



CHAPTER 9

ENVIRONMENTAL MANAGEMENT PLAN

9.1 Guided Self Regulation

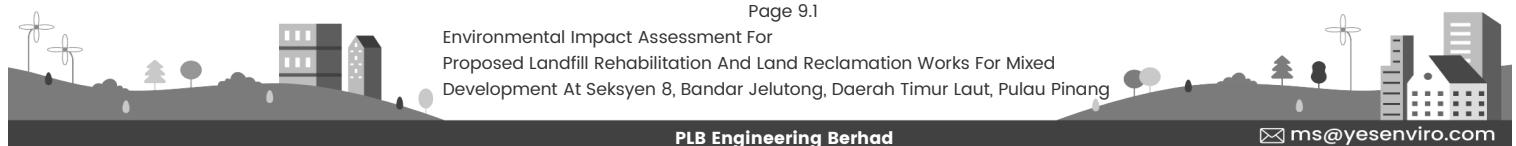
Self regulation has been adopted by the DOE as a long-term goal to be achieved and a culture to be inculcated within the regulated sectors through mainstreaming of environmental agenda. Environmental mainstreaming has been integrated into all the recent regulations of the DOE. The implementation of environmental mainstreaming to promote and instil self-regulation in pollution control has been translated into regulatory requirements on performance monitoring of pollution control measures, scheduling reporting, record keeping, competent persons and involvement of environmental professionals playing specific roles. This approach to pollution control is a win-win concept which has shown to accrue positive results in optimal operation of PCS (pollution control systems), prevention of PCS failures, cost savings in PCS operation, systematic management of performance monitoring data and improved regulatory compliance on a sustained basis. On a wider perspective, self-regulation which complements the existing command and control approach of the DOE, would result in cultivating environmental ownership and excellence in environmental commitment from the regulated sectors. Thus in managing the Proposed Project, the Project Proponent shall use the guided self regulation approached in ensuring environmental compliance.

9.2 Environmental Management Plan

Once the DOE approves the EIA report for the Proposed Project a number of actions are required to meet the EIA approval conditions for the Proposed Project. Environmental management is defined as a systematic means of managing environmental impacts, matching the necessary tasks with adequate resources to meet defined environmental objectives and targets.

Thus, an EMP (Environmental Management Plan) is an important tool to ensure that all the issues that are likely to arise from the Proposed Project are adequately addressed during the implementation of the Proposed Project. The EMP is proposed to document the potential issues and actions that are required to be undertaken to mitigate any adverse impacts that may arise.

Compliance to these measures must be ensured and it is recommended that the Project Proponent be subjected to uniform requirements for incorporation of these measures at both construction and operation stages. Failure to include this recommendation may result in different levels of priorities and





interests by the Project Proponent when proposing and implementing environmental management measures and monitoring of impacts laid down in the EMP.

To cater for the mainstreaming of the environmental agenda towards guided self regulation, the following environmental mainstreaming tools shall be incorporated in the EMP:-

- Environmental policy;
- Environmental budgeting;
- Environmental monitoring committee;
- Environmental facility;
- Environmental competency;
- Environmental reporting and communication; and
- Environmental transparency.

Also to be included in the EMP are various environmental management program including monitoring requirements to determine the effectiveness of the mitigation measures adopted and to monitor changes adverse or otherwise to the surrounding physical-chemical, biological and human environment. The environmental management programs provide a systematic review of all possible issues and concerns outlined in **Chapter 7** of this report and the specified action plans to address the issues of concern for purpose of project sustainability and minimizing impacts to the environment. The main elements in an EMP is shown in **Table 9.1**.

Table 9.1
Main Elements In An EMP

Subject Matter	Description
1. Administrative Set Up	An administrative set up (e.g an environmental officer) responsible for environmental management, that clearly defines the structure and manpower requirements, and responsibilities of each personnel identified to cater for environmental management.
2. Legislative Requirements	Legislative requirements that need to be observed and complied with.
3. Monitoring Programs	Environmental monitoring programmes including for water quality, noise, and air quality.
4. Emergency Response	Actions required and reporting sequence in response to abnormal operations during the implementation of the Proposed Project.

The EMP shall be managed by the EPMC (Environmental Performance and Monitoring Committee) to be identified by the Project Proponent as shown in **Figure 9.1**. The role and duties of the Project Proponent and environmental officer is shown in **Table 9.2** and **Table 9.3** respectively. The EO to be appointed shall be a competent person with the following certification issued by the Department of Environment:-





- Certified Sediment and Erosion Control (CSEC) or Certified Stormwater and Erosion Control Inspection (CESSWI); and
- Certified Environmental Professional In Scheduled Waste Management (CePSWAM).

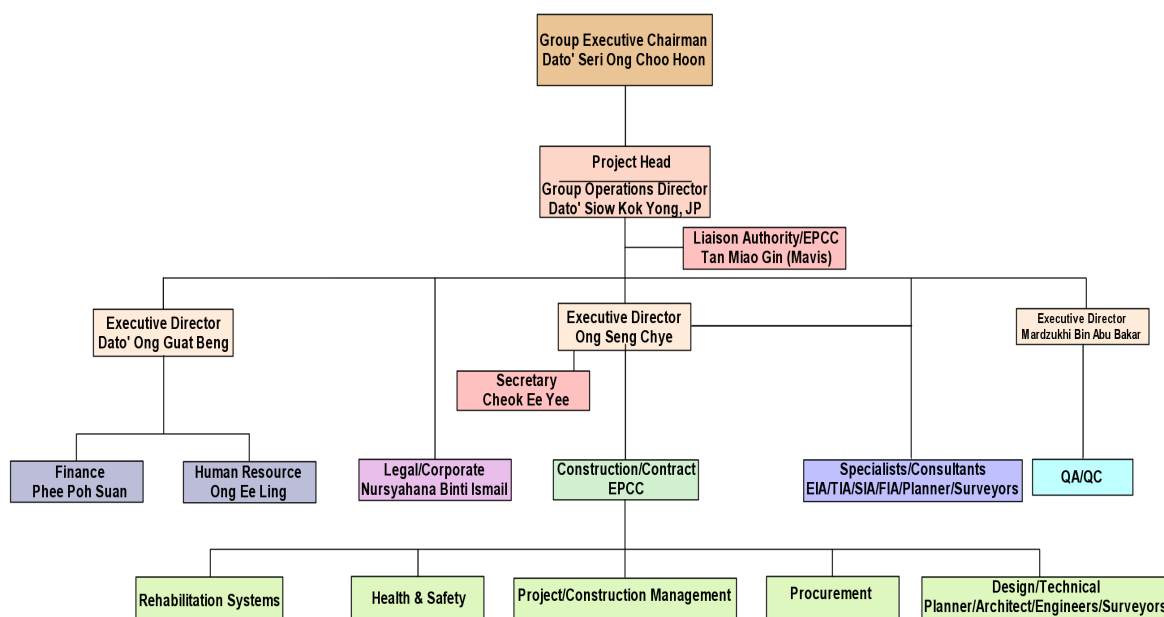


Figure 9.1 Proposed Structure For Environmental Performance And Monitoring Committee

