4.1 INTRODUCTION

This section examines alternatives to the development of the proposed tin ore smelting and refining facility in terms of the site option, project option, technology option and fuel option.

4.2 SITE SELECTION

Site selection is not an option *per se* for this proposed project. The Project Proponent has acquired the facility and land by considering the similar process from the previous activity of the facility by Metal Reclamation (Industries) Sdn Bhd (MRISB).

In terms of land use, compared to the current site of MSC Tin Ore Plant in Butterworth, the site in Pulau Indah is deemed to be more suitable due to its compatibility with the surrounding land use which is already marked and gazetted both by Federal and State Government as Industrial Zone under the National Physical Plan (*Rancangan Fizikal Negara 3*), State Structural Plan (*Rancangan Struktur Negeri Selangor* (Kelang 2035) and Local Plan (*Rancangan Tempatan Majlis Perbandaran Klang, Pengubahan 4, 2020*) as indicated in Chapter 1 of this EIA Report. The possibility of the site to be changed into other type of zoning and land use other than industry which then require the proposed plant to be relocated again is very slim and negligible.

4.3 PROJECT OPTION

4.3.1 “No Project” Option

No project option implies that the existing situation prevails i.e. no new development activity will take place. This option is mostly applicable in situations where the proposed project site is in ecologically sensitive areas. However, the land on which the proposed project site is located, within existing industrial area and was previously operated (recovery of lead from lead acid battery by smelting process).

From a socio-economic perspective, the "no project" alternative may not be the best alternative as the numerous benefits to be gained from the development both locally and nationally would not be realized and the resources in the area would continue to be underutilized since the land will be idle. It will also hinder the opportunity to boost the tin ore smelting and refining sector which is a vital component of the nation's economy.

4.3.2 With Project Option

The option to carry out the Project will involve the development of tin ore smelting and refining plant in Pulau Indah Industrial Park, Daerah Klang, Selangor Darul Ehsan. The advantages of this option are further elaborated under the following criteria:

Landuse Compatibility

The development of proposed project would complement the overall development of the area and is consistent with the land use zone of the *Rancangan Tempatan Majlis Perbandaran Klang 2020 (Pengubahan 4)* whereby the proposed site is under Planning Block **BPKS9 (Klang Selatan)** and Sub-Planning Block **BPK 9.1 (Pelabuhan Barat/ Bandar Armada Putra)** which is zoned as **"Industrial"** (Industri).

The immediate surrounding land use of the site is mostly industrial activity close to Westport. In addition, the site of the proposed facility is logistically and economically viable.

Therefore, the proposed site location and project activities do not go against the planning of the State authority.

Socio Economic

There will be additional social and economic benefits from the proposed project. These include employment and business opportunities to the surrounding

communities as the immediate stakeholders, and improvement in amenities and utilities. The Project will also contribute to sustain the demand in refining based industries.

Environmental

The Project site is not located within environmentally sensitive area identified in the National Physical Plan within the immediate surroundings. The Project site is mostly developed with some areas covered with grasses.

4.3.3 Technology Option

The current MSC Tin Ore Plant in Butterworth is using the ageing reverberatory furnaces and currently has an annual refined tin production capacity of about 40,000 tonnes. The smelting process using the reverberatory furnaces requires multiple tapping process in order to achieve high recovery of tin product in which not only involved a lot of cost and time consuming but also create environmental problem especially air pollution during the granulation process of tin slag before it is returned to the smelting circuit.

The proposed new MSC smelting plant in Pulau Indah will adopt a modern melting technology using Top Submerged Lance ("TSL") furnace. It will significantly increase the smelting capacity and drive operating cost down. This TSL furnace also offers considerable environmental benefits in the control and minimisation of fume and other particulate emissions.

The new plant will also add fumer as part of the process technology in order to optimise tin recovery rate. With addition of fumer, 99% of tin metal will be recovered from tin ore compared to only 95% tin metal produced by using TSL furnace.

The summary of the advantages and disadvantages of the reverberatory furnace and the TSL is tabulated in **Table 4.1** below.

Table 4.1: Technology Options Comparison between Reverberatory Furnace and the Top Submerged Lance Furnace

Criteria	Reverberatory Furnace	Top Submerged Lance Furnace
Equipment	Old technology	Modern Technology
Energy	Higher energy consumption	Lower energy consumption
Efficiency	Low efficiency	Higher efficiency
Production	Lower production rate as it requires multiple tapping process	Higher production rate as more products are produced within a shorter cycle duration and smelting time is further reduced with the use of the fumer
Waste	Higher emission of air pollutants due to multiple tapping to complete one smelting cycle	Cleaner waste and reduced fume with only one tapping in one complete smelting cycle
Environmental Impact	Higher emission of air pollutants increases the environmental impact	Environmental impact is reduced significantly with controlled emission of fume and adoption of close loop tin fume and waste recycle and recovery process

4.3.4 Fuel Option

The proposed new MSC smelting plant in Pulau Indah will use natural gas as a fuel for smelting process instead of light fuel oil as practiced in MSC Butterworth.