EXECUTIVE SUMMARY

1 PROJECT OVERVIEW

This Second Schedule Environmental Impact Assessment (EIA) has been prepared for the ***Proposed Expansion of Recycle Pulp & Packaging Paper Plant, on Lot PT 41098, PT 41097 & PT 473, Mahkota Industrial Park, Banting, Mukim Tanjung 12, Daerah Kuala Langat, Selangor Darul Ehsan*** *by* ***Best Eternity Recycle Technology Sdn. Bhd. (BERT)*** hereafter referred to as the Project. The Project involves the expansion of the existing paper mill's annual production of high-strength packaging paper from its current production of 700,000 tons per year to 1,400,000 tons per year. The expansion will include the acquisition of the adjacent land (Lot PT 41098, 17.97 acres) totalling to a combined area of 132.72 acres to cater to additional mill components

The main components of the proposed expansion Project include:

i. Additional packaging paper production plant (Paper Machines 3 and 4);
ii. Expansion of water treatment plant (WTP);
iii. Expansion of wastewater treatment plant (WWTP); and
iv. Biomass co-generation plant

The Project site is located approximately 6 km northeast of the nearest town Banting, 14 km west of Dengkil, 20 km northwest of the Kuala Lumpur International Airport (KLIA) and 35 km southwest of the capital Kuala Lumpur, as shown in **Figure ES-1**.

1.1 Project Proponent

The Project Proponent is Best Eternity Recycle Technology Sdn. Bhd. (BERT), an enterprise of foreign direct investment and an associated company of Lee & Man Paper Manufacturing Limited (Lee & Man Paper), China

Best Eternity Recycle Technology Sdn. Bhd. (1279344-A)

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1.2 Environmental Consultant

AGV Environment Sdn. Bhd. (AGV) has been appointed by Casa Sakti Sdn. Bhd., to prepare an EIA report for the proposed Project. Details of the company are as below:

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2 LEGAL REQUIREMENT

Based on the activities listed under the Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order, 2015, the proposed expansion Project is captured under the following prescribed activities:

i. **Second Schedule**, Item 6, Industry (e): Pulp or Pulp and Paper with production capacity of 50 tonnes or more per day.

ii. **First Schedule,** Item 11, Power Generation and Transmission (a): Construction of steam generated power station using fossil fuels (other than coal) and having the capacity of 10 megawatts or more, with or without transmission line;

iii. **Second Schedule,** Item 11, Power Generation and Transmission (a): Construction of coal fired power station and having the capacity of 10 megawatts or more, with or without transmission line.

The Second Schedule EIA report for the current BERT plant with production capacity of 800,000 ton/year wet pulp board and 700,000 ton/year of packaging paper was approved by the DOE Putrajaya on 12th April 2019. For the proposed expansion, the Terms of Reference (TOR) for the EIA study has been endorsed by DOE Putrajaya on 6th May 2020.

3 STATEMENT OF NEED

Due to the changes in the global market, paper production and manufacturing have been moved out of China and into Southeast Asia countries. Malaysia being a hub for industry and economic growth is the primary choice of BERT as it will be able to meet the growing demand for packaging paper. BERT decided to invest in the expansion of its packaging paper plant by due to the potential economic growth of the ASEAN region.

The total investment for the implementation of the Plant expansion is approximately RM 800 million for the additional packaging paper plants and auxiliary facilities. The proposed investment is wholly in line with the Malaysian Government's efforts to encourage foreign direct investment (FDI). Full operation of the BERT facility will generate an annual revenue of RM 2.55 billion and contribute RM 97 million in Profit Tax to Malaysia. In addition, a trade surplus of RM 1.72 billion per year is expected to be generated.

Post-expansion, BERT is expected to employ an additional 300 employees with a final total of 1,500 workers. The establishment of the plant is expected to provide new jobs to Malaysian workers in fields such as production, administration, finance, engineering, logistics and IT.

4 PROJECT OPTIONS

4.1 Build-Out vs No-Build

The Build-Out option involves the installation of the paper packaging lines PM3 and PM4, a Biomass co-generation plant and the expansion of the Water Treatment Plant (WTP) and Wastewater Treatment Plant (WWTP) within the Project site. Potential environmental concerns are expected if mitigation measures are not properly implemented. Under the No Build Option, the existing BERT plant will continue operating without the increase in production capacity. The cumulative environmental impacts will not occur

4.2 Technology Options

The typical refiner technology is a single section refiner which tends to receive insufficient material, reducing the product quality. BERT intends to implement a multi-section refiner that enables a greater efficiency of refining the product and is able to receive sufficient pulp. Therefore, the strength of the final product is improved and power consumption is lowered.

Conventional vacuum panel technology uses vacuum box panels that are arranged in strips, causing uneven absorption of moisture. BERT intends to use the serrated vacuum panels which effectively balances the non-uniformity caused by the fluctuation of vacuum, thus producing paper with higher quality.

4.3 Pollution Control Options

4.3.1 Wastewater Treatment Plant

i. Biological Treatment

BERT will utilize the anaerobic and aerobic biological treatment system as compared to the conventional two-stage aerobic treatment system. The benefits include better usage of space for equipment, lower energy consumption and higher rate of pollutant removal.

ii. Sedimentation Method

A dissolved air flotation (DAF) system will be included after the traditional second stage sedimentation. The DAF separates suspended matter from the wastewater and precision filtration to effectively separates the solid and liquids in the suspension.

iii. Screening Process

BERT uses an inclined screen to remove recyclable paper fibre before the first sedimentation process. Paper fibres are not commonly recycled

iv. Sludge Press

BERT will use a filter press rather than the commonly used belt press which is cheaper, high capacity but low dryness efficiency of 20%. The filter press is able to achieve a dryness of 50%, although requiring a long pressing duration.

4.3.2 Air Pollution Control (Biomass Boiler)

i. Special Designed Circulating Fluidized Bed (CFB) Boiler

The CFB allows greater fuel adaptability and high contamination reduction at different coal/biomass ratios. Suitable for combustion of Empty Fruit Bunches (EFB)

ii. Electrostatic Precipitator

An ESP induces an electrostatic charge capable of removing more than 99% of Particulate Matter (PM). BERT intends to use a five-stage ESP, with a removal rate of 99.85%.

4.4 Water Recycling Option

Reuse of treated effluent water (Standard A) is not suitable for production due to the high calcium and magnesium that often cause clogging inside equipment such as small pipes, headbox, filter and paper forming fabric. The high conductivity in the effluent will result in lower chemical efficiency and imbalance of pulp slurry's colloidal charges that affects the papermaking process. Approximately 20% of the treated water will be reused.

4.5 Waste Paper Option

The proposed Project requires about 2.5-2.9 million tons of waste paper as raw material. These materials will be primarily imported from United States and Europe due to their high waste paper generation. However, BERT is willing to accept waste paper locally on the condition that the waste paper meets their waste acceptance criteria.

4.6 Fuel Option (Biomass Boiler)

Wood chips is a suitable biomass fuel as it has a low ash and sulphur content with a high heat value of 10,000 kJ/kg. The primary biomass in the fuel mix is oil palm EFB fibres which will be purchased from suppliers and stored onsite. Ash produced by combustion of EFB easily sticks to the walls of the boiler, causing frequent stoppage and maintenance. Special designs and controls of the boiler are needed to solve this issue. Coal will be imported from Indonesia will have sulphur content not exceeding 0.5%.

5 PROJECT DESCRIPTION

5.1 Project Location

The Project site consist of the existing Phase 1 BERT site (114.75 acres) and the additional Lot PT 41098 (17.97 acres), totaling to an area of 132.72 acres within Mahkota Industrial Park, Banting. Access to the site is via the Maju Expressway (MEX) and the North-South Expressway Central Link (ELITE). From ELITE, an exit onto KLIA Extension and subsequently on Jalan Sultan Abdul Samad will lead directly to Federal Route 31 which is the main access to the Project site.

5.2 Project Description

The existing BERT plant includes four (4) wet pulp production lines with a total capacity of 800,000 tons/year and two (2) paper packaging manufacturing lines with combined capacity of 700,000 tons/year. The existing water intake station, WTP and WWTP had a capacity of 45 MLD. The

existing natural gas co-generation plant has a capacity of 60 MW and the Thermal Treatment Plant (TTP) providing an additional 30 MW and 140 ton/hour of steam.

For the proposed expansion, two (2) additional paper packaging lines with combined capacity of 700,000 tons/year will be constructed. The capacity of the raw water intake station, WTP and WWTP will be increased by 55 MLD from 45 MLD to 100 MLD. A biomass co-generation plant will supply an additional 50 MW and 260 ton/hour of steam. The components have been rearranged to accommodate the expansion. The Project layout is shown in **Figure ES-2**.

