

CHAPTER 8 MITIGATION MEASURES

8.1 INTRODUCTION

This chapter outlines recommendation of appropriate mitigation measures to minimize the negative impact that could occur from the execution of the project. The mitigation measures are based on activities during the various stages of the project as follows:

- i. Pre-Development Stage;
- ii. Development Stage;
- iii. Operation Stage; and
- iv. Abandonment Stage.

8.2 ADHERENCE TO DOE GUIDELINE

During the assessment of the impacts for this project, several guidelines have been referred to as follows:

- Environmental Impact Assessment Guidelines in Malaysia, Department of Environment, 2016;
- Guidance Document for Preparing Terms of Reference (TOR) Department of Environment, 2016.
- Guidance Document for addressing soil erosion and sediment control aspect in EIA;
- Guidance Document for the preparation of Land Disturbing Pollution Prevention and Mitigation Measures (LD-P2M2);
- Occupational Safety and Health (Control of Industrial Major Accident Hazards) Regulations 1996 of the Occupational Safety and Health Act 1994.

8.3 PROPOSED MITIGATION MEASURES

8.3.1 Pre-Development Phase

Pre-development activities involve surveys and studies of the project area which will involve minor land clearance for land. Land based survey, the project site is within the project site therefore no impendence to public roads is anticipated and the number of vehicles for the survey is limited to 3 or 5 vehicles per day with short duration. Thus no mitigation measures are required except to ensure safety to other road users.

8.3.2 Development Stage

8.3.2.1 Biomass Management

- i. The oil palm tree trunks, shrub and other vegetation foliage will be composted at suitable locations within the site that has been earmarked as green areas/vacant areas;
- ii. The site clearing shall be carried out in a timely phase manner to reduce soil erosion. and
- iii. Burning of cut vegetation is strictly prohibited to avoid deterioration of the atmospheric quality.

8.3.2.2 Soil Erosion

The Land Disturbing Pollution Prevention and Mitigation Measures (LDP2M2) will details out all temporary measures that will be implemented during the development stage.

The LDP2M2 plan has been prepared to meet the following principles:

- i. **Minimising soil erosion** - The north-western part of the project site is preserve and maintained as green area. Apart from that buffer strip on the western and eastern part of the project site will be maintained as green area.
- ii. **Preserving Top Soil and Other Assets** - topsoil removed from the site clearing will be stockpiles within the site and protected from erosion for reuse in landscaping and turfing.
- iii. **Access route and site management** - One access route is provided for the project. The construction entrance connecting to the existing road will be stabilised and paved (10m) and equipped with wash through.
- iv. **Runoff control and management** - Runoff from the undisturbed area at the northern part of the project site will be collected by inceptor drain and diverted into the existing drain without additional treatment. Temporary earth drains will be provided along the boundary of project site. A temporary drain network will be provided to collect runoff from disturbed areas.
- v. **Earthwork and Erosion control** - Erosion control is provided via vegetation cover. At the final slope, turfing will be provided. After earthwork is completed, areas not involved in construction are to be provided with close turfing.
- vi. **Sediment prevention control** - Silt trap is provided to control sediment delivery into the watercourse. The site perimeter is temporary secured by earth bank to avoid sediment leakage from the site.
- vii. **Slope stabilization** - All final slope within the site are provided with proper engineering stabilization and protected with turfing.
- viii. **Site maintenance** - All BMPs structures are designed for minimal maintenance requirements.

The LDP2M2 component for the project consists of five (5) aspects namely erosion control, runoff control, sediment control, site planning & management and general construction control. The proposed BMPs are tabulated in **Table 8.1**.

Table 8.1: Proposed Best Management Practices (BMPs)

