CHAPTER 9 ENVIRONMENTAL MANAGEMENT PLAN

9.1 INTRODUCTION

This chapter presents the environmental management plan (EMP) framework for the proposed project which covers both construction and operational stage of the Project.

The EMP framework and subsequent detailed EMP document are prepared in accordance with the EGIM 2016 document published by the DOE. EMP document will serve as an iterative dynamic document and shall be updated and refined when the EIA Approval Conditions and other permitting approvals are obtained from DOE.

As described in earlier chapters, upon Project's operation, the overall Press Metal operation will comprise operation of three aluminium smelting plants. Therefore, the EMP framework for operational stage will cover the environmental management to be implemented in all three plants.

9.2 OBJECTIVE

The primary objective of this EMP framework is to identify potential environmental issues that may arise during project implementation, to provide a set of procedures to manage environmental impacts to protect and sustain the environmental qualities of the Project on-site and off-site, to propose monitoring program to keep track on the environmental status, and communicate the plant's environmental requirements as well as environmental management practices and compliance to relevant parties.

This EMP framework would encompass action plan for managing environmental impacts as well as emergency conditions that may arise throughout the development of the Project. Hence, apart from the environmental management measures, an Emergency Response Plan (ERP) for any unusual incidents shall be included in the EMP.

The EMP framework comprises the following:

a. Administrative set up for environmental management of the project, where environmental mainstreaming shall be adopted,
b. Safety, Health and Environmental Policy set by the organisation,
c. Review of all legal regulatory requirements related to the Project,
d. Environmental audit and monitoring requirements that would help enhance the development of the Project and minimize environmental impacts. The parameters to be monitored and locations of monitoring sites will be determined based on representativeness, practicality and economy. The environmental audit requirements for the Project shall also be specified,
e. Safety and emergency response procedures to adopt and respond to accidents and emergency situations, and

f. Abandonment Plan – Where applicable, an outline of the abandonment plan will be included. The abandonment plan will identify the main measures and actions that need to be implemented to ensure that the plant site is properly and safety dismantled, decommissioned, decontaminated and the site made good for future use.

Presently, an approved EMP document for existing plant operation is implemented. Upon implementation of Project, the EMP document will be updated with latest operational information and will be incorporated with issued EIA approval conditions and other related requirements.

9.3 FORMAT OF EMP DOCUMENT

The EMP document will be prepared following the recommended format in the EGIM 2016 to include the following section (**Table 9-1**):

Table 9-1 Format of EMP Document

Section	Title	Content
Section 1	**Introduction**	Introduction to the Plant's background, EMP needs and objectives, plant layout, and EMP Preparer Information.
Section 2	**Environmental Policy**	This section focuses on the environmental policy adopted by Press Metal.
Section 3	**Organisational Structure and Responsibilities**	This section identifies personnel who are responsible for the execution of the EMP and their roles.
Section 4	**Training Requirement**	This section highlights training requirements on personnel relevant to environmental management.
Section 5	**Environmental Requirement**	This section highlights environmental requirements, compliance, environmental monitoring program, pollution controls practiced.
Section 6	**Conclusion**	Concludes the EMP document and outlines the requirement for future revision and updating of the EMP document.

9.4 POLICY

Press Metal is committed to provide a safe, injury free work environment by maintaining the highest standard of Environmental Health and Safety Management Systems by implementation of Environmental, Health and Safety (EHS) Policy, with the guidance of the international environmental, health and safety standards such as OHSAS 1800, MS 1722, ISO 14001 and etc. All employees and contractors including direct and indirect

workers, site contractors and its workers must strictly follow the EHS Policy. Press Metal's EHS Policy is shown in **Chart 9-1**.

Chart 9-1 Press Metal EHS Policy

Press Metal Bintulu Sdn Bhd is an aluminium smelting plant placing its focus on the manufacturing of aluminium in the form of billets, ingots and wire rods. Our primary focus is leaning towards the development of the major heavy industrial manufacturing in Sarawak. We are committed to provide a safe working environment in the prevention of injury and ill health to our employees and committed to prevent environmental pollution by reducing wastes and the consumption of resources by maintaining the highest standard of Environmental, Health and Safety Management System with guidance of the International Environmental, Health and Safety Standards such as OHSAS18001, MS1722, ISO14001 and etc.

The management system incorporates policy, regulations, standards and programs to ensure the welfare of employees, environment and surrounding community. We are dedicated to protect the best interests of our employees, contractors, customers, stockholders and the community. Press Metal Bintulu Sdn Bhd requires the utmost dedication and accountability from all employees and contractors to fulfill the compliance obligation to the Environmental, Health and Safety policies and standards.

Press Metal Bintulu Sdn Bhd is committed in: -

P roviding adequate safeguards and engineering controls for safe operations to reduce the risk.

R eaching out to all employees to instill the responsibility in adhering to environmental, occupational health & safety policy and requirements operations and reducing the risk.

E ducating employees in safe work practices and protection measures.

S eeking continual improvement of the Environmental Management System (EMS) and Occupational Health and Safety (OHS) Management by regularly reviewing its performance.

S etting appropriate environmental, occupational health & safety objectives and targets with periodic review.

M eeting and complying to applicable legal requirements and requirements which relate to environmental, health & safety legislation and industrial standards.

E nsuring suppliers, contractors and sub-contractors conform to our environmental, occupational health & safety standards.

T aking responsibility to ensure the policy is available to interested parties upon request.

A ctively pursuing waste and emission reduction through engineering control and other measures that reduce environmental impacts and conserve natural resources.

L eading the plant in measuring, reporting and reviewing our occupational health & safety performance and considerations on a regular basis in product design and business planning.

Tan Sri Dato' Paul Koon Poh Keong
Group Chief Executive Officer
1 June 2018
(EHS-APP-EP-001, Rev No.: 0)

9.5 ORGANISATIONAL STRUCTURE

Environmental management itself is a dynamic process, which is likely to evolve with time. Therefore, all people involved in any phases of Project development shall ensure that adjustments are made to accommodate changes for environmental protection works, plans, programmes as and when required.

While the Project Proponent has the major responsibility to prepare and manage the EMP, various stakeholders are required to bear their respective responsibilities to ensure the effective implementation of the EMP. In all works and activities associated with the Project implementation, there is need for understanding of the responsibilities of each stakeholder and actions that are required to be taken to minimise impacts to the environment. The main stakeholders and the overall structure of the organisation for environmental management are illustrated in **Chart 9-2** while the general roles and responsibilities of the respective members are shown in **Table 9-2**. Detail description of the roles and responsibilities will be described in the EMP document.