5.2.1 Raw Material

The raw material obtained is sourced locally and domestic, comprising primarily of sorted commercial and industrial waste/recycled paper. Raw material used in the process includes double liner kraft (4707.10.0000), sorted old corrugated container (4707.20.0000), old corrugated containers (4707.30.0000) and mixed paper (4707.90.0090).

5.2.2 Existing Wet Pulp Board Production

(i) Waste Paper Pulping Process

- Removal of heavy impurities and stored in the dump tower
- Slurry from the dump tower passes through primary and secondary sifter before reaching pulp thickener to increase the pulp concentration
- Slurry is sent to the concentrated slurry pool and then to the double-net six-pressure filter wet pulp machine to produce the wet pulp board

(ii) Wet Pulping Process

- Slurry with 4-5% pulp is buffered and evenly distributed between two nets
- Pulp layer is further pressed under high roller pressure to further intensify dewatering
- After the hydration zones of dual-wire press filter wet pulp machine, the slurry concentration increases to 48%.

(iii) Pulp Cutting & Packaging

- Pulp board is cut into a certain size of wet pulp board as required
- Wet pulp board are conveyed and sent to the weighing unit
- Wet pulp boards are then passed through the bale press, aligning, packing then temporarily stored before tying up, coding etc. and sent into warehouse for storage.

5.2.3 Existing and Proposed Packaging Paper Production

Two additional packaging paper process lines (PM3 and PM4) are proposed in the expansion. These lines will be identical to the existing lines.

(i) Waste Paper Preparation

- Imported Old Corrugated Containers (OCC) (90%) and Unbleached Kraft Pulp (UKP) (10%) are prepared in stages including high concentration filtering, coarse screening, fine screening, heat dispersion, and refining
- UKP is prepared in a similar manner with addition of two stages of fibre splitting and crushing

(ii) Production Line Process

There are two papermaking machine lines i.e. (i) the OCC Line and (ii) UKP Line.

- In the OCC Line, fibres are separated into 3 lengths (short, medium and long)
- Short fibres are further processed through a filter plate and heat dispersion
- Medium fibre is separated to light filtration system to remove light impurities, followed by disc filter systems, heat dispersion and grinding discs
- Long fibres mixed with impurities will go through fine screening equipment before being treated with disc filters, heat dispersion and grinding discs
- In the UKP Line, Kraft sheet is shredded by hydraulic grinder, and then filtered
- It is then sent through the grinding machine to achieve different grinding level in accordance to production demand

(iii) Impurities Removal and Pulp Treatment

- OCC is shredded into pulp fibre of different lengths and waste material will be separated and channelled out for waste processing
- The high concentration filtration equipment will filter out metal, glasses and stones
- Pulp then goes through 5 phases of filtration to remove impurities of sand and gravel
- The pulp line reaches the level 1 pulp screening equipment to separate short fibres
- Pulp is heated to about 85 – 150ºC using high pressure steam to soften the impurities
- A grinding disc is used to reduce the size of the particle contaminants
- Fibres are separated into long, medium and short to be processed separately
- Medium fibres pass through the filtering stages to filter impurities thoroughly
- Next, medium fibre will be blended with the original pulp to improve the pulp quality
- Long fibre pulp stream is processed and further fine screened through three stages using continuous wavy sieve to remove impurities before pulp concentration
- The fibres are then grinded to develop the best pulp for paper making

(iv) Paper Manufacturing Process

- Slurry is dewatered by gravity, vacuum suction, and doctoring to form a wet paper sheet with a specified strength
- Wet paper sheet is further dewatered using mechanical pressing
- The paper web will be dried to the standard and uniform moisture
- A coat or layer of modified starch and water-resistant substances will be evenly applied on the surface to make the paper stronger and water resistant
- Paper is smoothened by pressure at the Calendaring Section
- Paper web will be rolled into a jumbo roll of a specified diameter for further processing
- Finally, the jumbo roll will be cut into the diameter and width of the specifications

5.2.4 Water Supply

For the proposed Project, BERT intends to increase its existing water abstraction volume of 45 MLD to 100 MLD and an average water consumption of 80 MLD. Two (2) additional pumps will be installed at the Intake Station to increase the volume of water abstraction.

The raw water intake station is located 1.6 km south of the site, at the banks of Sg. Langat. The diameter of one of the two (2) existing pipelines will be increased from 800 mm to 900 mm. The discharge pipeline of 1,000 mm remains unchanged.

5.2.5 Wastewater Treatment Plant

For the proposed Project, The average wastewater generation will be increased by from the existing 29 MLD to 65 MLD. However, due to fluctuations in the water abstraction/consumption and production processes, the WWTP will have a total design capacity of 100 MLD.

The wastewater treatment process for the proposed Project involves a three-stage treatment process, involving (i) primary physical treatment, (ii) biological treatment and (iii) floatation and filtration (advanced oxidation technology).

The WWTP is expected to be able to treat effluent to meet the **Standard A** discharge limits of the Environmental Quality (Industrial Effluent) Regulations 2009, although the Project is only required to meet Standard B effluent quality, being located downstream of water intake stations for potable water supply. During the 12-hour maintenance period, water abstraction and discharge will be at its maximum (100 MLD).

5.2.6 Existing Solid Waste Treatment Plant

Solid residues are generated from the production line as well as the WWTP. These residues will be recovered in the Solid Waste Treatment Plant (SWTP). The SWTP separates and recovers waste components such as plastics, metals, pulp and waste residues using an advanced water washing line.

Almost all of the waste residue produced in this Project will be recycled and reused, avoiding the need for disposal. Waste pulp fibres will be sent back into the production line. Plastics and metals will be sold to a licensed waste collector, whereas the waste residue will be converted in Refuse-Derived Fuel (RDF) as fuel for the TTP.

5.2.7 Existing Thermal Treatment Plant

The existing BERT facility (Phase 1) includes a TTP with a steam production rate of 140 t/h which runs through a steam turbine producing 30 MW of energy. Steam is produced by the combustion of RDF, coal and sludge collected from the WWTP. With the implementation of the Phase 2, there will be a significant reduction of coal usage in the TTP.

Flue gas from the TTP will be treated with a flue gas treatment system which consists of Selective Non-Catalytic Reduction (SNCR) de-NOx system, CFB type semi-dry desulphurization system, activated carbon powder absorption system and two stages of Fabric Filters to ensure pollutants in emission is well within the Clean Air 2014 regulation.

5.2.8 Proposed Biomass Co-generation Plant

A new Biomass co-generation plant consisting of a Biomass Boiler and a 50 MW steam turbine will be installed to generate the steam and power required to run the additional paper lines.

EFB, wood chips and coal will be used as fuel at a ratio of 10%, 20% and 70% respectively. By consistently improving transportation and the fuel feeding mechanism, BERT intends to increase the total biomass fuel mix to approximately 50% over a span of 5 years.

The combustion of fuel, specifically EFB is considered problematic due to its chemical characteristics. The Biomass Boiler design specifications allow proficiency in EFB combustion. The Biomass Boiler is a CFB type which aids in keeping a low and uniform temperature of approximately 790℃.

Due to the low combustion temperature, emissions from the Biomass Boiler are low. A Selective Non-Catalytic Reduction (SNCR) De-NOx system utilising ammonia water solution as absorbent will be installed to further reduce NOx compliance with the regulation. A 5-stage Electrostatic Precipitator (ESP) will be installed for efficient removal of particulate matter in boiler emissions. Multiple power supply sources are used for the ESP to eliminate possible power failures.

5.2.9 Existing Sewage Treatment Plant

The existing BERT facility includes an on-site Sewage Treatment Plant (STP) with a design capacity of 525 Population Equivalent (PE). The STP capacity is sufficient in catering for the additional 300 employees employed through the implementation of the Project. No expansion of the STP is necessary. The STP will be located at the southern portion of the Project site next to the WTP. The final effluent discharge of the STP will comply with **Standard A** of the Environmental Quality (Sewage) Regulations, 2009. The STP design will be based on the extended aeration system with an average daily discharge of approximately 118 m^3/d.

5.3 Project Implementation Schedule

The planning and implementation of the Project is expected to take a total of two (2) years. Start-up of expanded components are expected to begin in April 2021.

6 EXISTING ENVIRONMENT

6.1 Topography

The land in the area is generally flat, sloping mildly across the Project site, from the northeast to the southwest. The ground elevation of the of the existing BERT site ranges from 8 m to 15 m. The additional lot PT 41098 has similar elevation ranging from 10 m to 15 m.