No.	BMPs	Number / Design	Description
Site Planning & Management Control			
1	Preserve existing trees and vegetation		Buffer strip along the drain and boundary will be maintained.
2	Stockpiles Topsoil		To make use of the existing site sources materials for erosion and sediment control which may minimize cost and time in the materials procurement.
Erosion Control			
1	Protection of Cut and Fill slope		To stabilised the cut and fill slope
2	Erosion Control Mattress including hydroseeding		To protect slope from eroded. Immediately applied after final slope
3	Mulching by using available material on site		Woodchip from oil palm trees can be used
Runoff Control			
1	Temporary Earth Drain with check dam	2 years ARI design storm Side slope: 2 : 1 or flatter	To direct runoff into temporary silt trap. Check dam help to reduce velocity of flow and also can trap sediment laden
2	Silt Fence		The silt fence does not filter runoff, but acts as a linear barrier creating ponding which allows soil particles to settle out thereby reducing the amount of soil leaving a disturbed area.
3	Temporary / permanent diversion channel permanent measures	2 years ARI design storm Side slope: 2 : 1 or flatter	To divert off-site runoff around the construction site, divert runoff from stabilised areas
4	Earth bank		A temporary ridge of compacted soil constructed immediately above a new cut or soil fill slope or around the perimeter of disturbed area. To divert storm runoff from upslope drainage areas away from unprotected disturbed areas and slope to a stabilised outlet. To divert sediment-laden runoff from disturbed area to a silt trap.
Sediment Control			
1	Silt Trap	1 unit	The silt trap is a temporary measure. To be maintained until the site area is permanently protected against erosion

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No.	BMPs	Number / Design	Description
2	Stabilised Construction Entrance/Exit	1	A temporary gravel, construction entrance/exit is a stabilised pad of crushed stone located at any point where traffic enters or leaves a construction site onto a public road
3	Wash Through	1	To reduce off-site sedimentation by eliminating the tracking or flowing of sediment onto main road.
General Construction Control			
1	Water Browser		
2	Secondary Containment System		A second containment wall or embankment constructed with concrete or pre-fabricated metal that fencing around any petroleum base products with the containment capacity of 110 % the capacity of the said vessel or tank. To failsafe the primary containment (vessel or tank wall) that leaks or spills from flowing out further into drainage way or watercourses before recovering action to be taken.
3	Designated Schedule Wastes Storage Area		To minimize or eliminate the discharge of pollutants from construction site generating hazardous waste to the storm drain system or to watercourses.
4	Sanitation		Temporary or portable toilet at all construction site to prevent sanitary and septic waste material directly to the storm drain system or to watercourses without any treated first to standard requirement and compliance.

8.3.2.3 Ambient Air Quality

Fugitive dust from vehicular movement on exposed surfaces can cause dust and reduce visibility. Following measures are commended to suppress the dust and avoid soiling of roadways:

- i. Site-spraying with water shall be carried out to minimize fugitive dust emission along access routes.
- ii. Wash trough to be constructed at the ingress and egress of the construction site to avoid soiling of the roadways with soil particles which can cause fugitive dust to other road use in the vicinity.
- iii. No open burning is allowed at site.

8.3.2.4 Noise Level

Vehicular movement, piling and construction activities can increase the noise levels. The following measures are recommended as mitigation against noise:

- i. Construction activities involving heavy machinery that emits loud noise such as piling and heavy vehicle movement should be confined to the daytime, between 7am-7pm;
- ii. All construction equipment must be properly maintained so that they do not produce noise higher than that specified by the manufacturer;
- iii. Noise suppression materials such as mufflers and silencers can be used where applicable for noisy equipment;
- iv. All construction workers who are involved with extensive noise emission activities should be equipped with hearing protective devices such as ear-muffs. In addition to this, warning signs should be installed at high-level noise areas to alert workers of the noise danger; and
- v. Hoarding should be set up as temporary noise barriers around the project site's boundary prior to commencement of construction activities.

8.3.2.5 River Water Quality

Following mitigation measures are recommended for the protection of the water quality:

- Land Disturbing – Pollution Prevention and Mitigation Measures (LD-P2M2) shall be prepared and implemented on site;
- One (1) unit silt trap has been proposed for this project to intercept sediment carrying runoff before discharging into the river. As the work progresses and site condition changes, additional sediment basins shall be installed as when and where necessary;
- The sediment basin shall be designed with the procedures given in the Urban Storm water Management Manual for Malaysia, 2012;
- Before the commencement of site clearing, temporary perimeter earth drains shall be constructed to channel surface runoff for control of sediment discharge; and
- Septic tank is to be provided for treatment of the workers sewage at the workers camp.

8.3.2.6 Ecological Impacts

As the site will be cleared, there are no practical conservation measures during the site clearing to mitigate the biological loss. Nevertheless, landscaping shall commence as soon as construction works are completed. A beautiful landscape can provide aesthetically pleasant surroundings.