Chart 9-2 Organisation Structure for Environmental Framework

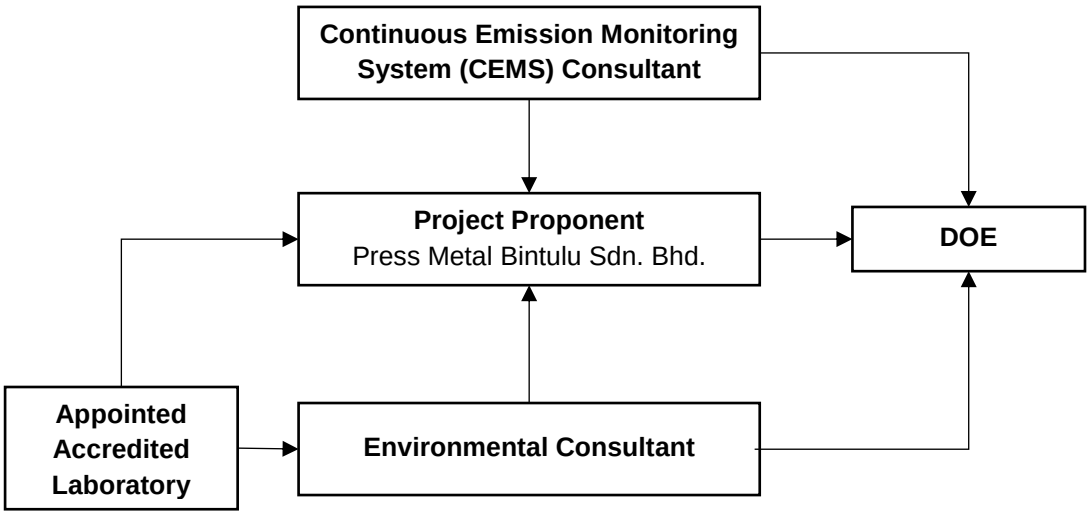

Table 9-2 Roles and Responsibilities in Environmental Management

Item	Stakeholder (Agency or Party)	Responsibilities
1	Department of Environment (DOE)	Authority to monitor and ensure the Project Proponent adhere to the Environmental Quality Act 1974 and its regulations. i) Check on adherence to all environmental regulations and approval conditions; ii) Carry out enforcement site visits to the Project site to observe and monitor the environmental status of the Project site.
2	Project Proponent (PP)	Overall responsible to ensure that the Project being implemented within the bounds of the environmental conditions that are defined to minimise impacts to the environment. The environmental conditions include those that are defined by law and those which are specified by the authorities by way of administrative procedures (such as the conditions of EIA approval). i) Directly responsible to the DOE and such other relevant authorities, to meet the legal and administrative requirements set for the Project. ii) To appoint Environmental Officer (EO) whom are trained in environmental management and able to perform duties to monitor and advise the management. iii) To appoint Competent Persons (CP) who are Certified in Environmental Professional for scheduled waste management (CePSWaM) and bag filter operation (CePBFO) for carrying out the EMP and monitoring program. iv) To report environmental compliance of the Project to the DOE with the assistance of EO through reporting procedures that are set by the DOE and described in the EMP. v) To conduct weekly Project meeting in which Environmental Management will be part of the meeting agenda to ensure that the environmental issues are adequately addressed. The EO will be present during the Project meetings in order to bring up and resolve environmental issues that involve multiple parties. Non-conformances to the EMP implementation shall be investigated by the EO and followed-up by the responsible party.

Item	Stakeholder (Agency or Party)	Responsibilities
3	Environmental Officer (EO)	EO is appointed by the management of PP to implement the EMP and monitoring program. Roles and responsibilities of an EO are: i) To implement the EMP and report the effectiveness of EMP to the Management. ii) To arrange and carry out the monitoring program as specified in the EMP. iii) To review the compliance of monitoring results and report to DOE. The report shall be detailing the status of environmental measures and the environmental monitoring results which should cover: • Compliance to and effectiveness of environmental control measures detailed in the EMP; • Monitoring requirement and result to address potential issues due to the changes in the Project during construction and operation; and • Records of public concerns and responses by the Contractor to address the highlighted concerns. iv) Ensure all activities undertaken within the site (include the Contractor's work) comply with all applicable environmental laws, acts, regulations, guidelines and terms and conditions of approval by the relevant authorities. v) To advise the management on the environmental performance and improvements that can be carried out.
4	Competent Person (CP)	Competent Person (CP) is appointed by the management of PP as a person who has been certified by the to be competent to supervise the operation of a pollution control system or the management of scheduled wastes. The CP must be: i) Knowledgeable in the basic tools, equipment, methods, safe work practices in the operation and routine maintenance of the mechanical and basic electrical components of the pollution control system. ii) Able to perform and operation typical unit operations and unit processes utilized for the treatment system. iii) Able to identify and rectify typical causes of the pollution control system non-compliance problems. Roles and responsibilities of CP are:

Item	Stakeholder (Agency or Party)	Responsibilities
		i) Monitoring performance of pollution control systems and adjusting controls to ensure the system is performing and carrying out its duties as designed for, ensure the treatment meets the design levels required. Monitoring is carried out by : ii) Scheduled checking the operational controls and recording/logging the appropriate readings iii) Conducting performance monitoring activities which iv) involve sampling, in situ measurements and basic process control laboratory tests. v) Performing corrective actions to address common vi) pollution control upset situations. vii) Reporting to operation team and management on system performance – scheduled reporting viii) Reporting incidences / abnormal events / system errors that may lead to unlikely release or abnormal operation, to operation and management ix) Undertake investigation and undertake corrective action on reported incident / accident/ system error x) Undertake system review for continual improvements
5	Contractors	Appointed by the PP for carrying out specific work for the Project. i) Responsible to ensure the work carry out complies to the implementation of EMP and relevant environmental regulations requirement. ii) To report environmental compliance of the Project to the PP via EO through reporting procedures that are set and described in the EMP.
6	Environmental Consultants (EC)	Appointed by the PP for getting proper advice and guidance pertinent to environmental management and monitoring, and remedial aspects of the Project. i) Assist the PP in matter pertaining to the environmental issue at site. ii) Advice the PP on the relevant compliance standards for the identified environmental components. iii) Liaise with the relevant authorities regarding all issues pertinent to the environment upon the request of PP.

9.6 TRAINING REQUIREMENT

All the plant workers and personnel are required to be trained and to have good understanding on importance of environmental management, safety and health. Training will be provided with the main aim of increasing and continual environmental and safety awareness among the plant workers and personnel so that appropriate measures that are planned for are implemented effectively. Training will cover the roles and responsibilities of all parties, the EMP, best management practices on site, and awareness on International Finance Corporation (IFC) Performance Standards and EHS Guidelines.

