Serco Guardian JV

EcoPark Operation EM&A

Annual Report

1 January 2008 to 31 December 2008

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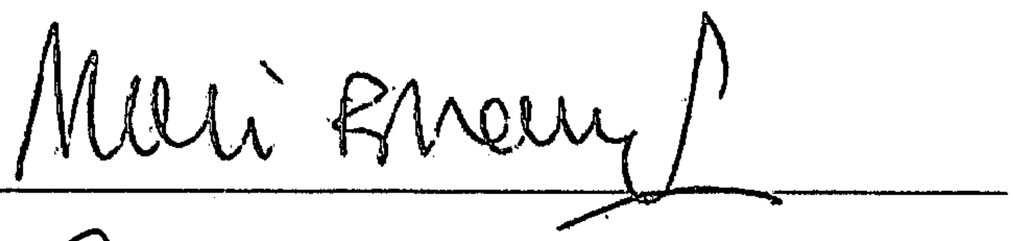
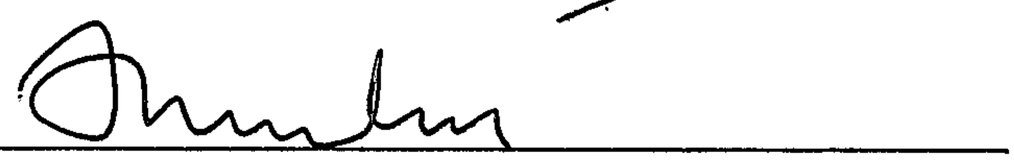
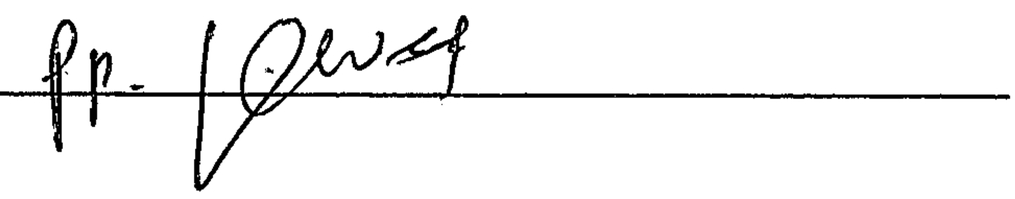
Certified By	**Alexi BHANJA** **ET Leader**	
Verified By	**Harold INSLEY** **IEC**	
Approver	**Lawrence WONG** **EPD Principal EPO**	

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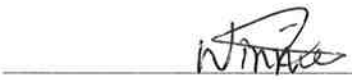
Author	Winnie MA	
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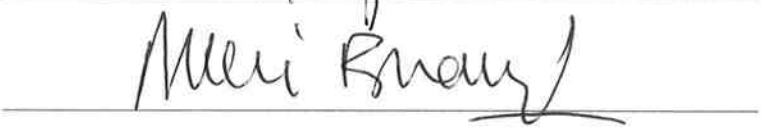
Approver	Alexi BHANJA	
Report No	EB000198-R09-02	
Date	3 February 2009	

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1 SUMMARY

EcoPark is a key element in Government's waste management policy that aims to promote the local recycling industry and jump-start a circular economy to provide a sustainable solution to our waste problems. EcoPark is being developed in two phases at a site in Tuen Mun Area 38 (see Figure 1-1). In November 2006, the seven-year contract for the operation of EcoPark – EP/SP/53/06 Provision of Management Services for EcoPark in Tuen Mun Area 38 – was awarded to Serco Guardian JV (SGJV) by the Environmental Protection Department (EPD). SGJV, the "Operator" of EcoPark have engaged Hyder Consulting as their Environmental Team (ET) to carry out the Environmental Monitoring and Audit (EM&A) required by the EM&A Manual in accordance with the conditions of the Environmental Permit.

This is the second annual EM&A report prepared for the operation phase of EcoPark and covers year 2008 operation (01 January 2008 to 31 December 2008). During 2008, there have been no complaints received; no notifications of summons; and no successful prosecutions.

In terms of monitoring, only quarterly monitoring of landfill gas (LFG) is required during operation phase EM&A and this only required "following construction". As construction was not completed by the end of 2008, operation phase LFG monitoring was not required.

In terms of auditing, all of the tenants' recycling activities are to be audited on a monthly basis, and the results are to be summarised in this report. At present, however, EcoPark is still under construction and while a number of tenancies were awarded during 2008, no recyclers actually commenced recycling activities during the year. As such, there is nothing significant to report at this time. Notwithstanding, the ET have made monthly site inspections and some general observations have been made.

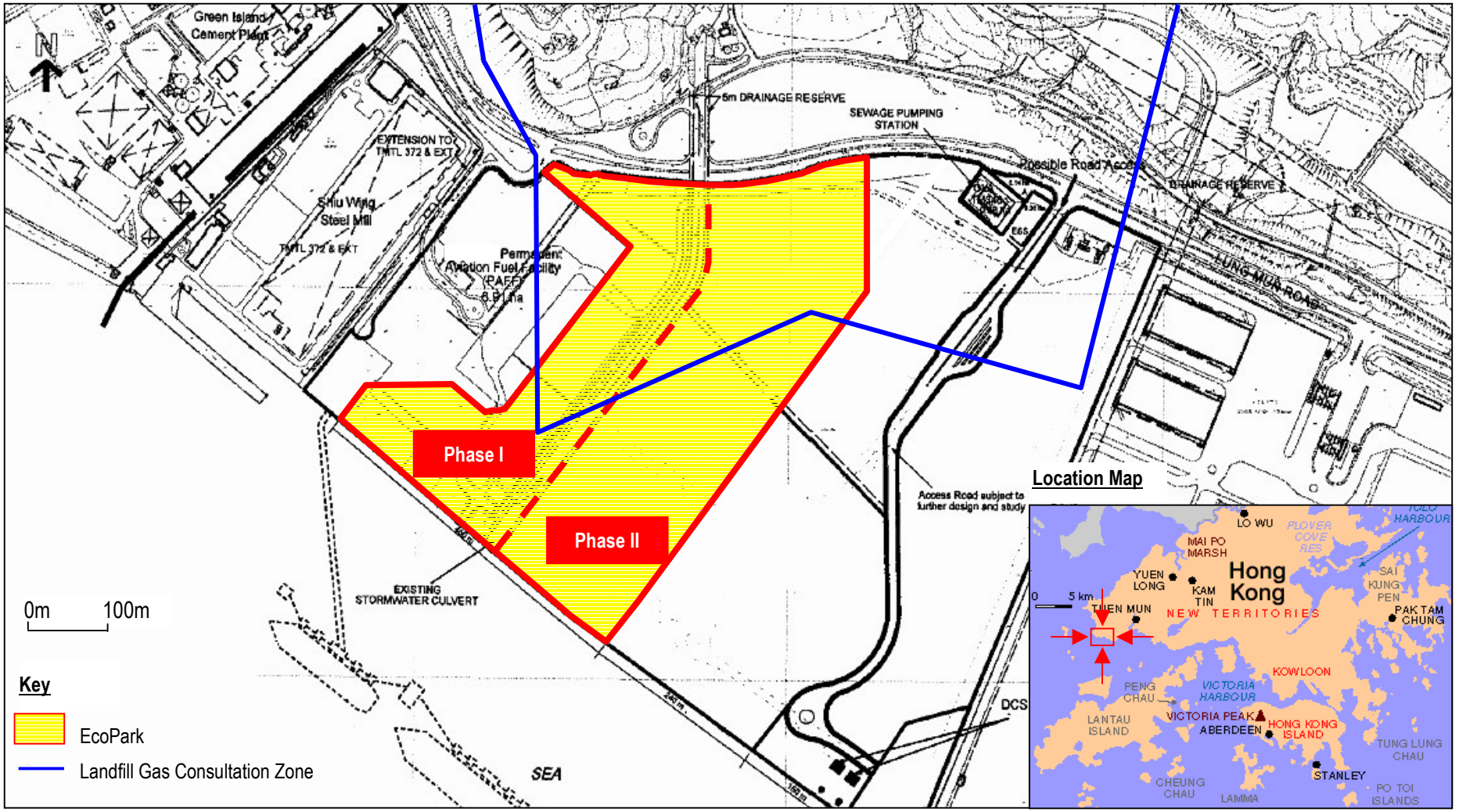

Figure 1-1 Location of EcoPark in Tuen Mun Area 38

2 BASIC PROJECT INFORMATION

2.1 Overview

In the document "A Policy Framework for the Management of Municipal Solid Waste (2005-2014)" the Government set out a comprehensive policy to support the recycling industry. This included allocating suitable land, encouraging research and development, introducing environmental legislation and providing effective support measures. To this end, EcoPark is a key element that aims to promote the local recycling industry and jump-start a circular economy to provide a sustainable solution to our waste problems. By encouraging and promoting the reuse, recovery and recycling of our waste resources and returning them to the consumption loop, EcoPark will help realize the full potential of the local recycling industry and alleviate the heavy reliance on the export of recyclable materials recovered from Hong Kong.

EcoPark is to be developed in two phases at a site in Tuen Mun Area 38 (see ***Figure 1-1***). The construction contract for EcoPark – EP/SP/52/06 Development of EcoPark in Tuen Mun Area 38 – was awarded to Kaden Construction in June 2006 by the Environmental Protection Department (EPD). This contract covers development of Phase I (ongoing) and extends to Phase II, anticipated to be developed in 2009.

In November 2006, the seven-year contract for the operation of EcoPark – *EP/SP/53/06 Provision of Management Services for EcoPark in Tuen Mun Area 38* – was awarded to Serco Guardian JV (SGJV) by EPD. SGJV, the “Operator” of EcoPark have engaged Hyder Consulting as their Environmental Team (ET) to carry out the Environmental Monitoring and Audit (EM&A) required by the EM&A Manual in accordance with the conditions of the Environmental Permit.

2.2 SGJV Organisation

Organisation of SGJV is shown in ***Figure 2-1***, below.

2.3 Operation Programme

As of 31 December 2008, no tenants have yet commenced recycling activities within their lots and so there is no operation programme to report at this time. Beside Hong Kong Hung Wai Wooden Board Company was awarded for recycling waste wood in 2007; Li Tong Group and Champway Technology Limited was awarded for recycling WEEE and waste cooking oil respectively on 9 January 2008. These three tenants have commenced preparatory works within their lots but have not yet commenced recycling activities. Hong Kong Telford Envirotech Group Limited was awarded for plastic recycling in April 2008. Tender invitations for tenancies to recycle waste metals and recycle of materials arising from industrial and commercial activities were commenced in October and November 2008 respectively.

2.4 EM&A Organisation

The EM&A is carried out predominantly by the ET, but SGJV and the Independent Environmental Checker (IEC) are also involved. ***Figure 2-2***, below, illustrates the current EM&A organisation:

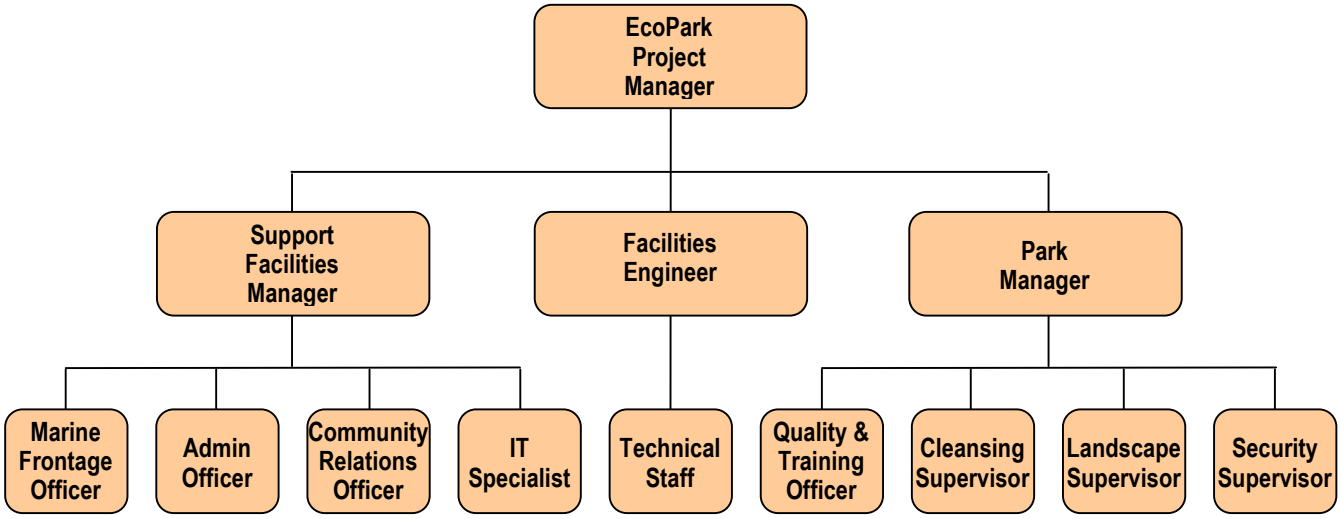

Figure 2-1 SGJV Organisation

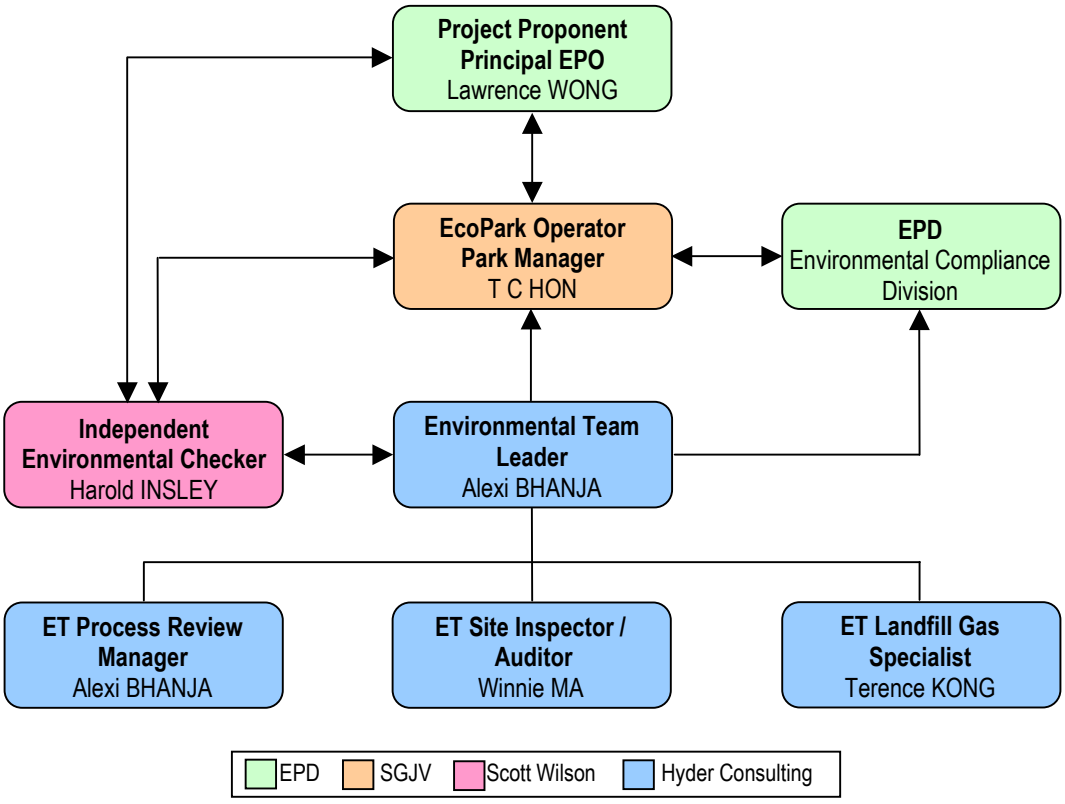

Figure 2-2 EM&A Organisation

3 SUMMARY OF EM&A REQUIREMENTS

3.1 Monitoring Parameters

The following parameters are required to be monitored as part of the operation phase EM&A programme:

Landfill Gas (LFG). Following construction, routine monitoring is required at service voids and utility boxes (locations to be agreed). Routine monitoring shall be carried out on a quarterly basis, however, should EPD alert the Operator that high LFG levels had been detected during monthly monitoring under the Siu Lang Shui Landfill restoration contract, then the Operator may be required to increase LFG monitoring to monthly until such time as EPD inform the Operator that quarterly monitoring can be resumed.

Since operation phase LFG monitoring is required "following construction" and construction has not yet been completed, operation phase LFG monitoring is not yet required to be carried out. It should be noted that construction phase LFG monitoring is ongoing and is reported in the Monthly EM&A Reports prepared by the construction contractor's ET. These reports can be downloaded from:

http://www.epd.gov.hk/eia/english/register/index8/vep2212006_content.html

3.2 Environmental Quality Performance Limits and EAP

The Action/Limit Levels and Event Action Plan (EAP) for LFG are shown below in ***Table 3-1***. No other A/L Levels or EAPs are specified in the EM&A Manual for operation phase EM&A. These refer to LFG detected in excavations, utilities and any enclosed on-site areas.

Parameter	Level		Action
Oxygen (O_2)	Action Level	<19% O_2	Ventilate trench/void to restore O_2 to > 19%
	Limit Level	<18% O_2	Stop works Evacuate personnel/prohibit entry Increase ventilation to restore O_2 to > 19%
Methane (CH_4)	Action Level	>10% LEL	Post "No Smoking" signs Prohibit hot works Increase ventilation to restore CH_4 to <10% LEL
	Limit Level	>20% LEL	Stop works Evacuate personnel/prohibit entry Increase ventilation to restore CH_4 to<10% LEL
Carbon Dioxide (CO_2)	Action Level	>0.5% CO_2	Ventilate to restore CO_2 to < 0.5%
	Limit Level	>1.5% CO_2	Stop works Evacuate personnel / prohibit entry Increase ventilation to restore CO_2 to <0.5%

Table 3-1 Action Levels, Limit Levels and Event and Action Plan for LFG

3.3 Environmental Audit of Non-monitored Parameters

Site inspections provide a direct means to trigger and enforce the environmental protection and pollution control measures specified in the EIA Report and are undertaken routinely by the ET to inspect operational practice. Regular site inspections are carried out by the ET once per month, and the ET is accompanied by the IEC once per quarter. *Ad hoc* site inspections are also carried out if significant environmental problems are identified. Inspections may also be required subsequent to receipt of an environmental complaint, or as part of the investigation work, as specified in the EAP. The following parameters are required to be audited as part of the operation phase EM&A programme:

- Air Quality
- Water Quality
- Waste Management
- Land Contamination

3.4 Environmental Mitigation Measures

Environmental mitigation measures applicable to the operation phase EM&A as stated in the Implementation Schedule are summarised in ***Appendix 1***.

3.5 Environmental Requirements in Tenancy Agreements

Environmental requirements specified in tenancy agreements are summarised in ***Appendix 2***.

4 OPERATION STATUS

Figure 4-1 shows the location of the lots within EcoPark, the tenancy numbers and the names of the tenants.

4.1 Tenants and Processes

4.1.1 Tenancy EP06-034

- Lot Size: Approx. 5,000m^2
- Activity: Recycling of Waste Wood
- Tenant: Hong Kong Hung Wai Wooden Board Company

The Process Review Checklist (PRC) was endorsed in April 2008 and the detail (PRC) is shown in ***Appendix 3***. The tenant received Building Plan approval from Buildings Department (BD) on 25 September 2008 and completed soil investigation in December 2008. Preparatory works within the tenant are still in progress.

As end of December 2008, recycling activities have not yet commenced and so EPD have advised the tenant to commence recycling activities as soon as possible.

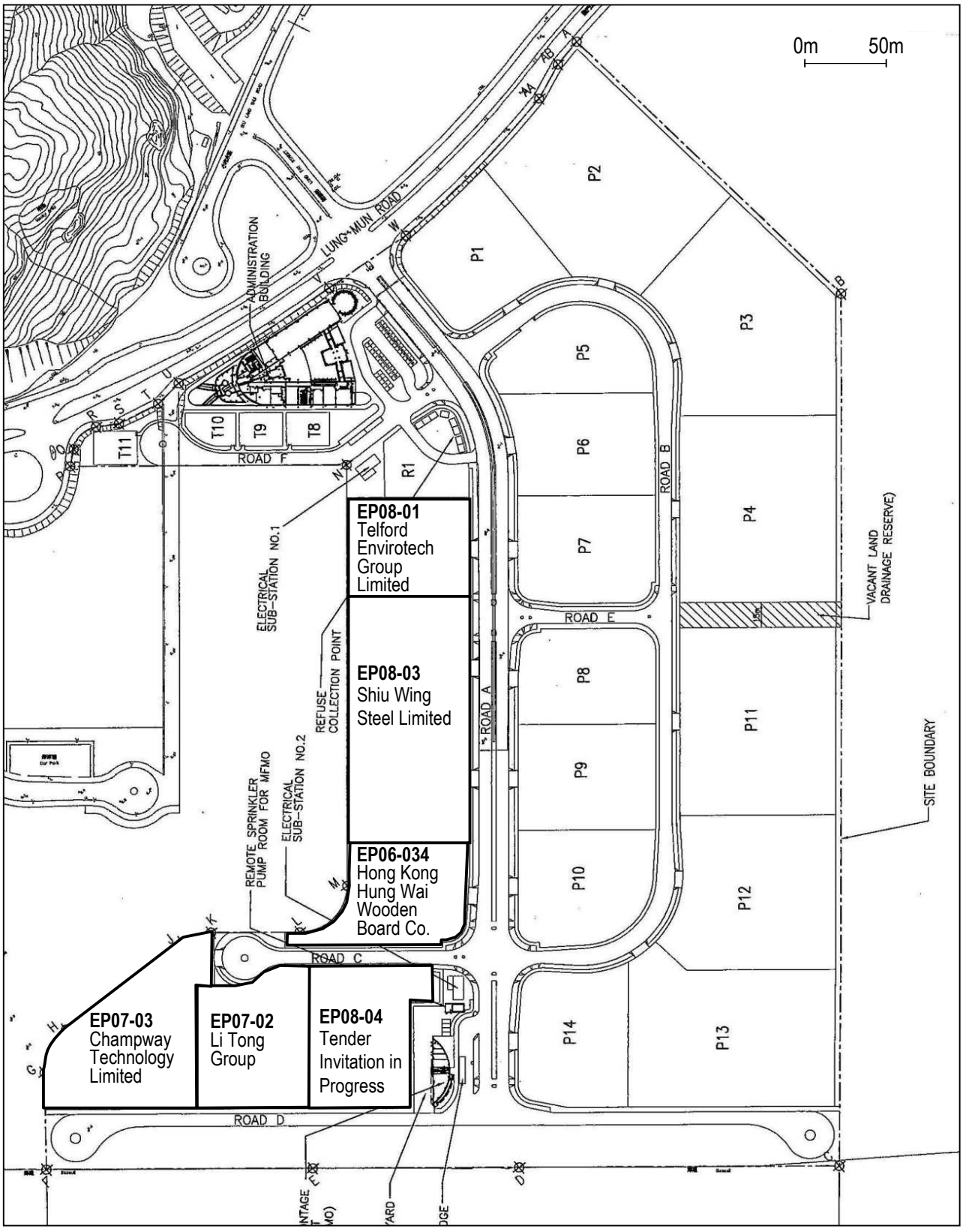

Figure 4-2 Current Lot Usage Within EcoPark

4.1.2 Tenancy EP07-02

- Lot Size: Approx. 6,500m^2
- Activity: Recycling of WEEE
- Tenant: Li Tong Group

Tenancy was awarded on 9 January 2008 and possession of lots on 15 January 2008. The PRC was endorsed in February 2008 and the detail PRC is provided in ***Appendix 3***.

Construction of a temporary site office was completed in July 2008. The Building Plan was submitted to BD in July 2008 and approval was received on 27 August 2008. All building submissions have already been approved. An additional 400A temporary electricity supply has been installed for future operations.

As end of December 2008, the tenant has commenced preparatory works within their lot but have not yet commenced recycling activities.

4.1.3 Tenancy EP07-03

- Lot Size: Approx. 6,000m^2
- Activity: Recycling of Organic Waste (Waste Cooking Oil)
- Tenant: Champway Technology Limited

Champway signed the tenancy agreement on 9 January 2008 and possession of lots was on 15 January 2008. As recycling of waste cooking oil was not assessed in the original EIA Report, a Design Audit as provided in ***Appendix 3*** was carried out and was endorsed on 9 May 2008.

The construction of the temporary site office was completed in July 2008. BD approval of the Building Plan was received in mid-September 2008. All building submissions have already been approved and consent of construction has also been granted. Construction of plant/equipment commenced in October 2008.

As end of December 2008, the tenant have not yet commenced recycling activities; but waste cooking oil has been delivered for the trial run of producing bio- diesel which will tentatively commence on 1 March 2009.

4.1.4 Tenancy EP08-01

- Lot Size: Approx. 5,000m^2
- Activity: Recycling of Waste Plastics
- Tenant: Hong Kong Telford Envirotech Group Limited

Notice of Award of Contract was issued and the tenant has already taken over the lot on 30 June 2008. As end of December 2008, the tenant has commenced preparatory works but have not yet commenced recycling activities.