8.3.2.7 Traffic

Mitigation measures during construction include:

- i. Transportation of heavy loads of construction materials and machinery should be done preferably during off-peak traffic hours;
- ii. These vehicles should also, as far as possible, avoid using the public roads during the weekends;
- iii. Adequate warning signs should be put up at suitable locations to forewarn road users of the existence of the construction site; and
- iv. During peak hours, flagmen should be employed to assist in the direction of traffic when site vehicles are joining the main traffic flow.

8.3.2.8 Social and Health

Social and health issue due to the use of labourers and foreign workers can be reduced with the following measures:

- i. Priority of employment to be given to the local population;
- ii. Work areas should be kept clean at all times;
- iii. Garbage and solid wastes should be disposed into the designated waste bins and stored at a central location prior to disposal at Pekan Nenas Landfill;
- iv. All foreign workers are to be screened for health and security purposes;
- v. Provide awareness campaign on “Good Health at Workplace” to avoid any contagious disease;
- vi. Health programs in relation to dengue, HIU, STD and TB will be held together with Jabatan Kesihatan Negeri Johor for the workers at site; and
- vii. Regular fogging needs to be carried out to avoid spread out vector based diseases such as dengue and malaria.

8.3.2.9 Scheduled Waste Management

- i. All scheduled wastes including used oil and spent/waste oil generated during the construction works from machines, generators, chemical containers, etc. shall be collected and disposed off-site by licensed contractors for disposal;
- ii. Storage and handling of scheduled waste is to be carried out according to the Environmental Quality (Scheduled Wastes) Regulations, 2005;
- iii. The wastes should be stored in sealed drums, labeled and placed in a designated scheduled waste storage area;
- iv. Separate compartments should be provided for different groups of incompatible wastes; and
- v. The quantity of scheduled wastes accumulated on site shall not exceed 20 metric tons and the wastes stored for a period not exceeding 180 days.

8.3.2.10 Solid Waste Management

Solid waste management from the workers dwelling will include:

- i. Proper waste storage bins for the workers must be provided; and
- ii. Solid waste shall be disposed of at existing Pekan Nenas landfill area.

8.3.2.11 Wastewater Management

Portable toilets will be provided which will be maintained on a regular schedule by the supplier of the toilets.

8.3.2.12 Workers Camp

Onsite labour toilet facilities may need to be provided. In the case of foreign workers, their legal employment and health status will need to be ascertained. Their health status is of crucial importance to curb the resurgence and recurrence of infectious and communicable diseases, such as typhoid, cholera and tuberculosis. Foreign workers will need to be closely monitored to ensure that social problems due to hostile interaction with local communities do not arise.

8.4 POST-DEVELOPMENT STAGE

- Excavated areas such as waste pit should be filled to reduce problems of ponding. Fill areas should be compacted and turfed;
- Septic tank shall be removed from the project site;
- The site should also be free from standing water to avoid breeding of mosquitoes;
- All debris arising from construction activities will have to be cleared and exposed areas turfed and 'dressed' back to their original condition as far as possible to reduce soil erosion;
- All wastes generated during construction should be collected at proper waste storage bin and sent to existing Pekan Nenas landfill area;
- Oil spills should be cleaned up to prevent possible oil contamination to the ground. The contaminated soil should be scooped in the container and sent into the prescribed licensed facility for further treatment;
- All unsafe structures to be dismantled and camp structure debris on the site be removed; and
- Silt traps should be continuously maintained until the land is fully revegetated.

8.5 OPERATION STAGE

8.5.1 Air Quality

No physical mitigation measures are necessary for air pollution as the extent of air pollution during the operational phase is not significant, since it is only originating from land vehicles. However the following mitigation measures should be taken consideration:

- Regular maintenance and frequent servicing of machineries and lorries to ensure that they are in good working condition with no excessive gaseous pollutants or dark smoke being emitted from the exhausts; and
- Vehicles transporting construction waste should be properly covered with canvass sheet and secured properly to minimize dust and particulate dispersion to the surrounding atmosphere.

8.5.2 Noise Level

- Regular maintenance and frequent servicing of machineries and lorries/truck so that they do not produce noise higher than that specified by the manufacturer; and
- All truck/lorry shall comply with the stipulated speed limit.

8.5.3 River Water Quality

Compliance to the Environmental Quality (Control of Pollution from Solid Waste Transfer Station and Landfill) Regulations 2009 at 0.0003 m³/s LTP effluent discharge did not exhibit obvious impacts towards Parit 1H/16 nor Parit 1H/15 for most modelled parameters. This was because Parit 1H/16 was already laden with leachate; “masking” most of the discharge. The anticipated load from the upcoming LTP was not that large either. Lead (Pb) and arsenic (As) depicted the most impact as levels would rise up to 14 µg/L and 7 µg/L.