6.2 Hydrology and Hydrogeology

6.2.1 Hydrology and Drainage

The BERT raw water intake station is located at Sg Langat, about 41 km from the river mouth of Southern Channel. Sg Langat basin has a total catchment area of 2,348 km^2 and a length of 180 km. The catchment area at BERT raw water intake is 1,783 km^2, about 76% of Sg Langat basin.

Sg. Langat Basin is drained by three (3) major tributaries – Sg. Langat, Sg. Semenyih, and Sg. Labu. The main tributary, Sg. Langat, flows about 182 km from the main range (Banjaran Titiwangsa) at the northeast of Hulu Langat District and drains south-westerly into the Straits of Malacca. Major industrial water abstraction users upstream of the BERT raw water intake station includes Hartalega Holdings Berhad (19 km upstream), Worldwide Holdings, GS Paperboard & Packaging Sdn Bhd (15 km upstream) and Jinxing Holdings (M) Sdn Bhd (450 m upstream).

6.2.2 Rainfall

The Project Site experience wetter months during the north-east monsoon of November to December and inter-monsoon period in April and October, with an average monthly rainfall of about 220 mm. Drier months are in January to February and June to August with monthly rainfall less than 150 mm. The mean annual rainfall of Sg Langat basin is about 2,100 mm.

6.2.3 Flow Regime

Dengkil station (2816441) is located 24 km upstream of the Project site and has a catchment area of about 1,240 km^2. Based on the historical data at Dengkil (1962 - 2016), the mean annual flow is about 34.78 m^3/s (3,000 MLD). Higher flow is observed in April to May and October to December with mean monthly flow ranging from 37 m^3/s to 66 m^3/s. Lower flow is observed in February and June to August with mean monthly flow ranging from 19 m^3/s to 24 m^3/s.

6.2.4 Hydrogeology

The Project site is located within an area with very high groundwater potential however, the Project does not utilize groundwater for its operations. As such, the Project is not expected to affect the local groundwater level.

A groundwater quality assessment was conducted during the Phase 1 EIA. Based on the groundwater sampling from eight (8) boreholes and analysis conducted, VOCs, SVOCs and TPH were not detected. However, heavy metals were reportedly detected in the groundwater samples.

6.3 Geology and Soil

Based on the Geological Map of Peninsular Malaysia (1985), the Project site and the regional geological settings comprises of unconsolidated Quaternary continental deposits, which overlie the sedimentary bedrock of Kenny Hill Formation.

Soil investigation (SI) for Lot PT 41098 involved drilling of two (2) boreholes. The SI work included standard penetration test, disturbed and undisturbed soil sampling for visual examination and laboratory testing.

6.4 Climate and Meteorology

The closest Malaysian Meteorological Department (MMD) monitoring location is located in KLIA. Annual data obtained from 2009 to 2019 shows that the area records an average temperature of between 27.2°C to 28.2°C with humidity ranging between 76.9% to 83.6%. The area received a maximum of 2,564.6 mm of rain in 2018 with a total of 199 raindays. Annual wind speeds generally fluctuate between 1.6 m/s and 2.6m/s.

6.5 Land Use

Based on the Environmentally Sensitive Area (ESA) classification, there are no environmental sensitive areas within the immediate impact zone (5 km) of the Project site. The ESAs located beyond 5 km radius includes Bukit Jugra Forest Reserve (14 km), Labohan Dagangan WTP (10 km), North Kuala Langat Forest Reserve (10 km) and Paya Indah Wetlands (9 km).

The Project site is surrounded by industrial areas comprising of an industrial gas production and bottling plant, housing material and assembly company and an automotive component manufacturer located within 1 km of the Project site.

The JKR Quarters (53 m southwest), S.R. Agama Integrasi Sungai Manggis (55 m west), Taman Bakti (55 m west), Sekolah Agama Menengah Tinggi Sungai Manggis (127 m northwest) and SJK (Tamil) Sungai Maggis (146 m south) are the closest sensitive receptors to the Project site. The 5-km landuse map is shown in **Figure ES-3**.

6.6 Socio-Economy

The socio-economic study covered a 5-km radius from the boundary of the Project site, Kuala Langat District. There were 12 major settlements selected within the 5 km zone around the Project site. A total of 297 questionnaires were completed out of a total of 21,669 housing units.

Majority or 52.2% of the study area are in the younger age group (40 years and below), followed by one-fifth of middle age 41-50 years, and the older group of 61 years and more (12.1%). Thus, the population of the study area had younger population than the older and dependent category.

Overall, the population may be considered as an educated community. More than half (60.6%) had gone through secondary education and more than one-quarter had attained tertiary level of education, with a significant number (9.1%) reaching the university level.

Generally, the people of the district earned average income. Those earning RM2,500 and above made up of only one-quarter (25.1%) of the sample. More than half (59.3%) were low earners of below RM2,000 per month

6.7 Environmental Baseline Monitoring

Baseline environmental monitoring was conducted to gauge the existing condition of ambient air, odour, water quality and noise levels during the Phase 1 EIA, namely from 18th to 24th July 2018 and 22nd to 25th October 2018. Results from the on-going monthly environmental monitoring for the existing Phase 1 plant, from August 2019 to January 2020 are also included.

6.7.1 Air Quality and Odour

i) Ambient Air Quality

The results of ambient air monitoring during the Phase 1 baseline study showed that the 24-hour averaging concentrations of particulate matters PM_{10} and $PM_{2.5}$ at all locations were below the respective limits of 120 µg/m3 and 50 µg/m3. As for gaseous and heavy metal pollutants, the SO_2, NO_2, HCl, HF and Hg (mercury) were all not detected at all five stations. For CO, the levels were lower than the limit of 10 mg/m3 for all locations. All the ambient air quality monitoring results complied with the respective limits in the Malaysia Ambient Air Quality Standard (MAAQS). Dioxin and Furan measurement at stations A2 and A5 showed that the overall I-TEQ concentration of 0.000001 ng/Nm3 for both locations. However, there was no limit stipulated under MAAQS.

During the monthly ambient air monitoring, PM_{10} and $PM_{2.5}$ is shown to have exceeded the MAAQS limit with no discernible pattern. The exceedance of the MAAQS limits for the months of September 2019 and October 2019 may be contributed by the national haze occurrence during this period of

the year. In later months, particulate matter exceedance is likely contributed by vehicular emission due to the holiday period as well as fugitive dust from the construction site.

ii) Odour Sampling

Perceived odour concentrations obtained from the baseline odour sampling carried out on 16 August 2018 indicates that the Project site and its surrounding areas do not experience objectionable smell. The highest D/T for unpleasant smells perceived through this sampling exercise was 2 D/T which is below the objectionable level of 7 D/T for the odour sensitive receptor. The perceived odours/smells at the Project site and surrounding areas are typical of rural setting with the localised rural activity, industrial activity and vehicle movements along the main road.

6.7.2 Noise Measurement

The Phase 1 baseline results for LAeq were within the respective noise limits of the Schedule 2 (recommended Permissible Sound Level (L_{Aeq}) by Receiving Land Use for Existing Build Up Areas) in "The Planning Guidelines for Environmental Noise Limits and Control, Third Edition, 2019"

The monthly monitoring results were compared against Schedule 2 sound permissible level according to the type of landuse. The monitoring results indicated that noise level surrounding the Project site were well within the recommended permissible levels and comparative the baseline noise level. Noise sources observed at the monitoring location are caused by vehicular movement along the main road and residential areas, earthworks and natural sounds from the environment.

6.7.3 Water Quality

From baseline monitoring conducted during the Phase 1 EIA, it can be summarized that most of the parameters are within the National Water Quality Standard (NWQS) Class III limits, except for TSS, Mn, Fe, AN, F and TP. Overall, the results obtained in October 2018 were better than in July 2018, indicating better Water Quality (WQ) during the raining period in October 2018 compared to dry period in July 2018.

BOD, COD, DO, TSS, Mn, Fe, AN and turbidity were the common parameters exceeding the NWQS Class II limits conducted during the on-going monthly monitoring (Aug 2019 – Jan 2020). The results indicated that Sg. Langat falls under "slightly polluted" category of Class III.

6.8 Ecology

Five (5) major phyla of phytoplankton were recorded at the study area, namely Bacillariophyta, Chlorophyta, Euglenophyta, Cyanophyta and Dinoflagellata. Chlorophyta was found to be the most abundant phylum, contributing to 57.2% of the total phytoplankton density, followed by Euglenophyta (17.0%) and Bacillariophyta (16.3%)

Three (3) major phyla of zooplankton, i.e. Rotifera, Arthropoda and Protozoa were recorded at the study area. Arthropoda was the most dominant, where they accounted for 67.7% of the total zooplankton density, followed by Rotifera (30.9%) and Protozoa (1.4%). Macrobenthos was represented by Clitellata and Polychaeta under phylum Annelida, with Clitellata being the most dominant group, consisting of 66.1% of the total macrobenthic fauna.

