工程項目簡介
PROJECT PROFILE

ASB Biodiesel (Hong Kong) Limited

Development of a Biodiesel Plant at Tseung Kwan O Industrial Estate
將軍澳工業邨生物柴油廠發展計劃

Project Profile
工程項目簡介

10th December 2007
二OO七年十二月十日

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Development of a Biodiesel Plant at Tseung Kwan O Industrial Estate

December 2007

For and on behalf of
ERM-Hong Kong, Limited

Approved by: Andrew Jackson

Signed:

Position: Managing Director

Date: 10th December 2007

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1 BASIC INFORMATION

1.1 PROJECT TITLE

Development of a biodiesel plant at Tseung Kwan O Industrial Estate

1.2 NAME OF PROJECT PROPONENT

ASB Biodiesel (Hong Kong) Limited

1.3 NAME AND TELEPHONE NUMBERS OF CONTACT PERSONS

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1.4 PURPOSE AND NATURE OF THE PROJECT

The Project Proponent proposes to construct and operate a 100,000 tonnes per annum (tpa) biodiesel plant in Tseung Kwan O Industrial Estate (TKOIE) using a multi-feedstock which consists of waste cooking oil (WCO), oil and grease recovered from grease trap waste (GTW), Palm Fatty Acid Distillate (PFAD) (1) and animal fats. The proposed biodiesel plant not only offers a convenient disposal outlet to the GTW and WCO but also converts the oil and grease recovered from these wastes into useful products. The Project also offers cleaner alternative diesel fuel to the Hong Kong market.

1.5 LOCATION OF PROJECT

The proposed biodiesel plant will be located at the Chun Wang Street within the TKOIE. *Figure 1.5a* shows the location of the proposed biodiesel plant.

1.6 PURPOSE OF THIS PROJECT PROFILE

The proposed biodiesel plant and the associated GTW pre-treatment facility are classified as a Designated Project (DP) under:

- Schedule 2, Part I, Item G.4(b) (ie waste disposal facility or activity for industrial or special waste); and

Under the *Environmental Impact Assessment Ordinance* (EIAO), an Environmental Permit (EP) will be required for the construction and operation of the biodiesel plant (the Project).

(1) PFAD is a fatty acid by-product of a palm oil refinery process. It is a liquid at about 60-80^{o}C.

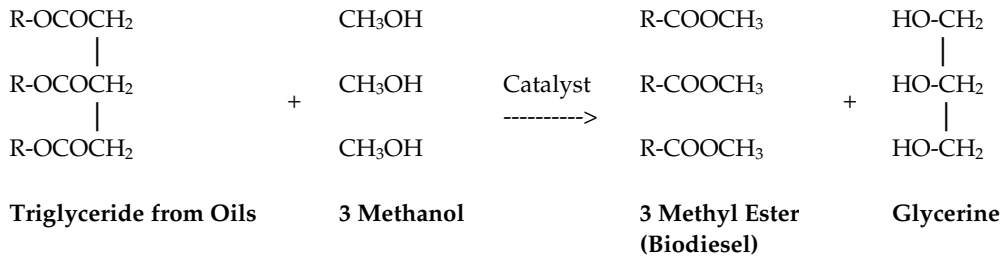
Previously the Project Proponent has submitted a Project Profile (DIR-158/2007) for application for approval to apply directly for an EP for the Project. However, Environmental Protection Department (EPD) considered that there is a need for an EIA Study for the Project and therefore permission for direct application for an EP was not given on 1 Nov 2007. This Project Profile is then prepared for application for an EIA Study Brief to conduct an EIA study for the Project.

2.1 INTRODUCTION

Biodiesel is a diesel fuel substitute produced from renewable sources such as vegetable oils, animal fats, and recycled oil and grease (ie WCO and oil and grease recovered from GTW (hereafter is referred to as trap grease). Chemically, it is defined as the mono alkyl esters derived from renewable sources. Biodiesel is typically produced through the reaction of a vegetable oil or animal fat (typically made of triglycerides which are esters of fatty acids with glycerine) with methanol or ethanol in the presence of a base-catalyst to produce glycerine and biodiesel (chemically called methyl or ethyl esters). It is a clear liquid at room temperature and its colour depends on the feedstock. Biodiesel can be used alone or mixed in any ratio with petroleum diesel fuel for use in the diesel engines. Biodiesel has similar physical and chemical properties to petroleum diesel with reference to the operation of a diesel motor.

Biodiesel is gaining recognition in many countries as an alternative fuel, which may be utilised without any modifications to the vehicle engine. It is currently produced and used throughout Europe and the USA and has been gaining worldwide popularity as an alternate energy source.

Figure 2.1a Transesterification Process



A number of advantages have been identified for biodiesel and they are listed below:

- it is non-toxic;
- it is biodegradable;
- it is made of renewable feedstock and therefore considered as a renewable source of energy;
- it contains practically no sulphur and therefore no SO_x will be produced;
- it contains oxygen and can thus provide a good ignition capacity;
- it allows low-pressure storage at ambient temperatures;

- it can be used in most diesel engines without modifications or retrofits [(1)];
- it reduces greenhouse gas emissions;
- it reduces emissions of pollutants, such as carbon dioxide, carbon monoxide, and particulates. Emissions of nitrogen oxides are either slightly reduced or slightly increased depending on the duty cycle of the engine and testing methods employed; and
- it is safer to transport because its flash point [(2)] of at least 120°C (normally at about 150°C) which is double of that for petroleum diesel (at about 70°C).

When compared with petroleum-based diesel, biodiesel has two significant advantages. It has a high Cetane number (a measure of a fuel's ignition quality) and its emission reduction potential. Therefore, biodiesel is regarded as a fuel that can help to reduce air pollution and related public health risks. Currently all diesel sold in the European Union (EU) must have 5% biodiesel mix (B5) and by 2010 the EU will mandatory require a minimum of 5.75% of all fuel sold to be biofuel (eg biodiesel and ethanol). This requirement will be increased to 8% biodiesel mix (B8) by 2015.

However, biodiesel is generally more expensive than petroleum diesel, which makes it less widely used in many countries. One way to reduce the cost of biodiesel is to use a less expensive form of oil such as WCO from food establishments and oils recovered from GTW. GTW would be a good alternative raw material for biodiesel production as it is virtually free.

2.2 *PROJECT DESCRIPTION*

The proposed 100,000 tpa biodiesel plant will use multi-feedstock (primarily from WCO and trap grease, and supplemented with PFAD and animal fats) to produce biodiesel which complies with the international standards. The biodiesel will be sold to local and international markets.

The proposed biodiesel plant will include a GTW pre-treatment facility (with a designed treatment capacity of 200,000 tpa or about 558 tpd), which will recover oil and grease from GTW and a wastewater treatment plant (with a designed treatment capacity of 170,000 m^3 per annum) for the treatment of wastewaters generated from the GTW pre-treatment facility and the biodiesel production processes.

This section describes the construction and operational activities associated with the proposed biodiesel plant at TKOIE.

(1) Biodiesel can be used as a fuel additive in 20% blends (B20) with petroleum diesel in compression ignition (diesel) engines without modification or retrofit. In some European countries, e.g. Germany, biodiesel is used extensively as pure diesel (B100) by commercial vehicle and bus operators.

(2) Flash point of a fuel is defined as the temperature at which it will ignite when exposed to a spark or flame. A fuel with low flash point a higher potential to cause fire, or even explosions. The higher a fuel's flash point, the safer it is to store and handle. Biodiesel has a flash point of much higher than petroleum diesel.

2.2.1 Technology to be Used

The Project Proponent will adopt the BioDiesel international (BDI) technology, a well proven technology in the design of the biodiesel plant in order to achieve a high efficiency (which is able to utilise oil and grease with a high level of free fatty acids (over 20%) and completely transform them into biodiesel and three useable by-products, namely glycerine, fertilizer, and bio heating oil) and safety standard in the biodiesel production operation. Hence, no waste will be generated from the biodiesel production process. The biodiesel produced will meet the specification of European standard CEN EN 14214.

The technology provider, the BDI, has a long history in developing and implementing waste-to-fuel technology. Over 22 plants are currently operating in Europe and USA and 7 new plants are being constructed have adopted BDI technology.

The key design parameters of the proposed biodiesel plant are shown in *Table 2.2a* and the process flow is shown in *Figure 2.2a*

Table 2.2a Key Design Parameters of the Biodiesel Production Plant

Parameters	
Operating mode	Semi-continuous
Operating days per year	330 (guaranteed), 358 (anticipated)
Operating hours per day	24
Capacity per hour (tonnes)	12.6
Capacity per day (tonnes)	303
Capacity per year (tonnes)	100,000

The incoming GTW will be pre-treated to recover the oil and grease (referred as the trap grease). The crude trap grease will then be treated to remove impurities and reduce the residual water content before it can be used the feedstock for the transesterification process. Water will be removed as much as possible because its presence will cause the triglycerides to hydrolyse to form salts of the fatty acids instead of undergoing transesterification to give biodiesel. The wastewater from the GTW pre-treatment plant will be treated at the on-site wastewater treatment plant to comply with the effluent discharge standards for foul sewer leading to the Tseung Kwan O (TKO) Sewage Treatment Works (1).

The biodiesel plant will consist of a number of storage and process tanks. *Figures 2.2b* shows the proposed layout plan of the biodiesel plant. The entire biodiesel production process is program-controlled for maintaining high level of safety and uniform quality of the final product. The reception, treatment and the production of biodiesel are described below.