The mitigation measures includes:

- A bi-weekly sampling exercise for all parameters listed in the Environmental Quality (Control of Pollution from Solid Waste Transfer Station and Landfill) Regulations 2009 should be conducted for the first year of operation at W1, W2, W4 and W7. Performance monitoring of LTP as mentioned in Chapter 9.
- Schedule maintenance and inspection of LTP shall be established and implemented, to ensure that the LTP is always in good condition.

8.5.4 Groundwater

The risk of soil, sub-soil and groundwater pollution as a consequence of leachate accumulation in unprotected areas due to potential discharges will be reduced, with proper management.

- LTP has been designed to treat the generated leachate
- Maintaining equipment in good working order is also important for preventing equipment malfunction, thus reducing the risk of surface and groundwater contamination caused by mechanical failure.

8.5.5 Health Impact Assessment

To minimize the possibility of pest breeding and the spread of pest-related diseases, the following measures are recommended:

- Steps should be taken to minimize solid waste spillage during collection and transportation to the waste transfer station.
- The entire compound of the waste transfer station should have proper housekeeping and be kept clean all the time to minimise the breeding of rodents and disease vectors.
- Fogging of the perimeter of the waste transfer station whenever necessary to destroy adult mosquitoes.
- As to the possibility of workers' exposure to carbon monoxide from garbage trucks and compaction machinery, it is proposed that adequate ventilation be provided in the building. If necessary, an exhaust fan can be used to extract any toxic gases from the building.

8.5.6 Traffic

- Traffic Management Plan shall be established and implemented during Operation stage;
- The trucks should also, as far as possible, avoid using the public roads during the weekends when more road users are expected to ply the road;
- Adequate warning signs should be put up at suitable locations to forewarn road users of the existence of the project activities; and
- During busy times, flagmen should be employed to assist in the direction of traffic when site vehicles are converging to the main traffic flow.

8.5.7 Socio-Economic

- Inform residents and the public and commercial areas of schedules as well as with the management plans prepared by the operators; and
- A comprehensive compost management and pollution control plan shall be develop.

8.5.8 Odour

The first initiative of JPSPN to address odour problem by a scientific investigation may be taken forward to achieve the objective of providing better air quality for the nation following may be taken up. Odour control is not a once-off activity and requires a constant re-evaluation of control techniques and this should form part of the odour management plan. An odour control at solid waste proposed project sites is possible. It begins with a clear understanding of the industry and an appreciation for the science behind how odours are caused. This must followed up with an awareness of the solid waste site activities that result in odours being released into the atmosphere.

To overcome the problem of odour pollution caused by the operation of proposed project activities, there are some mitigation measures can be made. The mitigation measures are as follows:-

- i. Defining and **developing barriers** at proposed project sites by **plantation and Green belt** on the boundary of with suitable species of plants / trees as natural media for reduction of odour pollution and restriction of odour nuisance in and around proposed project sites
- ii. **Abatement** of odour emissions from proposed project sites used a **Natural Effective Microorganism Enzyme (NEME)**. The used of NEME as a spraying material can reduce the odour level, the concentrations of NH_3 and H_2S and the number of flies. The used of this material has been proved to be successful based on study conducted by Chen et al. (2003). Based on their study, results revealed that after NEME was sprayed, the measured odour level ranged from 190 OU to 552 OU, and the reduction ratios were between 39.5 percent and 99.4 percent
- iii. A **regular Odour Impact Assessment** should be undertaken. The impact assessment should cover a range of reasonably foreseeable odour generation and receptor exposure scenarios and the effect of different mitigation options. Assessment should include point sources and area sources.
- iv. The **waste composition** to be processed at proposed TS should also be taken into account so that the waste received does not contain high gases content. The materials which promote the generation of gases should be excluded. For example, wastes with a high sulphate or sulphide content should be excluded. Co-ordination between the gatehouse and operators at the tipping face should take place where known odorous wastes are to be deposited. This approach can be implemented if the separation program at the source level which is gazetted in Act 672 is implemented successfully.
- v. A structured **Odour Management Plan** including:
 - Control measures to prevent or control odour. A demonstration/justification that there will not be an odour problem from the emissions under normal conditions. A description or copy of any conditions or limits put in place by any regulatory authority which relate to the prevention of minimisation of odour.