4.1.5 Tenancy EP08-03

- Lot Size: Approx. 9,500 m^2
- Activity: Recycling of Waste Metals

- Tenant: Shiu Wing Steel Limited

In March 2008, EPD terminated the tenancy with the incumbent tenant, Jets Technics Limited, because they failed to pay rent starting from 1 January 2008. Re-tendering of this lot (previously named as EP06-033) was closed on 31 October 2008 and Shiu Wing Steel Limited was awarded the lot on 11 December 2008.

4.1.6 Tenancy EP08-04

- Lot Size: Approx. 4,000 m^2
- Activity: Recycling of materials arising from industrial and commercial activities
- Tenant : To be confirmed

No confirming bid of the tenancies EP07-01 and EP08-02 was received before December 2008. Re-tendering of this lot (named as EP08-04) was opened on 5 December 2008 and closed on 12 January 2009.

4.2 Throughput Statistics

As of 31 December 2008, no tenants have yet commenced actual recycling activities within their lots.

Two tenants, Hong Kong Hung Wai Wooden Board Company and Champway Technology Limited have commenced the collection of waste input into tenant lots since June and October 2008 respectively. Throughput details of tenants are shown in ***Appendix 4***.

5 IMPLEMENTATION STATUS OF ENVIRONMENTAL PROTECTION MEASURES

Environmental mitigation measures applicable to the operation phase EM&A as stated in the Implementation Schedule are summarised in ***Appendix 1***. Environmental requirements specified in Tenancy Agreements are summarised in ***Appendix 2***.

As of 31 December 2008, no tenants have yet commenced recycling activities within their lots and so no environmental protection measures need to be implemented.

6 MONITORING RESULTS

Only LFG is required to be monitored on a quarterly basis. However, since operation phase LFG monitoring is only required "following construction" and construction is not yet completed, operation phase LFG monitoring is not yet required to be carried out.

7 WASTE GENERATION STATISTICS

As of 31 December 2008, no tenants have commenced recycling activities within their lots and so there are no waste generation statistics to be reported at this time.

8 SUMMARY OF ENVIRONMENTAL AUDIT

8.1 January 2008

The environmental audit was carried out by the ET Leader and IEC's Representative on 29 January 2008. At this time, construction of EcoPark Phase I was ongoing and no tenants were present within EcoPark. As such, there were no processes to be audited. No significant observations were made.

8.2 February 2008

The environmental audit was carried out by the ET Leader on 29 February 2008. At this time, construction of EcoPark Phase I was ongoing and no tenants were yet carrying out recycling activities within EcoPark. As such, there were no processes to be audited. No significant observations were made.

8.3 March 2008

The environmental audit was carried out by the ET on 31 March 2008. At this time, construction of EcoPark Phase I was ongoing. Site preparation was observed in EP07-03 and trial pits (for ground investigation, requested by EPD) were observed in EP08-01 and EP06-034, respectively.

Soil debris were observed deposited on public roads (as shown in ***Photograph 8-1***)as no provision of wheel washing facilities were observed at site entrances of lots EP07-03, EP08-01 and EP06-034. Provisions of wheel washing facilities were requested to prevent soil debris deposited on the road. The tenants had been informed and remedial measures taken accordingly.

Photograph 8-1 Soil Debris on the Road Outside EP08-01

An oil drum without drip tray was observed in the EP07-03, as shown in ***Photograph 8-2***. Provision of drip tray was requested to by the ET to prevent land contamination. The tenants had been informed and remedial measures taken accordingly.

Photograph 8-2 No drip tray was provided to the oil drum in EP07-03

8.4 April 2008

The environmental audit was carried out by the ET Leader and IEC's Representative on 25 April 2008. At this time, construction of EcoPark Phase I was ongoing (although close to completion) and no tenants were yet carrying out recycling activities within EcoPark. As such, there were no processes to be audited. No significant observations were made.

8.5 May 2008

The environmental audit was carried out by the ET on 23 May 2008. At this time, construction of EcoPark Phase I was ongoing and no tenants were yet carrying out recycling activities. As such, there were no processes to be audited. ***Photograph 8-2*** shows the Administration Building and landscaping.

Photograph 8-3 Administration Building and Landscaping

8.5.1 Tenancy EP06-034

Foundation works for the temporary site office have started. ***Photograph 8-3*** shows the status of the lot.

Photograph 8-4 Tenancy EP06-034

8.5.2 Tenancy EP07-02

The tenant is constructing temporary site offices, as shown in ***Photograph 8-4***.

Photograph 8-5 Tenancy EP07-02

8.5.3 Tenancy EP07-03

The tenant has completed construction of temporary site offices and has commenced laying of asphalt, as shown in ***Photograph 8-5***.

Photograph 8-6 Tenancy EP07-03

8.6 June 2008

The environmental audit was carried out by the ET on 26 June 2008. At this time, construction of EcoPark Phase I was ongoing. No major environmental deficiencies were observed. Provision of drip trays were observed to prevent land contamination due to leakage from oil

drums; however provision of proper coverage (e.g. tarpaulin sheet) was recommended to prevent water accumulation inside drip tray.

8.7 July 2008

The environmental audit was carried out by the ET and IEC on 29 July 2008. At this time, construction of EcoPark Phase I was ongoing and no tenants were yet carrying out recycling activities within EcoPark. As such, there were no processes to be audited. No significant observations were made.

8.8 August 2008

The environmental audit was carried out by the ET on 26 August 2008. At this time, construction of EcoPark Phase I was ongoing and no tenants were yet carrying out recycling activities within EcoPark. As such, there were no processes to be audited. No significant observations were made.

8.9 September 2008

The environmental audit was carried out by the ET on 30 September 2008. At this time, construction of EcoPark Phase I was ongoing and no tenants were yet carrying out recycling activities within EcoPark. As such, there were no processes to be audited. No significant observations were made.

8.10 October 2008

The environmental audit was carried out by the ET and IEC on 27 October 2008. At this time, construction of EcoPark Phase I was ongoing and no tenants were yet carrying out recycling activities within EcoPark. As such, there were no processes to be audited. No significant observations were made.

8.11 November 2008

The environmental audit was carried out by the ET on 26 November 2008. At this time, construction of EcoPark Phase I was ongoing and no tenants were yet carrying out recycling activities within EcoPark. As such, there were no processes to be audited. No significant observations were made.

8.12 December 2008

The environmental audit was carried out by the ET on 29 December 2008. At this time, construction of EcoPark Phase I was ongoing and no tenants were yet carrying out recycling activities within EcoPark. As such, there were no processes to be audited. No significant observations were made.

9 COMPLAINTS

As of 31December 2008, no tenants have yet commenced recycling activities within their lots and no complaints have been received related to recycling activities.

10 ANNUAL REVIEW

10.1 Comparison of EM&A Data with EIA Predictions

As of 31 December 2008, no tenants have yet commenced recycling activities within their lots and so there is no EM&A data that can be compared and contrasted with EIA predictions.

10.2 Environmental Acceptability of EcoPark

As of 31 December 2008, no tenants have yet commenced recycling activities within their lots and so it is not possible to assess the environmental acceptability of EcoPark

10.3 Monitoring Methodology

As of 31 December 2008, no tenants have yet commenced recycling activities within their lots and as no monitoring has been undertaken it is not possible to review the monitoring methodology.

10.4 Practicality and Effectiveness of EIA Process and EM&A Programme

As of 31 December 2008, no tenants have yet commenced recycling activities within their lots and so the EM&A programme has not yet been fully utilised. As such, the cost-effectiveness of operational auditing EcoPark, while it is still under construction and without any tenants carrying out recycling activities, is questionable. No improvements to the EM&A programme are recommended.

11 CONCLUSIONS

As of 31 December 2008, no tenants have yet commenced recycling activities within their lots and so there are no conclusions to draw relating to the operation of the operation phase EM&A programme at this time.

Appendix 1

Environmental Mitigation Measures (from the Implementation Schedule)

EIA Ref.	EM&A Ref.	Environmental Protection Measures Identified in the Implementation Schedule that are Applicable to the Operation Phase of EcoPark	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Relevant Legislation and Guidelines
General					
5.5.23 to 5.5.25, 10.2.24 & 10.2.37	4.2.5 to 4.2.8	The Operator shall develop and implement an Emergency Response Plan (ERP) that lists the procedures to be followed in case of fire, fuel or chemical spillage or other emergency within the EcoPark.	Throughout the duration of the operation.	Operator	
12.2	7.2	No process shall be allowed to operate within EcoPark without approval from WFBU. Approval will be based on the ten-step Process Review, which may include a Design Audit if deemed to be necessary.	Throughout the duration of the operation.	ET IEC Project Proponent	
	8.1.2	All reports (including Process Review Checklists and any Design Audits) shall be prepared and certified by the ET, verified by the IEC and approved by the Project Proponent.	Throughout the duration of construction works until construction is substantially completed. Throughout the duration of the operation.	ET IEC Project Proponent	
12.3	7.3	The Operator shall prepare and implement an Environmental Management Plan (EMP) to define mechanisms for achieving the environmental requirements specified in the EIA, EP and in statutory regulations.	Throughout the duration of the operation.	Operator	
Air Quality					
13.2		The Operator shall ensure that the EcoPark "base case" assumptions for air quality shown in Table 13.1 of the Final EIA Report are met by tenants, as a whole.	Throughout the duration of the operation.	Operator	Table 13.1 of the Final EIA Report
Water Quality					
5.4.11 & 5.6.7		To minimise the chance of accidental spillage during loading and unloading, and thereby reduce marine water quality impacts, well established cargo handling guidelines should be followed.	Adjacent to EcoPark marine frontage when loading or unloading goods.	Operator Operators of bulk carriers	Sections 5 and 6 of *IMO Code of Practice for the Safe Loading/Unloading of Bulk Carriers*
5.5.19		Contaminated water collected in the surface drainage systems shall be treated at the WTF or other appropriate treatment facility.	Within EcoPark throughout the life of the facility.	Operator	

EIA Ref.	EM&A Ref.	Environmental Protection Measures Identified in the Implementation Schedule that are Applicable to the Operation Phase of EcoPark	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Relevant Legislation and Guidelines
5.5.23 to 5.5.25	4.2.5 to 4.2.7	An Emergency Response Plan (ERP) will be formulated to address various accident scenarios. The ERP will be certified by the Environmental Team (ET) and verified by the Independent Environmental Checker (IEC) under the operation EM&A programme.	Within EcoPark throughout the life of the facility.	Operator	
5.6.4		For uncovered areas where recovery process identified as causing potentially high level of contamination are located, stop-logs will be installed in the perimeter drainage system to isolate contamination.	Within EcoPark throughout the life of the facility.	Operator	
	4.2.2	The ET should develop an audit checklist, with the agreement of the IEC, to ensure that each mitigation measure is implemented when appropriate and operated correctly when implemented.	Within EcoPark throughout the life of the facility.	ET with IEC	

Waste Management

6.8.7	5.2.4	The Operator should register with EPD as a chemical waste producer.	Within EcoPark throughout the life of the facility.	Operator	Waste Disposal (Chemical Waste) (General) Regulation
6.8.16		The dust collected by any air pollution control equipment installed by tenants must be tested to ensure compliance for landfill disposal.	Within EcoPark throughout the life of the facility.	Operator	Practice Note for disposal of dusty waste at landfills & Admission Ticket System
6.8.18 & 6.8.22	5.2.4	Sludge will be disposed of at WENT landfill, or at any future dedicated sludge treatment facility. Sludge will be collected by a Licensed collector at regular intervals, as determined by the operation of the WTF	Within EcoPark throughout the life of the facility.	Operator	
6.8.21	5.2.4	Chemical wastes shall be stored in appropriate containers in a covered area. "No Smoking" signs will be clearly displayed to prevent accidental ignition of any flammable materials. Drip trays capable of storing 110% of the volume of the largest container will be used to mitigate possible leakage.	Within EcoPark throughout the life of the facility.	Operator	Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes
	5.2.3 & 5.2.5	The ET should develop an audit checklist, with the agreement of the IEC, to ensure that each mitigation measure is implemented when appropriate and operated correctly when implemented.	Within EcoPark throughout the life of the facility.	ET with IEC	