(1) Table 1 of the EPD's *Technical Memorandum on Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters*.

2.2.2 *Operation of Biodiesel Plant*

The biodiesel plant would include the following major facilities:

- feedstock reception and storage facilities;
- GTW pre-treatment and wastewater treatment works;
- biodiesel production and glycerine purification system; and
- product storage and ancillary facilities.

Feedstock Reception and Handling

The biodiesel plant will be operated and opened to receive GTW and WCO from all specified sources 24 hours a day and 365 days a year.

The GTW and WCO will be delivered to the biodiesel plant by sealed road tankers via Wan Po Road, then through the roads within the TKOIE and enter the site via Chun Wang Street. After weighting at the weighbridge office located at the entrance, the tankers will proceed to the reception area. The GTW will be randomly sampled and tested to check if they comply with the definition of GTW and is not contaminated with chemical waste (eg lubricating oils, engine oils, hydraulic oils etc). GTW contaminated with chemical waste will be rejected. The truck drivers will be advised to dispose the waste at the Chemical Waste Treatment Centre at Tsing Yi.

The GTW and WCO will be unloaded at the designated stations as shown in *Figure 2.2b*. Four unloading bays will be provided. The GTW and WCO will be unloaded via flexible hoses directly to the receiving tanks under a closed system arrangement. The unloading areas will be enclosed and fitted with a ventilation and air scrubbing system (with an odour removal efficiency of 99.5%) and will be maintained with a slight negative pressure as a precautionary measure and a good design practice.

PFAD will be delivered to Site by barge and pumped from the barge to the storage tank. *Table 2.2b* summarises the transportation of feedstock and products to and from the biodiesel plant.

Table 2.2b Estimated Number of Material Delivery to and from Biodiesel Plant

Material	Vehicle / Barge	Estimated Truck Trips Per Day	Estimated Truck Trips Per Hour
Land-based Delivery			
Grease Trap Waste	10m³ Sealed Road Tanker	60	Average: 3 (a); Peak hour: 5
Waste cooking oil	10m³ Sealed Road Tanker	5	1 (b)
Animal fat	10m³ Sealed Road Tanker	5	1
Gas Oil	10m³ Sealed Road Tanker	1	1
Glycerine	10m³ Sealed Road Tanker	2	1
Fertilizer	10 tonne truck	1	1
Nitrogen	10m³ Sealed Road Tanker	1 per week	1
Other Reagents	10 tonne Truck/Tanker	2 to 3	1
Biodiesel (c)	20 m³ Road Tanker	10	1
Total		***87 to 89***	11 to 13
Marine-based Delivery			
Biodiesel	1,000 tonne barge	2 per week	
PFAD	1,000 tonne barge	1 per week	
Methanol	1,000 tonne barge	1 per week	
Total		***4 per week***	

Notes:

(a) GTW will be delivered to the site on 24-hour basis. Assuming a peak factor of 1.5. With respect to the collection pattern of the GTW collector, it is anticipated that the peak hour will be at night.

(b) WCO will be provided by designated suppliers and will be delivered to the facility during day-time.

(c) Under circumstance when marine transportation is not possible (eg during incremental weather).

The estimated maximum turnaround time for GTW and WCO collection vehicles within the biodiesel plant is about 30 minutes (including weighing, sampling (if selected) and unloading (about 20 minutes)). Four unloading bays will be provided and therefore a total of 8 tankers per hour can be processed in the biodiesel plant. Four unloading bays will be able to handle the forecast vehicle flow and will not cause queuing of tankers outside the site entrance.

Feedstock Pre-treatment

The GTW will be screened to remove food residues and other large objects and then process to recover the oil and grease. The screenings collected will be disposed of at the SENT Landfill or other landfills if SENT Landfill is full.

The oil and grease recovered (trap grease) from the GTW pre-treatment process will be further purified by a multi-step purification system in the oil and fat preparation tank. The oil and water in the mixture will be separated by a decanter and the water content of the oil phase will be reduced to 5 to 10%. The feed will be heated up to about 60°C and intensively mixed with saturated steam. The water/oil mixture will then be separated by a decanter so that the purified oil will achieve the required maximum residual water

content.

The wastewater generated from the purification processes will be treated at the on-site wastewater treatment plant prior to discharge to the foul sewer leading to TKO Sewage Treatment Works. About 33 tpd of screenings and solid residues (solid impurities) will be produced during the feedstock pre-treatment processes which will be collected and disposed of at SENT Landfill. The purified oils that are suitable for use as the feedstock for the esterification process will be stored in the buffer tanks.

Wastewater Treatment Plant

It is estimated that a total of about 170,000 m^3 per year (or about 515 $m^3 d^{-1}$ or 515 tpd) of wastewater will be generated from feedstock pre-treatment and glycerin dewatering processes. The wastewater collected will contain trace amount of oils and fats (such as triglycerides and free fatty acids) and have a high COD concentration (about 9,400 to 15,000 mg L^{-1}). The on-site wastewater treatment plant will be designed based on these characteristics and to comply with the standards for effluent discharged into foul sewer.

The key components of the wastewater treatment plant will include an oil-water separator, a dissolved air flotation (DAF) system, an Internal Circulation (IC) Reactor (an anaerobic treatment utilises the upflow anaerobic sludge blanket (UASB) technology), an aerobic treatment system and a secondary clarifier. The IC Reactor is an anaerobic treatment technology that can effectively reduce the organic loading of the wastewater especially for wastewater with high organic matter content. The effluent from the IC Reactor will be transferred to the aeration tanks for further treatment. The suspended solids in the treated effluent from the aeration tanks will be settled in the secondary clarifier so that the effluent will meet the standards for effluent discharged into foul sewer leading to the TKO Sewage Treatment Works. The sludge will be dewatered to at least 30% dry solids in order to comply with the landfill acceptance criteria. It is estimated that about 1.3 tpd of dewatered sludge will be generated and stored in enclosed containers prior to landfill disposal. The filtrates from dewatering process will be fed back to the aeration tank for treatment. The dewatered sludge will be delivered to landfill by trucks.

The biogas generated from the IC Reactor (average flow about 80 $m^3 hr^{-1}$) has a high energy value and will be used as an energy source for on-site facilities (eg as fuel for the steam boiler). The biogas will be temporary stored in the biogas buffer tank. It is anticipated that all the biogas will be consumed by the steam boiler. When the steam boiler is under maintenance, the biogas will be combusted by the flare (with a diameter of about 1 m) with a designed capacity of 150 $m^3 hr^{-1}$.

Biodiesel Production

The purified trap grease, WCO, PFAD or other feedstock will be pumped to the transesterification unit. Each batch of transesterification process will use only one type of feedstock (ie either trap grease or WCO or PFAD or animal

fats). Here, the oils will be mixed with an alcohol-catalyst (methanol and potassium hydroxide). The system will be operated at about room temperature and under normal pressure.

After the transesterification process, biodiesel (the fatty acid methylester or FAME) and glycerine will be formed. The biodiesel will be purified and excess methanol will be recovered by centrifuge. The methanol recovered will be reused in the transesterification process. The biodiesel will then be fed into the biodiesel distillation tank for polishing in order to improve its quality. The final products from the distillation tank are the biodiesel (up to 303 tpd) and the bioheating oil (about 23 tpd). The biodiesel will be sampled for laboratory testing to ensure that its quality meets the specification requirements. The biodiesel will be stored in the biodiesel storage tanks (2 nos., with a total capacity 3,700 m^3).

The glycerine separated during the transesterification process will also contain unused catalyst (ie potassium hydroxide) which will be neutralised with sulphuric acid to form fertiliser (about 7 tpd). The fertiliser will be sold to the market. The free fatty acids in the glycerine phase will be separated by decanters and fed back to the transesterification process. The glycerine will be purified and dewatered by an evaporation process to remove the trace amount of methanol and water. The methanol will be reused in the transesterification process while the water will be pumped to the wastewater treatment plant for treatment. The purified glycerine (at about 80% purity, up to 7 tpd) will be sold to the local or international market. It is estimated that about 9,600 m^3 per year (or about 30 m^3 d^{-1} or 30 tpd) of wastewater (depending on the characteristics of the feedstock) will be generated in the biodiesel production processes.

No solid waste will be generated from the biodiesel production process.

All vessels/tanks machinery and all other equipment for the biodiesel production plant will be designed to international safety standards and to comply with mechanical, technical and safety standards for biodiesel plant design and local regulations. The entire production process will be program-controlled. The process visualization allows the monitoring of the process and intervention by the manual mode, if required. The process equipment for the biodiesel production line (such as vessels, machines, pipelines, instruments etc) will be made of stainless steel or other resistant materials fulfilling the respective mechanical, technical and safety standards. The vessels and pipelines will be insulated by aluminium plate. All vessels will be equipped with agitators and with a manhole. All pumps for methanol will be sealed with a magnetic coupling. All other pumps will be equipped with single-acting mechanical seals. All pumps will be monitored by a fully automatic process control system (PCS) to prevent dry running.

The process equipment will be mounted in a steel structure building which is open inside. The building will be covered with metal sheet cladding. The following plant sections will be situated in a separate building:

- Building for process equipment;

- Building for steam boiler, chilling and air compressor;
- Building for materials storage, workshop, spare parts, control and electrical control room and office;
- Building for trap grease preparation;
- Tank farm (including loading and unloading systems);
- Wastewater treatment plant; and
- Outdoor utility plants (ie air cooling tower).