A total of ten (10) fishes were caught at F1 i.e. seven (7) individuals of Patin, Shortbarbel Pangasid (Pseudolais micronemus) from Family Pangasidae and three (3) individuals of Keli Afrika, African Sharptooth Catfish (Clarias gariepinus) from family Clariidae.

On riparian vegetation, only Berembang (*Sonneratia caseolaris*) and Nipah (*Nypa fruticans*) were listed as least concern (LC) in the IUCN Red List of Endangered Species while other species were not listed. All the species observed during the survey are commonly found throughout the country with the similar habitat conditions.

The closest aquaculture farm is located approximately 30 km downstream of the Project site at Kg. Bandar, housing more than 30 aquaculture farms. The main species reared were Seabass (*Lates calcarifer*). Sg. Langat is also considered an active site for fishermen and recreational angling, primarily for Ikan Patin. It is estimated the direct economic value from recreational fisheries amounts to RM 258,300 per year.

6.9 Community Health

Generally, the area has adequate coverage of safe drinking supply, sanitary toilet and electricity. The disease burden of the study area was low as most of communicable diseases were well below the rate of the State of Selangor. However, dengue fever important vector borne diseases that require special attention in the study area.

6.10 Traffic

Access to the Project site in Mahkota Industrial Park (MIP) is via the Federal Route 31 (FR31) at the signalized junction which leads to the industrial park internal road. The Jalan Semenyih – Dengkil stretch to Bandar Mahkota (FR31) and Jalan Persiaran Graphite within the MIP are operating at good level of service (LOS) for peak hours. However, the current traffic flow of FR31 at the MIP stretch to Pekan Manggis is operating at a critical LOS and experiencing forced flow. Its morning and evening peak hour traffic has already breeched its volume/capacity at ratios of 1.20 and 1.14 respectively. This route needs upgrading even with the present traffic volume. The existing the site entrance junction however its operating well below its capacity.

7 EVALUATION OF IMPACTS

7.1 Hydrology and Hydrogeology

7.1.1 Impacts During Construction Phase

The Project will involve the development of 17.97 acres of adjacent lot. During the land clearing and construction phase, there may be increase of stormwater runoff from the Project site. However, the stormwater runoff will be drained into the downstream engineered detention pond (MASMA-compliance) before flowing out to Sg. Langat. The incremental storm runoff is expected to be extremely small as compared with the Sg. Langat flow originated from the catchment area of 1,783 km_2. This insignificant and temporary increase of storm runoff is unlikely to have any impact on the flow regime of Sg. Langat.

7.1.2 Impacts During Operational Phase

i. Impact on Water Availability at Sungai Langat

Under normal flow condition, flow availability analysis at the existing BERT raw water intake was conducted to assess the potential impacts of the Project's water abstraction to Sg. Langat. The computed normal flow of Sg. Langat at BERT raw water intake was 3,760 MLD. The nett abstraction of 15 MLD, which only constitutes 0.4% of the normal flow is insignificantly small.

Under the design low flow condition, the 7-day low flow of 50-year ARI (7Q50) at the BERT raw water intake was computed to be 281 MLD. The nett flow reduction of 15 MLD, equivalent to about 5% of the low flow, is very small and have no significant impact to Sg. Langat and its existing water users from Bukit Tampoi Weir to the river mouths.

ii. Hydraulic Impact on Sg. Langat

Under the 7Q50 low flow condition, for both normal operation and maintenance operation, the reduction in water level (WL) is only 1 to 2 mm. This magnitude is insignificant as compared with the water depth of Sg. Langat. The plant expansion is not expected to cause any significant change in the river WL and flow availability to Sg. Langat along the tidal reach.

iii. Potential Increase in Stormwater Runoff

The surface runoff for the industrial area has been designed to discharge into the Main Drain A and subsequently Detention Pond A before flowing into Sg. Langat. The Main Drain A and the Detention Pond A were designed to cater for the industrial area of 105 ha and upstream catchment of 200 ha. As the design has taken into consideration the ultimate development in the catchment, the increase in the storm runoff due to the proposed Project shall not cause any impact to the Main Drain, Detention Pond and Sg. Langat.

iv. Potential Impact to Hydrogeology Regime

Additional water abstraction from Sg. Langat for the plant expansion is not expected to have any impact on the hydrogeology regime as the raw water is abstracted from Sg. Langat and not from the groundwater. Besides, the effluent discharge will be conveyed directly to Sg. Langat and not seep into the groundwater.

7.2 Soil Erosion

For the Existing Condition (pre-development), 100% of the site falls within the Low Erosion Category. The annual soil loss is estimated to be around 5.60 ton/ha/yr over an area of 7.279 hectares.

Worst-Case scenario (without control measures) indicates approximately 6.902 hectares (about 94.82% of assessed area) of the site will be subject to low erosion risk. 4.92% falls under the Moderate erosion risk. With no control measures, the potential soil loss rate is expected to be about 47.11 ton/ha/yr.

For Scenario 3 (With Control Measures), erosion will be in the Low Risk category with 100% falling into this category and a total annual soil loss rate of about 2.3 ton/ha/yr. This suggests that the usage of Best Management Practices (BMPs) along with other erosion control measures will further reduce the risk of soil erosion at this low-lying and flat area.

7.3 Air Quality

7.3.1 Impacts During Construction Phase

It is noted that earthworks for Phase 1 had completed with the required platform level for both Phase 1 and Phase 2, therefore, only minor construction works will be carried out for this Project. The main air pollutant from this activity will be fugitive dust. The area of impact for fugitive dust is anticipated to be localized within the Project's construction footprint area (usually less than 50 m away) as the work area will be limited in nature. The duration of impact for the construction phase will be short-term to medium-term. For this Project, the nearest residential area is more than 500 m away from the Project's construction area (at northeastern portion of the site), hence, the air quality impact due to this activity is anticipated to be minimal.

7.3.2 Impacts During Operational Phase

Similar to the previous Phase 1 approved EIA study, the cumulative Maximum Average Incremental Concentrations (MAICs) for the identified criteria air pollutants for both Phase 1 and Phase 2 are simulated using the USEPA AERMOD air quality model with utilization of the same hourly meteorological data obtained and processed from the nearest Malaysian Meteorological Department (MMD) meteorological station, namely Kuala Lumpur International Airport [KLIA], Sepang, Selangor. The ambient air quality assessment criteria is the Standard (2020) of the Malaysian Ambient Air Quality Standards (MAAQS [Standard (2020]).

Air modelling results indicates that during normal operation, the contribution of identified air pollutants from the BERT plant, both Phase 1 and Phase 2 to the surrounding environment is assessed to be minimal except for the calculated of $PM_{2.5}$ at the identified off-site ASRs, which had slightly exceeded the prescribed limit. Assessment on the Project contribution to the airshed based on 25% threshold of the adopted IFC standard indicates that the predicted MAICs for $PM_{2.5}$ were within the calculated threshold value of 8.75 µg/m_3.

Under abnormal or failure situation, the predicted 1-hour averaging time particularly PM_{10}/$PM_{2.5}$ was assessed to have significant impact to the surrounding areas. The distance of the nearest stack (paper manufacturing line) and Project boundary to the nearest ASRs (JKR Quarters) is approximately 420 m.

The airshed carrying capacity assessment show that the MAICs for all pollutants were in compliance with the respective 25% threshold values.

7.4 Noise and Vibration

7.4.1 Impacts During Construction Phase

The proposed expansion Project is predicted to cause minor increase of localized boundary noise at the northwestern Project boundary during construction stage. The predicted levels are nevertheless well within the Schedule 2 and Schedule 6 recommended level as proposed in *DOE Guidelines for Environmental Noise Limits and Control 2019*. The slight increase is not anticipated to cause any concerns to the surrounding industries receptors.

7.4.2 Impacts During Operational Phase

For the operational noise from the proposed expansion Project, Project noise attenuated to the Project boundaries and the receptors sites is predicted to reduce compared to the existing BERT site scenario. This is due to proposed control measures for installation of 2.6 m height perimeter concrete wall along the Project boundary. The predicted levels are well within Schedule 2 recommended sound permissible level for both the industrial receptor and residential as well as sensitive receptors within the study area. An increment of less than 1 dB to the baseline level predicted within the Project boundaries and the nearest sensitive receptors indicates insignificant noise impact from the proposed expansion.