- Identification of the actions to be taken in the event of abnormal events or conditions which might lead to odour or potential odour problems
- An understanding of the impact in the event of abnormal events or conditions for example the failure of a segregation machine. This may require modelling the dispersion of odours under such circumstances.
- Monitoring undertaken, specifically the communication with for example local residents if an odour problem arises or is likely to arise.

Overall, in order to reduce the release of odorous compounds and their impact at community or sensitive receptors, the minimisation of odour should be considered in relation to: - the types of wastes, site layout, engineering aspects of the operation, management procedures and the day-to-day operational practices.

8.6 ABANDONMENT STAGE

In the event the project does not materialise as planned and has to be abandoned, then all materials and equipment on site will be sent back to supplier or sold. All structures will be dismantled and sold to recyclers or sent back to suppliers. The site will be planted with fast growing grass to void erosion from exposed surface.

Overall, the summary of proposed possible mitigation measures as discussed above are listed in **Table 8.2**.

Table 8.2: Potential Impact and Mitigation Measures

Environmental component	Potential Impact	Mitigation measures
Pre-Development Stage		
Site survey	<ul style="list-style-type: none"> Pre development surveys are conducted prior to design works and the survey may lead to interference with other road users. Minor land clearance was carried out which did not have a significant impact. 	Land based survey, the project site is within therefore no impendence to public roads is anticipated and the number of vehicles for the survey is limited to 3 or 5 vehicles per day with short duration. Thus no mitigation measures are required except to ensure safety to other road users.
Development Stage		
Biomass Management	<ul style="list-style-type: none"> Site clearing involves clearing of the existing vegetation which is oil palm and shrub clearance. The uneconomical oil palm and trees such as leaves, wood remnants, undergrowth and shrubs will be shredded on site using machinery that is commonly used for this purpose. The shredded vegetation will be stored on site for natural decomposition and decay. Impact on waterways and groundwater could arise with improper containment of the biomass decay process. 	<ul style="list-style-type: none"> The oil palm tree trunks, shrub and other vegetation foliage will be composted at suitable locations within the site that has been earmarked as green areas/vacant areas; and Burning of cut vegetation is strictly prohibited to avoid deterioration of the atmospheric quality.
Soil erosion	<ul style="list-style-type: none"> Soil erosion due to exposed surface 	<ul style="list-style-type: none"> The north-western part of the project site is preserve and maintained as green area. Apart from that buffer strip on the western and eastern part of the Project site will be maintained as green area. Topsoil removed from the site clearing will be stockpiles within the site and protected from erosion for reuse in landscaping and turfing. One access route is provided for the project. The construction entrance connecting to the existing road will be stabilised and paved (10 m) and equipped with wash through. Runoff from the undisturbed area at the northern part of the project site will be collected by inceptor drain and diverted into the existing drain without additional treatment. Temporary earth drains will be provided along the boundary of project site. A temporary drain network will be provided to collect runoff from disturbed areas Erosion control is provided via vegetation cover. At the final slope,

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Environmental component		Potential Impact	Mitigation measures
			<p>turfing will be provided. After earthwork is completed, areas not involved in construction are to be provided with close turfing</p> <ul style="list-style-type: none"> • Silt trap is provided to control sediment delivery into the watercourse. The site perimeter is temporary secured by earth bank to avoid sediment leakage from the site. • All final slope within the site are provided with proper engineering stabilization and protected with turfing.
Ambient Quality	Air	<ul style="list-style-type: none"> • Dust generation from vehicular movement at unpaved access road, during site construction activity. 	<ul style="list-style-type: none"> • Site-spraying with water shall be carried out to minimize fugitive dust emission along access routes. • Wash trough to be constructed at the ingress and egress of the construction site to avoid soiling of the roadways with soil particles which can cause fugitive dust to other road uses in the vicinity. • No open burning is allowed at site.
Noise Level		<ul style="list-style-type: none"> • Noise level may increase due to heavy machineries usage 	<ul style="list-style-type: none"> • Construction activities involving heavy machinery that emits loud noise such as piling and heavy vehicle movement should be confined to the daytime, between 7am-7pm; • All construction equipment must be properly maintained so that they do not produce noise higher than that specified by the manufacturer; • Noise suppression materials such as mufflers and silencers can be used where applicable for noisy equipment; • All construction workers who are involved with extensive noise emission activities should be equipped with hearing protective devices such as ear-muffs. In addition to this, warning signs should be installed at high-level noise areas to alert workers of the noise danger; and • Hoarding should be set up as temporary noise barriers around the project site's boundary prior to commencement of construction activities.
River Quality	Water	<ul style="list-style-type: none"> • Sediment runoff from the loosened soil may increase the TSS and turbidity levels of the receiving waterways. • Spillage and/or leakage of fuel, oils and lubricants, either through improper storage or improper maintenance of machinery/equipment could cause contamination of the drainage channels. • Indiscriminate disposal of solid wastes and debris by the 	<ul style="list-style-type: none"> • Land Disturbing – Pollution Prevention and Mitigation Measures (LD-P2M2) shall be prepared and implemented on site; • One (1) unit silt trap has been proposed for this project to intercept sediment carrying runoff before discharging into the river. As the work progresses and site condition changes, additional sediment basins shall be installed as when and where necessary; • The sediment basin shall be designed with the procedures given in