**Table 9.2
Roles and Responsibility of Project Proponent**

No	Roles and Responsibilities
1.	Formulating an EP (Environmental Policy) of the company with respect to the EIA project, which shall be communicated to the stakeholder, consultants, contractors and other parties involved in the project planning and implementation.
2.	Establishing an organizational structure which clearly shows the emplacement of a Registered EIA Consultant and an EO (Environmental Officer), where they are charged with specific responsibilities to ensure environmental aspects are taken into consideration, and P2M2 (Pollution Prevention and Mitigation Measures) are integrated into every stage of project planning and implementation.
3.	Allocating sufficient funds for all steps in the EIA process and every stage of project planning and implementation with itemized budget required for water quality, air quality and noise monitoring, for comprehensive site survey and investigation of the specific existing site conditions, for implementation of EMP (Environmental Management Plan) including temporary P2M2. P2M2 shall be those which can be described as state of the technologies, BATs (Best Available Technologies), or industry best practices.
4.	Appointing an EO, at the stage of post submission of EIA Report to be charged with responsibilities to execute environmental quality control and performance monitoring functions during the construction and operation phases of the project implementation. Service of an EO can also be obtained from an EO Service Provider. Service of EO from EO service provider is allowed during the construction stage only. However, at the operational stage, the Project Proponent shall employ his own EO.
5.	Establishing a project EPMC (Environmental Performance Monitoring Committee) to monitor the environmental performance, effectiveness of P2M2, and status of regulatory compliance of the project. The EPMC shall be represented by all relevant parties involved in project implementation and chaired by a senior member representing the Project Proponent. The chairman who shall be formally appointed by the PP (Project Proponent) shall be responsible for ensuring the decisions of the meeting are responsibly executed. The EPMC shall meet at a minimum, once in a quarter and the minutes of the meeting shall be maintained.
6.	Ensuring the EMP including temporary and permanent P2M2 are implemented and maintained according to best practices.





Table 9.3
Responsibilities Of Environmental Officer

No	Responsibilities
1.	Implementing the EMP (Environmental Management Plan), and installing the temporary and permanent P2M2 (Pollution Prevention and Mitigation Measures).
2.	Preparing EPMD (Environmental Performance Monitoring Document). EPMD describes in detail how EIA approval conditions are going to be complied and how performance monitoring* of the various P2M2 will be conducted to ensure the optimal functionality of the P2M2 is maintained. The details shall include, among others: performance monitoring equipment/instruments, sampling protocols and analysis, monitoring parameters, sampling frequency, preventive and corrective maintenance procedure for the P2M2, discharge compliance, record keeping, etc. EPMD also includes CM (Compliance Monitoring) and IM (Impact Monitoring) wherever relevant. (* Note: Performance monitoring in this context refers to the monitoring of certain characteristics that would indicate that a P2M2 is functioning in an optimal manner. It also includes the preventive and corrective maintenance of the P2M2 to maintain their optimal performance. P2M2 refers to all measures to prevent and mitigate pollution such as sedimentation pond, sewage treatment system and includes temporary pollution prevention and mitigation measures).
3.	Performance or supervising the conduct of PM (Performance Monitoring) program as specified in the PMD.
4.	Preparing PMR (Performance Monitoring Report). PMR discusses the results of the performance monitoring conducted as described in the PMD. Wherever relevant, PMR shall include data interpretation and assessment of the effectiveness of the P2M2 by making comparison of the performance monitoring parameters with their recommended ranges (or standards). Statistical techniques and graphical presentation monitoring parameters should be used wherever appropriate. PMR should also make some definitive conclusions on the overall performance of the P2M2 and suggest improvement measures to be taken if necessary. PMR shall be submitted to the EPMC as established by the Project Proponent for the EIA project and maintained for the inspection of the DOE officers.
5.	Communicating the status of environmental regulatory compliance of the project during construction and operation phases to the Project Proponent.
6.	Maintaining a detailed record of major upset conditions encountered, if any, for the duration of the project construction and operation phases. The date of occurrence, nature and causes of upset conditions, and the corrective actions taken shall be recorded. Upset conditions refer to failures of P2M2 which result in noncompliance with the EIA approval conditions or discharge/emission standards, or pollution that affects the immediate neighbourhood or seriously threatens the environment or public health and safety.
7.	Acting as an environmental advisor to the Project manager in advising him to undertake additional efforts, if any, to further ensure affective implementation EMP including temporary P2M2 on a sustained basis.

The EMP need to be periodically reviewed and modified to include changes or other impacts that may be identified in the course of project implementation.

9.3 Environmental Monitoring Programs

Environmental monitoring comprises three types of monitoring namely performance monitoring, compliance monitoring and impact monitoring and discussed further as follows:-



A. Rehabilitation And Reclamation Works

(i) Performance Monitoring

Table 9.4 provides the proposed performance monitoring program during the reclamation works. The performance monitoring program aims to ensure that the best management practices are in place and maintained on a routine basis to minimize impacts to the environment.

Table 9.4
Proposed Performance Monitoring During Rehabilitation And Reclamation Works

Performance	Parameters	Frequency	Compliance Limit	Remedial Action
Silt Curtains	Potential tears and displacement in areas shown in Figure 9.2	Once a month	<ul style="list-style-type: none"> <50mg/l for SS 	Repair or reinstall affected areas

(ii) Compliance Monitoring

Various conditions imposed by the DOE and Jabatan Laut with the approval of the EIA report has to be complied with during the reclamation works which requires monitoring. **Table 9.5** provides the compliances monitoring imposed by Jabatan Laut to meet the requirements imposed by the related agency.

Table 9.5
Proposed Compliance Monitoring During Rehabilitation And Reclamation Works

Issues And Sources	Location	Parameters	Compliance	Frequency
TSS in Marine Waters (as per Jabatan Laut's conditions)	<ul style="list-style-type: none"> 6 sampling locations as per Figure 9.3. 	<ul style="list-style-type: none"> TSS 	<ul style="list-style-type: none"> < 50 mg/l 	<ul style="list-style-type: none"> Monthly
Leachate	<ul style="list-style-type: none"> 1 sampling location as per Figure 9.4 	<ul style="list-style-type: none"> Al, NH₃, An, Ag, As, Ba, BOD, B, Cd, Ca, Cl, Cr, Cr⁶⁺, Cr³⁺, Co, pH, Conductivity, Cu, Cn, F, Formaldehyde, Hardness, Fe, Pb, Mg, Mn, Anionic Detergent, Hg, Mineral Oil, Ni, NO₃, NO₂, Oil & Grease, Turbidity, Phenol, K, Se, Na, Sn, Sr, SO₄, S₂, Temperature, TDS, Zn, V, Salinity, DO, E.Coli, Total Coliform, Gross α, Gross β, Aldrin, Chlordane, DDT, 2,4-D, Dieldrin, Endosulfan, Heptachlor, Heptachlor Epoxide, Hexachlorobenzene, Methoxychlor, Lindane, Chloroform, Bromoform, Dibromochloromethane and bromodichloromethane 	<ul style="list-style-type: none"> NOMC 	<ul style="list-style-type: none"> Monthly during rehabilitation and reclamation works.