All plant workers are required to undergo a series of the training programs as shown in following subsections. General training program are compulsory for all staff while specific training is required for those working in their respective work areas. The relevant topics for training shall include the following (**Table 9-3**):

Table 9-3 Training Topics

No.	Training Program	Training Subject and Topic
1.	**Environmental Legislation and Regulations**	• Environmental Act, 1974 • Environmental Quality (Scheduled Waste) Regulations 2005 • Environmental Quality (Clean Air) Regulations 2014 • Environmental Quality (Industrial Effluent) Regulations 2009 • Environmental Quality (Sewage) Regulations 2009 • ISO 14001 Environmental Management • ISO 14001 Environmental Management Audit
2.	**Environmental Best Management Practices (BMPs)**	• Dust Control • Noise Control • Scheduled Waste Management • Housekeeping
3.	**Safety, Health and Environmental Awareness**	• Use of Personal Protection Equipment (PPE) • Fire Drill, Emergency Preparedness and Response • Basic Occupational First Aid Training • Accident & Incident Investigation and Reporting • Basic Safe Handling of Chemical and Waste Management • EHS Law of Malaysia, EQA, OSHA, FMA • Transportation and Handling of Hazardous Materials • Chemical Spillage and Drills Training
4.	**Competent person for managing or operating**	• Certified Environmental Professional in Bagfilter Operation (CePBFO) • Certified Environmental Professional in Scheduled Waste (CePSWaM)

9.7 ENVIRONMENTAL REQUIREMENTS

In the EMP document, information for the environmental requirements will be presented; such as:

- Legal requirements,
- EIA Approval Conditions,
- Pollution Prevention and Mitigation Measures (P2M2) to be implemented
- Pollution sources and control measures,
- Environmental monitoring program and reporting,
- Emergency response plan (ERP), and
- Abandonment and closure plan.

9.8 PROPOSED ENVIRONMENTAL MONITORING PROGRAM

Environmental monitoring aims to evaluate the effectiveness of the mitigation measures implemented in order to ensure that the potential impacts to the environment are minimized and in compliance with statutory and non-statutory requirements. Through long term monitoring, changes to the environmental conditions at Project and its surrounding area can be monitored. This would enable the detection of migrating contaminants from the Plant to the surrounding environment.

The summary of the environmental monitoring program for construction stage and operational stage is shown in **Table 9-4, Table 9-5** and **Table 9-6,** while locations of the environmental monitoring points are shown in **Figure 9-1** and **Figure 9-2**.

Table 9-4 Environmental Monitoring Program – Construction Stage

Monitoring Target	Parameter	Compliance	Frequency
Ambient Air Monitoring			
A1 – Open space at Project site (3°33'09.1"N, 113°19'41.5"E) **A2** – Open space at Samalaju Lodge, 0.4 km from Project site (3°32'35.7"N, 113°19'33.3"E) **A3** – Open space at Samalaju Lodge (Local Camp), 0.8 km from Project site (3°32'17.6"N, 113°18'57.6"E)	a. Particulate Matter less than 10 micron (PM_{10}) b. Particulate matter less than 2.5 micron ($PM_{2.5}$)	Malaysia Ambient Air Quality Standard 2013 (2020 Standard): a. 100 µg/m^3 (24 hour) b. 35 µg/m^3 (24 hour)	Quarterly
Noise Level Monitoring			
N1 – Open space at Project site (3°33'09.1"N, 113°19'41.5"E) **N2** – Open space at Samalaju Lodge, 0.4 km from Project site (3°32'35.7"N, 113°19'33.3"E) **N3** – Open space at Samalaju Lodge (Local Camp), 0.8 km from Project site (3°32'17.6"N, 113°18'57.6"E)	a. A-weighted Equivalent Sound Level (LA_{eq}) (24 Hours) b. Maximum Sound Level (L_{max}) (24 Hours) c. Minimum Sound Level (L_{min}) (24 Hours) d. Noise Level Exceeded for 10% of Measurement Period (L_{10}) (24 Hours) e. Noise Level Exceeded for 90% of Measurement Period (L_{90}) (24 Hours)	The Planning Guidelines for Environmental Noise Limits and Control: a. For N1 - 70 dBA (Daytime) & 60 dBA (Night Time), for N2, N3 - 55 dBA (Daytime) & 45 dBA (Night Time)	Quarterly

Monitoring Target	Parameter	Compliance	Frequency
Water Discharge Quality Monitoring			
ST1 – Sediment Pond Discharge (N 3°33'19.8" ; E 113°19'55.9") **ST2** – Sediment Pond Discharge (N 3°33'16.9" ; E 113°19'54.3") **FD1** – Final Discharge Point from Plant (N 3°33'2.54"; E 113°18'55.82") **FD2** – Final Discharge Point from Plant (N 3°33'17.51" ; E 113°19'10.01")	a. Total suspended solid (TSS) b. Turbidity c. Oil and grease	EIA Approval Condition (subject to final approval condition): a. 50 mg/l b. 250 NTU c. -	Monthly

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Table 9-5 Environmental Monitoring Program – Operational Stage

Monitoring Target	Parameter			Compliance	Frequency
	Plant 1	Plant 2	Plant 3		
Stack Emission Monitoring (Plant 2 EIA Approval Conditions No. 30, 32 & 53)					
FTS's Stacks Plant 1 **F1** (N 3°33'11.52"; E113°19'8.88") **F2** (N 3°33'19.24"; E 113°19'16.29") **F3** (N 3°33'26.21"; E 113°19'23.27") Plant 2 **F4** (N 3°33'3.76"; E 113°19'16.93") **F5** (N 3°33'11.41"; E 113°19'24.26") **F6** (N 3°33'19.06"; E 113°19'31.90") Plant 3 **F7** (N 3°32'53.5"; E 113°19'26.1") **F8** (N 3°33'04.5"; E 113°19'36.2") **F9** (N 3°33'14.3"; E 113°19'45.1")	a. Hydrogen Fluoride (HF)(2) b. Sulphur Dioxide (SO_2)(2) c. Total Fluoride (TF) d. Total Particulate Matter (TPM)(2)	a. Hydrogen Fluoride (HF)(2) b. Sulphur Dioxide (SO_2)(2) c. Total Fluoride (TF) d. Total Particulate Matter (TPM)(2) e. Nitrogen dioxide (NO_2)(2)	a. Hydrogen Fluoride (HF)(2) b. Sulphur Dioxide (SO_2)(2) c. Total Fluoride (TF) d. Total Particulate Matter (TPM)(2) e. Nitrogen dioxide (NO_2)(2)	Environmental Quality (Clean Air) Regulations 2014: a. 1 mg/Nm^3 b. 100 mg/Nm^3 c. 1.5 mg/Nm^3 d. 10 mg/Nm^3 e. 100-300 mg/Nm^3(1)	a. Continuous(2)& Quarterly b. Continuous(2) & Quarterly c. Quarterly d. Continuous(2) & Quarterly e. Continuous(2)
	a. Carbon dioxide (CO_2) b. Perfluorocarbon (PFC)	a. Carbon dioxide (CO_2) b. Perfluorocarbon (PFC)	a. Carbon dioxide (CO_2) b. Perfluorocarbon (PFC)	a. - b. 0.1 (anode effects/cell/day) (3)	a. Yearly b. Yearly
Bag Filter's Stacks Plant 1 (Anode Rodding Plant) **P1** (N 3°33'12.05"; E 113°19'14.53") **P2** (N 3°33'13.27"; E 113°19'15.56") **P3** (N 3°33'14.28"; E 113°19'16.82") **P4** (N 3°33'15.37"; E 113°19'17.73") **P5** (N 3°33'14.74"; E 113°19'18.83") **P12** (N 3°33'14.74"; E 113°19'18.83") Plant 2 (Anode Rodding Plant) **P6** (N 3°33'4.43"; E 113°19'22.50")	a. Total Particulate Matter (Total PM)	a. Total Particulate Matter (Total PM)	a. Total Particulate Matter (Total PM)	a. 50 mg/Nm^3	Quarterly