EIA Ref.	EM&A Ref.	Environmental Protection Measures Identified in the Implementation Schedule that are Applicable to the Operation Phase of EcoPark	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Relevant Legislation and Guidelines
Prevention of Contaminated Land					
7.3.1	5.3.2	Any spillages of contaminating material shall be cleaned up immediately through the use of an absorbent. Any such used material should then be considered chemical waste and disposed of appropriately.	Within EcoPark throughout the life of the facility.	Operator	
7.3.3		Any areas within the lot to be used for recycling processes shall be concrete paved before recycling activities commence.	Within EcoPark throughout the life of the facility.	Operator	
7.3.5	5.3.2	During operation, the greatest risk of land contamination will come from the storage of chemical wastes, therefore the following measures should be followed : ▪ All chemical storage areas shall be provided with locks and be sited on sealed areas. The storage areas shall be surrounded by bunds with a capacity equal to 110% of the storage capacity of the largest tank to prevent spilled oil and chemicals from contaminating the ground. ▪ Management of chemical waste is implemented through the control of waste storage, labelling of waste, transportation and treatment of chemical waste at an appropriate facility. ▪ Chemical wastes will be collected, stored and disposed of in accordance with the Regulation. Disposal of other construction waste will be undertaken by Licensed contractors in accordance with applicable statutory requirements in the WDO. ▪ Chemical wastes shall be handled according to the relevant code of practice. Spent chemicals shall be stored and collected by an approved operator for disposal at a licensed facility in accordance with the relevant regulation.	Within EcoPark throughout the life of the facility.	Operator	Waste Disposal (Chemical Waste) (General) Regulation Code of Practice on the Packaging, Labelling and Storage of Chem Wastes & Chemical Waste (General) Regulation

EIA Ref.	EM&A Ref.	Environmental Protection Measures Identified in the Implementation Schedule that are Applicable to the Operation Phase of EcoPark	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Relevant Legislation and Guidelines
	5.3.3	The ET should develop an audit checklist, with the agreement of the IEC, to ensure that each mitigation measure is implemented when appropriate and operated correctly when implemented.	Within EcoPark throughout the life of the facility.	ET with IEC	

Landfill Gas

8.7.10 & 8.7.11	6.1.2	▪ Alert workers and visitors of possible LFG hazards ▪ Prohibit smoking and open fires on site ▪ Conduct regular (quarterly) LFG monitoring at mobile offices, equipment stores, etc.	Within EcoPark throughout the life of the facility.	Operator	
	6.4.3	Following construction, routine monthly monitoring may be required at service voids and utility boxes. The monitoring requirement and specific locations of monitoring points shall be established based on the findings of the monitoring carried out during construction (i.e. if no LFG is detected during construction then no routine monitoring is required). The need for continued monitoring shall, however, be reviewed through discussion with EPD.	Within EcoPark throughout the life of the facility.	Operator	

Hazard to Life

10.4.3		Building height limit within EcoPark shall be applied to structures within which people may work at elevated levels.	Within EcoPark throughout the life of the facility.	Operator	EIA Report Table 10.2

Landscape and Visual

9.4.4		It recommended that this commonality be promoted throughout EcoPark by the Operator and adopted by tenants, if practicable.	Within EcoPark throughout the life of the facility.	Operator	

Appendix 2

Environmental Requirement in Tenancy Agreement

GENERAL ENVIRONMENTAL RESPONSIBILITIES

9.1 The Tenant shall at its own cost(s) comply with and shall ensure that the Premises is used, designed, constructed, operated and maintained in accordance with:-

(a) All relevant Ordinances, by-laws, regulations, statutory technical memorandums, codes of practice, rules, non-statutory guidance notes, schemes and abatement notices for the time being in force in Hong Kong including those relating to the environment and governing the control of any form of pollution (see specific Ordinances mentioned hereinbelow) and licensing requirements under relevant Ordinances and regulations.

(b) All information, mitigation measures, prohibitions, restrictions, recommendations and requirements under the Environmental Impact Assessment Report for Development of an EcoPark in Tuen Mun Area 38 with Appendices, i.e. the EIA Report (Register No.: AEIAR-086/2005) dated April 2005, the Final EM&A Manual dated April 2005, the application documents including all attachments (Application No. AEP-226/2005) and other relevant documents in the Register (or in any other places, any internet websites or by any other means as specified by the Director), including the prohibitions and mitigation measures for processes in Table 14.1 and the material throughputs, processes and remarks in Table B.1 of the EIA Report (in so far as applicable).

(c) All information, conditions, submissions, mitigation measures, orders, notices, requirements, prohibitions, restrictions and time limits under the Environmental Permit No. EP-226/2005 as amended by the Variation of Environmental Permit – Application No.VEP-221/2006 (including updated information about the Permit, any amended permit and any further permit) and all mitigation measures recommended and to be recommended in submissions that shall be deposited with or approved by the Director as a result of permit conditions contained in the Environmental Permit No. EP-226/2005 as amended by the Variation of Environmental Permit – Application No.VEP-221/2006 (including updated information about the Permit, any amended permit and any further permit). The Tenant shall refer to, inter alia, Conditions 4.1 to 4.14 (and Annexes A and B) and Conditions 3.7 and 3.8 (and Figures 2 and 3) of the Environmental Permit No. EP-226/2005 as amended by the Variation of Environmental Permit – Application No.VEP-221/2006 regarding measures to mitigate air quality impact, measures to mitigate hazard to life impact, measures to prevent land contamination, measures to mitigate landfill gas hazard, maintenance of landscape and visual measures (see also hereinbelow regarding Condition 5 of the Environmental Permit and specified Ordinances).

(d) All information, conditions, submissions, mitigation measures, orders, notices and requirements under on going surveillance and monitoring activities during all stages of the Project and during the tenancy under the Tenancy Agreement (e.g. any additional mitigation measures recommended and to be recommended under the Process Review and Design Audit (carried out and to be carried out in accordance with the EM&A Manual) for various environmental impacts including, but not limited to, noise pollution, air quality, hazard to life, landfill gas hazard, landscape and visual measures, waste management and land contamination).

(e) All recommendations referred to in the documents of the EIAO Register which are not expressly referred to in Environmental Permit No. EP-226/2005 as amended by the Variation of Environmental Permit – Application No.VEP-221/2006 and any amended Environmental Permit (unless expressly excluded or impliedly amended in the Environmental Permit No. EP-226/2005 as amended by the Variation of Environmental Permit – Application No.VEP-221/2006 and any amended Environmental Permit).

9.2 Further to Condition Nos. 6 and 8 hereinabove, the Tenant shall at its own cost provide relevant environmental monitoring data, information, documents and assistance to the Director and/or the Environmental Protection Department and shall permit authorised representatives of the

Environmental Protection Department to access, inspect, take samples and monitor the Premises and operations for the Process Review and the Design Audit carried out and/or to be carried out pursuant to Conditions 4.1 and 5 of the Environmental Permit No. EP-226/2005 as amended by the Variation of Environmental Permit – Application No.VEP-221/2006 (and any updated Permit, amended permit and further permit).

9.3 If the Tenant's operations (i.e. activities and facilities for recovery and/or recycling and/or reprocessing) are not covered by the EIA Report and/or deviate from the development parameters mentioned in inter alia the EIA Report, the Environmental Permit No. EP-226/2005 as amended by the Variation of Environmental Permit – Application No.VEP-221/2006 (including the parameters at Annex A) and/or any environmental licence (e.g. the Water Treatment Facility ("WTF") Discharge Licence), and if additional mitigation measures are not available or are not effective in the opinion of the Director, to ensure compliance with the EIA Report, the Environmental Permit No. EP-226/2005 as amended by the Variation of Environmental Permit – Application No.VEP-221/2006 (including any updated Permit, amended permit and further permit) and the relevant environmental licence(s), the Tenant shall comply with any modified parameters and/or the Tenant shall immediately modify its operations in such a way that the findings and requirements of the EIA Report, the Environmental Permit No. EP-226/2005 as amended by the Variation of Environmental Permit – Application No.VEP-221/2006 (including any updated Permit, amended permit and further permit) and the environmental licence(s) are complied with and shall immediately cease to continue the offending part of the operations or activity in question.

9.4 The Tenant shall at its own cost(s) apply for, obtain, renew, maintain and comply with all the relevant licences related to compliance with all relevant Ordinances, by-laws, regulations, statutory technical memorandums, codes of practice, rules, non-statutory guidance notes, schemes, abatement notices and the environmental permits for the time being in force in Hong Kong (including those relating to the environment and governing the control of any form of pollution). The Tenant shall obtain, renew and comply with all the said licences within the relevant time limits (in any event, within one (1) calendar month of the date of signing and/or execution of the Tenancy Agreement), shall comply with all abatement notices, orders, directions and requests of the relevant authorities and public officers and shall be responsible for paying all relevant fees, costs, fines and penalties.

9.5 The Tenant shall not do anything or omit to do anything which would cause, contribute to or involve a breach or potential breach by the Director relating to any of the matters mentioned in Conditions 9.1 to 9.4 hereinabove (and other Conditions hereinbelow).

9.6 The Tenant shall fully indemnify the Government and/or the Director for any fees, costs, damages, expenses, fines, penalties, losses and claims arising (a) out of any breach of any of the matters mentioned in inter alia Conditions 9.1 to 9.4 hereinabove (and other Conditions hereinbelow) or (b) from the use of the Premises or (c) out of any works carried out at any time during the term to or at the Premises or (d) out of anything now or during the term attached to or projecting from the Premises or (e) from any neglect or default by the Tenant or by its respective servants or agents or by any express licensee of the Tenant.

SPECIFIC ENVIRONMENTAL RESPONSIBILITIES

Air Pollution

10. Save with an appropriate exemption under the Air Pollution Control Ordinance (Cap. 311 of the Laws of Hong Kong) any regulations made thereunder and any amending legislation, the Tenant shall not install or permit or suffer to be installed upon the Premises or any part thereof or any building(s) or structure(s) or part of any building(s) or structure(s) erected or to be erected thereon any furnace, oven, chimney or flue or any other combustion equipment or use or permit or suffer to be used any fuel or any method or process of manufacture or treatment that might in any circumstance result in, cause or contribute to the discharge or emission of any pollutant or any noxious, harmful or corrosive matter, whether it be in the form of gas, smoke, liquid, solid or otherwise (including but not limited to

air pollutant as defined in Section 2 of the Air Pollution Control Ordinance (Cap. 311 of the Laws of Hong Kong)), which exists or which is imminent, without the prior written approval of the Director.

11. No alteration to the installation and method of manufacture shall be made without the prior written consent of the Director. In any event, the Tenant shall at its own cost(s) comply with, inter alia, Conditions 4.2 to 4.7 and Annex A of the Environmental Permit No. EP-226/2005 as amended by the Variation of Environmental Permit – Application No.VEP-221/2006 regarding design, installation and operation of chimney, location of fresh air intakes and use of ultra-low sulphur or other cleaner fuel(s) as agreed by the Director (and the conditions of any updated Permit, amended permit and further permit regarding measures to mitigate air quality impact), good practices and relevant provisions of the EIA Report and Final EM&A Manual.

Noise Pollution

12. The Tenant shall take all necessary measures as may be required by and to the satisfaction of the Director to ensure that the operation of all plant and equipment, installed or used on the Premises or in any building(s) or structure(s) or any part of any building(s) or structure(s) erected or to be erected thereon, will not result, not cause and/or will not contribute any noise (which exists or which is imminent) which disturbs or annoys the residents or occupiers of any adjoining or neighbouring lot or lots or premises, or causes and/or contributes to disturbance to the general public under the Noise Control Ordinance (Cap. 400 of the Laws of Hong Kong) any regulations made thereunder and any amending legislation.

13. The decision of the Director as to whether any such plant and equipment are causing disturbance or annoyance as aforesaid shall be final and binding on the Tenant.

Waste Management

14. The Tenant shall not permit, allow or suffer any fuel or chemical and any sewage, waste water or effluent containing sand, cement, silt or any suspended or dissolved material to flow, escape or run from the Premises onto any adjoining land or allow any waste matter which does not form part of the recovery and/or recycling and/or reprocessing operation or is not part of the final product of such operation to be deposited, kept, held or stored anywhere within the Premises and other areas of EcoPark. The Tenant shall at its own cost(s) have all such matters and all waste arising from recycling activities, chemical waste arising from maintenance of plant and equipment, sewage sludge (from WTF) and general daily waste from the operation removed from the Premises or any building(s) or structure(s) or any part of any building(s) or structure(s) erected or to be erected thereon in a proper manner to the satisfaction of the Director.

15. In any event, the Tenant shall at its own cost(s) comply with, inter alia, Conditions 4.11 and 4.12 of the Environmental Permit No. EP-226/2005 as amended by the Variation of Environmental Permit – Application No.VEP-221/2006 regarding paving all areas of the Premises with concrete/using concrete hardstanding and siting all fuel tanks and chemical storage areas on the specified sealed areas, respectively (and comply with the conditions of any updated Permit, amended permit and further permit regarding measures to prevent land contamination). The Tenant shall at its own cost(s) comply with relevant provisions of the Waste Disposal Ordinance (Cap.354 of the Laws of Hong Kong) good practices and relevant provisions of the EIA Report and Final EM&A Manual.