7.5 Water Quality

7.5.1 Impacts During Construction Phase

During the construction phase, the potential threat to river water quality (WQ) is mainly sediment and TSS outflow due to the land disturbing activities. There is a main drain and detention pond located at immediate downstream of the Project site. The stormwater runoff containing sediment and TSS is likely to be trapped in the sediment trap within the Project site before draining into the main drain and detention pond prior to discharge into Sg. Langat. The impact to Sg. Langat's WQ is expected to be minimal due to the mitigation effect of the sediment trap and the detention pond.

7.5.2 Impacts During Operational Phase

Under the BERT expansion, it could be seen that WQ will continue to deteriorate at immediate discharge point during both 7A10 low flow and normal flow scenario. All the parameters remain in the same class as per BERT Phase 1 operation. Similar to BERT Phase 1 operations, the impact is localised at Sg. Langat original river course and does not extend to Sg. Langat main river.

Regardless of low flow or normal flow condition, the operation of both expanded BERT and JXM plants will only have effect on Sg. Langat main river and the cumulative impact is insignificant.

7.5.3 Additional Water Quality Modelling

With the proposed Project, the WQ changes are obvious, especially for AN and BOD at the effluent discharge point. Base on the review of the design of the WWTP system, the treated effluent is able achieve BOD ≤ 15 mg/L and AN ≤ 5 mg/L, which are better than the Standard A limits of BOD 20 mg/L and AN 10 mg/L.

The assessment based on the better effluent quality shows improved water quality in terms of BOD and AN, both under the 7Q10 low flow and normal flow conditions. The concentrations of both BOD and AN are close to the baseline ambient quality.

7.6 Waste Management

7.6.1 Impacts During Construction Phase

The potential impacts arising from improper management of the construction, municipal and scheduled wastes include the following:

- Odour nuisance;
- Public health impacts within nearby residential areas;
- Contaminate surface runoff;
- Soil and groundwater contamination;
- Obstruction of drainage flow;
- Aesthetic issues; and
- Fire hazards.

7.6.2 Impacts During Operational Phase

Waste generated from the production plants will comprise of mainly metals, plastics and waste residue which will be separated and recovered in the Solid Waste Treatment Plant (SWTP). Almost all of the wastes generated from the production processes will be recycle and reused into secondary “products”. Other non-recoverable wastes will be disposed in the TTP or to landfill.

Overall, the impacts arising in terms of waste management is expected to be minimal during operation and can be mitigated with the implementation of appropriate waste management practices.

7.7 Quantitative Risk Assessment

The credible scenario consequences assessed does not reach involuntary recipients of industrial risk (IR) surrounding the project, which comply with DOE’s risk acceptance criteria.

- Hazard zones contour for credible scenarios does not reach involuntary recipients of IR:
  - 37.5 kW/m_2 heat radiation hazard zone; and
  - 0.21 bar explosion overpressure

- IR Contours:
  - There is no result for 1 x 10^{-5} per year IR contour for proposed Project site; and
  - The 1 x 10^{-6} per year IR contour of the proposed Project slightly goes beyond the boundary but does not encompass involuntary recipients of industrial risks such as residential areas, schools, hospitals, and places of continuous occupancy, etc.

The risks have been assessed on a conservative basis, both in terms of consequences (e.g. maximum inventories of hazardous substances in vessels, worst case process conditions, maximum release rates, no account taken of site drainage/ emergency spill containment systems etc., computer models that are inherently conservative) and frequency i.e. no account has been taken of Project site safety systems.

7.8 Ecology

7.8.1 Impacts During Construction Phase

Potential increase in soil erosion during the construction phase are due to intense precipitation events (rain) and nature of the soil. The increase in SS would lead to the rise of water temperature due to greater heat absorption by the suspended particles, which in turn, would reduce DO concentrations. This will lead to retardation of primary productivity through reducing light

penetration, thereby suppressing photosynthetic activity of phytoplankton, algae and macrophytes. Fewer photosynthetic organisms will be available as food sources for many invertebrates.

7.8.2 Impacts During Operational Phase

The abstraction of water can potentially lead to the reduction of water levels and changes in river flow. However, based on water availability analysis, the reduction in the river flow is insignificant. In addition, the abstraction of water could potentially cause fish and other aquatic species as well as their hatchlings to be drawn into the water intake. This can lead to the reduction in population and imbalance in the aquatic ecosystem.

Water quality may deteriorate due to effluent from the Plant. This would create unfavourable conditions for most aquatic organisms and decrease the survival rate due to the high temperatures, low DO, high BOD, high TSS and high nutrients in the water. Subsequently, it will affect the fisheries activity at Sg Langat. On the other hand, impacts on aquaculture operations are considered insignificant as the nearest aquaculture activity is found to be present approximately 30 km downstream of Project site.

7.9 Socio-Economy

The sampled respondents (297 individuals) represented a fairly well educated lower-middle income community in a Malay majority semi-urban setting. The few traditional settlements were socially urbanized and found to be generally fairly comfortable, socially and economically. It is a generally young community with more than half were 40 years and below, which signals a good human resource base.

From the analysis of the responses on perceived impact of the paper production processes the following conclusions may be drawn about the people of the study area:

i. They were generally very positive about development programs, and were amenable if not receptive.

ii. They were knowledgeable about development and appeared able to appreciate industrial processes leading to ability to evaluate the pros and cons of industries' operations. Thus, they were able to indicate what they liked or otherwise.

iii. As far as the paper producing process was concerned, worries about pollution – air as well as water – were not serious.

iv. There was a fairly high level of confidence that river water which is vital in the paper production would remain unaffected. Treatment of used water as important as pre-use treatment seemed to be appreciated.

The generally positive perception may be due to factor that the majority showed high appreciation of the decision to build the paper plant within a designated industrial park which would mean that at the outset, there was a general location-compliance.

7.9.1 Impacts During Construction Phase

The BERT Phase 2 expansion is envisaged to result in direct and indirect effects on the socio-economic status of the surrounding area. Expected impacts are the enhancement of employment opportunity, enhancement of social and economic benefits of the local population

7.9.2 Impacts During Operational Phase

During the operational phase of the plant, some of the jobs will be performed by the locals who reside in the nearby settlements. In the long run, the requirement for labour will also increase and will directly benefit the surrounding population.

It is expected that an income boost will be generated in the area. Directly, this would be in the form of salaries and wages earned by the additional workforce as well as the receipts from purchases of local material inputs for the Project. Additionally, income would also be generated resulting from the expansion of the economic and commercial activities in the area.

A potential socio-economic impact will result from the in-migration of people into the area to stay on a more permanent basis during the operation period. Positive effect can be seen in terms of increased demand for goods and services which could benefit the surrounding commercial area.

7.10 Community Health

The health risk assessment exercise found that the Project has minimal impact onto the communities surrounding the site. Air dispersion modelling showed the emission of the proposed Project would not pose any added risk to the health of vicinity communities. Noise modelling also found low potential of community vulnerability to high sound arising from the BERT compound. No health impact was anticipated from the expansion in the short and long term.

7.11 Traffic

7.11.1 Impact During Construction Phase

The increased vehicular movement during the construction phase may potentially impede traffic during peak hours along the main Jalan Banting – Dengkil road (FR31) which is the main access to the industrial park via the signalised junction at the main road. Additional traffic during construction phase is not anticipated to be significant in terms of vehicle volume (pcu) and not expected to significantly affect the traffic flow. Nonetheless, measures need to be taken to ensure the construction traffic occur during off peak hours.

7.11.2 Impacts During Operational Phase

The forecasted traffic generated during the operation phase is estimated at 620 trucks trips per day due to the incoming raw materials and outgoing delivery of products. In addition, the proposed Project is expected to employ 1,500 workers upon full operation. Based on the traffic projection, the proposed Project will generate additional traffic of 229 pcu/hour and attract 413 pcu/hour during the morning peak, whilst at evening peak it is expected to generate 338 pcu/hour and attract 216 pcu/hour from the combination of trucks and employees' vehicles.

The increase of traffic caused by the expansion is however low compared to the overall traffic projected in the area. The analysis shows that Federal Road FR31 (Pekan Sg Manggis stretch) will experience LOS F and need to be upgraded whether without or with the proposed Project development due to normal traffic growth. The Jalan Persiaran Graphite junction can still cater for development traffic after 10 years of Project operation. However, if the existing

road stretch to Pekan Sg. Manggis is not upgraded; the back of queue will become worse than the existing condition. Therefore, mitigate measures are required to ensure satisfactory traffic condition at the surrounding area of the Project site.

