terdapat beban luar biasa daripada penyelenggaraan atau kegagalan proses, beban itu hendaklah terkandung dalam tangki kecemasan untuk didos secara perlahan tanpa mengganggu keadaan IETS. • Tangki efluen yang dirawat (juga sebagai tangki air Backwash) boleh digunakan sebagai Kolam Tadahan, di mana di salur masuknya boleh diletakkan meter pH dan ammonia atas talian; efluen terawat yang tidak mematuhi peraturan boleh dikitar semula untuk rawatan selanjutnya.
Bahan buangan gas	Prestasi buruk pada mana-mana peringkat APCS boleh menjejaskan prestasi keseluruhan sistem.	- Prestasi setiap peringkat atau operasi unit APCS perlu dipantau dan dikawal dengan teliti supaya prestasi unit seterusnya boleh diramal. - beban ke unit akhir, cth., elektrostatik precipitator (EP), hendaklah dikekalkan pada setiap masa, pada tahap yang dikira untuk mematuhi had pelepasan seperti EQ(CA)R 2014. - Setiap peringkat APCS hendaklah beroperasi dan melepaskan efluen gas dalam lingkungan yang ditetapkan. Sebarang lebihan, pada mana-mana peringkat dalam APCS, bukan hanya pada timbunan, boleh disambungkan untuk mencetuskan penggera di bilik kawalan dan pada telefon bimbit mudah alih orang yang bertanggungjawab (PIC).

Projek ini melibatkan pemanggangan soda perlahan biasa bagi mangkin terpakai untuk mengoksidakan Molibdenum (Mo) dan Vanadium (V) kepada oksida larut supaya ia boleh terlarut dan diasingkan daripada sebahagian besar sedimen pemangkin terpakai. Selepas itu larutan Mo dan V diperkaya sebelum Mo dan V dimendakkan. Keseluruhan proses melibatkan operasi unit yang biasa dan tidak seharusnya menimbulkan kesan alam sekitar yang ketara jika proses diurus dengan baik pada setiap masa. Pemaju projek, Taiyo Koko, adalah sebuah syarikat yang mantap di Jepun dan telah mengendalikan kilang yang sama di Ako, Jepun, oleh itu adalah pilihan terbaik untuk projek jenis ini. Mo dan V berada dalam permintaan yang semakin tinggi disebabkan oleh pembangunan komponen berkecekapan dan berkapasiti tinggi untuk kenderaan elektrik, turbin angin, dsb., dan sedang dilombong, di China, Afrika Selatan, dsb. menyebabkan kerosakan alam sekitar. Pemulihan oleh SCaRF daripada pemangkin terpakai yang terdapat di Malaysia, menggunakan gas asli yang terdapat pada saluran paip di tapak (dengan itu adalah proses yang bersih dan selamat), akan menjadikan sumber boleh diperbaharui bagi logam berharga ini. Dengan langkah-langkah mitigasi seperti yang disyorkan dalam laporan ini, dapat dilihat bahawa manfaat akan jauh melebihi potensi kesan.