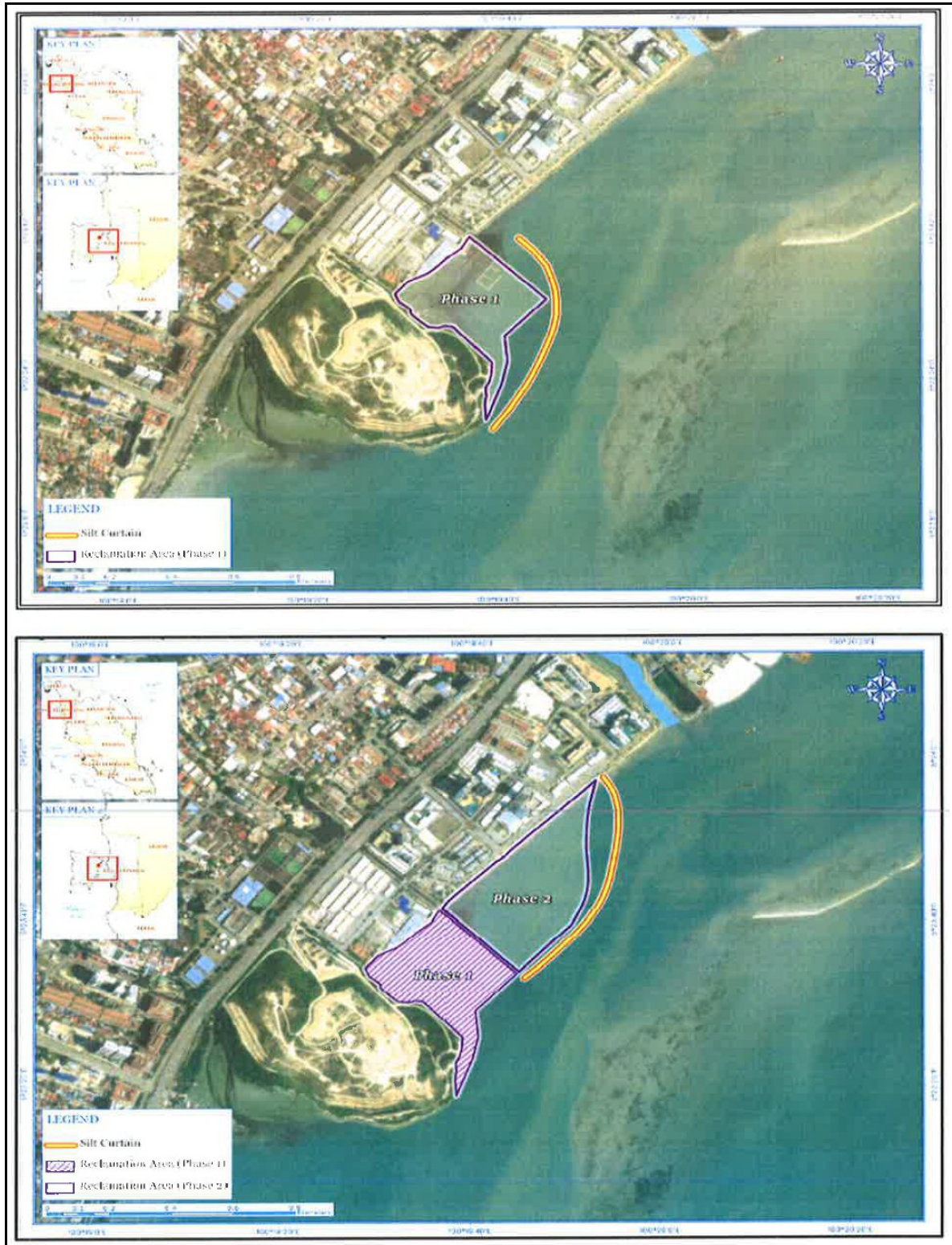


Figure 9.2 Loation Of Silt Curtains





WQ	Description	Latitude (N)	Longitude (E)
WQ1	River mouth of Sg Pinang	5°24'00.07"N	100°20'04.14"E
WQ2	North channel	5°24'04.89"N	100°20'19.65"E
WQ3	Middle bank	5°23'39.61"N	100°20'06.27"E
WQ4	Temporary Drain	5°23'28.99"N	100°19'48.43"E
WQ5	Outlet 1	5°23'12.20"N	100°19'20.70"E
WQ6	South channel	5°22'50.58"N	100°19'27.88"E

Figure 9.3 Location Of TSS Sampling Stations In Marine Waters



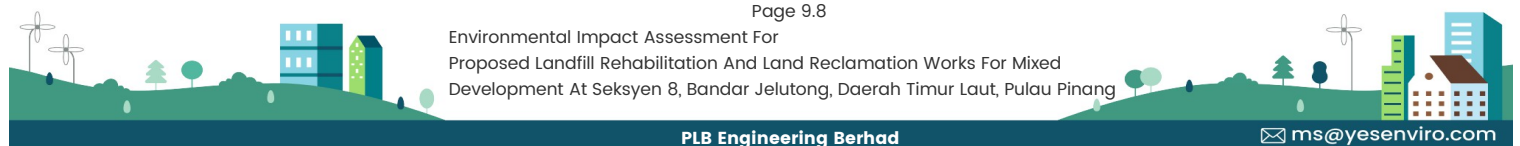


Figure 9.4 Proposed Location Of Impact Monitoring Stations For Air, Noise, Drain Water And Landfill Gas

Description Of Impact Monitoring Stations

Segment	Station ID	Georeferences	Location
Air Quality	AQ1	N 5° 23' 28.87" E 100° 19' 9.20"	At Mutiara Idaman 1
	AQ2	N 5° 23' 42.31" E 100° 19' 37.22"	At Persiaran Karpal Singh
	AQ3	N 5° 23' 59.59" E 100° 19' 55.92"	At Persiaran Karpal Singh in the east
Noise Levels	NL1	N 5° 23' 28.87" E 100° 19' 9.20"	At Mutiara Idaman 1
	NL2	N 5° 23' 42.31" E 100° 19' 37.22"	At Persiaran Karpal Singh
	NL3	N 5° 23' 59.59" E 100° 19' 55.92"	At Persiaran Karpal Singh in the east
Drain Water	DW1	N 5° 23' 39.97" E 100° 19' 21.49"	At upstream of drain adjacent to existing land mass
	DW2	N 5° 23' 34.38" E 100° 19' 29.64"	At downstream of drain adjacent to existing land mass
	DW3	N 5° 23' 29.15" E 100° 19' 12.86"	At downstream of drain adjacent to existing land mass
	DW4		At upstream of drain adjacent to existing landmass in north of project site
Landfill Gas	BH2	N 5° 23' 31.79" E 100° 19' 17.88"	At north of project site
	BH4	N 5° 23' 20.23" E 100° 19' 21.24"	At west of project site
	BH5	N 5° 23' 26.32" E 100° 19' 25.48"	At center of project site
	BH6	N 5° 23' 30.66" E 100° 19' 29.79"	At south of project site
	BH8	N 5° 23' 19.92" E 100° 19' 33.88"	At east of project site

Source : YES Bizz Sdn. Bhd.