On-site Storage and Ancillary Facilities

The steam boiler system will make use of the towngas, biogas, bioheating oil and biodiesel produced as energy sources for heating. It is estimated that fuel consumption equivalent to about 8.4 tpd of biodiesel will be required for the boiler system. The emissions from the boiler will be discharged to the atmosphere via a 20m stack.

The methanol will be stored in a 500 m^3 steel storage tank. All process tanks and machines will be designed to be gas tight and equipped with a gas displacement system. The methanol in the exhaust gas will be removed in an air scrubber prior to discharge to the atmosphere. A gas warning system measuring the 10% of the lower explosion limit (6% v/v) of methanol (ie alarming level will be set at 0.6% v/v) will be installed to monitor the methanol concentration inside the process room. The plant will shut down automatically and the emergency ventilation system will be activated if the monitoring system detects a methanol concentration of 0.6% v/v inside the room.

The capacities of the storage tanks for various materials are presented in the *Table 2.2b*.

Table2.2c Capacities of Storage Tanks for the Biodiesel Plant

Description of Storage Tank	No.	Capacity (m^3)	Capacity (Days)
Raw GTW Tank	2	1,500 each	5 (total)
Cleaned Trap Grease Tank	1	1,000	3
Raw WCO Tank	2	150 each	1 (total)
Purified WCO Tank	1	1,000	3
PFAD Tank	1	1,500	4.5
Raw Animal Fat Tank	1	500	1.5
Cleaned Animal Fat Tank	1	500	1.5
Methanol Tank	1	500	12
Sulphuric Acid Tank	1	50	21.5
Phosphoric Acid Tank	1	25	49.5
Reagents Buffer Tank	1	25	-
Additive Storage Tank	1	50	15
Biodiesel Quality Tank	2	500 each	3 (total)
Biodiesel Storage Tank A	1	2,500	7.5
Biodiesel Storage Tank B	1	1,200	3.5
Glycerine (80%) Tank	1	500	18.5
Fertiliser Silo	1	20	3
Bioheating Oil Tank	1	100	10
Gas Oil Tank (as back up fuel)	1	200	13
Nitrogen Tank	1	25	16.5
Switch Tank	1	1,200	-

Transportation of Biodiesel and By-products

The biodiesel will be sold to potential buyers. It will be delivered to the potential buyers by 1,000 tonnes barge. During incremental weather, the biodiesel could be transported by 20 m^3 road tankers similar to that currently used for petroleum diesel in Hong Kong (ie Type D vehicle for conveyance of Category 5 Dangerous Goods). It is estimated that about 2 barge loads per week or 10 truck trips per day will be required to transport biodiesel out of the plant.

The glycerine and fertiliser produced will be sold to buyers, e.g. soap factory, as raw materials in China. They will be transported out of the biodiesel plant by road tankers or trucks.

Plant Personnel

Based on similar biodiesel plant, the staff requirements for the operation of the proposed biodiesel plant will be 19 in daytime and at least 7 at any time. If necessary, external personnel will be hired for maintenance and repair works.

Site Drainage

The stormwater runoff of the site will pass through oil interceptors before discharge into the stormwater drainage system of the TKOIE.

2.2.3 *Construction of the Biodiesel Plant*

Metal hoarding will be erected around the site prior to the commencement of the foundation work. As the site has been formed, only minor earthwork will be required. Driven steel H piles with reinforced concrete pile caps will be used for the foundations of the buildings. Piling will be carried out during day-time. Reinforced concrete slab and raft foundation will be built for the process area, tank farm area and wastewater treatment plant. The process and tank farm areas will be contained by perimeter bund walls. The pre-fabricated structural steelworks and storage tanks will be assembled on site using hydraulic and tower cranes. The reinforced concrete buildings will be constructed on site using ready-mix concrete and conventional construction method. The pipes, gantries and biogas flare in the wastewater treatment plant will be supported by structural steelwork.

Equipment installation will begin on the completion of civil work. Installation work may be carried out on a 24-hour per day basis and seven days per week.

The jetty for reception of marine vessels during operation phase will be constructed by piled deck (see *Figure 2.2c*) and no dredging of marine sediment will be required. Marine piles will be driven through the existing rubble mound seawall to competent bearing strata by a hydraulic hammer piling barge. Concrete infill to piles will be undertaken prior to placement of trellis beam and pre-cast concrete panels. It is estimated that the construction of the jetty will take about 8 months, including 4 months for pile installation and 4 months for jetty deck construction.

2.2.4 *Project Planning and Implementation*

The Project Proponent has appointed BioDiesel International (BDI) to carry out the design of the biodiesel production plant. Jacobs China Ltd was appointed as the consultant responsible for the overall management of the engineering design of the Project. Paques Environmental Technology Co. Ltd was appointed to undertake the design and construction of the wastewater treatment plant. The contractors for the construction of the Project are yet to be determined through the subsequent tendering process.

The development programme of the biodiesel plant is outlined in *Table 2.2e*:

Table 2.2e Tentative Project Development Programme

Activities	Timeline
Engineering design and equipment procurement	May 2007 to August 2008
Commencement of the construction of the Biodiesel plant and installation of equipments	September 2008 to June 2009
Commencement of testing and checkout	July to September 2009
Commencement of the Biodiesel plant	October 2009

3 POSSIBLE IMPACTS ON THE ENVIRONMENT

3.1 INTRODUCTION

Table 3.1a identifies the potential environmental impacts that may arise from the construction and operation of the proposed biodiesel plant. The key potential impacts are air quality, waste management, water quality, and hazard to life associated with the storage of raw materials, biodiesel and biogas.

Table 3.1a Potential Sources of Environmental Impacts

Potential Impact	Construction	Operation
• Gaseous Emissions	×	✓
• Dust	✓	×
• Odour	×	✓
• Noise	×	×
• Night-time Operations	×	✓
• Traffic (Land & Marine)	✓	✓
• Liquid Effluents, Discharges or Contaminated Runoff	✓	✓
• Generation of Waste or By-products	✓	✓
• Manufacturing, Storage, Use, Handling, Transport, or Disposal of Dangerous Goods, Hazardous Materials or Wastes	×	✓
• Hazard to Life	×	✓
• Landfill Gas Hazard	×	×
• Disposal of Spoil Material, including potentially Contaminated Materials	×	×
• Disruption of Water Movement or Bottom Sediment	✓	×
• Unsightly Visual Appearance	×	×
• Cultural & Heritage	×	×
• Terrestrial Ecology	×	×
• Marine Ecology	✓	×
• Cumulative Impacts	×	✓

Note:
✓ = Possible × = Not Expected

3.2 EXISTING ENVIRONMENTAL CONDITIONS

The proposed biodiesel plant is located at the Chun Wang Street within the TKOIE (see *Figure 3.2a*) which was developed on a reclaimed land and is currently managed by the Hong Kong Science and Technology Park (HKSTP) Corporation. According to *Tseung Kwan O Outline Zoning Plan (OZP) S/TKO/15*, the TKOIE is zoned as "Other Specified Use (Industrial Estate)" which aims to provide land for developing industries which cannot be accommodated in conventional industrial buildings.

The Site can be accessed by barge (via the existing sloping rubble mount seawall, however modification of the existing seawall will be required (see

Figure 1.5a). The Site has been vacanted since it was formed. The nearest buildings to the Site are the Gammon Skanska and the Trade Development Council Building which are located opposite to the Chun Wang Street. The South East New Territories (SENT) Landfill (about 680 m from the Site) and TKO Area 137 (public fill bank) are located to the south-east of the Site. The nearest existing residential development is Oscar by the Sea which is located at about 2km from the Site. The nearest planned residential development (the Dream City) will be located at TKO Area 86 (on top of the MTRC TKO Line Deport, at about 1km to the north-east of the Site, see *Figure 3.2a*) and is currently under construction.

A stormwater outfall is located at the seawall adjacent to the Site.

The existing environment of the Site and its surroundings were reviewed and sensitive receivers were identified in accordance with the guidelines of the *EIAO-TM*.

3.2.1 Air

The local air quality was mainly affected by the stack emissions from the industrial premises in TKOIE and the vehicular emissions from Wan Po Road and the local road networks. Air Sensitive Receivers (ASRs) has been identified in accordance with the criteria stipulated in Annex 12 of the *EIAO-TM*. The locations of representative ASRs are presented in *Figure 3.2b* and listed in *Table 3.2b.*

Table 3.2b Representative Air Sensitive Receivers (ASRs)

ASR	Location	Approximate Distance from nearest Project Site Boundary (m)
A1	Gammon Skanka	30
A2	Proposed Industrial Uses (currently vacant)	30
A3	Hong Kong Trade Development Council Exhibition Services & Logistic Centre	50
A4	HAECO Component Overhaul Building	210
A5	HAELO	470
A6-1	TVB City	510
A6-2	TVB City	560
A6-3	TVB City	570
A7-1	Asia Netcom HK Limited	160
A7-2	Asia Netcom HK Limited	235
A8	Mei Ah Centre	310
A9	Yan Hing Industrial Building	415
A10	Wellcome Co. Ltd	240
A11	Next Media Apple Daily	415
A12	Hitachi Tseung Kwan O Centre	380
A13	Avery Dennison	445
A14	Next Media Co. Ltd	420
A15	Varitronix Limited	500
A16	Hong Kong Oxygen Acetylene Co. Ltd	415

3.2.2 Noise

The nearest Noise Sensitive Receiver (NSR) to the biodiesel plant is the residential development at TKO Area 86 (LOHAS Park, currently under construction), which is about 1km away.