Monitoring Target	Parameter			Compliance	Frequency
	Plant 1	Plant 2	Plant 3		
P7 (N 3°33'5.42"; E 113°19'23.48") **P8** (N 3°33'6.60"; E 113°19'24.63") **P9** (N 3°33'7.60"; E 113°19'25.72") **P10** (N 3°33'7.05"; E 113°19'26.67") **P11** (N 3°33'6.60"; E 113°19'24.63") <u>Plant 3 (Anode Rodding Plant)</u> **P13** (N 3°32'53.9"; E 113°19'32.1") **P14** (N 3°32'55.5"; E 113°19'33.1") **P15** (N 3°32'57.0"; E 113°19'34.4") **P16** (N 3°32'57.9"; E 113°19'35.3") **P17** (N 3°32'57.5"; E 113°19'35.6")					
Bag Filter's Stack <u>Plant 1 (Casthouse)</u> **C1** (N 3°33'32.44"; E 113°19'33.73") **C2** (N 3°33'33.00"; E 113°19'34.32") **C3** (N 3°33'33.12"; E 113°19'34.14") <u>Plant 2 (Casthouse)</u> **C5** (N 3°33'22.7"; E 113°19'37.3") <u>Plant 3 (Casthouse)</u> **C6** (N 3°33'28.1"; E 113°19'46.6") **C7** (N 3°33'26.4"; E 113°19'52.1") <u>Plant 2 (Crucible Cleaning 2)</u> **E1** (N 3°33'25"; E 113° 19' 45")	a. Total PM	a. Total PM	a. Total PM	a. 50 mg/Nm^3	Quarterly

Monitoring Target	Parameter			Compliance	Frequency
	Plant 1	Plant 2	Plant 3		
Ambient Air Monitoring (Plant 2 EIA Approval Conditions No. 33 & 53)					
A1 – At Kg. Nyalau Tengah (N 3°37'16.42 "; E 113°24'40.05") **A2** – Suburmas Oil Palm Estate Southeast of Plant (N 3°32'45.78"; E 113°21'33.89") **A3** – Laku Centralised Water Treatment Plant (N 3°31'16.65"; E 113°20'18.74")	a. Particulate Matter less than 10 micron (PM_{10}) b. Particulate matter less than 2.5 micron ($PM_{2.5}$) c. Sulphur Dioxide (SO_2) d. Nitrogen Dioxide (NO_2) e. HF[(4)]			Malaysia Ambient Air Quality Standard 2013 (2020 Standard): a. 100 µg/m³ (24 hour) b. 35 µg/m³ (24 hour) c. 80 µg/m³ (24 hour) d. 280 µg/m³ (1 hour) e. 20 µg/m³ (24 hour)	Quarterly
Noise Monitoring (Plant 2 EIA Approval Conditions No. 41 & 53)					
N1 – Plant Boundary (N 3°33'27.39"; E 113°19'19.70") **N2** – Plant Boundary (N 3°32'51.9"; E 113°19'31.3") **N3** – Land Property Plant Boundary (N 3°33'10.71" ; E 113°19'59.69")	a. A-weighted Equivalent Sound Level (LA_{eq}) (24 Hours) b. Maximum Sound Level (L_{max}) (24 Hours) c. Minimum Sound Level (L_{min}) (24 Hours) d. Noise Level Exceeded for 10% of Measurement Period (L_{10}) (24 Hours) e. Noise Level Exceeded for 90% of Measurement Period (L_{90}) (24 Hours)			The Planning Guidelines for Environmental Noise Limits and Control: a. 70 dBA (Daytime) & 60 dBA (Night Time)	Quarterly
Water Discharge Quality (Plant 2 EIA Approval Conditions No. 27 & 53)					
FD1 – Final Discharge Point from Aluminium Plant (N 3°33'2.54"; E 113°18'55.82") **FD2** – Final Discharge Point from Aluminium Plant (N 3°33'17.51" ; E 113°19'10.01")	a. pH b. Temperature c. BOD_5 d. COD e. Suspended Solids f. Oil & grease g. Ammoniacal nitrogen			Standard B limit of Environmental Quality (Industrial Effluent) Regulations, 2009: a. 5.5 – 9 b. 40 °C c. 50 mg/L d. 200 mg/L e. 100 mg/L f. 10 mg/L g. 20 mg/L	Monthly
River Water Quality (Plant 2 EIA Approval Condition No. 26)					
RW1 – River water at Sg. Semba (N 3°31'40.60"" ; E 113°19'22.70") **RW2** – River water at Sg. Similajau (N 3°30'38.98"; E 113°19'2.03") **RW3** – River water at **FD1** (N 3°33'2.54"; E 113°18'55.82")	a. pH b. Temperature c. BOD_5 d. COD e. TSS f. Mercury g. Cadmium h. $Chromium^{6+}$ i. $Chromium^{3+}$ j. Arsenic			Class III limit of National Water Quality Standard (NWQS): a. 9 b. Normal ± 2 c. 6 d. 50 e. 150 f. 0.004 g. 0.01 h. 1.4	Quarterly