(iii) Impact Monitoring

Various segments of the environment has to be monitored during the rehabilitation and reclamation works which us aim to assess the short term and long terms impacts of the Proposed Project. The segments to be monitored are summarized in **Table 9.6** which also includes Jabatan Laut's requirements for baseline monitoring as outlined in the approval for the coastal hydraulic study.

Table 9.6
Proposed Impact Monitoring During Rehabilitation And Reclamation Works

No.	Issues and Concerns	Location	Parameters	Compliance	Frequency
1.	Drain water Quality	• 4 sampling locations as per Figure 9.4	• pH, BOD, COD, SS, AN, DO & E.Coli	• Baseline and NWQS	• Monthly during rehabilitation and reclamation works.
2.	Marine Water Quality	• 4 sampling locations as per Figure 9.5*	• PO ₄ , AN, NO ₃ , SS, DO, Oil & Grease and Faecal Coliform	• Marine Water Quality Standards	• Monthly during rehabilitation and reclamation works.
3.	Ambient Air Quality	• 3 sampling locations as per Figure 9.4	• PM _{2.5} and PM ₁₀	• PM _{2.5} – 35 µg/m ³ • PM ₁₀ – 100 µg/m ³	• Monthly during rehabilitation and reclamation works.
4.	Gaseous Emissions at Jelutong Landfill	• 5 sampling locations as per Figure 9.4 included additional on Jelutong Landfill	• An, CO, H ₂ S, CH ₄ and NMVOC	• AAAQG and USEPA	• Monthly during rehabilitation and reclamation works.
5.	Noise Levels	• 3 sampling locations as per Figure 9.4	• dB(A) Leq	• 65 dB(A) Leq (datetime) and 60 dB(A)Leq (nighttime at nearest residential	• Monthly during rehabilitation and reclamation works.
6.	Shoreline monitoring	• As per Figure 9.6	• Bathymetry	• Baseline Bathymetry	• Once prior commencement of reclamation works (Baseline) • Once in 3 months during reclamation works and once in 6 months after reclamation works for 3 years

* Baseline sampling at WS4 to be conducted and reported in EMP



Figure 9.5 Marine Water Quality Sampling Stations







B. Construction On New Landmass

Impacts to be monitored and managed during the construction stage that are identified to have significant environmental impacts at site and the surrounding area which requires strict supervision and frequent monitoring and surveillance are as follows:-

- Earthworks and construction activities; and
- Drainage, runoff and erosion control.

The following general review and inspection must be undertaken at the construction stage:-

- Review on the ESCP at regular intervals during the earth work stage and modifications or improvements shall be made when ever necessary to improve and provide further prevention of soil erosion and excessive run-offs;
- Regular inspection of the erosion and sediment control measures including BMP's (Best Management Practices) e.g drains, chutes, sediment traps, retention ponds etc. and also inspection immediately after a storm event, to ensure effectiveness of measures and prevention of malfunction;
- Regular monitoring to ensure that sediment traps are regularly maintained to prevent over tapping or failure. It is suggested that regular inspections be made immediately after a storm event. Desilting should be carried out when designed capacities are not met; and
- Regular monitoring of the contractors implementing works on the project site to ensure all specification and engineering designs are followed closely especially in relation to slope strengthening.

The environmental monitoring programs during the construction stage include the following:-

(i) Performance Monitoring

Table 9.7 provides the performance monitoring required during the construction on the new landmass. The performance monitoring program aims to ensure that the best management practices in place are maintained on a routine basis thereby minimizing impacts to the environment. **Table 9.8** provides the performance monitoring of the LD-P2M2 to be provided for each land parcel involved with the topsite development.





Table 9.7

Proposed Performance Monitoring Program During Construction On New Landmass

Performance	Parameters	Frequency	Compliance Limit	Remedial Action
Drainage	New drainage lines not controlled	At least once every two days in areas where earth-moving is occurring Weekly elsewhere	<ul style="list-style-type: none"> < 50 mg/l for SS < 250 NTU for turbidity 	Install appropriate sediment controls on new drainage lines
Sediment controls, silt fences and traps	Not controlled effectively	Daily in dry weather Within first two hours of a storm Three times a day during prolonged rainfall	<ul style="list-style-type: none"> < 50 mg/l for SS < 250 NTU for turbidity 	Remove sediment from trap Replace barrier or filter material Redesign installation Improve maintenance
Haul roads	Dust Soil on paved roads	At least daily	<ul style="list-style-type: none"> Ambient air quality guidelines 	Pave haul roads with gravel or impervious sealant Install wheel wash and rumble grid Manually wash vehicle wheels Increase road cleaning frequency
Cut-off and diversion drains	Water not diverted away from sensitive areas	Weekly	<ul style="list-style-type: none"> < 50 mg/l for SS < 250 NTU for turbidity 	Replace or repair damaged drains Redesign ineffective drains
In-stream weirs	Ineffective during low flow Release of trapped sediment during storms	Weekly in dry weather 24 hours before forecast rain remove sediment trapped behind weir	<ul style="list-style-type: none"> < 50 mg/l for SS < 250 NTU for turbidity 	Clean out behind weir if filled to 25% capacity
Stockpiles and bare slopes	Erosion	Weekly	<ul style="list-style-type: none"> < 50 mg/l for SS < 250 NTU for turbidity 	Minimise exposure to run-off and action of wind Ensure stabilisation measures are effective
Unvegetated areas	Dust	Daily during dry weather	<ul style="list-style-type: none"> Ambient air quality guidelines 	Increase use of water spray on unvegetated areas Protect untrafficked areas temporarily with mulch or geofabric blanket
Vehicles and machinery	Noise pollution Exhaust gases	Initially when vehicle or machinery is introduced to the site and thereafter monthly	<ul style="list-style-type: none"> Near living receptors Daytime : 65 dB(A) Nighttime : 60 dB(A) 	Ensure that mufflers and noiseshielding are effective Ensure that emission controls are effective and motors well maintained
Chemical storage areas	Spills	Weekly	<ul style="list-style-type: none"> No spills 	Clean-up contaminated area Improve bunding
Litter controls	Litter on and off-site	Daily on and off-site	<ul style="list-style-type: none"> No littering 	Clean-up litter originating on-site Review number and placement of rubbish bins Ensure materials are not stored in such a manner that they could contribute to litter Speak to staff about the litter disposal