3.2.3 Water Quality

The marine water adjacent to the biodiesel plant falls within the Junk Bay Water Control Zone (WCZ). The water quality of Junk Bay WCZs has been improved since the implementation of HATS Stage 1 in 2001 and had attained 100% compliance with the key WQOs in 2005. There are no major water sensitive receivers (such as mariculture zones, commercial fisheries, seawater intake or recreational beaches) identified in close proximity of the biodiesel plant.

3.2.4 Ecology

No ecologically sensitive area is identified within 500m of the Project Site boundary. However, soft corals were found along the natural coastline of Fat Tong Chau at about 700m to the south of the Site.

3.2.5 Cultural Heritage

The proposed biodiesel plant will be constructed on reclaimed land within the TKOIE. No cultural heritage resources have been identified within the Project Site. No cultural heritage impacts due to the construction and operation of the biodiesel plant are expected.

3.2.6 Landscape and Visual

The Site situated in the TKOIE with an industrial setting and surrounded by factories, warehouses and industrial buildings. The Visual Sensitive Receivers (VSRs) includes offices in TKOIE, visitors of Clear Water Bay Country Park / High Junk Bay Country Trail, planned and existing residential developments in TKO town area, marine users in the Junk Bay area and distance views from Chai Wan and Siu Sai Wan.

3.2.7 Landfill Gas Hazard

The proposed biodiesel plant is located outside the landfill consultation zone of the existing SENT Landfill and the restored TKO Stages I and II & III landfills. Therefore the potential hazard associated with landfill gas migration from landfill to the biodiesel plant will be very low.

3.3 AIR QUALITY

Construction Phase

The Site has been formed and is currently vacant. Hence, no major earthwork will be required for the site formation works. Minor excavation works will be

required for the construction of the foundation works and site utilities. The tank farms and process equipment will be pre-fabricated off-site and assembled on site and hence minimal dust will be generated from this activity. Dust generated from the concreting works for the construction of site buildings will be minimal. With the implementation of dust suppression measures stipulated under the *Air Pollution Control (Construction Dust) Regulation* and adoption of good site practice, no adverse construction dust impact is anticipated.

Operation Phase

Potential air emission sources from the biodiesel plant during the operation phase include emissions the boiler and the standby biogas flare; odour from unloading and treatment of GTW; and odour from the on-site wastewater treatment.

GTW will be delivered to the biodiesel plant by sealed road tankers. GTW will be discharged from the tanker directly to the storage tanks in a closed system (via flexible hose) in order to prevent odour nuisance. As a precautionary measure and a good design measure to prevent odour emission from the site, the unloading stations will be enclosed and fitted with a ventilation and air scrubbing system in order to maintain a slight negative pressure inside the unloading stations. All process tanks, storage tanks and wastewater treatment tanks (including the aeration tanks) will be enclosed and the exhaust air will be scrubbed prior to discharge to atmosphere. It is anticipated that odour nuisance will be negligible during operation of the biodiesel plant.

Additional traffic associated with the operation of the biodiesel plant (< 100 truck trips per day) only constitutes a very small percentage of the total traffic in the Study Area. Therefore it is anticipated that the potential air quality impact due to additional traffic is negligible.

3.4 NOISE

Construction Phase

The construction of the biodiesel plant (including the jetty) will involve the use of Powered Mechanical Equipment (PME) such as generators, excavators, piling machine, concrete breakers, concrete lorry mixers, and mobile/tower cranes. Given the relative small scale of the Project and the large separation distance between the NSRs and the site of more than 800 m, the construction activities are not expected to cause adverse noise impacts at the identified NSR.

Operation Phase

Noise from fixed sources during the operational phase will be generated from pumps, blowers, and reactors. Most of these noise sources will be installed within buildings. The designed total sound pressure level of the noise generated from all plant and equipment will be limited to 85 dB(A) at the site boundary. Given the large separation distance between the NSR and the site, it

is not expected that its operation will cause adverse noise impacts at the identified NSR.

With respect to the small traffic generation (less than 13 trucks in and out per hour) due to the operation of the biodiesel plant, the incremental traffic noise will be negligible when compared with the background traffic noise in the Study Area. It is not expected that the operation of the biodiesel plant will cause adverse traffic noise impacts to the identified NSR.

3.5 NIGHT TIME OPERATION

Construction Phase

No piling will be carried out at restricted hours (ie between 21:00 hrs and 07:00 hrs) and public holidays and Sundays. Equipment installation works may be carried out on a 24-hour per day basis and 7 days per week. As these activities will not involve noisy plant and equipment and dusty activities, it is not anticipated that the installation works will cause adverse air and noise impacts at the identified sensitive receivers. Construction work to be carried out within the restricted hours will satisfy the requirements of the *Noise Control Ordinance*.

The installation works at night-time will involve a few vehicles per hour. As the night-time traffic in the Study Area will be low, it is not anticipated that the night-time traffic associated with the installation works will cause adverse traffic impact to the local road network.

Operation Phase

The biodiesel plant will open to receive feedstock and operate 24 hours a day (1). The most significant environmental concern associated with night-time operation will be fixed plant noise. As discussed in *Section 3.5*, the total sound pressure level of all plant and equipment will be limited to 85dB(A) and the nearest NSR is about 800 m away, it is not anticipated that the night-time operation of the biodiesel will cause adverse noise impact at the NSR.

As the night-time traffic of the local road networks will be low, it is not anticipated that the night-time traffic due to delivery of feedstock to the biodiesel plant (a maximum of 5 truck trips per hour) will cause adverse traffic impact to the local road network.

3.6 TRAFFIC

The transportation of feedstock, reagents and products / by-products in and out the biodiesel plant will generate additional traffic in Wan Po Road and the roads within the TKOIE. As indicated in *Table 2.2b*, the anticipated hourly

(1) It should be noted that most of the feedstock will be delivered during day-time. Only GTW will be delivered to site on a 24 hours per day basis.

traffic flow associated with the operation of the biodiesel plant will be less than 13 truck trips. This is negligible when compared with the background traffic along Wan Po Road (about 20,000 vehicles per day in 2005). The operation of the facility is not expected to cause adverse traffic impacts to the local road networks.

The reception bays for GTW and WCO could handle at least 8 tankers per hour. It is anticipated that a maximum of 6 road tankers will deliver GTW and WCO to the facility per hour. Queuing of road tankers outside the site entrance will not occur. It should also be noted that the proposed site of the biodiesel plant is away from the main road (ie Wan Po Road) and hence will not impact on the local traffic.

3.7 WATER QUALITY IMPACT

Construction Phase

The construction of jetty and temporary marine access will involve minor marine works (see *Section 2.2*). No dredging of marine sediment will be required.

Marine piling will be conducted for installation of the hollow cylindrical piles. These piles will be driven into position and the soil inside the driven-in piles will not be removed. No soil or sediment excavation would be carried out. It is expected that the marine piling will cause limited disturbance to the sediments and is unlikely to cause unacceptable impacts to the water quality in Junk Bay.

Construction site runoff will be the major source of water quality impacts associated with the land based construction activities. As discussed in *Section 2.2*, the construction of the biodiesel plant will only involve minor earthwork. The construction of the superstructures has low risk of generating contaminated runoff. Portable toilets will be used and the sewage will be collected regularly by specialised contractor for off-site disposal. With the implementation of general good site practice in accordance with the *Practice Note for Professional Persons on Construction Site Drainage (ProPECC PN1/94),* the land based construction activities will not cause adverse water quality impacts.

Operation Phase

The proposed 60m long and 22.5m width jetty will be in a form of reinforced concrete deck supported on marine piles. A total of about 12 piles, with approximate diameter of 1 m, will stand underneath the deck of the berthing facility. The cross-sectional area of each pile underwater has been estimated to be 0.8 m^2 with the depth underwater will be in a range of 4 m to 7.5 m. It is estimated that the volume of each pile underwater will be in a range of 3.2 to 6 m^3. Although there may be localised effects due to the physical resistance of the piles, the water flow through the piled structure will generally be maintained as at present. In the view of the small cross-sectional area occupied by the piles and the closeness to the shore, it is not expected that the structure

will result in any adverse impact to the hydrodynamic system. Therefore no significant impact on the flow regime is anticipated during operation phase.

The draught of the marine vessels (1000 tonnes barges) for the transportation of biodiesel, PFAD and methanol will be about 2m. There will be sufficient water depth for the access of the marine vessels and no dredging will be required during the operation of the biodiesel plant.

The operation of the biodiesel plant has a potential to cause adverse water quality impacts if the site runoff, wastewater and material storage are not properly managed. The first flush of the stormwater runoff from the site will be intercepted and passed through a silt trap and an oil interceptor prior to discharge to existing stormwater drainage system of the TKOIE.

All wastewaters generated from the site (including the wastewater from the GTW pre-treatment, process water from biodiesel production, wash water from the reception area, sewage from site personnel, etc) will be collected and treated at the on-site wastewater treatment plant prior to discharge to foul sewer leading to the TKO Sewage Treatment Works. The effluent quality will comply with the discharge standards stipulated in Table 1 of the *Technical Memorandum on Standards for Effluents Discharged to Drainage and Sewerage Systems, Inland and Coastal Water* published by the EPD. No adverse water quality impact due to operation of the biodiesel plant is anticipated.