Monitoring Target	Parameter			Compliance	Frequency
	Plant 1	Plant 2	Plant 3		
RW4 – River water at **FD2** (N 3°33'17.51"; E 113°19'10.01")	k. Lead l. Copper m. Manganese n. Nickel o. Tin p. Zinc q. Iron r. Silver s. Aluminium t. Selenium u. Fluoride v. S^{2-} w. Oil & grease x. Ammoniacal nitrogen y. Dissolved oxygen			i. 2.5 j. 0.4 k. 0.02 l. - m. 0.1 n. 0.9 o. 0.004 p. 0.4 q. 1.0 r. - s. - t. - u. - v. - w. - x. 0.9 y. 3 – 5	
Sewage Discharge Quality (Plant 2 EIA Approval Conditions No. 23 & 53)					
SW1 – Sewage discharge point from the Aluminium Plant (N 3°33'32.24″; E 113°19'28.01")	a. pH b. BOD c. COD d. Oil & Grease e. Ammoniacal Nitrogen (river) f. Nitrate (river) g. Total coliform count	- - - - - - -	- - - - - - -	Standard B limit of Environmental Quality (Sewage) Regulations, 2009: a. 5.5-9.0 b. 50 mg/L c. 200 mg/L d. 10 mg/L e. 20 mg/L f. 50 mg/L g. -	Monthly
Ecology Monitoring (Plant 2 EIA Approval Conditions No. 42 & 53)					
Areas Surrounding Press Metal	Fluoride (in bioindicators)			-	Triannual Sampling - Monsoon (wet) - Transition - Post monsoon (dry)

Note:
(1) & (3) Compliance limit for NO_2 and PFC is based on IFC EHS Guidelines for Base Metal Smelting and Refining, IFC 2007
(2) Continuous monitoring for the stacks is by CEMS, which linked directly to DOE Sarawak.
(4) Permissible ambient level for HF is referred to Arizona Ambient Air Quality Guidelines, 1999 as per Condition No.33 of Existing Plant DEIA Approval (ref no: AS (PN) 37/209/101/084 Jld 3 (20)), due to absence of ambient limits in Malaysia.

Table 9-6 Summary of Environmental Monitoring Program Calendar

Monitoring	Requirement	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Stack emission monitoring	Quarterly Monitoring			✓			✓			✓			✓
Stack emission monitoring (CO_2, PCF)	Yearly Monitoring												✓
Ambient air monitoring	Quarterly Monitoring			✓			✓			✓			✓
Monitoring and final effluent discharge sampling	Monthly monitoring	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Monitoring and sewage discharge sampling	Monthly monitoring	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Monitoring and river water sampling	Quarterly Monitoring			✓			✓			✓			✓
Boundary noise level monitoring	Quarterly Monitoring			✓			✓			✓			✓
Environmental Audit	Yearly Audit									✓			
Ecology Monitoring	Triannual Sampling - Monsoon (wet), - Transition, - Post monsoon (dry)		✓				✓				✓		

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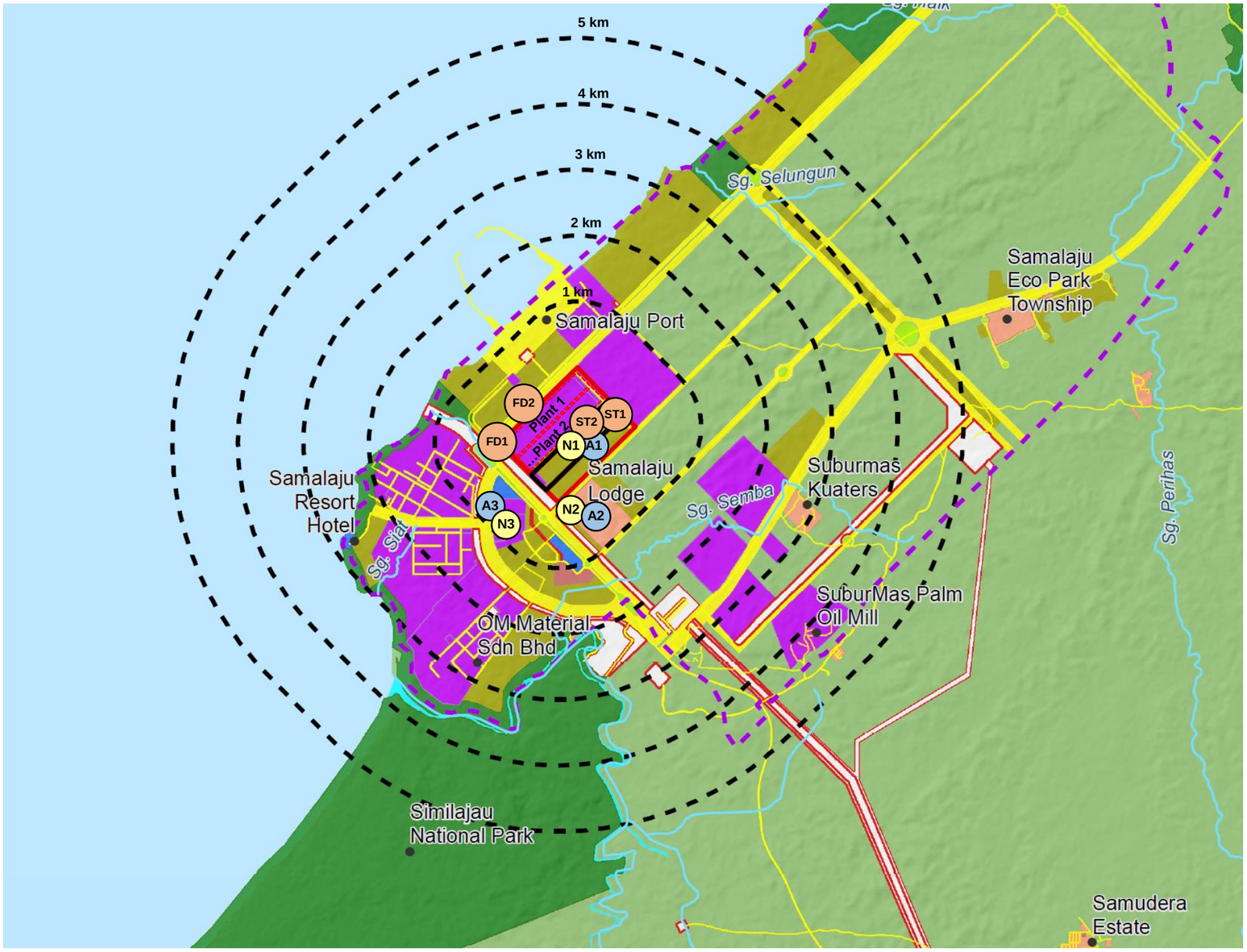

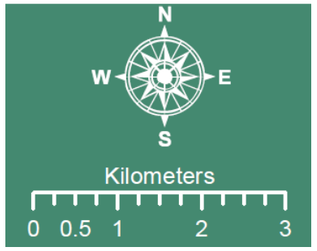

Legend:

A	Ambient Air Monitoring Location
N	Noise Level Monitoring Location
W	River Water Monitoring Station

- Residential
- Commercial
- Industry
- Institutional
- Infrastructure and Utility
- Transportation
- Forest
- Agriculture
- Recreational
- Vacant Land
- Water Bodies
- Project Site (Plant 3)
- Press Metal
- Road Network
- River Network
- Samalaju Industrial Estate