Table 9.8
Proposed Performance Monitoring Program For LD-P2M2

Performance	Parameters	Frequency	Compliance Limit	Remedial Action
Drainage	New drainage lines are not controlled	At least once every two days in areas where earth-moving is occurring Weekly elsewhere	<ul style="list-style-type: none"> <50 mg/l for TSS <250 NTU for turbidity 	Install appropriate sediment controls on new drainage lines
Sediment controls and traps	Sediment is not controlled effectively	Daily in dry weather Within first two hours of a storm Three times a day during prolonged rainfall	<ul style="list-style-type: none"> <50 mg/l for TSS <250 NTU for turbidity 	Remove sediment from trap Replace barrier or filter material Redesign installation Improve maintenance
Internal haul roads	Dust and soil are on paved roads	At least daily	<ul style="list-style-type: none"> Ambient air quality guidelines 	Pave haul roads with gravel or impervious sealant Install wheel wash and rumble grid Manually wash vehicle wheels Increase road cleaning frequency
Cut-off and diversion drains	Water is not diverted away from sensitive areas	Weekly	<ul style="list-style-type: none"> <50 mg/l for TSS <250 NTU for turbidity 	Replace or repair damaged drains Redesign ineffective drains Relocate incorrectly placed drains
Retardation and settlement basins	Sediment is not effectively removed	Weekly	<ul style="list-style-type: none"> <50 mg/l for TSS <250 NTU for turbidity 	Redesign installation Increase retention times Add flocculants*
Stockpiles	Erosion	Weekly	<ul style="list-style-type: none"> Covered where possible 	Minimise exposure to run-off and action of wind Ensure stabilisation measures are effective
Open disturbed areas	Dust	Daily during dry weather	<ul style="list-style-type: none"> Ambient air quality guidelines 	Increase use of water spray on unvegetated areas Protect untrafficked areas temporarily with covers such as mulch or geofabric blanket
Vehicles and machinery	Noise pollution Exhaust gases	Initially when vehicle or machinery is introduced to the site and thereafter monthly	<ul style="list-style-type: none"> Near living receptors Daytime : 65 dB(A) Nighttime : 60 dB(A) 	Ensure that mufflers and noise shielding are effective Ensure that emission controls are effective and motors well maintained
Scheduled waste storage area	Spills	Weekly	<ul style="list-style-type: none"> Environmental Quality (Scheduled Wastes) Regulation 2005 	Clean-up contaminated area Improve bunding and regular disposal at licensed facility
Litter controls	Litter is on and off-site	Daily on and off-site	<ul style="list-style-type: none"> Local Government Act 	Clean-up litter originating on-site Review number and placement of rubbish bins Ensure materials are not stored in such a manner that they could contribute to litter Speak to staff about the litter disposal



(ii) Compliance Monitoring

Table 9.9 provides the compliance monitoring program to be conducted for the Proposed Project so as to meet with the requirements of the EIA conditions of approval.

Table 9.9
Proposed Compliance Monitoring Program During Construction On New Landmass

Issues And Sources	Location	Parameters	Compliance	Frequency
1. Discharges from Sedimentation Pond	• As per numbers in ESCP	• TSS and Turbidity	• 50 mg/l for TSS • 250 NTU for Turbidity	• Monthly • After rain event/ monthly
2. Leachate Discharge	• At outlet	• Al, NH ₃ , An, Ag, As, Ba, BOD, B, Cd, Ca, Cl, Cr, Cr ⁶⁺ , Cr ³⁺ , Co, pH, Conductivity, Cu, Cn, F, Formaldehyde, Hardness, Fe, Pb, Mg, Mn, Anionic Detergent, Hg, Mineral Oil, Ni, NO ₃ , NO ₂ , Oil & Grease, Turbidity, Phenol, K, Se, Na, Sn, Sr, SO ₄ , S ₂ , Temperature, TDS, Zn, V, Salinity, DO, E.Coli, Total Coliform, Gross α , Gross β , Aldrin, Chlordane, DDT, 2,4-D, Dieldrin, Endosulfan, Heptachlor, Heptachlor Epoxide, Hexachlorobenzene, Methoxychlor, Lindane, Chloroform, Bromoform, Dibromochloromethane and bromodichloromethane	• Environmental Quality (Control of Pollution from Transfer Station and Landfill) Regulation 2009	• Monthly
3. Transportation Road Traffic Safety	• Near project area and at access points.	• Traffic speed, traffic rules congestion.	• Road Traffic Regulations. • Local bye laws.	• As required
4. Solid Wastes	• Sources, collection and disposal of waste.	• Inspection of condition of containers, collection and disposal by contractor.	• General Aesthetic	• As required
5. Social / Health - Disposal of construction domestic solid wastes. - Workers Health	• At collection points allocated. • All construction employees.	• Regular collection and good housekeeping of bins, cleanliness etc. • Medical examination.	• Health Regulation. • Health Employment Regulation.	• Weekly or as required • Prior to employment and as needed

Source : YES Bizs Sdn. Bhd.

(iii) Impact Monitoring

Table 9.10 provides the proposed impact monitoring program which will be used to assess the impacts during the construction on reclaimed land to the environment. The data obtained from the environmental monitoring programs shall be used to assess the effectiveness of the mitigation

measures in place and to enhance the pollution prevention and mitigation measures in place if changes are detected that could have resulted from the implementation of the Proposed Project.

Table 9.10
Proposed Impact Monitoring Program During Construction On New Landmass

Area of risk	Control /Parameters	Frequency	Limit	Remedial action
Water Quality	Discharges from sediment pond	Monitor the discharges from the sediment pond for each parcel of development	<ul style="list-style-type: none"> TSS <50 mg/l Turbidity <250 NTU 	Review and enhance site control
Noise	Determine whether noise nuisance exists	Monitor noise monthly at the representative residence near construction activities for each parcel of development	<ul style="list-style-type: none"> Near living receptors Daytime : 65 dB(A) Nighttime : 60 dB(A) 	Review and enhance noise control measures
Air quality (dust)	Determine whether dust nuisance exists	Monitor on monthly basis for dust deposits at locations that indicate impact on adjacent residents and at site boundary	<ul style="list-style-type: none"> PM_{2.5} : 35 ug/Nm³ PM₁₀ : 100 ug/Nm³ 	Improve controls on dust emissions
Marine water quality	Identify ineffective sediment control installations Quantity SS discharge from site	As per sampling stations outline in Figure 9.5 on monthly basis by individual development	Marine Water Quality Standards	Revise on-site controls if regulatory standards are breached
Shoreline monitoring	To assess changes in shoreline	Every 6 months after reclamation until 3 years	Changes in shoreline	Maintenance dredging to be carried out at jetty area if sedimen built up

C. Operation Stage

It is envisaged that the operational stage of the Proposed Project will generate less significant impacts although it can be cumulative and long term. However, if the Project Proponent is successful in addressing all environmental problems and impacts during the construction stage, the sequential management of impacts during the operation stage will be easier and more effective.