There is a potential for spillage of biodiesel, PFAD and methanol during the loading/unloading operations at the jetty area. The operations will be undertaken at the paved loading/unloading station and will be manned by trained staff and closely monitored with flow control equipment. Any spillages will be intercepted by the collection drain and conveyed into the on-site wastewater treatment plant. An emergency response plan will be developed to stipulate the actions to be taken in case spillage occurred and prevent any spillages from discharge into the sea.

3.8 ECOLOGY

Construction Phase

No terrestrial ecological impacts are expected, as the proposed biodiesel plant will be constructed on reclaimed land within the TKOIE.

Soft corals (dominated by *Echinomuricea sp*. and *Euplexaura sp*. which are quite common in Hong Kong) were found along the natural coastline of Fat Tong Chau at about 700m to the south of the Site. The marine works associated with the modification of seawall will have minimal disturbance to the seabed and is far away from the soft coral area at Fat Tong Chau. As discussed in *Section 3.7*, it is not expected that the marine works will cause adverse water quality impacts and hence the works will not cause adverse impact to the marine ecology.

Operation Phase

Surface runoff and effluent discharged from the site will be properly controlled during the operation of the biodiesel plant (see *Section 3.7*) and no dredging will be required during the operation phase, potential ecological impacts during the operation of the biodiesel are not expected.

3.9 LANDSCAPE AND VISUAL

Landscape Impact

The proposed biodiesel plant will be located at the TKOIE. The proposed site is a reclaimed land with limited vegetation (mainly grasses). The development of the biodiesel plant will therefore have negligible impact on landscape resource.

Visual Impact

Construction Phase: The construction works will last for about 11 months. As the biodiesel plant will be located at the TKOIE and scale of the construction activities is relatively small, it is not expected that it will not cause significant impacts to the Visual Sensitive Receivers (VSRs).

Operation Phase: The biodiesel plant will consist of a number of storage and process tanks. The biodiesel production process will be housed in a process building. *Figure 3.9a* shows the vertical profile of the plant. The heights of the buildings and tanks are comparable to the adjacent buildings within the TKOIE. The biogas flare will be an enclosed flare and no flame will be seen by the VSRs.

The identified representative VSRs and their visual sensitivity are summarized in *Table 3.9a.*

Table3.9a Identified Representative VSRs and Their Visual Sensitivity

Visual Sensitive Receivers	Approximate Distance From the Proposed Biodiesel Plant (m)	Visual Sensitivity
Offices in TKOIE	Immediately adjacent	Low (Industrial)
Distance views from users of Clear Water Bay Country Park / High Junk Bay Country Trail	1,500	Low (Transient)
Distance views from planned residential development in TKO Area 86 (LOHAS Park)	1,000	High (Residential)
Distance views from residential developments in TKO New Town	2,000 to 3,000	High (Residential)
Distance views from marine user in TKO	500	Low (Transient)
Distance views from Chai Wan and Siu Sai Wan	> 2,500	High (Residential)

As the biodiesel plant will be developed within the TKOIE, its visual character will be compatible with the adjacent industrial facilities. The out-door

structures will include steelwork tanks and buildings. The tallest structure is the IC reactor of the wastewater treatment plant, with a diameter of 4m and a height of 24m. The heights of the main processing building, tank farm and wastewater treatment plant will be lower than the adjacent buildings (eg Gammon Skanaka and TVB City). With respect to the industrial setting of the area, the existing visual quality of the area is low. The development of the biodiesel plant will therefore not change the quality of the viewshed of the VSRs and will not block the view towards existing landscape features. Therefore it is considered that the potential visual impact associated with the proposed biodiesel plant in the TKOIE is acceptable without mitigation measures.

3.10 WASTE

Construction Phase

Construction and Demolition Materials (C&DM): The site is currently covered with limited vegetation (mainly grass). The quantity of site clearance waste to be generated will be minimal (about 20 m^3) and it will be disposed of at the SENT Landfill. C&DM will be generated from site preparation work and construction of biodiesel plant. As the site has been formed, no major earthworks will be required for site formation. All excavated materials generated from the foundation works will be reused on site for site ground levelling.

With respect to the small scale of the new building construction works, it is anticipated that a small amount of C&DM (approximately 1,200 m^3) (1) will be generated within 6 months. On average, about 200 m^3 of C&DM will be generated each month. The C&DM will be segregated on-site into public fill and construction waste (including paper, metals, plastics and wood waste from packaging materials and wooden formworks) and stored in separately skips for disposal at public filling facilities at TKO Area 137 and SENT Landfill, respectively. Recyclable, such as paper waste, metal and wood waste will be stored in different skips for recycling as far as practicable. It is expected that the amount of construction waste requiring disposal at SENT Landfill will be small. No adverse waste management impact is anticipated.

Chemical Waste: The chemical waste likely to be generated from the construction activities will, for the most part, arise from the maintenance of construction plant and equipment. The quantity of chemical waste to be generated will be small (expected to be less than one hundred litres). These chemical wastes will be readily accepted at the Chemical Waste Treatment Centre (CWTC) at Tsing Yi.

Storage, handling, transport and disposal of chemical waste will be arranged in accordance with the *Code of Practice on the Packaging, Labelling and Storage of*

(1) Based on "Reduction of Construction Waste Final Report (March 1993)" (Hong Kong Polytechnics), a generation rate of 0.1 m^3 per m^2 of GFA constructed is adopted.

Chemical Waste published by the EPD. Provided that this occurs, the potential environmental impacts arising from the handling, storage and disposal of a small amount of chemical waste generated from the construction activities will be negligible.

Sewage and General Refuse: Sewage and general refuse will be generated from construction workforces. An adequate number of portable toilets will be provided on site to ensure that sewage from site staff is properly collected. The portable toilets will be desludged and maintained regularly by a specialised contractor. Recyclable materials (ie paper, plastic bottles and aluminium cans) will be separated for recycling, in order to reduce the amount of general refuse to be disposed of at landfill. Adequate number of enclosed waste containers will be provided on-site to avoid spillage of waste. No adverse environmental impacts are envisaged.

Operation

Table 3.10a summarises the types and quantities of waste / by-products that will be generated from the operation of the biodiesel plant.

Table 3.10a Solid Waste / By-product To Be Generated During the Operation of the Biodiesel Plant

Treatment Process	Quantity / Frequency	Reuse / Disposal
Screenings and solid residue from the GTW pre-treatment works	About 30 tpd	Disposed of at landfills by trucks
Wastewater Treatment System	About 1 tpd of dewatered sludge (>30% dry solids contents)	Disposed of at landfills by trucks
Chemical Waste (used lubricant oil, solvents from plant maintenance activities, laboratory waste)	About a few litres per month	Disposed of at CWTC or other licensed facilities
General refuse from site personnel	Less than a tones per month	Disposed of at landfills by trucks
Total: About 31 tpd of solid waste to be disposed of at landfill		

It is not anticipated that the disposal of these wastes at landfills and CWTC will have adverse environmental and operational impacts on landfills and CWTC. The handling and disposal of these wastes will not cause adverse environmental impacts provided good practices (such as storage in appropriate containers to avoid vermin and odour, employ reputable or licensed contractors) are implemented.

The proposed biodiesel plant allows the possibility to reuse the renewable sources such as vegetable oils, animal fats, and recycled oil and grease and hence reduces the amount of solid residues to be disposed of at landfills.

3.11 LAND CONTAMINATION

Construction Phase

The site is a reclaimed land and has yet to be developed. There is no land contamination issue associated with the construction of the Project.

Operation Phase

During the operation of the biodiesel plant, potential land contamination may arise when there is any spillage of materials. The materials to be stored on-site include reagents (sulphuric acid, phosphoric acid, methanol, sodium hydroxide) and products (including biodiesel, glycerine, fertiliser, bioheating oil). Biodiesel is biodegradable. The potential environmental impact due to accidental spillage of biodiesel or leakage from the biodiesel storage tanks will be much lower than that for petroleum diesel.

As all materials storage tanks will be designed to comply with the relevant statutory requirements (including structural integrity of the tank; construction of a containment bund and concrete floor; and the type of storage tank will be compatible with the materials) the chance of reagents or biodiesel seepage into the subsoil will be low. An emergency response plan will be developed to ensure that any spillage of reagents or biodiesel, and leakage from the storage tanks will be responded immediately and the affected area appropriately cleaned up. With the implementation of the precautionary design measures and an emergency response plan, it is considered that the potential for land contamination due to the operation of the biodiesel plant will be minimal.

GTW and WCO are not a chemical / hazardous waste and therefore any spillage within the site is not expected to cause land contamination as defined by the EPD.

3.12 HAZARD TO LIFE

A risk assessment of the proposed biodiesel plant will be conducted to assess the potential hazard to life associated with the operation of the plant. Hazards from storage of the following materials will be considered:

- Biodiesel;
- Methanol;
- Gas oil;
- Sulphuric acid; and
- Phosphoric acid.

Based on an examination of hazards associated with the proposed biodiesel plant, a checklist of release cases will be developed and assessed in the EIA Study.

3.13 CUMULATIVE IMPACTS

Construction Phase

No planned major construction works will be undertaken in the Study Area during the construction of the biodiesel plant. No cumulative environmental impacts are anticipated.

Operation Phase

The traffic and air quality impact assessment have taken account of background traffic and other emission sources during the operation of the biodiesel plant. No adverse impacts have been identified.

3.14 ENVIRONMENTAL PROTECTION MEASURES

The following good site management practices and environmental protection measures will be implemented for the Project.

Construction Phase

- All debris and materials will be covered or stored in a sheltered debris collection area. Dust control measures such as water spaying on roads and dusty areas, covering of lorries by impervious sheets and controlling of the falling height of fill materials, will be implemented in accordance with *Air Pollution Control Ordinance*.