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Environmental component	Potential Impact	Mitigation measures
	workers and improper discharge of sewage and sullage from workers dwelling could cause pollution of the rivers.	the Urban Storm water Management Manual for Malaysia, 2012; <ul style="list-style-type: none"> Before the commencement of site clearing, temporary perimeter earth drains shall be constructed to channel surface runoff for control of sediment discharge; and Septic tank is to be provided for treatment of the workers sewage at the workers camp.
Traffic	<ul style="list-style-type: none"> Traffic movement could cause a minor increase in traffic volume. The traffic generated could have a potential to contribute to increased risk of road accidents 	<ul style="list-style-type: none"> Transportation of heavy loads of construction materials and machinery should be done preferably during off-peak traffic hours; These vehicles should also, as far as possible, avoid using the public roads during the weekends; Adequate warning signs should be put up at suitable locations to forewarn road users of the existence of the construction site; and During peak hours, flagmen should be employed to assist in the direction of traffic when site vehicles are joining the main traffic flow. Transporter/vehicles to follow the speed limit
Scheduled Waste Management	<ul style="list-style-type: none"> Improper disposal and management of scheduled wastes can result in contamination of river water. 	<ul style="list-style-type: none"> All scheduled wastes including used oil and spent/waste oil generated during the construction works from machines, generators, chemical containers, etc. shall be collected and disposed off-site by licensed contractors for disposal; Storage and handling of scheduled waste is to be carried out according to the Environmental Quality (Scheduled Wastes) Regulations, 2005; The wastes should be stored in sealed drums, labeled and placed in a designated scheduled waste storage area; Separate compartments should be provided for different groups of incompatible wastes; and The quantity of scheduled wastes accumulated on site shall not exceed 20 metric tons and the wastes stored for a period not exceeding 180 days.
Solid Waste Management	<ul style="list-style-type: none"> Improper solid waste storage, disposal and housekeeping could cause unhygienic conditions and clogging of waterways which can cause breeding of vectors such as rats and mosquitoes. With proper storage bins in place and regular collection by approved licensed contractor, the impacts can be minimised. 	<ul style="list-style-type: none"> Proper waste storage bins for the workers must be provided; and Regular collection of waste by licensed collectors must be carried out.

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Environmental component	Potential Impact	Mitigation measures
Workers Camp	<ul style="list-style-type: none"> Inadequate or sub-standard facilities can lead to the creation of un-aesthetic and unhealthy conditions resulting in disease incidence. 	<ul style="list-style-type: none"> Onsite labour toilet facilities may need to be provided In the case of foreign workers, their legal employment and health status will need to be ascertained
Post Development Stage		
Heavy machineries, worker's base camp, material storage area and site office	<ul style="list-style-type: none"> Upon completion of the construction works, the closure of the work site includes the heavy machineries, workers' base camp, material storage areas will decrease the aesthetic value and hazard to the public. 	<ul style="list-style-type: none"> All machineries shall be demobilisation from the project site Septic tank or portable toilet shall be remove from the project site; Temporary buildings and infrastructure should be demolished and Oil spills should be cleaned up by scooping it in other container to prevent possible oil contamination to the ground. The contaminated soil should be treated or send to approved licensed facility.
Waste management	<ul style="list-style-type: none"> Wastes generated are mainly construction debris, packing materials, rags, used oil, metal scrap and bulk waste. Improper disposal and management of wastes can result in contamination of water body and soil. 	<ul style="list-style-type: none"> All wastes will be segregated into scheduled and non-scheduled wastes; All non-scheduled wastes generated during construction shall be collected and removed by a contractor to an approved waste disposal site; Scheduled waste generated from the construction stage such as used oil, waste of paint and contaminated rags shall be handling in according to the Environmental Quality (Scheduled Wastes) Regulations, 2005; <ul style="list-style-type: none"> The wastes should be stored in sealed drums, labelled and placed in a designated scheduled waste storage area; Separate compartments should be provided for different groups of incompatible wastes; Scheduled wastes will be collected by licensed collector and disposed at approved licensed facility. Construction debris and bulky waste shall be collected and removed by a contractor to at approved construction waste disposal site.
Excavated area and exposed area	<ul style="list-style-type: none"> Water ponding area and subsequently caused a breeding of mosquitoes. Open area will caused a soil erosion. 	<ul style="list-style-type: none"> Excavated areas should be filled up to reduce problems of ponding. Fill areas should be compacted and turfed; The site should also be free from standing water to avoid breeding of mosquitoes; Exposed areas shall be turfed as far as possible to reduce soil erosion; Silt traps should be continuously maintained until the land is fully revegetated.