The inevitable environmental impacts associated with the operations of the Proposed Project are to be properly managed to ensure protection of the surrounding environment.

The operational stage nevertheless will result in various residual issues which have been discussed in **Chapter 7** of the report. The extend of the residual issues can be monitored depending on the related environmental segment that may be adversely affected due to the activities related to the Proposed Project.

The impacts on water quality can be reduced if discharges into the waterbody are properly contained prior to discharge to ensure the status quo before and after development are the same. However, the organic or inorganic load onto the water body may increase as a result of the development. The organic

load entering the water body in the area is a residual impact that may change the water quality of the receiving water. Thus monitoring of the long term impacts are essential. **Table 9.11** depicts the issues that have to be managed for water quality protection.

Table 9.11
Management Of Surface Water Quality At Operation Stage

Issues	Measures
(i) Sullage and Sewage Discharge	All sullage and sewage discharges must be effectively collected and channeled for conveyance to the centralized sewage treatment plant. Monitoring of the discharges from the centralized sewage treatment plant is to be conducted by the related service provider. Similarly discharges from the Proposed Project will impose higher loading to the water body.
(ii) Urban runoff	Regular and effective maintenance of detention facilities must be incorporated to ensure the suspended solids level in the receiving waterway does not increase and urban runoffs are contained prior to discharge.

9.4 Reporting Requirements

Table 9.12 provides the reporting requirements for the Proposed Project. Whilst is normally imposed into the EIA conditions of approval.

Table 9.12
Summary Of Reporting Requirements Normally Imposed By DOE

No.	Items	Type	Frequency of Reporting to DOE
1.	Outline BMP Inspection Report	• BMP's	Inspection conducted within 24 hours after continuous rainfall
2.	Photographic reports on BMP's rectification	• Rectification of BMP's	After 7 days of incident
3.	Photographic of earthwork progress.	• Earthwork	Monthly
4.	Environmental Monitoring Reports	• Monitoring of environmental segments	Once in 3 months
5.	Progress Reporting – Form EIA1-18	• Construction progress	Once in 3 months
6.	Compliance Reporting – Form EIA2-18	• Compliance	Once in 3 months
7.	Environmental Management Plan	• Monitoring and management	EMP submission prior commencement of works.
8.	Environmental Audit Report	• Effectiveness of Environmental control measures	Yearly basis from EIA approval

9.5 Environmental Auditing

Environmental audit is made a mandatory requirement when the EQA 1974 was amended to include provisions for EIA studies. Thus, Section 34A (7) requires that an audit be conducted to ensure all conditions attached to the EIA approval letter are complied with accordingly.

Therefore, it is recommended that routine auditing be conducted for the Proposed Project and its report submitted on a quarterly basis to the DOE during the construction stage. Thus, the Project Proponent must also be



prepared to undertake post monitoring and compliance auditing for the Proposed Project.

The audit report shall include the following:-

- Compliance to all monitoring requirements as imposed by the DOE;
- Compliance to all standards, criteria and guidelines imposed by DOE and other authorities;
- Compliance to all proposed plans submitted to relevant government departments;
- Compliance to mitigation measures; and
- Compliance to any other conditions imposed by the government agencies.

9.6 Environmental Contingency Plans

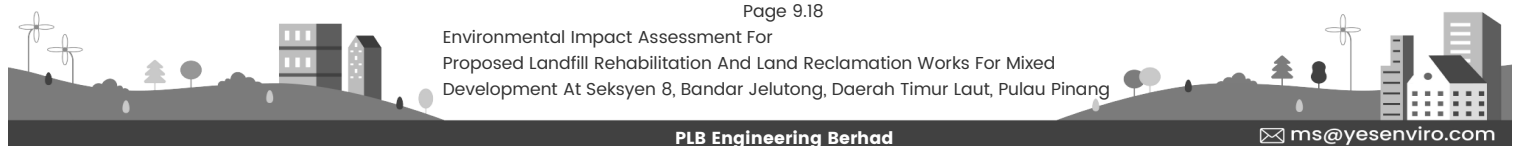
In order to ensure contingency control for any potential mishap or accident that may occur on the project site, a contingency plan is also to be formulated for the Proposed Project. For effective discharged of responsibilities, an emergency response team shall be organized for the Proposed Project during the construction stage. The emergency response planning is divided into two parts which involves on site emergency and off site emergencies.

On site emergency involves situations that are localized and can be controlled within the project site. This include localized water ponding situation, on site fire and oil spill or localized accidents dealing with construction activities. Off site emergencies involves situations that cannot be controlled on site and may cause environmental hazards to receptors outside the boundaries of the project site. This includes issues such as localized flooding downstream of the development which may be caused by poor supervision and construction methodologies adopted at the project site. Some of the related emergency flow charts are shown in **Figure 9.7 to Figure 9.10**.

Although these emergency situations are not anticipated due to the strict supervision and construction methodology to be adopted at site, contingency plans nevertheless shall be in place in order to cater for any abnormal situations.

9.7 Abandonment

This Proposed Project is not expected to be decommissioned or abandoned. In the eventuality, proper recovery and disposal of buildings, utilities, infrastructures and services will be undertaken. Rehabilitation of the site to minimize the impacts from abandonment shall also be carried out. For this purpose an abandonment plan is to be submitted to the relevant authorities if the Proposed Project is anticipated to be abandoned at any stage of development.