- Idling PME will be switched off. Quiet PME will be used as far as practicable. Work sequences to avoid the simultaneous use of noisy PME will be planned ahead of commencement of works.

- Public fill and general refuse will be segregated and stored separately for disposal. Waste will be properly stored at site and windblown litter and dust will be minimised during transportation by either covering trucks or transporting wastes in enclosed containers. Waste will be disposed of at licensed sites. A trip-ticket system will be established in accordance with *ETWBTC No. 31/2004* to monitor the disposal of construction waste at the SENT Landfill and to control fly-tipping.

- The contractor will register as a chemical waste producer with EPD. Chemical waste will be handled in accordance with the *Code of Practice on the Packaging, Handling and Storage of Chemical Waste*.

- Effluent discharge from construction activities shall conform to relevant *ProPECC Note 1/94 Construction Site Drainage* requirements and comply with the *Technical Memorandum on Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters* under the *WPCO*.

Operation Phase

Proven technologies and environmental protection measures (for example, reception of GTW and WCO in closed system; enclosure and provision of air scrubbing system for of the GTW reception area and feedstock storage tanks; provision of air scrubbing system for the wastewater storage and treatment tanks; limit the total sound pressure level at the site boundary to 85 dB(A), etc) have been adopted for the design and operation of the proposed biodiesel plant. The environmental assessment shows that the operation of the biodiesel plant will not cause adverse environmental impacts and unacceptable hazard to life. No additional environmental mitigation measures will be required.

3.15 REFERENCE TO PREVIOUSLY APPROVED EIA REPORTS

References were made to the *EIA for Fill Bank at Tseung Kwan O Area 147 (EIA-076/2002)* and *EIA for Permanent Aviation Fuel Facility for Hong Kong International Airport (EIA-127/2006)* during the preparation of this Project Profile.

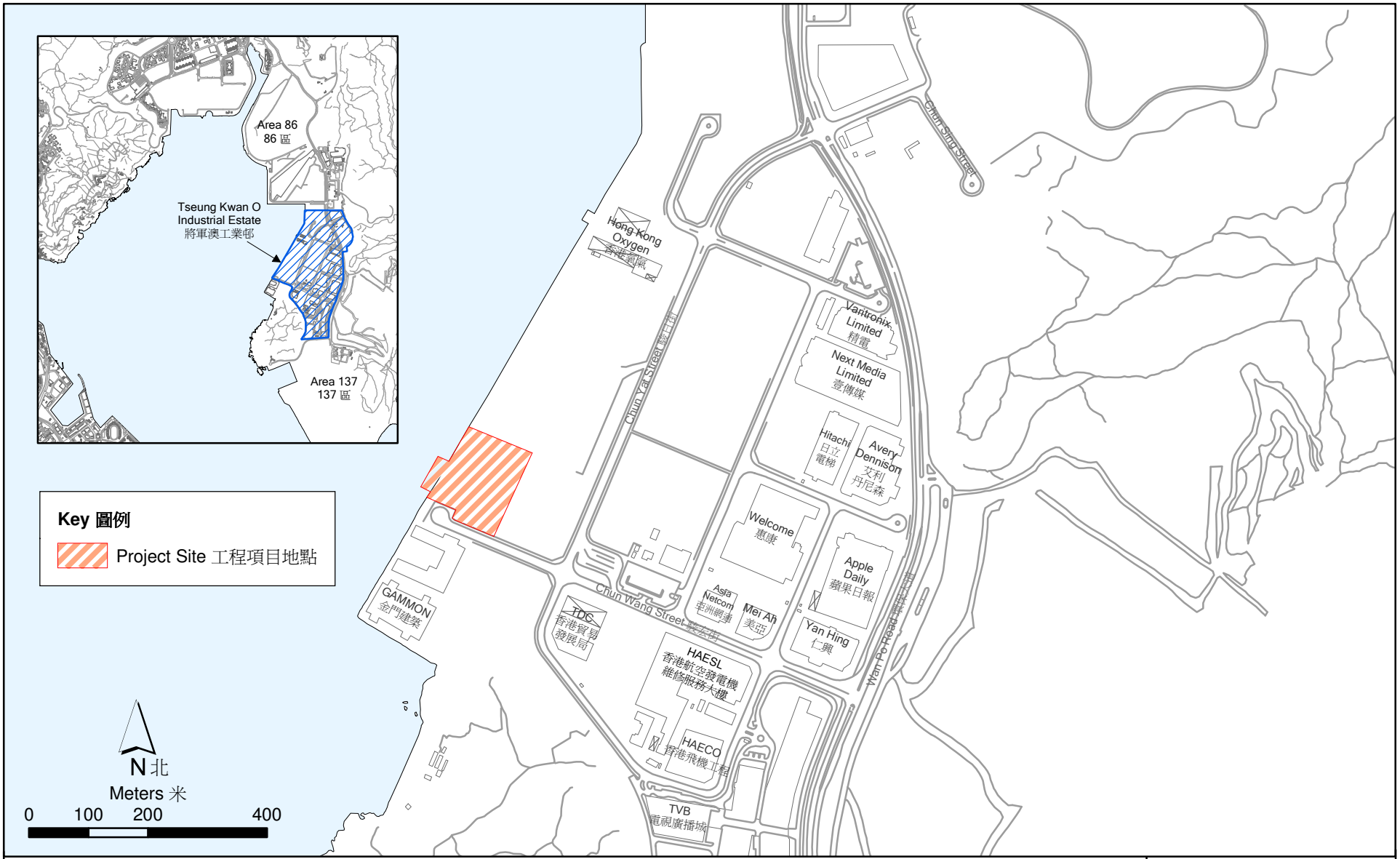


Figure 1.5a
圖 1.5a

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Site Location Plan of the Biodiesel Plant
生物柴油廠位置圖

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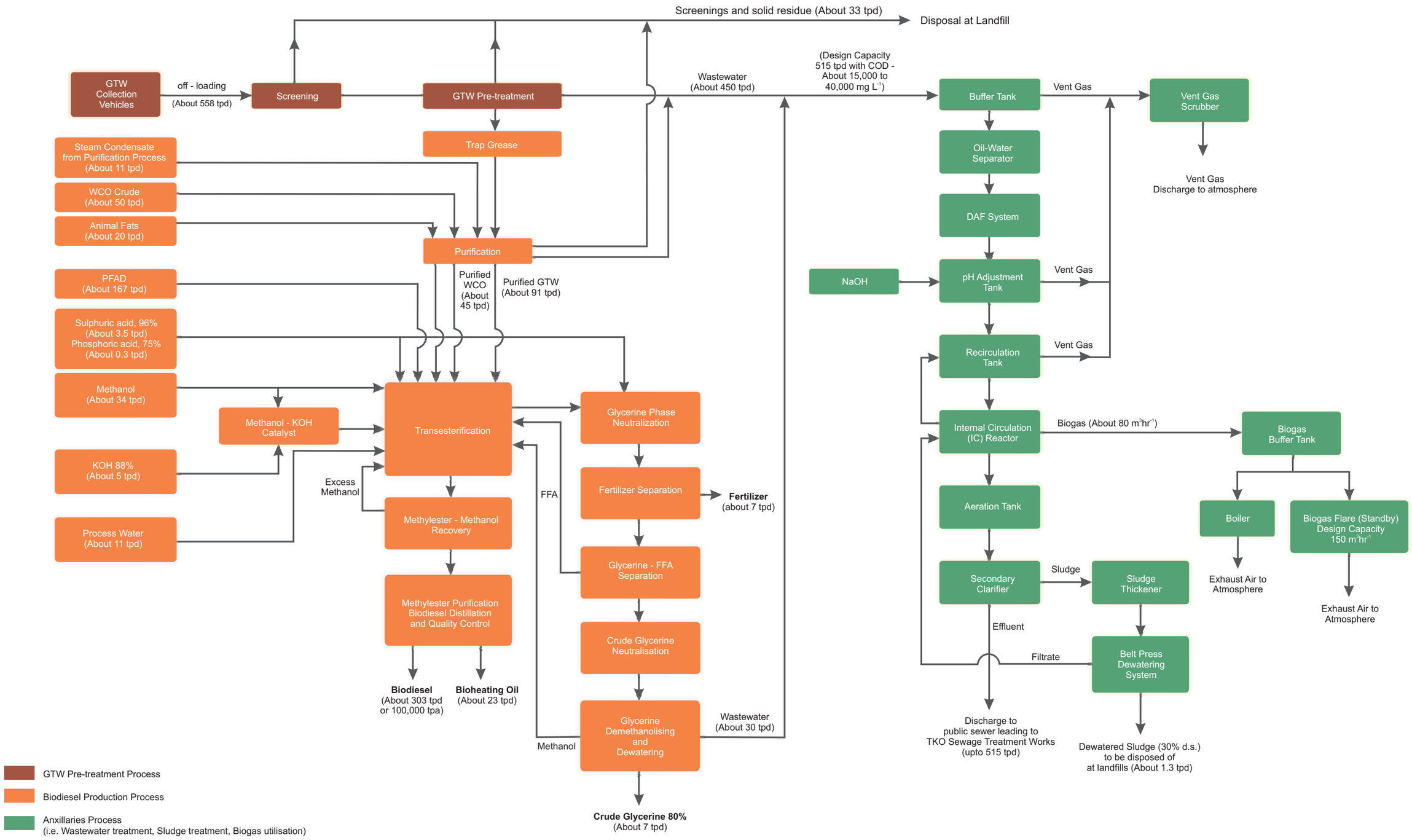