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Environmental component		Potential Impact	Mitigation measures
Operation Stage			
Ambient air quality		<ul style="list-style-type: none"> Air pollution from exhaust emission and fugitive dust from truck movement Air pollution from exhaust emission from vehicles 	<ul style="list-style-type: none"> Regular maintenance and frequent servicing of machineries and lorries to ensure that they are in good working condition with no excessive gaseous pollutants or dark smoke being emitted from the exhausts; and Vehicles transporting construction waste should be properly covered with canvass sheet and secured properly to minimize dust and particulate dispersion to the surrounding atmosphere.
Ambient Noise Level	Noise	<ul style="list-style-type: none"> Ambient noise level may increase due to heavy machineries and lorries 	<ul style="list-style-type: none"> Regular maintenance and frequent servicing of machineries and lorries.
River Quality	Water	<ul style="list-style-type: none"> Waste water discharge from leachate treatment plant (LTP) Waste water generated from open composting area 	<ul style="list-style-type: none"> Provide LTP and ensure that the final discharge from LTP is complying with the Schedule II (Section 13), Environmental Quality (Control of Pollution from Solid Waste Transfer Station and Landfill) Regulation 2009. Compliance to the Environmental Quality (Control of Pollution from Solid Waste Transfer Station and Landfill) Regulations 2009 at 0.0003 m³/s LTP effluent discharge did not exhibit obvious impacts towards Parit 1H/16 nor Parit 1H/15 for most modelled parameters. This was because Parit 1H/16 was already laden with leachate; "masking" most of the discharge. The anticipated load from the upcoming LTP was not that large either. Lead (Pb) and arsenic (As) depicted the most impact as levels would rose up to 14 µg/L and 7 µg/L. A bi-weekly sampling exercise for all parameters listed in the Environmental Quality (Control of Pollution from Solid Waste Transfer Station and Landfill) Regulations 2009 should be conducted for the first year of operation at W1, W2, W4 and W7.
Groundwater		<ul style="list-style-type: none"> Encountering unforeseen contamination; Creation of pathways for contaminants to groundwater resources; Interruption of, or disturbance to, public or private water supplies; Direct impact on glacial geomorphological features; Direct impact on groundwater recharge Direct contamination of soils, surface water or 	<ul style="list-style-type: none"> LTP has been designed to treat the generated leachate Maintaining equipment in good working order is also important for preventing equipment malfunction, thus reducing the risk of surface and groundwater contamination caused by mechanical failure.

SECOND SCHEDULE ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

for the Proposed Development of Solid Waste Transfer Station, on 12.474 Acres of Land on Lots 1336 & 1337, Pekan Nenas, Mukim Jeram Batu, Daerah Pontian, Johor Darul Takzim for Jabatan Pengurusan Sisa Pepejal Negara (JPSPN)