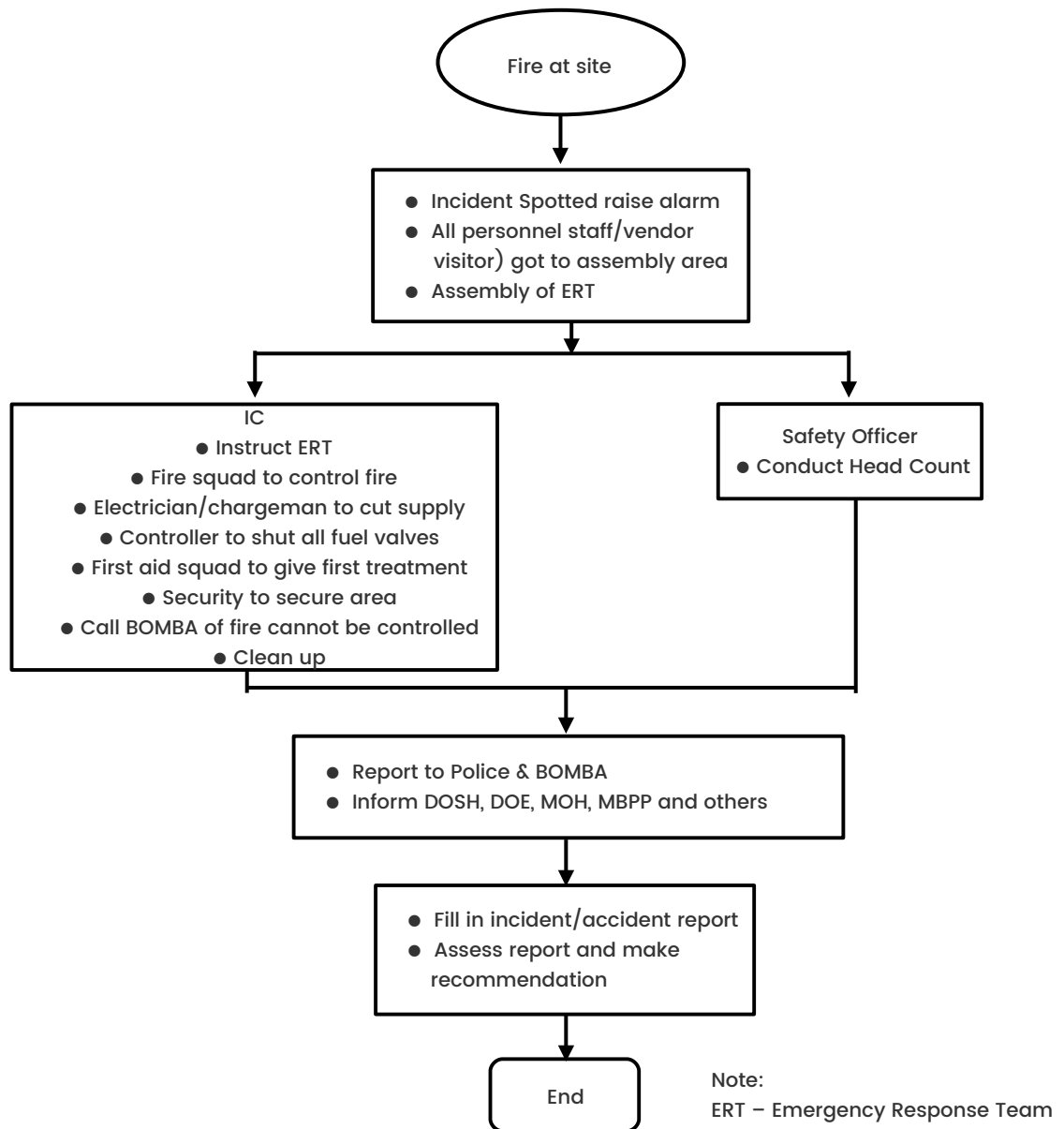


Figure 9.7
Process Flowchart For Fires At Site

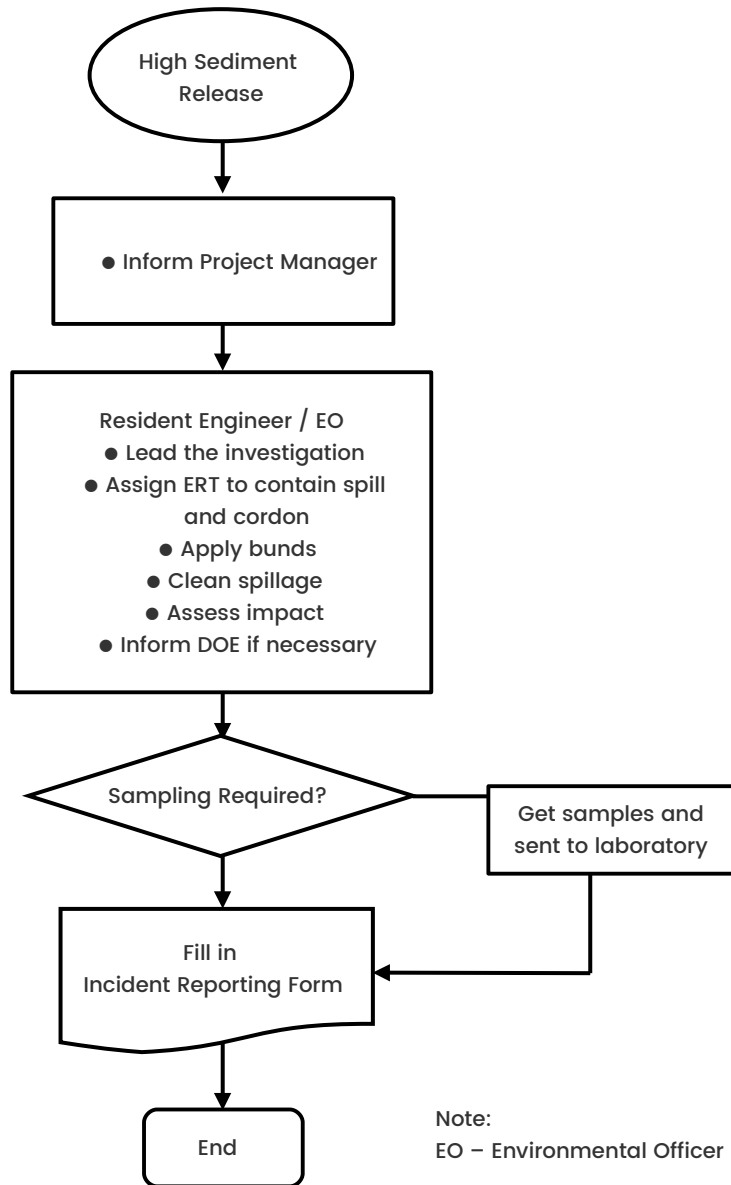


Figure 9.8
Process Flowchart For High Sediment Release