8 MITIGATION MEASURES

8.1 Hydrology and Hydrogeology

The water availability and hydraulic study shows there is negligible hydraulic impact in terms of water level reduction (1-2 mm) at the Project area and the downstream area. In addition, there are no major water abstraction activities located at the downstream of the proposed water intake (either for water supply or industry). Although the hydraulic impacts are negligible, flow meters will be installed to record the volume of river water being abstracted to fulfil the requirements stipulated by LUAS. The river bank and inlet structure will be inspected regularly to avoid scouring along the river banks within the vicinity of the inlet structures. Appropriate protection measures will be provided if required.

The water abstraction from Sg Langat for the Mill usage is not expected to have any impact on the hydrogeology regime as the raw water abstraction will be drawn from Sg Langat and not from groundwater. Moreover, the effluent discharge will be conveyed directly to Sg Langat. Therefore, no mitigating measure are necessary.

8.2 Soil Erosion

Majority of the soil loss estimate for the new lot involved in the expansion falls under the low risk category. These erosion rates are low due to the flat terrain of the Project site. Nevertheless, BMPs will be employed in order to further minimize the risk of soil washout into the surrounding drainage system. Temporary earth drainage will channel surface runoff within the site to sediment basins before channelling all runoff into the permanent drains.

As outlined in the Erosion Sediment Control Plan (ESCP), two (2) sedimentation basins will be constructed. All drainage channels will also be inspected daily to remove any sediment deposited. The Contractor be vigilant towards soil movement especially during conditions of heavy rainfall such that the surrounding drainage area must be kept free of debris and silt at all times.

Mitigating measures as outlined in the Land Disturbances Pollution Prevention and Mitigation Measures (LD-P2M2), will be implemented which include construction of silt traps, site inspections, maintenance of P2M2 and monitoring of silt trap discharge. Construction activities will be strictly confined within the proposed Project area, stockpile and construction storage areas will be clearly marked and will be covered with temporary roofing structures or with tarpaulins.

8.3 Air Quality

8.3.1 Mitigating Measures During Construction Phase

In order to minimize the fugitive PM generated during the construction period, *where applicable*, the following mitigating measures can be adopted by the Project Proponent:

- Fenced construction area to reduce wind-blown dust dispersion and dust clouds;
- Ensure construction access or haulage route are kept damp by water browser or equivalent measures on regular basis during the whole construction period.
- All dusty materials should be sprayed with water prior to any loading, unloading or transfer operation so as to maintain the dusty materials wet;
- Wash trough to be constructed at the entrance of each access road. All construction vehicles shall have their wheels washed before leaving or entering the site onto a public road;
- All vehicle within the Project site to adhere to the speed limit of 25 km/hr;
- All stockpile construction material that could generate fugitive dust during high wind speed such as fine sand and aggregate to be covered when not in used or during high wind speed;
- Fuel-efficient and well-maintained trucks will be used to minimize exhaust emissions.
- A good housekeeping checklist for managing construction dust can be developed by the Project Proponent as part of its periodic internal environmental auditing for the Project.

8.3.2 Mitigating Measures During Operational Phase

The Project shall comply to the relevant schedules of the Clean Air Regulations (CAR) 2014 for the proposed stacks emission concentration limits. The proposed APCS for the Biomass Co-generation Plant shall be monitored in accordance with DOE's Technical Guidance on Performance Monitoring of Air Pollution Control System and competent personnel will be trained and certified under the Certified Environmental Professional in Bag Filter Operation (CePBO).

For the coal to be used in the Biomass Boiler, the Sulphur content shall not exceed 1% weight as prescribed in the *Second Schedule [Regulation 13]: Limit Values And Technical Standards (General): (I) Control of fuel burning equipment, incinerators* under CAR 2014.

In the event that there is residual odour nuisance, other operational control techniques that may be applied by the Project Proponent during the operational period are as follows:

- Restrict acceptance of raw material known to be strongly maldorous/ objectionable;
- Any handling or treatment of maldorous raw material should be carried out in an enclosed area suitable for the capture, containment and treatment of odours;
- Use of appropriate abatement equipment;
- Conduct regular inspections, monitoring and maintenance of raw material handling areas and abatement equipment; and/or
- Use of neutralizing sprays and additives to be considered where odours cannot be prevented.

8.4 Noise and Vibration

8.4.1 Mitigating Measures During Construction Phase

To minimise noise emission and dispersion, the following mitigation measures will be implemented:

- A 2.5 m height hoarding will be installed along the perimeter of the project boundary with exceptional 3 m height hoarding along southwestern boundary

- Piling work along the southwestern and southern boundary to be scheduled and planned to reduce total exposures time in a day
- Piling work near the boundary of Primary Islamic Religious School to be scheduled after school hours or during school holiday
- No piling or high noise intensity works allowed near southwestern boundary at night
- When necessary, notify and engage with the potentially affected receptor when piling activities is scheduled near the southwestern and southern boundary
- Turn off the machinery which is not in use
- All vehicles and machinery will be properly serviced and maintained
- Noise monitoring program will be carried out during the construction stage

8.4.2 Mitigating Measures During Operational Phase

The following control measures are adopted in the design and operation approach of the Project:

- Significant noise sources (eg. Co-gen plant) will be designed to be located away from the southwestern boundary
- Enclosures will be provided to the noisy equipment to reduce noise from sources.
- A 2.6 m noise barrier wall will be installed along the perimeter boundaries
- Vibration isolation pad will be provided for the compressor unit in cogeneration plant
- Regular maintenance of heavy vehicles and machinery will be carried out.
- Periodical monitoring program will be conducted
- Noise management plan including requirement and procedure to attend to public complaints

8.5 Water Quality

8.5.1 Mitigating Measures During Construction Phase

The construction activities will not have significant and direct impact to Sg Langat water quality as the stormwater discharge and sediment outflow from the construction site will drain through the main drain and detention pond located at the downstream reach of the Project site prior to discharge to Sg Langat.

Furthermore, it is mandatory in this Project to provide proper ESCP measures adopting the latest LD-P2M2 guide. Thus, the impact arising from the construction activities is not expected to be significant with proper control measures.

8.5.2 Mitigating Measures During Operational Phase

(i) Wastewater Treatment

Although effluent discharge from the Project is only required to comply to the Standard B limits under the Environmental Quality (Industrial Effluent) 2009, the Project Proponent has committed to ensure that effluent from the Project site will be treated to comply with **Standard A** limits. Furthermore, in order to maintain the existing water quality of Sg Langat, BOD and AN will be

treated to **better than Standard A limit**. Periodic maintenance operation will also be avoided during low flow and neap tide conditions.

(ii) Sewage Treatment

Sewage from the workforce of 1,500 workers will be treated in the STP to comply with the **Standard A** limits under the DOE Environmental Quality (Sewage) Regulation 2009.

(iii) Control Measures for Failure Scenarios

In the event that the WWTP fails, effluent will be contained in a holding tank which has the capacity to retain effluent up to 6 hours. The plant production operations will be slowed down until the WWTP operation is resumed back to normal. In the event that the WWTP operation is unable to resume within 6 hours, the whole plant operation will be ceased or shut down.

Similarly, for the STP, it is designed to have the capacity to retain untreated effluent up to 12 hours in the event of malfunction.

(iv) Monitoring Programme

Two types of monitoring programme (on-line monitoring and laboratory testing) will carried out on the WWTP. Online monitoring analyser which is connected to DOE server will be installed at the final discharge point of WWTP while weekly laboratory testing for WWTP samples will be carried out to ensure that the quality of effluent discharge is within the acceptable quality and quantity limit.

8.6 Waste Management

8.6.1 Mitigating Measures During Construction Phase

Municipal and Construction Wastes

The potential environmental impacts arising from the improper management of municipal and construction wastes can be minimized with the implementation of the following practices:

- Biomass will be separated from other wastes and left to biodegrade or decompose at green areas within the Project site that will not be developed;
- General construction waste will be recycled on site as much as possible.
- Unsalvageable demolition waste will be stockpiled at a designated site and sold to salvage yard operators or other contractors interested in recycling the material.
- Domestic waste generated from the site office will be stored in garbage bins and collected regularly by a licensed contractor for disposal at approved landfill; and
- The work place organization practice of 5S (Sort, Set in order, Shine, Standardize and Sustain) will be adopted within the site.

During the operational phase of the Project, the municipal wastes will be collected by licensed contractors. Collection is recommended to be carried out once in every two days since accumulated wastes at the Project site will pose a health risk and aesthetically unpleasant.