Projection: WGS84
Source: Updated from Pleaides Imagery, 2019

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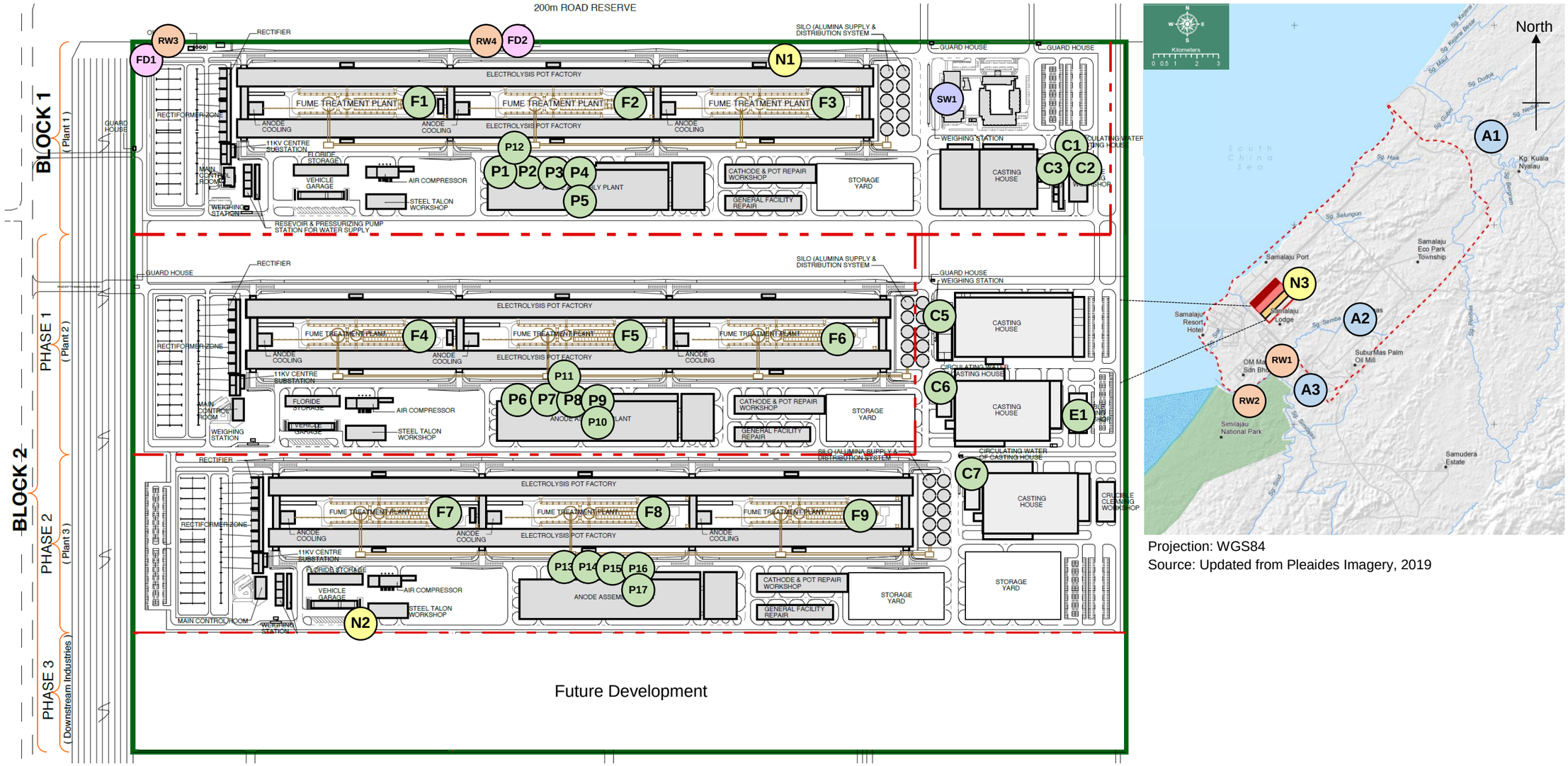
Figure 9-1 Proposed Environmental Monitoring Location (Construction Stage)



Projection: WGS84
Source: Updated from Pleaides Imagery, 2019

Layout Scale: 1:7500
Source: Press Metal, 2019

TRi ECOEDGE

Figure 9-2 Proposed Environmental Monitoring Location (Operational Stage)

All samples collected during monitoring will be carried out by competent field personnel and to be sent to a laboratory accredited with the *Skim Akreditasi Makmal Malaysia* (SAMM).

Established methods such as those prescribed by Malaysia Standard (MS), British Standard (BS), American Public Health Association (APHA), Environmental Protection Agency (EPA) and the International Standard Organization (ISO) are to be implemented during sampling and analysis of samples. Some examples of the typical sampling and analysis methods are summarised in **Table 9-7**.

Table 9-7 Typical Sampling and Analytical Methods

Type	Sampling Method	Standards
Stack Emission		
Particulate Matter	Isokinetic sampling	Malaysian Standard (MS 1596:2003)
Dark Smoke	Observation (Ringelmann Chart)	BS-2742C:1957
SO_2	Using a portable flue gas analyser with electrochemical sensors	EPA Method 6C
NO_2	Alkaline Permanganate / Colorimetric Method)	EPA Method 7C
HF	Isokinetic sampling	EPA Method 26A
Total Fluoride	Isokinetic sampling	EPA Method 13B
CEMS	Extractive/Path/ In-Situ sampling method	Volume I: Guideline for the Installation & Maintenance of CEMS for Industrial Premises/ Facilities. Volume II: Guideline for the CEMS-Data Interface System for Industrial Premises/ Facilities.
CO_2	Portable flue gas analyser	EPA Method 3A
PFC	Anode effects	Based on Slope Method *
Ambient Air		
PM_{10}	High volume sampler	ASTM 4096, 1993
$PM_{2.5}$	High volume sampler	ASTM D 4096, 1993
SO_2	Air aspiration through tetrachloromercurate (TCM) solution	ASTM D 2914, 1993
NO_2	Air aspiration through azo-dye-forming reagent solution	ASTM D 1607, 1991
HF	High volume sampler	EPA Method 26