Figure 2.2a

Process Flow Diagram of Proposed Biodiesel Plant

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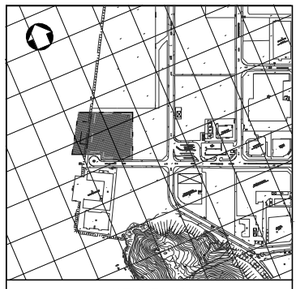
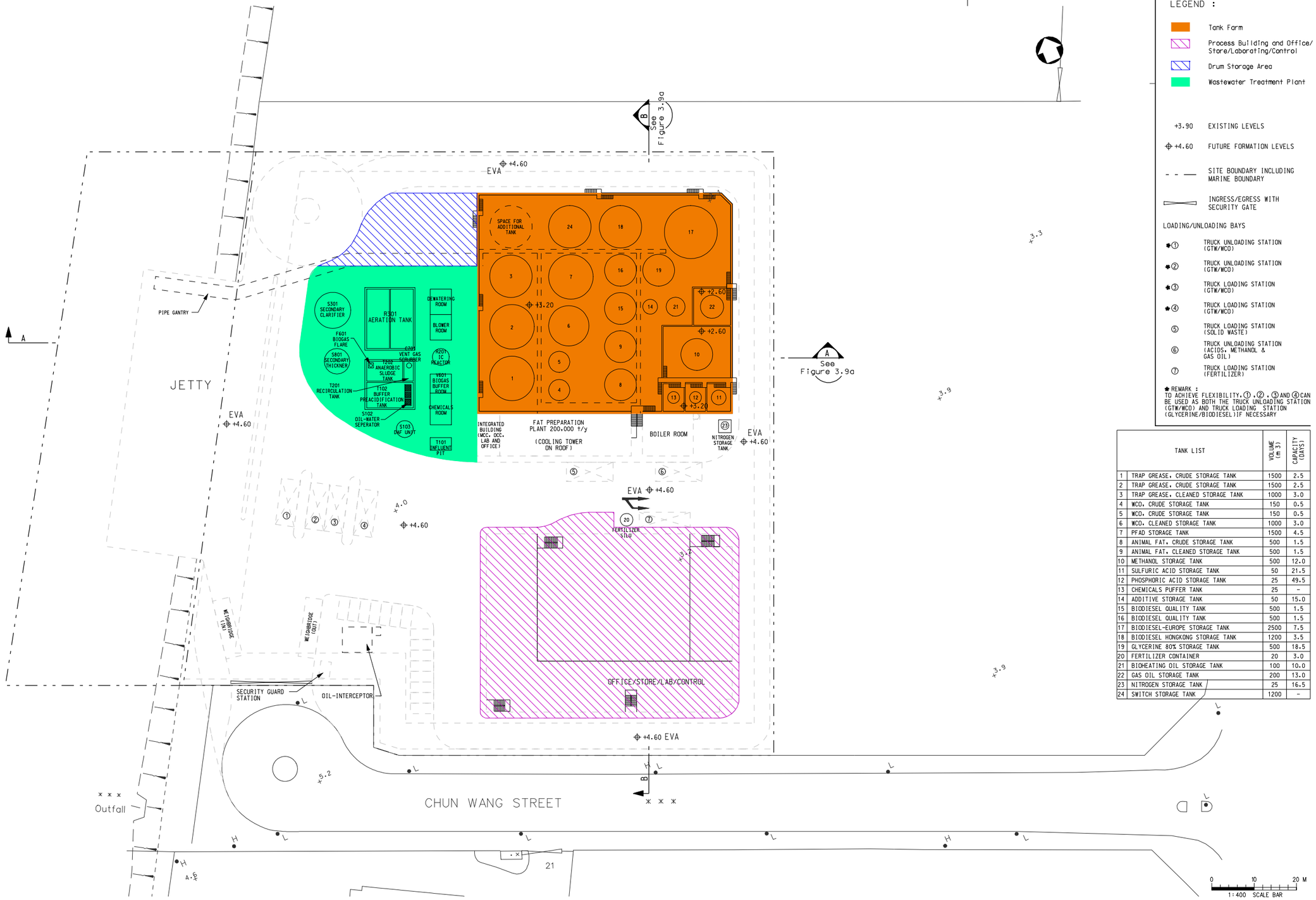


KEY PLAN
SCALE 1:5000



LEGEND :

- Tank Farm
- Process Building and Office/ Store/Laboratory/Control
- Drum Storage Area
- Wastewater Treatment Plant

+3.90 EXISTING LEVELS

+4.60 FUTURE FORMATION LEVELS

SITE BOUNDARY INCLUDING MARINE BOUNDARY

INGRESS/EGRESS WITH SECURITY GATE

LOADING/UNLOADING BAYS

- *① TRUCK UNLOADING STATION (GTW/WCO)
- *② TRUCK UNLOADING STATION (GTW/WCO)
- *③ TRUCK LOADING STATION (GTW/WCO)
- *④ TRUCK LOADING STATION (GTW/WCO)
- ⑤ TRUCK LOADING STATION (SOLID WASTE)
- ⑥ TRUCK UNLOADING STATION (ACIDS, METHANOL & GAS OIL)
- ⑦ TRUCK LOADING STATION (FERTILIZER)

* REMARK :
TO ACHIEVE FLEXIBILITY, ①, ②, ③ AND ④ CAN BE USED AS BOTH THE TRUCK UNLOADING STATION (GTW/WCO) AND TRUCK LOADING STATION (GLYCERINE/BIODIESEL) IF NECESSARY

	TANK LIST	VOLUME (m3)	CAPACITY (DAYS)
1	TRAP GREASE, CRUDE STORAGE TANK	1500	2.5
2	TRAP GREASE, CRUDE STORAGE TANK	1500	2.5
3	TRAP GREASE, CLEANED STORAGE TANK	1000	3.0
4	WCO, CRUDE STORAGE TANK	150	0.5
5	WCO, CRUDE STORAGE TANK	150	0.5
6	WCO, CLEANED STORAGE TANK	1000	3.0
7	PFAD STORAGE TANK	1500	4.5
8	ANIMAL FAT, CRUDE STORAGE TANK	500	1.5
9	ANIMAL FAT, CLEANED STORAGE TANK	500	1.5
10	METHANOL STORAGE TANK	500	12.0
11	SULFURIC ACID STORAGE TANK	50	21.5
12	PHOSPHORIC ACID STORAGE TANK	25	49.5
13	CHEMICALS PUFFER TANK	25	-
14	ADDITIVE STORAGE TANK	50	15.0
15	BIODIESEL QUALITY TANK	500	1.5
16	BIODIESEL QUALITY TANK	500	1.5
17	BIODIESEL-EUROPE STORAGE TANK	2500	7.5
18	BIODIESEL HONGKONG STORAGE TANK	1200	3.5
19	GLYCERINE 80% STORAGE TANK	500	18.5
20	FERTILIZER CONTAINER	20	3.0
21	BIOHEATING OIL STORAGE TANK	100	10.0
22	GAS OIL STORAGE TANK	200	13.0
23	NITROGEN STORAGE TANK	25	16.5
24	SWITCH STORAGE TANK	1200	-

FIGURE 2.2b

Proposed Layout Plan of the Biodiesel Plant

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DATE: 15/08/2007

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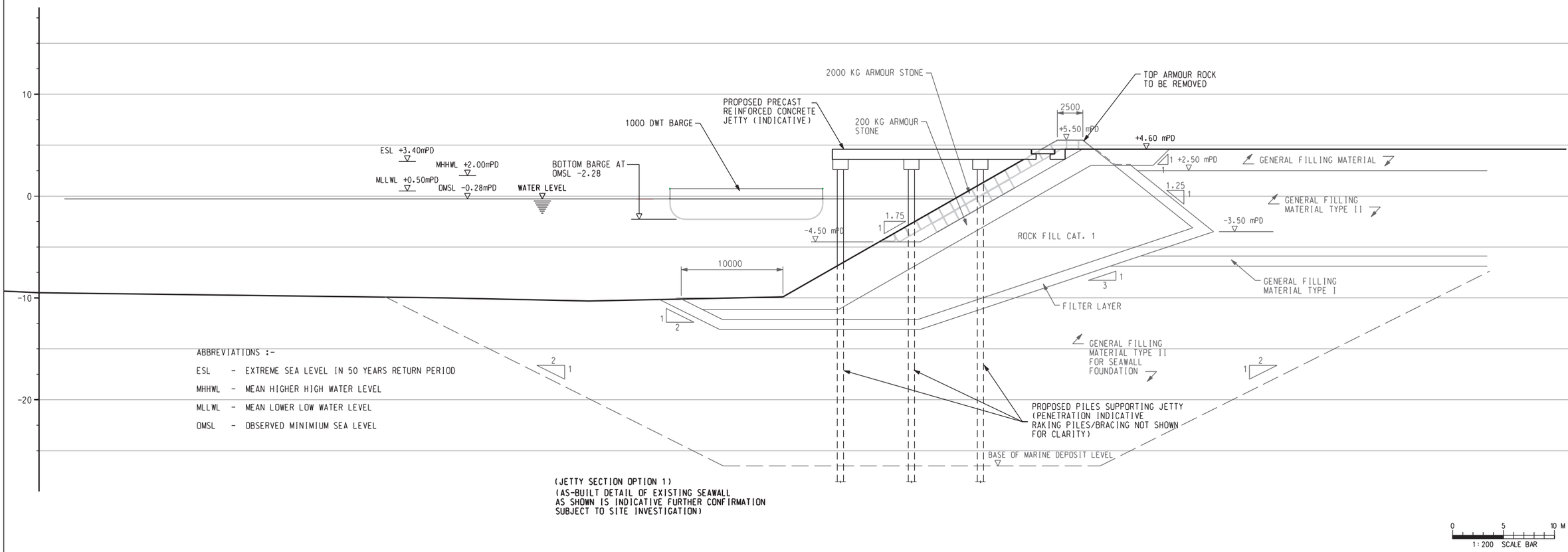