Water Pollution

16. In the event that the Tenant produces, generates, permits, causes, allows or suffers any discharge which is subject to control under the Water Pollution Control Ordinance (Cap. 358 of the Laws of Hong Kong) any regulations made thereunder and any amending legislation, and is not covered by a WTF Discharge Licence issued under the Water Pollution Control Ordinance (Cap. 358 of the Laws of Hong Kong) the Tenant shall apply to the Director for a licence and comply with the terms and conditions stipulated in the licence and the WTF Discharge Licence at the Tenant's own cost(s). Otherwise, the Tenant is not allowed to discharge directly or indirectly or to produce, generate,

permit, cause, allow or suffer any discharge into any public sewer, storm-water drain, channel, stream-course, sea or any area inside or outside the Premises any trade effluent or foul or contaminated water or cooling or hot water. Subject to the said licence from the Director and WTF Discharge Licence, the Tenant shall at its own cost(s) separate, collect, discharge and send all process or industrial wastewater to the WTF for treatment to the standard required for discharge into a sewer leading to the sewage treatment works at Pillar Point or other treatment works specified in the licence.

17. Subject to obtaining advance written approval of the Director, the Tenant shall at its own cost(s) provide, install, operate and maintain its own waste water pre-treatment plants within the Premises if such process or industrial wastewater could not meet the influent limits / exceeds the maximum influent criteria of the WTF (in accordance with paragraph 7.2.9 of the Final E&MA Manual). The Tenant shall at its own cost(s) separate, collect, discharge and send all domestic wastewater (i.e. other than process or industrial wastewater) to the Pillar Point Sewage Treatment Works directly for treatment or other treatment works specified in the licence.

18. In any event, the Tenant shall prevent any spilled materials from entering the surface water drainage system and prevent contamination of the sea at its own cost(s) by, inter alia, providing, installing, operating and maintaining stop-logs or interceptors in the surface water drainage system and at the marine frontage area, respectively, or as required by the licence. The Tenant shall at its own cost comply with relevant provisions of the Dumping at Sea Ordinance (Cap 466 of the Laws of Hong Kong) good practices and relevant provisions of the EIA Report and Final EM&A Manual.

Hazard to Life Impact

19. To mitigate hazard to life impact, the Tenant shall comply with, inter alia, Conditions 4.8 to 4.10 of the Environmental Permit No. EP-226/2005 as amended by the Variation of Environmental Permit – Application No.VEP-221/2006 (and comply with the conditions of any updated Permit, amended permit and further permit regarding measures to mitigate hazard to life impact) and shall not:-

(a) Bring, keep, store or transport chlorine within the Premises and other areas of EcoPark;

(b) Bring, keep, store, locate or transport dangerous goods, substances and fuels supporting combustion including oxygen, acetylene, hydrogen peroxide, rubber tyres and diesel within 10 metres from the boundary of the site of EcoPark; and

(c) Exceed the building height restrictions for buildings on the Premises which are on/near the western boundary of the site of EcoPark as mentioned in Annex B to the Environmental Permit No. EP-226/2005 as amended by the Variation of Environmental Permit – Application No.VEP-221/2006 (including any updated Permit, amended permit and further permit).

Landfill Gas Hazard

20. To mitigate landfill gas hazard, the Tenant shall at its own cost(s) comply with, inter alia, Condition 4.13 of the Environmental Permit No. EP-226/2005 as amended by the Variation of Environmental Permit – Application No.VEP-221/2006 regarding raising clear of the ground all buildings and enclosed structures as specified in inter alia Condition 3.7 (and comply with the conditions of any updated Permit, amended permit and further permit regarding measures to mitigate hazard to life impact).

Landscape and Visual Impacts

21. To mitigate landscape and visual impacts, the Tenant shall at its own cost(s) comply with, inter alia, Condition 4.14 of the Environmental Permit No. EP-226/2005 as amended by the Variation of Environmental Permit – Application No.VEP-221/2006 regarding maintaining landscape, planting, treatment and mitigation measures as specified in inter alia Condition 3.8 and Figure 3 (and comply with the conditions of any updated Permit, amended permit and further permit regarding measures to mitigate landscape and visual impacts).

Appendix 3

Endorsed Process Review Checklist

EcoPark Process Review Checklist

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General Details

PRC No. 001 (PRC 1 of 1)

Tenant Ref. No.

Tenant Name Li Tong Group

EcoPark Lot No. EP07-02

Related Processes PRC

Process Overview and Throughput

Material Type WEEE

Process Name Computer / Electronics Recovery

Process Specifics Separation and Testing

Shredding and Separation (Electromagnetic and Electronics)

Details Attached ☑ Yes (attached) ☐ No, not required

Associated Material Throughput (incl. DGs, if any)

Material	In/Out	Throughput (tonnes/yr)
WEEE	In	1,200

Throughput < EIA Limit? ☑ Yes ☐ No, exceeds by

Risk Assessment ☐ Yes (attached) ☑ No, not required

Impact Assessment

☑ Process has already been assessed in the EIA (from EIA Table 14.1):

Impacts to:

AQ	☑ Yes	☐ No	Fugitive dust control required
WQ	☐ Yes	☑ No	None
WM	☑ Yes	☐ No	Minimal wastage of unusable components
CL	☑ Yes	☐ No	Metal fines controlled by APC equipment

Note : AQ=Air Quality | WQ = Water Quality | WM = Waste Management | CL=Contaminated Land

EcoPark Process Review Checklist

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Impact Assessment (continued)

Proposed Mitigation The tenant has proposed to install air pollution control equipment to control dust and metal fines. Also the recovery rates for ferrous, coppers, fibres, plastics and aluminium are anticipated to be more than 90%, which will result in a very small amount of waste generation. Unusable (residual) WEEE will be in the order of 10 tonnes/month.

Includes Chimney ? ☐ Yes ☑ No

If Yes, Complies with EIA Table 13.1? ☐ Yes ☐ No ☐ Pending Confirmation

☐ Process has not been assessed in the EIA but is unlikely to warrant a full Design Audit because:

Summary

☑ Process meets EP Conditions

☑ ❶ Process meets EIA requirements (see above).

☐ ❷ Process is unlikely to warrant a full Design Audit (see above)

☑ No unacceptable environmental impacts – allow process to operate

☐ ❸ Unacceptable/undetermined environmental impacts – do not allow process to operate until Design Audit has been completed and approved

Note : ❶, ❷ and ❸ relate to the process review flowchart, EIA Report Figure 12.1

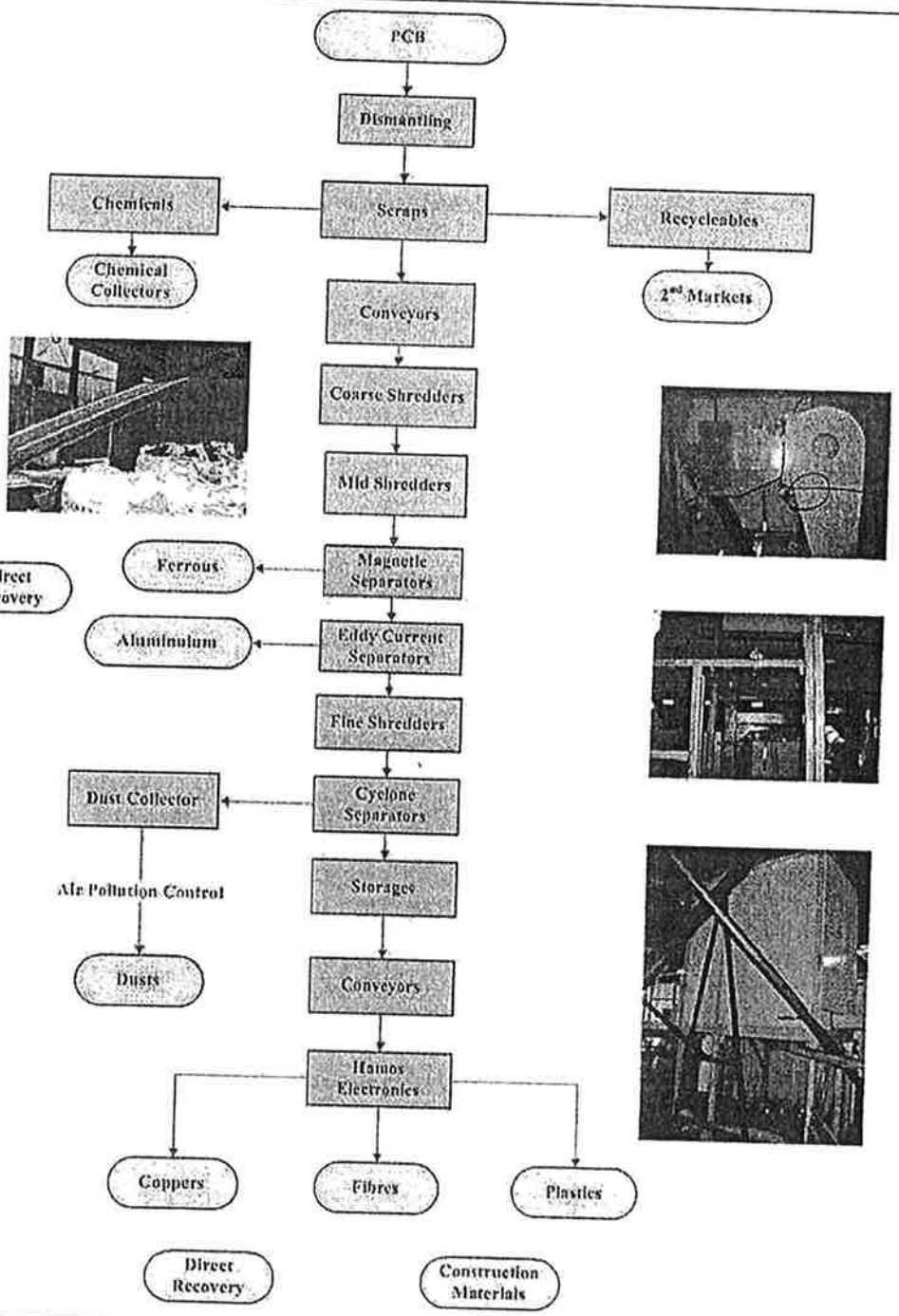
Sign-off Requirements

	ET	IEC	EPD	Operator
Name	Hyder Consulting	Scott Wilson	Waste Reduction & EcoPark Group	Serco Guardian Joint Venture
Sign-off	Certified	Verified	Approved	Tenant Advised
Date				
Signed	Alexi BHANJA	Mike BAINS	Lawrence WONG	T C HON
Role	ET Leader	IEC	Principal EPO	Park Manager
Signature				

Recycling of PCB/ PCBA

Li Tong's Electrostatic Separator hamos KWS (Hamos) , which is the unique recycling plant in Hong Kong, shall separate the metals and non-metals thought mechanical and electromagnetic means. The work flows of the Hamos are as follows:

Work Flow of Electrostatic Separator hamos KWS



EcoPark Process Review Checklist

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General Details

PRC No. 002 (PRC 1 of 2)

Tenant Ref. No.

Tenant Name Champway Technology Limited

EcoPark Lot No. EP07-03

Related Processes PRC

Process Overview and Throughput

Material Type Organic waste

Process Name Waste cooking oil recycling into biodiesel

Process Specifics Raw material extraction, neutralization, separation and distillation

Details Attached ☑ Yes (attached) ☐ No, not required

Associated Material Throughput (incl. DGs, if any)

Material	In/Out	Throughput (tonnes/yr)
Organic waste (waste cooking oil and grease trap waste)	In	40,000
Biodiesel	Out	To be determined in Design Audit
Glycerin	Out	
Inorganic waste	Out	

Throughput < EIA Limit? ☑ Yes ☐ No, exceeds by

Risk Assessment ☐ Yes (attached) ☐ No, not required

Impact Assessment

☐ Process has already been assessed in the EIA (from EIA Table 14.1):

Impacts to:

AQ	☐ Yes	☐ No	Pending confirmation in Design Audit
WQ	☐ Yes	☐ No	Pending confirmation in Design Audit
WM	☐ Yes	☐ No	Pending confirmation in Design Audit
CL	☐ Yes	☐ No	Pending confirmation in Design Audit

Note : AQ=Air Quality | WQ = Water Quality | WM = Waste Management | CL=Contaminated Land

EcoPark Process Review Checklist

Impact Assessment (continued)

Proposed Mitigation The tenant has proposed to use a pump truck to minimise odour emission, install air extraction system for collection of odourous gases and jacket pipes for minimization of fugitive dust emission. Byproduct and packaging would be reused. Sulphur-free biodiesel would be used as operation fuel, or induction heating from CLP. No wastewater treatment proposed.