Scheduled Wastes

The scheduled wastes potentially generated during the construction phase will require proper handling, storage and disposal in compliance to the scheduled waste regulations which include, but are not limited to, the following:

- Notification to DOE Selangor on the quantity and types of scheduled wastes generated;
- Scheduled waste to be stored in suitable closed containers, drums or bags under a cover with provisions that prevent leakage or spillage into the environment;
- Storage area for scheduled waste is to be secured and provided with secondary containment for control of spillage.
- Containers/drums/bags to be labelled appropriately including type of waste, waste code, date of generation, quantity and hazard symbol;
- Main Contractor shall ensure that only licensed scheduled waste contractors are employed for the transportation of scheduled wastes to the disposal or recovery facility.

8.6.2 Mitigating Measures During Operational Phase

Waste generated from the Project during the operational phase will comprise of metals, plastics and waste residue that will be separated and recovered in the SWTP. The metal residues recovered from the production process, which is mainly steel and aluminium, will be sold off to licensed recycling contractors as scrap metals. The recovered plastics from the production process will be recycled into resins or sold off as recycle plastics. The remaining waste residues which constitute about 51% of the combined wastes will be converted into RDF and burnt in the TTP to generate steam or landfill.

Recovered fibres from the WWTP will be mostly reused as fill material in the middle layer of the paper product, which is a common technology in modern paper manufacturing.

Scheduled wastes generated from the Project such as WWTP sludge will be incinerated in the TTP while other scheduled wastes will be disposed through licensed contractors.

8.7 Risk Management

The Project will adopt proven technology in facility design to safeguard against possible hazardous events. These include, but not limited, to the following:

- Facilities will be built according to recognized design standards / specifications including selection of good quality materials
- Quality assurance and control in the process of construction of the facilities
- Appropriate external and internal coating of storage and process vessels to prevent corrosion
- Regular maintenance / inspection of the facilities including performance monitoring

An Emergency Response Team (ERT) shall be set up to handle any emergency / incidents occurring in the plant.

8.8 Ecology

8.8.1 Mitigating Measures During Construction Phase

The following mitigation measures are recommended:

- Existing perimeter drain should be well maintained to ensure the sediment run-off from construction site would not overflow to the receiving water
- Wastes, sand/gravel, concrete residue, or any materials should not be allowed to accumulate in perimeter drain.
- Washing of vehicles and equipment on the construction site should be discouraged and should be washed offsite.

8.8.2 Mitigating Measures During Operational Phase

(i) Abstraction of Water from Sg. Langat

- Continuous control of the water consumption.
- An appropriate structure (physical barriers or devices) should be construct in order to avoid large number of fishes being drawn into the water abstraction structures

(ii) Discharge of Effluent into Sg. Langat

- Sedimentation basin must be installed to remove suspended solids from effluents; and
- Water quality monitoring must be carried out to ensure that the treated water complies with the standard required by DOE before discharge to the river.
- Screen structure and sedimentation basin have been placed to remove pieces of wood and suspended solids from the effluent; and
- Monitoring of biological components (plankton, benthos, fishes) to be conducted to ensure the levels of effluent discharge are within the optimum level to sustain aquatic ecosystem

8.9 Socio-Economy

8.9.1 Mitigating Measures During Construction Phase

- Ensure that the workers are legally registered with the Department of Immigration
- Ensure that the workers are well managed and confined to their worksite to avoid any misunderstanding with the local community
- Constructing control barriers
- Project Proponent need to monitor the community/settlements near the construction area
- Provide proper mitigation measures to reduce pollution especially on water quality to nearby stream or river
- For noise and air pollution measure, comments or feedback from nearby residents should be taken into consideration

8.9.2 Mitigating Measures During Operational Phase

- Pre-employment health check of all workers
- Building the worker quarters (if any) away from the residential areas with proper facilities.
- A properly organized social and sports programmes for the workers to provide healthy recreational activities.
- Informing and working together with the local development and security committee – Jawatankuasa Kemajuan dan Keselamatan Kampung (JKKK).

8.10 Community Health

The common approach and measures to prevent communicable diseases amongst workers and the local communities are outline below.

i. Medical Surveillance

During the construction and operational phase of the Project, the Project Proponent will adhere to the Malaysian guidelines on worker intake which requires each of the employees (including construction workers) to have a full medical check-up before employment. The Project Proponent to implement a comprehensive medical surveillance system to monitor workers' health which include pre-placement medical examination, biological monitoring and serology monitoring, workplace inspections, notification, and record keeping and evaluation.

ii. Dengue fever

During the construction phase, cleanliness of the construction site to be made priority by all parties, including workers, developer and local government agencies. The concept of 5S will be implemented.

The abovementioned practices should continue especially with the management of recycled packaging material storage and waste generated during the Plant operation.

8.11 Traffic

8.11.1 Mitigating Measures During Construction Phase

- Implementation of appropriate road signage;
- Transportation of construction machinery and materials will be carried out during off-peak hours of the day;
- Speed of vehicles will be restricted to 80 km/hr (or other designated speed limits) to reduce the impacts of dust dispersion and fugitive material spillage;
- Safety measures to be observed at all times. All loads will be secured with chains/strong rope. Dusty material will be secured with tarpaulin covers; and
- Transportation vehicles used will be well maintained and drivers licensed and competent.

8.11.2 Mitigating Measures During Operational Phase

- Specific utilization of access road for different class of vehicle (Access 1 – heavy vehicle, Access 2 – light vehicle, Access 3 – vehicle of industrial area);
- Use of adequate information signs and safety equipment on all trucks;
- Strict adherence to the relevant regulations pertaining to road transport;
- Proper scheduling of the transportation trucks to ensure the truck turn-around time is not delayed and to prevent truck-waiting within the site;
- Extension of hours and days (weekends and public holidays) to spread out and reduce traffic congestion; and
- Transportation route to Port Klang will be diverted to the WCE once it is completed to minimize traffic residentially populated roads.

9 ENVIRONMENTAL MANAGEMENT PLAN (EMP)

The primary objective of the EMP will be to ensure that sound environmental practices are adhered to during the construction and operational phase. The implementation of the mitigating measures is dependent on the responsibility and self-regulatory initiative of the parties concerned, namely the Project Proponent, the Main Contractors and the appointed Environmental Officer (EO).

For the proposed expansion Project, an environmental monitoring program is recommended which includes the locations (**Figure ES-4** and **Figure ES-5**) and parameters based on the baseline monitoring program. The final location, parameters and frequency of the proposed monitoring will be detailed in the final EMP document to be prepared and submitted to the Selangor State DOE.

The EMP for the current BERT Phase 1 plant will need to be updated to incorporate the additional components and emission sources of the proposed expansion (Phase 2).

10 CONCLUSION

The detailed assessment of potential impacts from the Project development (both from current Phase 1 and proposed Phase 2 plant), encompassed all important environmental aspects, namely soil erosion, air quality, water quality, noise levels, risks and hazards, waste management, ecology, socio-economy and community health.

The main environmental concerns associated with the Project, are related to the abstraction of raw water from Sungai Langat, discharge of effluents into the same river, air emissions from plant stacks and management of wastes generated during the plant operation.

Through careful planning and engineering design, combined with prudent implementation of all recommended mitigation measures and proven control systems, the proposed Project will be able to reduce the predicted adverse impacts to a low level of significance. The Project is also expected to have important economic benefits both locally and regionally.

Summary of Environmental Impacts and Mitigating Measures

All the potential impacts identified to be a result from this development Project below with their respective mitigation measures.

Activities	Potential Environmental Impacts	Proposed Mitigating Measures	EIA Reference
Hydrology and Hydrogeology	Construction Phase • Increased in stormwater runoff Operational Phase • Hydraulic impact on Sg. Langat • Water availability on Sg. Langat • Stormwater runoff • Impacts are expected to be insignificant	• Flow meter installed to record volume of water abstraction • Regular inspection of inlet structure and river bank • No mitigating measure proposed for hydrogeological impacts.	Chapter 7, Section 7.1 & Chapter 8, Section 8.2
Soil Erosion	Construction Phase • Soil erosion due to site clearing, earthworks, land preparation and grading	• Implementation of LDP2M2 measures and Best Management Practices (BMPs) • Establishment of temporary earth drain • Covering exposed areas with soil cover & immediate turfing • Demarcation of stockpile & construction storage area • Inspection of all drainage channels	Chapter 7, Section 7.2 & Chapter 8, Section 8.3

Air Pollution	Construction Phase
	• Dust emission & vehicle exhaust emission
	
	Operational Phase
	• Emission sources from the proposed expansion Plant and biomass cogeneration plant
		Construction Phase
		• Adoption of Best Management Practices (BMPs) such as:
		  ○ Fence up construction area;
		  ○ Construction access kept damp regularly;
		  ○ Covering loads on construction vehicles;
		  ○ Wash trough for wheel washing; and
		  ○ Minimise height of material unloading
		