Type	Sampling Method	Standards
Noise Level		
LA_{eq}, LA_{min}, LA_{max}, LA_{10}, LA_{90}	Sound Level Meter (Measurement for 24 hour) Measurement and assessment according The Planning Guideline for Environmental Noise Limits and Control (DOE, 2007)	ISO 1996
Water Discharge Quality		
pH	In-situ measurement	APHA 4500 H+B, 1995
Temperature		APHA 2550 B, 1995
BOD	Grab sampling (ASTM D 5358, 1993)	APHA 5210 B, 1995
COD		APHA 5220 B, 1995
Total suspended solid (TSS)		APHA 2540 D, 1995
Oil and Grease		APHA 5520 B, 1995
Ammoniacal Nitrogen as N		APHA 4500–NH_3 B&C, 1992
Sewage Discharge		
pH	In-situ measurement	APHA 4500 H+B, 1995
Temperature		APHA 2550 B, 1995
BOD	Grab sampling (ASTM D 5358, 1993)	APHA 5210 B, 1995
COD		APHA 5220 B, 1995
Oil and Grease		APHA 5520 B, 1995
Ammoniacal Nitrogen as N		APHA 4500–NH_3 B&C, 1992
Nitrate		APHA 4500-NO_3– E.,1999
Total Coliform		In house method based on APHA 9222B

* Protocol for Measurement of Tetrafluoromethane (CF4) and Hexaluoroethane (C2F6) Emission from Primary Aluminium Production, USEPA and International Aluminium Institute London, 2008

9.9 REPORTING

Two types of environmental reporting procedures are required by the DOE Sarawak which includes **Environmental Monitoring Report (EMR)** and **Environmental Compliance Audit Report (ECAR)**. The description of such reporting procedures is listed in the following sections.

Additional reporting, if required by Project's EIA approval conditions, will be incorporated in reporting program as necessary.

9.9.1 Environmental Monitoring Report

Environmental Monitoring Report (EMR) shall be prepared on a quarterly basis for the overall Plant throughout the operational stage for submission to DOE Sarawak.

The quarterly EMR content shall include (not limiting to):

- The environmental monitoring status and reporting for pollutant emission, discharges, waste managements and related environmental concerns, comparison against of compliance for stacks, ambient air and boundary noise levels, accompanied with the laboratory analysis certificates.

- Status of compliance of the mitigating measures proposed in the EMP and also the corrective and preventive measures taken in the event of non-compliance.

Currently, based on the existing EIA approval conditions, online monthly reporting of sewage and effluent discharge quality to DOE Sarawak is on-going and shall be continued accordingly.

Table 9-8 lists all the reporting schedule during the Plant operational phase.

Table 9-8 EMR Reporting Schedule

No	Reporting	Frequency
1	Environmental Monitoring Report (EMR) which include: a) Stack emission b) Ambient air quality c) Boundary noise d) River water quality	Quarterly
2	a) *EIA 1-18 Form – Work Progress Report b) *EIA 2-18 Form – EIA Approval Compliance Report EIA form 2-18 will be submitted to cover all three Plants as a single operation. EIA Form 1-18 will be submitted separately for each plant for updating of work progress to the DOE.	

No	Reporting	Frequency
3	**[Plant 2 EIA Approval Conditions No 53 (iii)]** Online reporting of sewage and effluent discharge quality	Monthly
4	**[Plant 2 EIA Approval Condition No 53 (iv)]** Report on monitoring and assessment of carbon dioxide (CO_2) and perfluorocarbon (PFC)	Annually
5	**[Plant 2 EIA Approval Condition No 53 (v)]** Ecology monitoring report consist of: a) Identification of reliable and suitable plant as indicator for airborne fluoride emission b) Determination of baseline level of fluoride in chosen indicator plant and seawater away from the plant c) Monitoring of fluoride content in indicator plants and seawater samples at selected sites	Annually

Note:
*This report to be submitted together with the EMR.

9.9.2 Environmental Audit Program

External environmental audit is required to be carried out annually as a means of assessing the level of compliance of the Plant's activities to the requirements of the EMP, the EIA approval conditions, regulations in Environmental Quality Act and the relevant DOE guidelines. Audit for all three plants will be conducted within third quarter of every year. Audit will be conducted in accordance to the Environmental Audit Guidance Manual published by DOE. All environmental audit cost shall be borne by the Press Metal.

The primary objectives of the environmental audit are as below:

- To monitor and ensure that the various environmental protection/conservation measures conform to the EMP and the EIA approval conditions;
- To ensure that the Contractor and other sub-contractors engaged comply with the environmental legislative requirements, standards and guideline limit values, and other relevant conditions as specified in the contract documents; and
- To submit a report to DOE Sarawak on the Plant's status and level of compliance.

The scope of the audit program is as follows:

- To review all relevant documentation which specify the environmental objectives/measures/procedures to be complied with during operational phase;
- To conduct a site inspection to assess the level of compliance within the Plant's premise in terms of implementation of the mitigation measures outlined in the EMP document;

- To verify and validate the environmental monitoring results and the level of compliance to the environmental quality criteria specified in the EMP;
- To review the adequacy of the mitigation measures to ensure that the environmental objectives are achieved. Additional mitigation/remedial measures, changes in working practices etc. will be recommended in the case of non-compliance with environmental performance limits or identification of adverse impacts;
- To conduct follow-up site audits and revise audit and inspection protocol as required to reflect changing of plant activities;
- To investigate any complaints from sensitive receivers/neighbouring premises and ensuring the necessary actions are taken in response to complaints received;
- To liaise with responsible parties (e.g. DOE, Local Authority) on matters relating to the environmental quality at the plant site; and
- To submit the findings of the audit via annually compliance audit reports to DOE Sarawak.

9.10 ENVIRONMENTAL MAINSTREAMING TOOLS

Environmental mainstreaming is a set of tools for accomplishing the goal of cultivating the self-regulation culture in the regulated sectors through mainstreaming of environmental agenda. This is presently being promoted by the DOE and all industries are encouraged to adopt in order to streamline their operations towards instilling self-regulations. To assist industries, a set of Environmental Mainstreaming Tools (EMT) was developed to serve as a guide on areas and elements to be considered in their planning, development and implementation of the mainstreaming initiatives for their operations (referencing to the Environmental Mainstreaming Directive by DOE, 1st June 2017).

In the existing operation, Press Metal has implemented these EMTs as part of their management commitments and will continue to enhance said implementations as part of overall improvements towards the plant operation and performance. Upon Project's operation, adoption of EMTs will be reviewed and incorporated wherever applicable at the new Plant. This incorporation will be reflected and detailed out in EMP document.

The mainstreaming agenda presently adopted in the existing operation is presented in **Table 9-9** and supporting documents and records being implemented are appended in **Appendix J**.