Includes Chimney ? ☑ Yes ☐ No

If Yes, Complies with EIA Table 13.1? ☐ Yes ☐ No ☑ Pending Confirmation

☐ Process has not been assessed in the EIA but is unlikely to warrant a full Design Audit because:

Summary

☑ Process meets EP Conditions

☐ ❶ Process meets EIA requirements (see above).

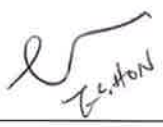
☐ ❷ Process is unlikely to warrant a full Design Audit (see above)

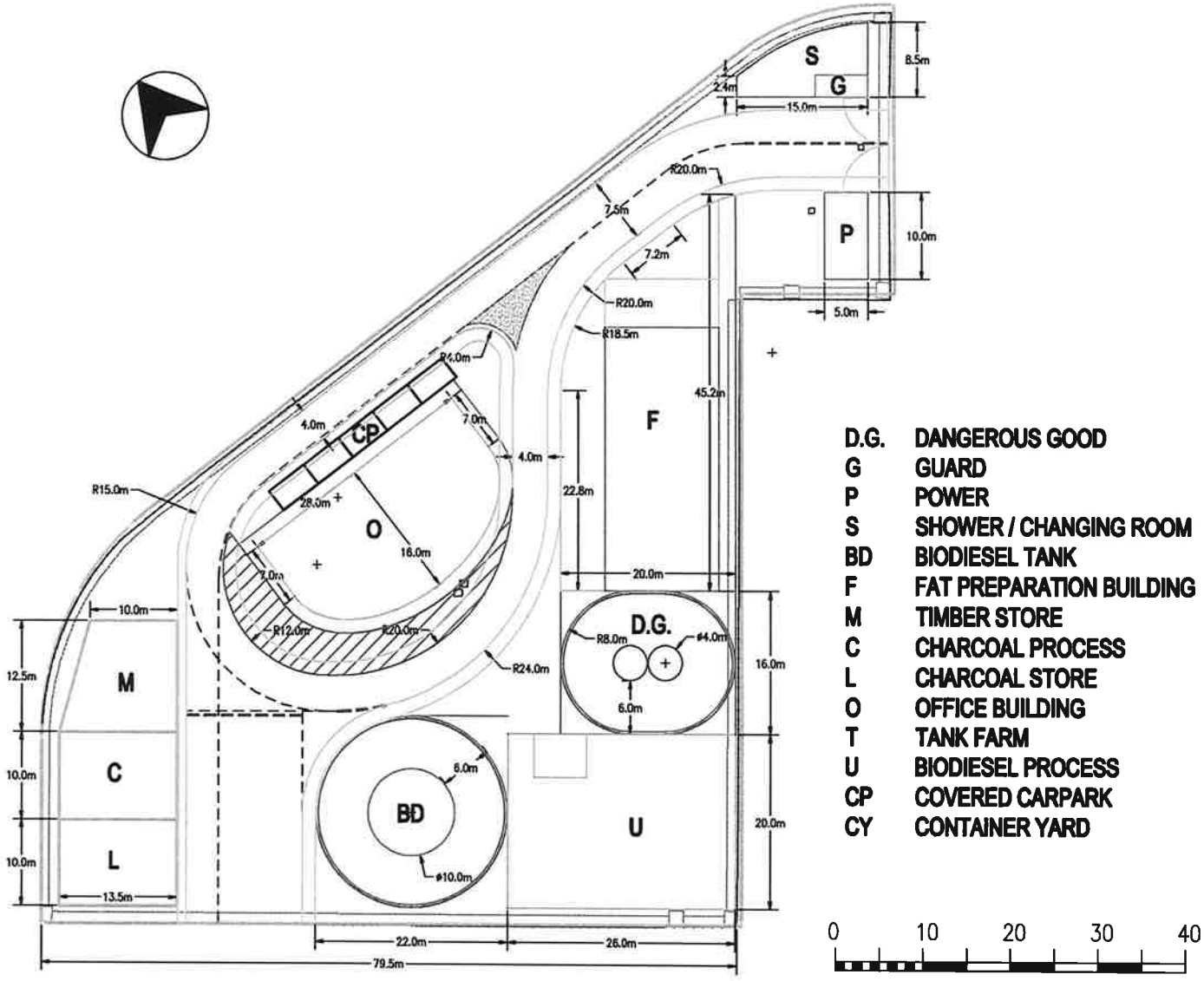
☐ No unacceptable environmental impacts – allow process to operate

☑ ❸ Unacceptable/undetermined environmental impacts – do not allow process to operate until Design Audit has been completed and approved

Note : ❶, ❷ and ❸ relate to the process review flowchart, EIA Report Figure 12.1

Sign-off Requirements

	ET	IEC	EPD	Operator
Name	Hyder Consulting	Scott Wilson	Waste Reduction & EcoPark Group	Serco Guardian Joint Venture
Sign-off	Certified	Verified	Approved	Tenant Advised
Date				
Signed	Alexi BHANJA	Mike BAINS	Lawrence WONG	T C HON
Role	ET Leader	IEC	Principal EPO	Park Manager
Signature				



D.G.	DANGEROUS GOOD
G	GUARD
P	POWER
S	SHOWER / CHANGING ROOM
BD	BIODIESEL TANK
F	FAT PREPARATION BUILDING
M	TIMBER STORE
C	CHARCOAL PROCESS
L	CHARCOAL STORE
O	OFFICE BUILDING
T	TANK FARM
U	BIODIESEL PROCESS
CP	COVERED CARPARK
CY	CONTAINER YARD

0 10 20 30 40

G/F LAYOUT PLAN VER.3.2_3D

SCALE 1:750

Table 1 - Schedule of Environmental Aspects and Impacts

Supply Chain	**Supplier/Purchasing**	**Producing**	**Delivering**	**Sales**	**Customer**
Life Cycle	**Material acquisition**	**Manufacturing**	**Transport**	**Storage & Packaging**	**Utilization**
Relevant Operation(s) (i.e. environmental aspects)	• Collection of organic waste such as waste cooking oil/waste lipid/grease trap waste • Procurement of reagents such as methanol and mineral acid	• Fat preparation • Reaction process • Separation/recovery process • Neutralization • Storage and transfer of products & reagents	• Delivery of biodiesel and heavy fraction of biodiesel as industrial grade • Delivery of by-product such as inorganic salt	• Packaging of biodiesel and other by-products	• Use of biodiesel and other by-products
Environmental Impacts (including air, noise and water pollution as well as waste generation and material consumption)	• Odour emission from collection operation • Fugitive emission from procurement of reagents • Accidental spillage of organic waste and reagents • Noise and air emission from collection fleet exhaust • Packaging waste arising from collection of organic waste and procurement of reagents	• Odour emission from fat preparation • Fugitive emission from storage and transfer of reagents • Wastewater arising from fat preparation • Accidental spillage of organic waste, reagents and products/by-products • Noise and air emission from plant/equipment exhaust • By-products such as inorganic salt and glycerin generated from separation/recovery process • Consumption of reagents	• Air and noise emission from delivery fleet exhaust • Accidental spillage of products/ by-products	• Accidental spillage of products/ by-products • Packaging waste such as containers	• Improper maintenance of vehicle/fleet/plant/equipment leads to higher noise and air emission and fuel consumption (energy inefficient) • Disposal of by-products leads to waste generation • Accidental spillage of products/ by-products

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Table 2 - Schedule of Environmental Mitigation/Waste Management Measures and Green Initiatives

Supply Chain	**Supplier/Purchasing**	**Producing**	**Delivering**	**Sales**	**Customer**
Life Cycle	**Material acquisition**	**Manufacturing**	**Transport**	**Storage & Packaging**	**Utilization**
Relevant Operation(s) (i.e. environmental aspects)	• Collection of organic waste such as waste cooking oil/waste lipid/grease trap waste • Procurement of reagents such as methanol and mineral acid	• Fat preparation • Reaction process • Separation/recovery process • Neutralization • Storage and transfer of products & reagents	• Delivery of biodiesel and heavy fraction of biodiesel as industrial grade • Delivery of by-product such as inorganic salt	• Packaging of biodiesel and other by-products	• Use of biodiesel and other by-products
Mitigation/Waste Management Measures (Items C1 & C2)	• Use of pump truck to minimize odour emission • Establishment of proper storage facility for dangerous goods • Provision of training on spillage prevention and control & conduct of drill using spill control kit • Use of sulfur free biodiesel as the fuel of collection fleet • Routine maintenance of collection fleet • Separation of organic waste at source with incentive scheme in place (i.e. preventing organic waste from discharging into foul sewer) • Reuse of containers in packaging biodiesel and other by-products • Arrangement for surplus metal container to be collected by metal recycling companies	• Use of air extraction system for collection of odourous gases • Use of jacket pipes for transferring reagents to minimize fugitive emission • Discharge of wastewater into foul sewer • Provision of training on spillage prevention and control & conduct of drill using spill control kit • Concrete paving with bund as containment of spillage • Use of sulfur free biodiesel as the fuel of plant/equipment • Routine maintenance of plant/equipment (i.e. generation sets, boilers, etc.) • Use of inorganic salt (i.e. by-product) as fertilizer in landscaping work • Blending of glycerin and heavy fraction biodiesel to produce industrial grade biodiesel	• Provision of training on spillage prevention and control & conduct of drill using spill control kit • Use of sulfur free biodiesel as the fuel of delivery fleet • Routine maintenance of delivery fleet	• Provision of training on spillage prevention and control & conduct of drill using spill control kit • Reuse of containers in packaging biodiesel and other by-products	• Improper maintenance of vehicle/fleet/plant/equipment leads to higher noise and air emission and fuel consumption (energy inefficient) • Disposal of by-products leads to waste generation • Accidental spillage of products/ by-products
Green Initiatives (Item C3)	• Assist waste producer (e.g. catering industry) in participating into Wastewise Scheme • Use of computer programme to enhance logistic/route planning for collection of organic waste (i.e. minimize usage of fuel)	• Application of algae tube for odour removal • Procurement of flaked timber (through by-product exchange) to produce biocharcoal – an effective solid catalyst in substitution for mineral acid (i.e. reduced consumption of mineral acid) • Greening the rooftop of plant facility	• N/A	• Planning for participation into the environmental awards such as eco-product, eco-business, etc.	• Establishment of Biodiesel Fan Club for exchange of views and information among users, suppliers, authorities, academic institution and other stakeholders

EcoPark Process Review Checklist

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General Details

PRC No. 003 (PRC 1 of 1)

Tenant Ref. No.

Tenant Name Hung Wai Wooden Board Company

EcoPark Lot No. EP06-034

Related Processes PRC

Process Overview and Throughput

Material Type Wood

Process Name Waste wood recycling

Process Specifics Hydraulic compaction / mechanical shearing

Details Attached ☑ Yes (attached) ☐ No, not required

Associated Material Throughput (incl. DGs, if any)

Material	In/Out	Throughput (tonnes/yr)
Waste wood	In	65,000
Wooden board	Out	50,000

Throughput < EIA Limit? ☑ Yes ☐ No, exceeds by _____

Risk Assessment ☐ Yes (attached) ☑ No, not required

Impact Assessment

☑ Process has already been assessed in the EIA (from EIA Table 14.1):

Impacts to:

AQ	☐ Yes	☑ No	None
WQ	☐ Yes	☑ No	None
WM	☑ Yes	☐ No	Metals/plastics to other recylers
CL	☐ Yes	☑ No	None

Note : AQ=Air Quality | WQ = Water Quality | WM = Waste Management | CL=Contaminated Land

EcoPark Process Review Checklist

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Impact Assessment (continued)

Proposed Mitigation The tenant proposes to use plant and equipment to separate wood materials from other reusable materials, such as plastic, paper, metals, etc. The sorted reusable materials will be made available to other recyclers within EcoPark as feedstock. As such, the quantity of materials that needs to be disposed of as waste can be minimised.

Includes Chimney ? ☐ Yes ☑ No

If Yes, Complies with EIA Table 13.1? ☐ Yes ☐ No ☐ Pending Confirmation

☐ Process has not been assessed in the EIA but is unlikely to warrant a full Design Audit because:

_____

_____

_____

_____

Summary

☑ Process meets EP Conditions

☑ ❶ Process meets EIA requirements (see above).