		Operational Phase
		• Proper management and monitoring of existing air pollution control system (APCS) by certified competent person
		• Regular service and maintenance of the air pollution control system
		• Effective response in the event of emergency or system failure
			Chapter 7, Section 7.3
			
			&
			
			Chapter 8, Section 8.4

Activities	Potential Environmental Impacts	Proposed Mitigating Measures	EIA Reference
		• Ensuring sulphur content in coal is less than 1% • Monitoring of all APCS according to DOE's Technical Guidance on Performance Monitoring of APCS • Restrict acceptance of raw material known to have malodorous odour • Handling of raw material within enclosed area to contain odour	
Noise Generation	Construction Phase • Noise from transportation & operation of machinery, foundation work, piling. Operational Phase • Noise from the cogeneration plant, packaging paper production plant, machinery operations and transportation vehicles.	Construction Phase • Installation of hoarding as a noise barrier • Piling work along the boundary to be appropriately scheduled • No piling or other high noise intensity works near southwestern boundary at night • When necessary, notify and engage with the potentially affected receptor when piling activities is scheduled near the southwestern and southern boundaries • Turn off the machinery when not in use • All vehicles and machinery will be maintained to ensure good working condition • Noise monitoring at Project boundary and sensitive receptors Operational Phase • Enclosures will be provided to the noisy equipment • Vibration isolation pad will be provided for the compressor unit in cogeneration plant • A 2.6 noise barrier wall to be installed along the Project boundary • Transportation truck will be turn off when the vehicle is in idle mode • Regular maintenance of heavy vehicles and machinery will be carried out. • Periodical noise monitoring at Project boundary and sensitive receptors	Chapter 7, Section 7.4 & Chapter 8, Section 8.5

Activities	Potential Environmental Impacts	Proposed Mitigating Measures	EIA Reference
Water Quality	Construction Phase • Sediment and TSS outflow due to land disturbing activities Operational Phase • Slight deterioration of water quality at the immediate downstream of Sg. Langat • Difference of changes in water quality is minimal and remains within WQI Class III	Construction Phase • To implement ESCP measures and recommendations in the LD-P2M2 Operational Phase • To ensure that effluent be treated to comply with Standard A limits under the Environmental Quality (Industrial Effluent) 2009 • The sewage discharged will comply with the Standard A limits under the DOE Environmental Quality (Sewage) Regulation 2009 • WWTP effluent will be contained in a holding tank with capacity to retain effluent up to 6 hours during failure • STP will be designed to retain untreated effluent up to 12 hours in the event of malfunction • Weekly WWTP effluent monitoring programme	Chapter 7, Section 7.5 & Chapter 8, Section 8.6
Waste Management	Construction Phase • Wastes will be generated include construction, municipal, and scheduled wastes. • Potential impacts arising includes odour nuisance, attraction of disease carrying rodents and insects & potential contamination of the surface runoff within the plant site.	Construction Phase • Biomass will be separated from other wastes • General construction waste will be recycled on site as much as possible • Unsalvageable demolition waste will be stockpiled at a designated site and sold to salvage yard operators • Disposal arrangements will be made with registered private contractors to carry out regular collection and off-site disposal at approved disposal site; • Domestic waste generated will be stored in garbage bins/secure containers and collected regularly by a licensed contractor for disposal at an approved landfill; and • Practice of 5S (will be adopted within the site. • Notification to DOE Selangor on the quantity and types of scheduled wastes generated; • Scheduled waste to be stored in suitable closed containers, drums etc. • Storage area for scheduled waste is to be secured with secondary containment • Containers/drums/bags to be labelled appropriately • Main Contractor shall ensure that only licensed contractors are employed for transportation and disposal of scheduled wastes.	Chapter 7, Section 7.6 & Chapter 8, Section 8.7

Activities	Potential Environmental Impacts	Proposed Mitigating Measures	EIA Reference
	Operational Phase • Waste is expected to be minimal as almost all wastes generated will be recycled or reused as RDF for the TTP	Operational Phase • Recovered plastics and metal residues will be sold off to licensed recycling contractors • Most WWTP sludge will be reused as fill material in the paper product. • Remaining waste residues and WWTP sludge will be disposed in the TTP • Other scheduled wastes will be properly managed and disposed through licensed contractors	
Quantitative Risk Assessment	Operational Phase • Potential fires and explosion due to leaks from the natural gas pipeline • Potential coal dust explosion from rupture of coal crusher	Risk Reduction Measures • Facilities will be built according to recognized design standards / specifications including selection of good quality materials • Quality assurance and control in the process of construction of the facilities • Appropriate external & internal coating of storage/process vessels to prevent corrosion • Regular maintenance of the facilities including performance monitoring Emergency Response • Preparation of Emergency Response Plan (ERP)	Chapter 7, Section 7.7 & Chapter 8, Section 8.8
Ecology	Construction Phase • Water quality impacts due to soil erosion from earthwork and clearing activities Operational Phase • Reduction of water level and changes in river flow causing imbalance in aquatic ecosystem • Entrainment of fish into the water intake • Deterioration of water quality causing unfavourable conditions for aquatic organisms	Construction Phase • Existing perimeter drain should be well maintained to ensure the sediment run-off will not overflow to the receiving water • Wastes, sand/gravel, concrete residue, or any materials should not be allowed to accumulate in perimeter drain • Washing of vehicles and equipment on the construction site should be discouraged and should be washed offsite Operational Phase • Continuously monitor and control the water consumption efficiently • Appropriate structure to be constructed to avoid large number of fishes being drawn into the water abstraction point • Screen structures/sedimentation basin must be installed for the purpose to remove suspended solids from effluents • Water quality monitoring must be carried out	Chapter 7, Section 7.8 & Chapter 8, Section 8.9

Activities	Potential Environmental Impacts	Proposed Mitigating Measures	EIA Reference
		• Monitoring of biological components (plankton, benthos, fishes) to ensure the levels of effluent discharge are within the optimum level to sustain aquatic ecosystem	
Socio-Economy	Construction Phase • Employment opportunities • Short term economic opportunity for local businesses • Short-term increased in demands and goods from in-migration of people Operational Phase • Employment opportunities • Economic opportunity • Increased in demands and goods	Construction Phase • Ensure that the workers are legally registered with the Department of Immigration • Ensure that the workers are well managed and confined to their worksite to avoid any misunderstanding with the local community • Construct control barriers around the site • Monitor the community/settlements near the construction area • Provide proper mitigation measures to reduce pollution especially on water quality to nearby stream or river • Comments or feedback from nearby residents to be taken into consideration Operational Phase • Official operators-contractors agreement must be in place • Enforcement of discipline on workers and vehicles drivers to ensure roads and site are clean, dry and without potholes to avoid the breeding of mosquitoes and rodents • Pre-employment health check of all workers • Social and sports programmes for workers to provide healthy recreational activities • Informing and working together with the local development and security committee (JKKK)	Chapter 7, Section 7.9 & Chapter 8, Section 8.10
Community Health	Construction Phase • Potential increase in communicable diseases and dengue outbreaks Operational Phase • Project has no significant direct impact on health of surrounding communities	Construction Phase and Operational Phase • Adherence to the Malaysian guidelines on worker intake • Worker's camp equipped with proper waste management and sanitary amenities. • Regular health campaigns on self-hygiene and healthy lifestyle • Establish a system to monitor the presence of vectors and pests within the site	Chapter 7, Section 7.10 & Chapter 8, Section 8.11

Activities	Potential Environmental Impacts	Proposed Mitigating Measures	EIA Reference
Traffic	Construction Phase • Increase in traffic generation • Potentially impede traffic during peak hours along the main route. Operational Phase • Additional traffic of 229 pcu/hour during the morning peak hours and 338 pcu/hour during the evening peak hours.	Construction Phase • Implementation of appropriate road signage • Transportation of construction machinery and materials will be carried out during off-peak hours of the day. • Speed of vehicles will be restricted to 80 km/hr (or other designated speed limits) to reduce dust dispersion • All loads will be secured with chains or strong rope • Dusty material will be secured with tarpaulin covers • Transportation vehicles used will be well maintained with the drivers licensed and competent Operational Phase • Specific utilisation of access road for different vehicle class • Use of adequate information signs and safety equipment on all trucks • Strict adherence to the relevant regulations pertaining to road transport; • Designing the facilities on the trucks/transport vehicles • Proper scheduling of the transportation trucks to ensure the truck turn-around time is not delayed and to prevent truck-waiting within the site. • Extension of hours and days (weekends and holidays) to spread out and reduce traffic congestion	Chapter 7, Section 7.11 & Chapter 8, Section 8.12