Table 9-9 Environmental Mainstreaming Tools

No	Mainstreaming Tools	Action by Project Proponent	Comments/Remarks
1	Environmental Policy (EP)	• Give the date the EP was formulated and the review date, if EP review was made. If EP is newly formulated, give the date of its formulation. • Make your own assessment of the strength of the message of environmental commitment in your EP by assigning your own rating. • Submit your current EP (as attachment for this report) to DOE as evidence.	• EHS policy has been established and currently implemented as mandatory work compliance • EHS policy – **Chart 9-1, Appendix J.**
2	Environmental Budgeting (EB) • Design stage - design and installation of pollution control facilities • Operational stage - operation and maintenance of pollution control systems - Management of waste	• Give the date your organization started or will start allocating budget specifically for environmental purposes. • Make your own assessment of the adequacy of the EB for implementing measures to comply with environmental requirements of the EQA and its regulations or approval conditions by assigning your own rating. • Provide a statement stating the amount of EB for the previous year (as attachment for this report) to DOE as evidence.	• Press Metal has allocated adequate budget for implementation of its EMP and overall environmental protection for operational phase. Budget allocations for environmental management during operation is presented in **Appendix J**.
3	Environmental Monitoring Committee (EMC) • Working level – EPMC • Policy level – ERCMC	1. Give the dates the Environmental Performance Monitoring Committee (EPMC) and Environmental Regulatory Compliance Monitoring Committee (ERCMC) were set up or will be set up in your organization.	1. Environmental Regulatory Compliance Monitoring Committee (ERCMC) • Top management will uphold the responsibilities of ensuring operations to be carried out in environmentally compliance manner.

No	Mainstreaming Tools	Action by Project Proponent	Comments/Remarks
		2. Make your own assessment of the strength of the representativeness of the members of the committees by assigning your own rating. 3. Submit the organization charts of the EPMC and ERCMC (as attachment for this report) to DOE as evidence.	• ERCMC is chaired by Group CEO with committee members comprises of Boards of Director, General Manager, Operation Review and Deputy General Managers. 2. Environmental Performance Monitoring Committee (EPMC) • EHS committee and competent persons have been appointed to act as EPMC.
4	Environmental Facility (EF) • Pollution Control Systems (APC, IETS) • Laboratory Equipment	• Give the dates the EF components were installed or will be installed in your organization. • Make your own assessment of the adequacy of the EFs installation and their effectiveness in complying with the regulatory standards and requirements or approval conditions by assigning your own rating. • Provide information only on EF components which are relevant to your organization (as attachment for this report) to DOE as evidence.	• EF implemented by Press Metal include air pollution control system, support facilities such as laboratory, performance monitoring equipment and waste management infrastructure. Best management practices (BMPs) are also applied during operation.
5	Environmental Competency (EC) • Personnel and Competent person requirement)	• Give the dates the organization's personnel were certified or will be attending the certification course(s). • Make your own assessment of the adequacy of the number of personnel required by your organization to comply with the regulatory requirements or approval conditions by assigning your own rating. • Provide the names of Competent Persons in your organization or submit your training plan to get your staff certified (as attachment for this report) to DOE	• Competent persons (CP) appointed by Press Metal for scheduled waste management and bag filter operation are as follows: Scheduled Waste Management (CePSWaM): 3 CPs Bag Filter Operation (CePBFO): 2 CPs • List of names and certifications for above CPs are listed in **Appendix G**.

No	Mainstreaming Tools	Action by Project Proponent	Comments/Remarks
		as evidence. Provide information only on EC requirements which are relevant to your organization.	
6	Environmental Reporting and Communication (ERC)	• Give the dates your organization started to implement or will start to implement the ERC components (CC, DA, and IR). • Make your own assessment of the adequacy of the ERC components and their effectiveness in ensuring environmental concerns are immediately reported to the responsible persons in your organization for appropriate actions by assigning your own rating. • Submit CC flow chart or any other relevant document (as attachment for this report) to DOE as evidence. **CC=Communication Channel; DA=Data Analysis; IR=Internal Reporting*	• Reporting and communications are made for: 1. Internal Reporting • Reporting made to EHS committee (EPMC), management and ERCMC. • Decision making process for raised environmental concerns will be resolved at respective levels based on seriousness of the issue and type of mitigation or approval required. 2. External Reporting • Comprises of statutory report to DOE for environmental compliance monitoring on quarterly basis. • Details on environmental reporting and communications are outlined in **Appendix G**.
7	Environmental Transparency (ET)	• Your organization may want to implement this ET immediately or you may want to study the best option to implement ET in your own situation and implement it at a later date. If possible, give the dates your organization is planning to start implementing the ET components (ESR, WS, BB, flier issuance, or others).	• Environmental monitoring and resource management are included in Press Metal's Annual Report since 2016. It is one of the platforms to share on practices and efforts to minimize emission and ensure efficient resource management (i.e. electric consumption, water consumption and waste management) to public and all interested parties.

No	Mainstreaming Tools	Action by Project Proponent	Comments/Remarks
		• Make your own assessment of the implementation status of the implementation of ET components in your organization by assigning your own rating. • Submit CC flow chart (as attachment for this report) to DOE as evidence. **ESR=Environmental Sustainability Report; WS=Website; BB=Billboard*	

9.11 EMERGENCY RESPONSE PLAN (ERP)

Emergency Response Plan (ERP) is action plan to tackle unexpected or abnormal incidents that may occur during the operational phase of the plant. The plan is to identify potential areas where these incidents are likely to occur and preventive measures that can be taken to contain the impact within the plant as much as possible and prevent it from spreading to the surrounding environment. The ERP also serve as a step-by-step guide to the workers at the plant to respond to non-life-threatening emergencies in an orderly and effective manner. The ERP should be executed in a proper and systematic manner. Therefore, it shall be made known and available to all workers who in turn should become familiar with its various procedures. Key personnel are the main action people due to the decision-making capacity therefore should know and understand their responsibilities as well as coordinate their response actions with their subordinates.

In general, this ERP plan covers the response procedure within the plant and communication networks with off-site agencies such as Police Department, Bomba and Hospital to ensure that operations can be coordinated in an orderly, effective and systematic manner.

Existing ERP (Document EHS-APP-ERP-001 Rev. 0.2) shall be updated with emergency response procedures at Plant 3.

9.12 ABANDONMENT AND CLOSURE PLAN

A general abandonment plan has been prepared for the existing Plant in the event of temporary and permanent Plant closure, and shall be updated to incorporate procedures and requirements of Plant 3. In order to complement the plan, a detailed closure plan shall be prepared at least six (6) months in advance before the any Plant closure. The framework of the plan shall include the following:

- Adequate notification of intent to cease operation to be given to relevant authorities and workers. At least six (6) months prior to the closure,
- All structures such as sheds, containers and such will be dismantled and removed from the site,
- All building and biomass waste stockpiled within the site will be disposed off at the approved landfill site,
- Exposed areas will be re-vegetated and re-graded if necessary, and
- Removal of all structural materials, fuel and oils from the site. Residues fuel oil is Scheduled Waste (SW305) and shall be managed according to Environmental Quality (Scheduled Wastes) Regulations 2005.
- Fire protection, plant safety and environmental protection during closure works and post closure period.