☐ ❷ Process is unlikely to warrant a full Design Audit (see above)

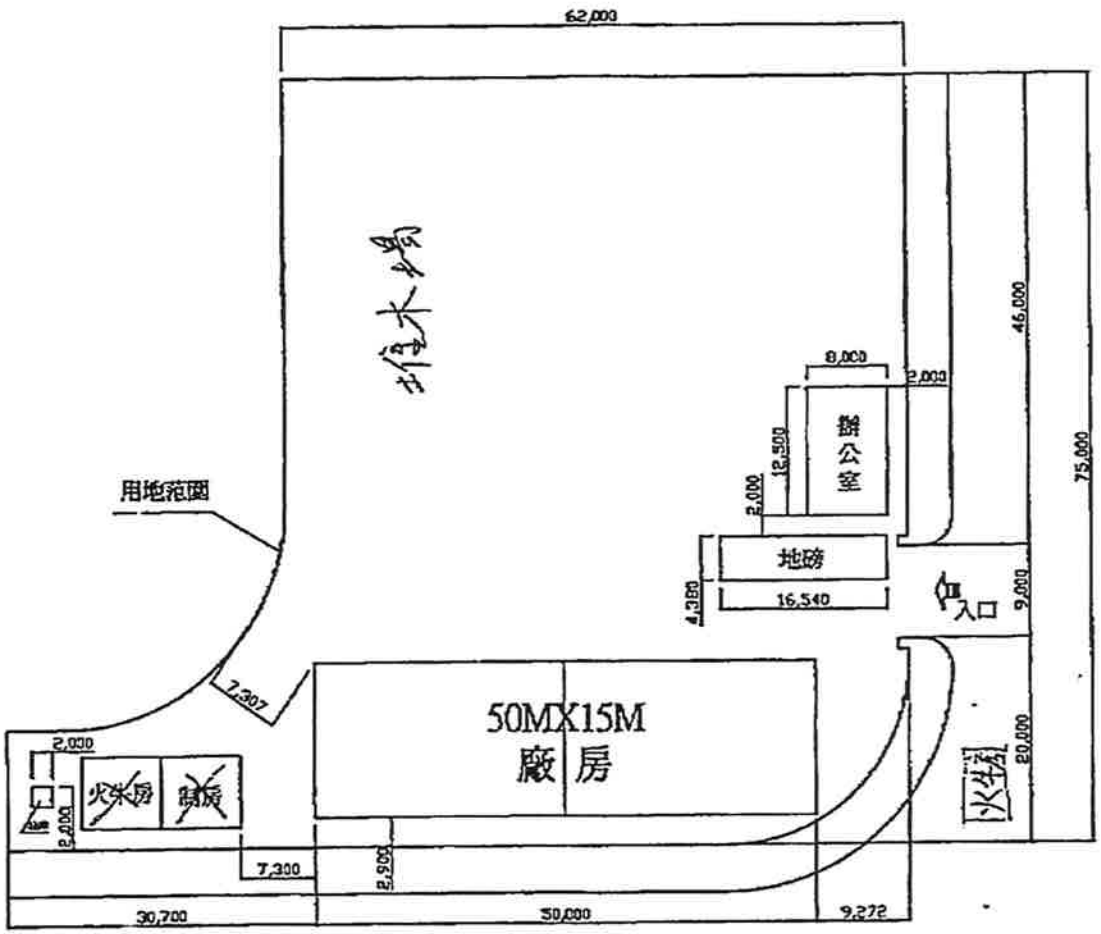
☐ No unacceptable environmental impacts – allow process to operate

☐ ❸ Unacceptable/undetermined environmental impacts – do not allow process to operate until Design Audit has been completed and approved

Note : ❶, ❷ and ❸ relate to the process review flowchart, EIA Report Figure 12.1

Sign-off Requirements

	ET	IEC	EPD	Operator
Name	Hyder Consulting	Scott Wilson	Waste Reduction & EcoPark Group	Serco Guardian Joint Venture
Sign-off	Certified	Verified	Approved	Tenant Advised
Date	20/03/08	1/04/08		7/4/08
Signed	Alexi BHANJA	Mike BAINS	Lawrence WONG	T C HON
Role	ET Leader	IEC	Principal EPO	Park Manager
Signature				



Revision	Date	Description	Checked
Drawing NO.			
Job NO.		Scale: 1:630	
Drawn:	Checked:	Date:	

香港 Hong Kong Pre-fabricated Products Ltd.
香港預製件有限公司

鴻偉公司廠房用地佈置

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最边地下辦公室平面圖

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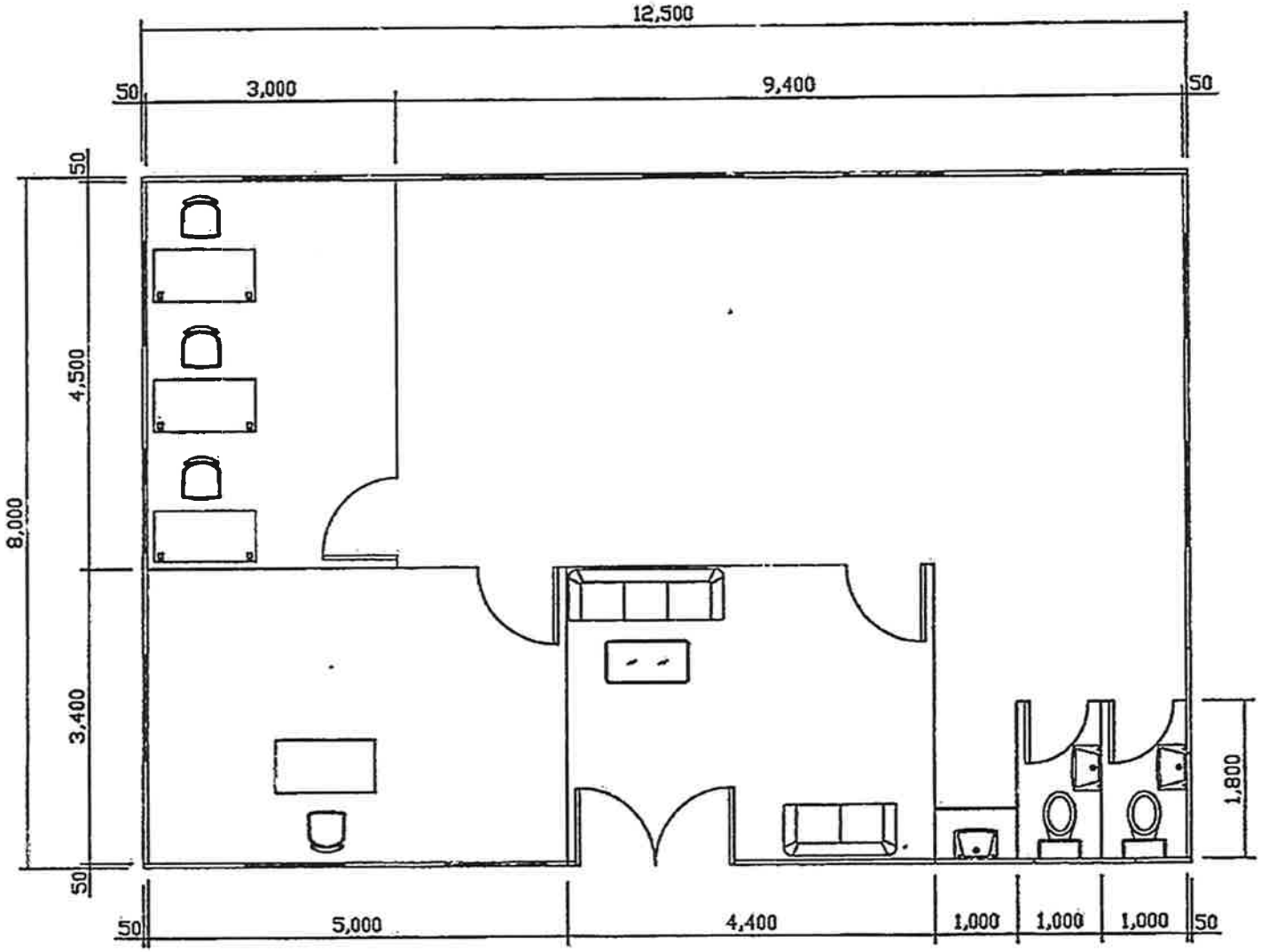

EcoPark Process Review Checklist

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General Details

PRC No. 002 (PRC 2 of 2)

Tenant Ref. No.

Tenant Name Champway Technology Limited

EcoPark Lot No. EP07-03

Related Processes PRC

Process Overview and Throughput

Material Type Organic waste

Process Name Waste cooking oil recycling into biodiesel

Process Specifics Raw material extraction, neutralization, separation and distillation

Details Attached ☑ Yes (attached) ☐ No, not required

Associated Material Throughput (incl. DGs, if any)

Material	In/Out	Throughput (tonnes/yr)
Organic waste (waste cooking oil and grease trap waste)	In	40000
Alcohol	In	7600
Biodiesel	Out	37240-37620
Glycerin	Out	3920-3960
Inorganic waste	Out	640-920

Throughput < EIA Limit? ☑ Yes ☐ No, exceeds by

Risk Assessment ☑ Yes (attached) ☐ No, not required

Impact Assessment

☐ Process has already been assessed in the EIA (from EIA Table 14.1):

Impacts to:

AQ ☐ Yes ☐ No

WQ ☐ Yes ☐ No

WM ☐ Yes ☐ No

CL ☐ Yes ☐ No

Note : AQ=Air Quality | WQ = Water Quality | WM = Waste Management | CL=Contaminated Land

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EcoPark Process Review Checklist

Impact Assessment (continued)

Proposed Mitigation The tenant has proposed to use a pump truck to minimise odour emission, install air extraction system for collection of odourous gases and jacket pipes for minimization of fugitive dust emission. Byproduct and packaging would be reused. Sulphur-free biodiesel would be used as operation fuel, or induction heating from CLP. No wastewater treatment proposed.

Includes Chimney ? ☐ Yes ☑ No

If Yes, Complies with EIA Table 13.1? ☐ Yes ☐ No ☐ Pending Confirmation

☑ Process has not been assessed in the EIA, Design Audit is attached.

☐ Process has not been assessed in the EIA but is unlikely to warrant a full Design Audit because:

_____

_____

_____

Summary

☑ Process meets EP Conditions

☑ ❶ Process meets EIA requirements or passes Design Audit (see above).

☐ ❷ Process is unlikely to warrant a full Design Audit (see above)

☑ No unacceptable environmental impacts – allow process to operate

☐ ❸ Unacceptable/undetermined environmental impacts – do not allow process to operate until Design Audit has been completed and approved