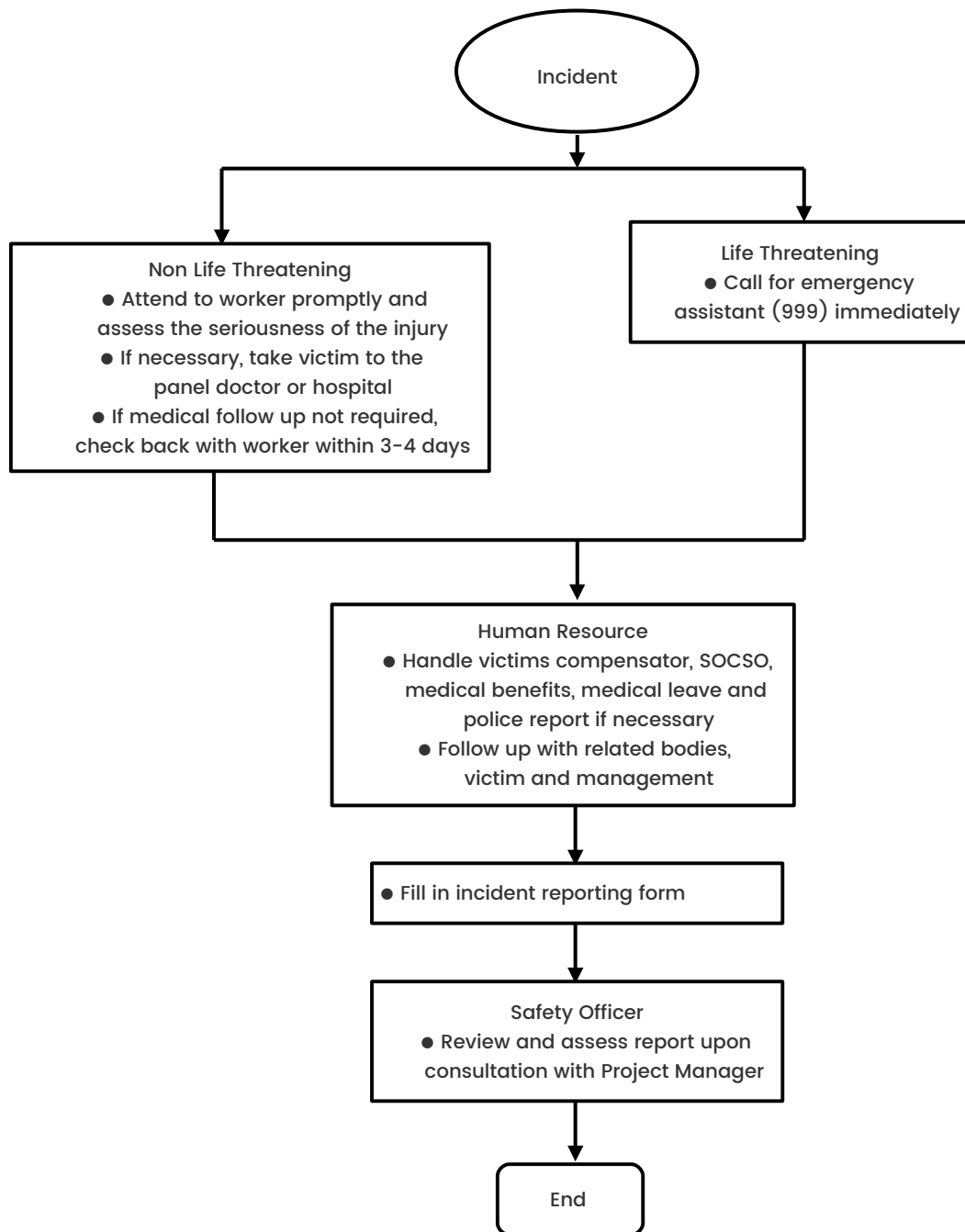


Figure 9.9
Process Flowchart For Incidents At Site



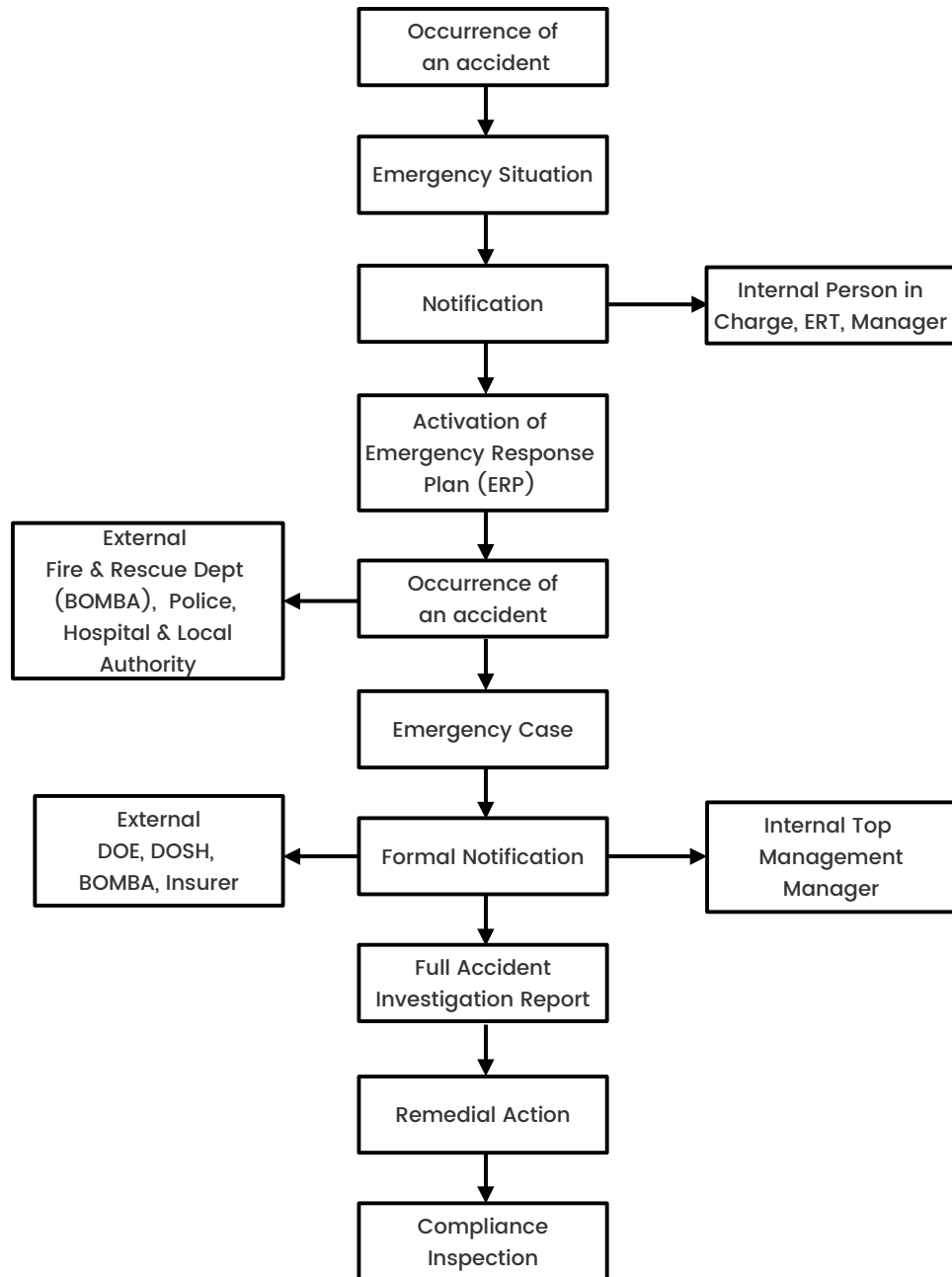


Figure 9.10
Accident Notification and Reporting Flowchart