Environmental component	Potential Impact	Mitigation measures
	<p>groundwater through the accidental import and spreading of contaminated material or accidental spillages within the working area during construction;</p> <ul style="list-style-type: none"> Discharge of liquid wastes and sewage directly to ground or to controlled waters; and Temporary sterilisation of areas of mineral resources (both current and future). 	
Health Impact Assessment	<ul style="list-style-type: none"> The predicted highest ambient heavy metal concentrations in the receiving water, ADDt, RfD and HQ for non-carcinogenic health effects from body contact while wading or swimming, under various modelling scenarios. The HQ for arsenic, cadmium, mercury and nickel are well below 1. Therefore, the non-carcinogenic health risks are deemed as acceptable. The predicted highest ambient heavy metal concentrations in the receiving water, LADDt, CSF and LCR for carcinogenic effect from body contact exposure to arsenic, cadmium and nickel while wading or swimming, under the normal modelling scenario. The total LCR for exposure to arsenic, cadmium and nickel is 1.7×10^{-6}. This total estimated LCR which already represents the highest predicted ambient water concentration of each carcinogenic pollutant under the worst case scenario, is still considered as acceptable as it within the range of acceptable LCR proposed for Malaysia, which is between 10^{-6} (1 in a million) to 10^{-4} (1 in 10,000). 	<ul style="list-style-type: none"> Steps should be taken to minimize solid waste spillage during collection and transportation to the waste transfer station. The entire compound of the waste transfer station should have proper housekeeping and be kept clean all the time to minimise the breeding of rodents and disease vectors. Fogging of the perimeter of the waste transfer station whenever necessary to destroy adult mosquitoes.
Traffic	<ul style="list-style-type: none"> Traffic congestion and safety issue Road littering from moving trucks Road surface contamination due to mud/earth from trucks if washing bay not functioning Nearby local community will be impacted due to noise from movement of RORO trucks to and from the transfer station 	<ul style="list-style-type: none"> Traffic Management Plan shall be establish and implemented during Operation stage. The trucks should also, as far as possible, avoid using the public roads during the weekends when more road users are expected to ply the road. Adequate warning signs should be put up at suitable locations to forewarn road users of the existence of the project activities. During busy times, flagmen should be employed to assist in the direction of traffic when site vehicles are converging to the main

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Environmental component	Potential Impact	Mitigation measures
Socio economy	<ul style="list-style-type: none"> Enhancement of employment opportunities. Potential of respiratory or skin diseases Impacts will be occurred on the community health in the surrounding area, this may include: <ul style="list-style-type: none"> odour and gas emissions would cause nuisance to surrounding community, impacts of heavy machinery movement, the presence of pathogens, vectors and insects. Safety and health risk due to skin contact with leachate, gas and odour Open composting could potentially become mosquito breeding grounds, cockroaches and mice. 	<p>traffic flow.</p> <ul style="list-style-type: none"> Inform residents and the public and commercial areas of schedules as well as with the management plans prepared by the operators. A comprehensive compost management and pollution control plan shall be develop.
Odour nuisance	<ul style="list-style-type: none"> Odour nuisance to the surrounding community due to leachate leaking at the road side. Odour nuisance to the surrounding community due to leachate generation at the transfer station. 	<ul style="list-style-type: none"> Defining and developing barriers at proposed project sites by plantation and Green belt on the boundary of with suitable species of plants / trees as natural media for reduction of odour pollution and restriction of odour nuisance in and around proposed project sites Abatement of odour emissions from proposed project sites used a Natural Effective Microorganism Enzyme (NEME). The used of NEME as a spraying material can reduce the odour level, the concentrations of NH3 and H2S and the number of flies. A regular Odour Impact Assessment should be undertaken. The impact assessment should cover a range of reasonably foreseeable odour generation and receptor exposure scenarios and the effect of different mitigation options. Assessment should include point sources and area sources. The materials which promote the generation of gases should be excluded. For example, wastes with a high sulphate or sulphide content should be excluded. Co-ordination between the gatehouse and operators at the tipping face should take place where known odorous wastes are to be deposited. This approach can be implemented if the separation program at the source level which is gazetted in Act 672 is implemented successfully.
PROJECT ABANDONMENT		

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Environmental component	Potential Impact	Mitigation measures
Abandonment	<ul style="list-style-type: none">• Direct contamination of soils, groundwater by the accidental import of, and/or spreading of contaminated material or accidental spillages within the working area during construction;• Discharge of liquid wastes and sewage direct to ground or to controlled waters;• Direct impact on peat resource; and• Direct impact on geomorphological features.	<ul style="list-style-type: none">• In the event the project does not materialise as planned and has to be abandoned, then all materials and equipment on site will be sent back to supplier or sold. All structures will be dismantled and sold to recyclers or sent back to suppliers. The site will be planted with fast growing grass to void erosion from exposed surface