Figure 2.2c

Piled Deck Jetty Construction

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DATE: 15/08/2007

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Key 圖例

Project Site
工程項目地點

Dream City (under construction)
夢幻之城 (興建中)

Existing Seawall
現有海堤

Stormwater Outfall
雨水渠出口

Gammon Construction Ltd
金門建築

Fat Tong Chau
佛堂洲

Existing Condition of Project Site
項目位置現時情況

Trade Development Council
香港貿易發展局

Figure 3.2a
圖 3.2a

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Site Surrounding Environment
項目位置鄰近的環境情況

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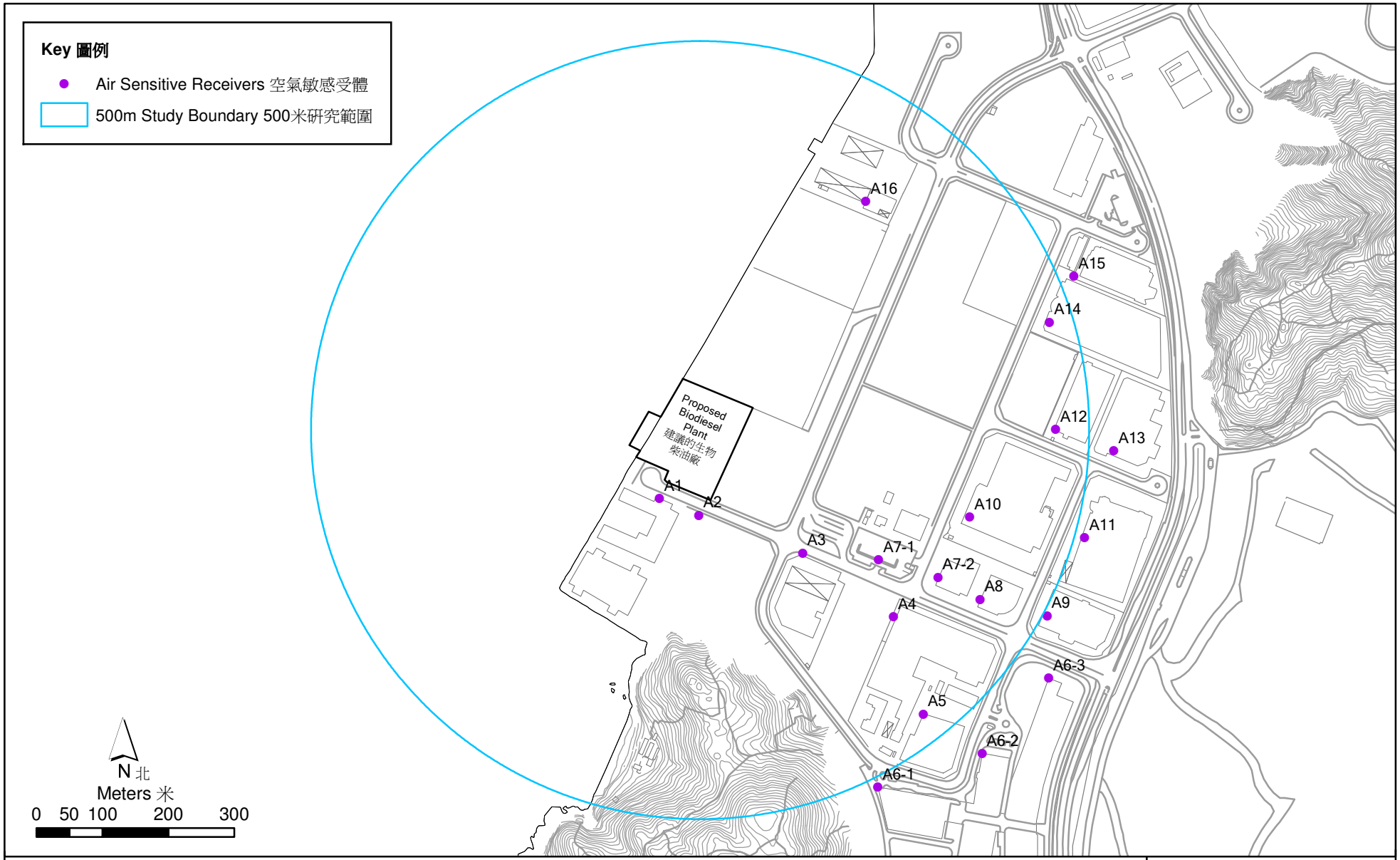

Figure 3.2b
圖 3.2b

Locations of Representative Air Sensitive Receivers
空氣敏感受體位置圖

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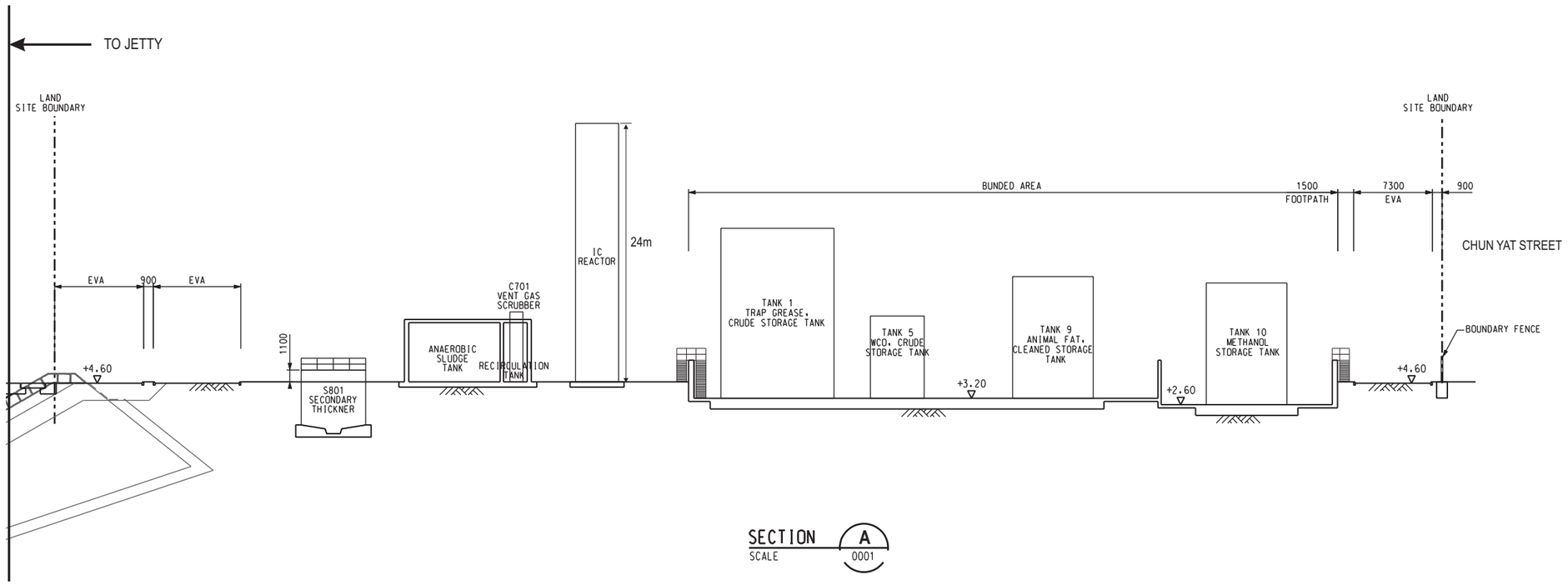

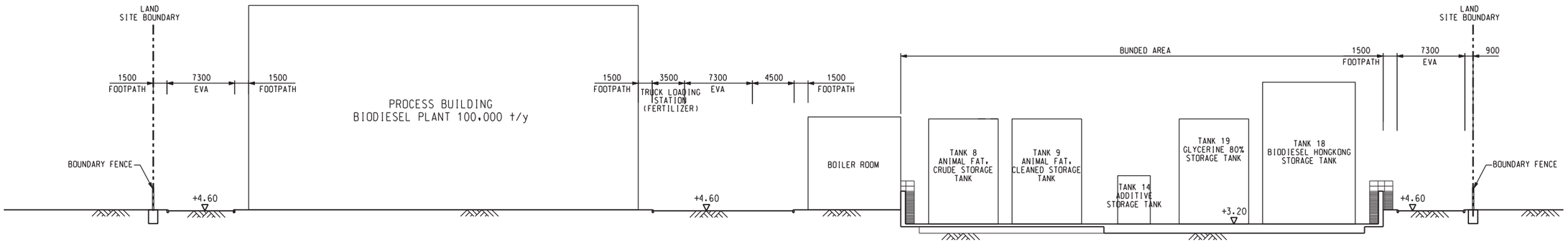

Figure 3.9a

Verticle Profile of Biodiesel Plant

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DATE: 15/08/2007

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