Note : ❶, ❷ and ❸ relate to the process review flowchart, EIA Report Figure 12.1

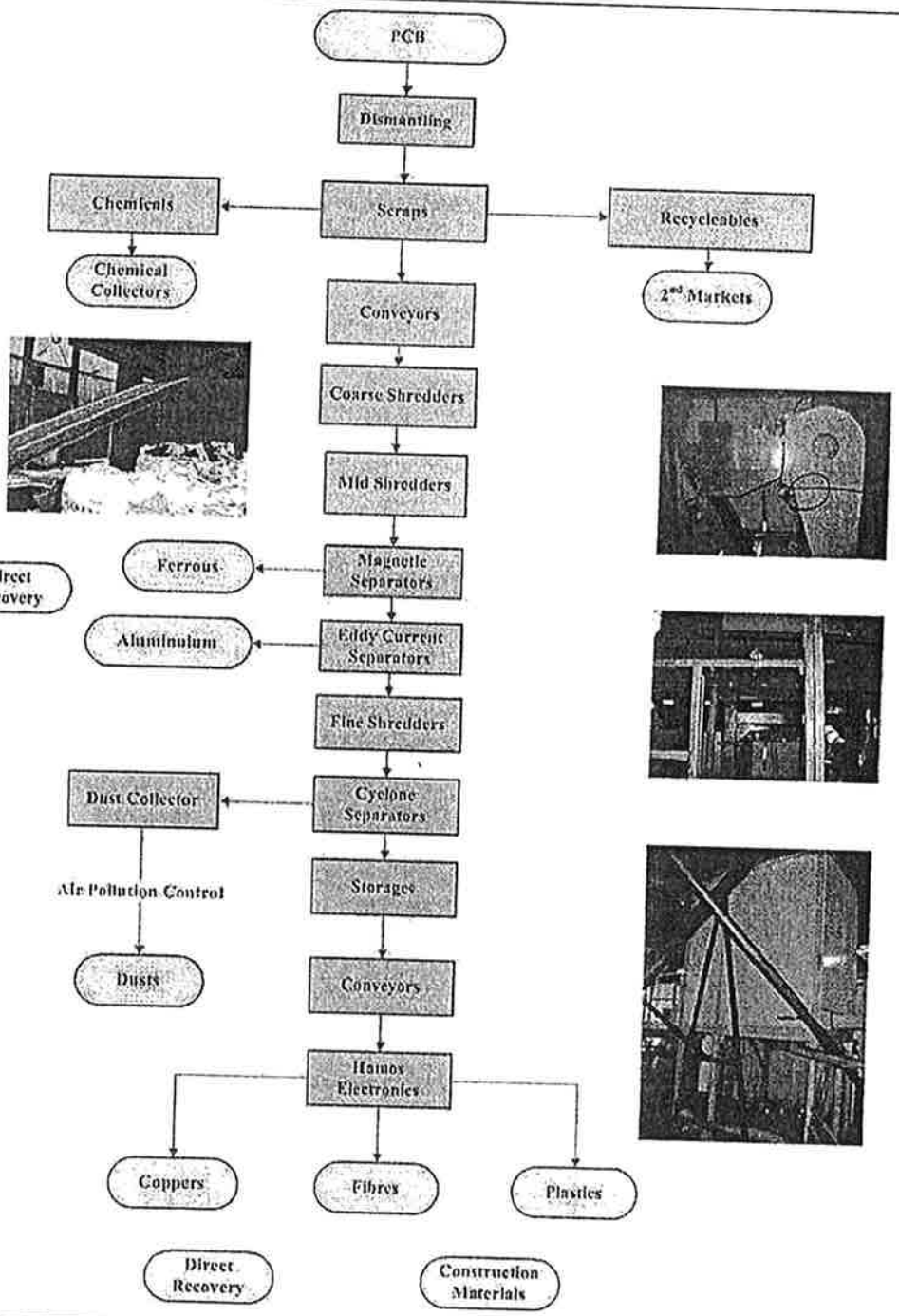
Sign-off Requirements

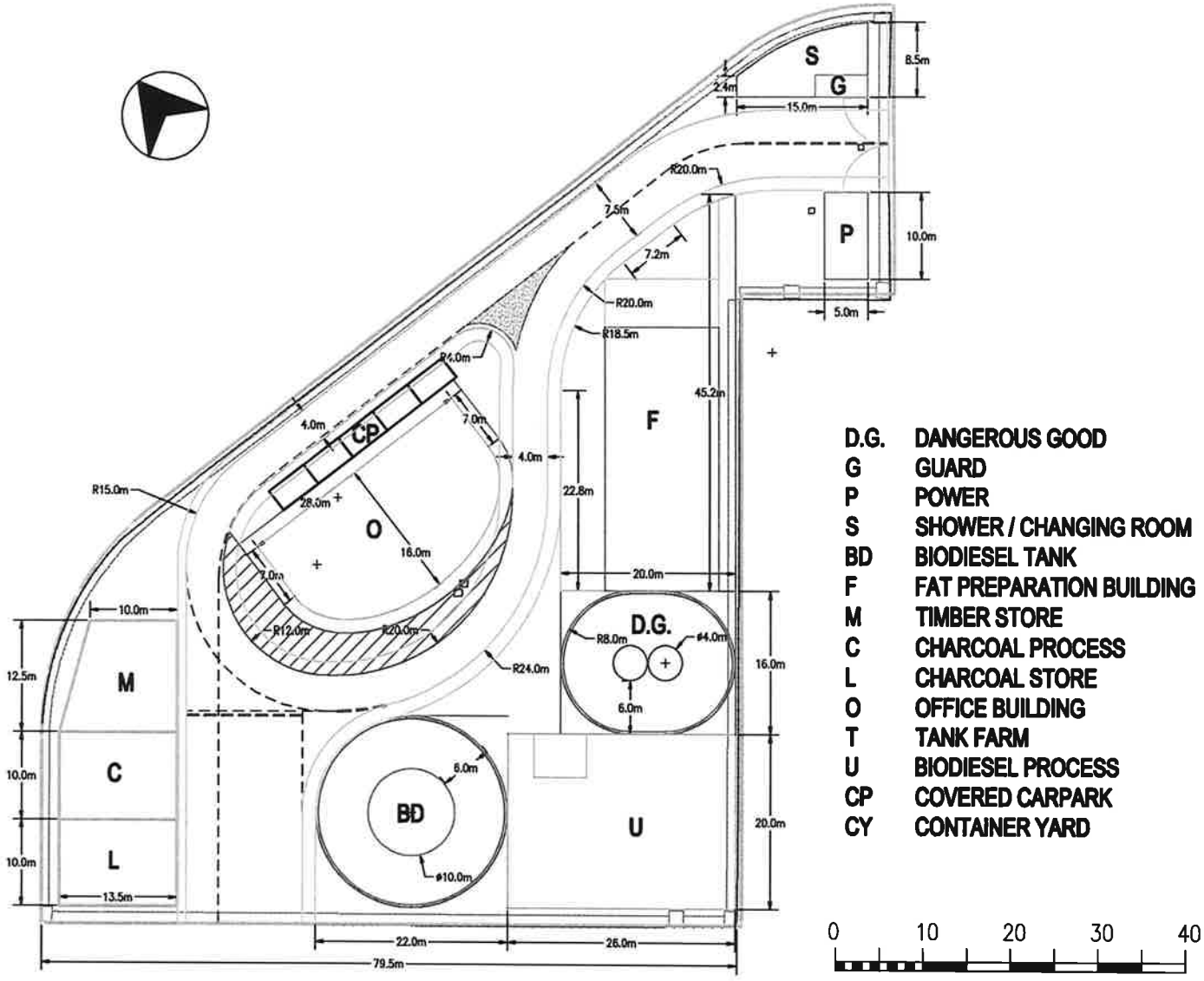
	ET	IEC	EPD	Operator
Name	Hyder Consulting	Scott Wilson	Waste Reduction & EcoPark Group	Serco Guardian Joint Venture
Sign-off	Certified	Verified	Approved	Tenant Advised
Date		14-05-2008	15.5.2008	16.5.2008
Signed	Alexi BHANJA	Mike BAINS	Lawrence WONG	T C HON
Role	ET Leader	IEC	Principal EPO	Park Manager
Signature				

Recycling of PCB/ PCBA

Li Tong's Electrostatic Separator hamos KWS (Hamos) , which is the unique recycling plant in Hong Kong, shall separate the metals and non-metals thought mechanical and electromagnetic means. The work flows of the Hamos are as follows:

Work Flow of Electrostatic Separator hamos KWS





D.G.	DANGEROUS GOOD
G	GUARD
P	POWER
S	SHOWER / CHANGING ROOM
BD	BIODIESEL TANK
F	FAT PREPARATION BUILDING
M	TIMBER STORE
C	CHARCOAL PROCESS
L	CHARCOAL STORE
O	OFFICE BUILDING
T	TANK FARM
U	BIODIESEL PROCESS
CP	COVERED CARPARK
CY	CONTAINER YARD

0 10 20 30 40

G/F LAYOUT PLAN VER.3.2_3D

SCALE 1:750

Table 1 - Schedule of Environmental Aspects and Impacts

Supply Chain	**Supplier/Purchasing**	**Producing**	**Delivering**	**Sales**	**Customer**
Life Cycle	**Material acquisition**	**Manufacturing**	**Transport**	**Storage & Packaging**	**Utilization**
Relevant Operation(s) (i.e. environmental aspects)	• Collection of organic waste such as waste cooking oil/waste lipid/grease trap waste • Procurement of reagents such as methanol and mineral acid	• Fat preparation • Reaction process • Separation/recovery process • Neutralization • Storage and transfer of products & reagents	• Delivery of biodiesel and heavy fraction of biodiesel as industrial grade • Delivery of by-product such as inorganic salt	• Packaging of biodiesel and other by-products	• Use of biodiesel and other by-products
Environmental Impacts (including air, noise and water pollution as well as waste generation and material consumption)	• Odour emission from collection operation • Fugitive emission from procurement of reagents • Accidental spillage of organic waste and reagents • Noise and air emission from collection fleet exhaust • Packaging waste arising from collection of organic waste and procurement of reagents	• Odour emission from fat preparation • Fugitive emission from storage and transfer of reagents • Wastewater arising from fat preparation • Accidental spillage of organic waste, reagents and products/by-products • Noise and air emission from plant/equipment exhaust • By-products such as inorganic salt and glycerin generated from separation/recovery process • Consumption of reagents	• Air and noise emission from delivery fleet exhaust • Accidental spillage of products/ by-products	• Accidental spillage of products/ by-products • Packaging waste such as containers	• Improper maintenance of vehicle/fleet/plant/equipment leads to higher noise and air emission and fuel consumption (energy inefficient) • Disposal of by-products leads to waste generation • Accidental spillage of products/ by-products

Serco Guardian JV

EcoPark Operation EM&A Design Audit #1 for Biodiesel

Lot EP07-03
Champway
Technology Limited

May 2008

Report no: 01464R041

Hyder Consulting

Serco Guardian JV

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EcoPark Operation EM&A Design Audit #1 for Biodiesel

Lot EP07-03 Champway Technology Limited

Author: Alexi BHANJA

Checker: Winnie MA

Approver: Guiyi LI

Report no: 01464R041

Date: May 2008

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Hyder Consulting

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1 Executive Summary

As a Designated Project (DP) under the Environmental Impact Assessment Ordinance (EIAO), EcoPark operates under Environmental Permit (EP) No. EP-226/2005/A. The issue of the permit was based on the EIA, which assessed some 86 different processes under twelve material types. For processes not assessed in the EIA Report, Process Review and Design Audit mechanisms were provided.

Champway Technology Limited (Champway) propose to recycle waste cooking oil into biodiesel. This is a process that was not assessed in the EIA Report and its complexity warrants a Design Audit. This report presents the Design Audit for the Champway process to recycle waste cooking oil into biodiesel. The process is based on trans-esterification in continuous reactor units followed by separation and distillation into biodiesel, with glycerine as the major by-product.

The impact assessment follows the key impacts assessed in the EIA Report, namely, air quality, water quality, waste management implications, prevention of contaminated land and hazard to life (in terms of off-site fatalities). For each criteria, the sources and potential impacts have been assessed and also the mitigation measures proposed by Champway. Where appropriate, additional mitigation measures are recommended to further reduce impact.

For each of the criteria, it has been concluded that the impacts posed by the assessed process are no greater than those already assessed in the EIA Report. As such, the process is deemed to meet the requirements of the EIA Report and should therefore be allowed to operate within EcoPark.

2 Introduction

2.1 The Original EIA

As a Designated Project (DP) under the Environmental Impact Assessment Ordinance (EIAO), EcoPark operates under Environmental Permit (EP) No. EP-226/2005/A.

The EIA for EcoPark, on which the EP is based, assessed some 86 different processes under twelve material types. Of the 86 different processes, some were rejected on grounds of unacceptable environmental impact – these included inedible rendering of organic food waste and demagging of aluminium. The remaining processes were considered acceptable to operate within EcoPark and these are summarised in ***Table 2-1***, below.

Material Type	Typical Recycling Processes to be Carried Out
Batteries	Mechanical / physical separation, shredding, neutralization (of electrolyte)
Electronics	Separation and testing, shredding, electromagnetic and electrostatic sorting, manual dismantling
Glass	Manual / automated sorting, crushing, melting, moulding, forming and finishing
Organic Food Waste	In-vessel composting (enclosed)
Ferrous Metals	Sorting and baling, shearing and shredding
Non-ferrous Metals	Sorting and baling, shearing and shredding, melting, refining and alloying
Paper	Sorting and baling, pulping, cleaning, de-inking, non-chlorine bleaching, pressing and drying
Plastics	Sorting, crushing and baling, flaking, shredding and cutting, blending, moulding and extrusion, Plastic Wood Composite (PWC) manufacturing
Textiles	Sorting and baling
Rubber Tyres	De-beading, shredding, crumbing, processing, re-treading
Wood	Dismantling and sorting, compaction, shearing, pallet refurbishment, chipping, non-chlorine bleaching, PWC manufacturing
Spent Copper Etchant	Electrolysis

Table 2-1 Processes Assessed Under the EIA Study

2.2 Purpose and Need for Design Audit

It was acknowledged in the EIA Report that the list of processes assessed (and considered acceptable) for inclusion within EcoPark was not exhaustive and that, at some point, there would be potential tenants seeking the inclusion of processes within EcoPark that had not been previously assessed. To address this eventuality, the Process Review and Design Audit mechanisms were included in the Environmental Monitoring and Audit (EM&A) programme for EcoPark. The Process Review comprises ten steps, as shown in ***Figure 2-1***.

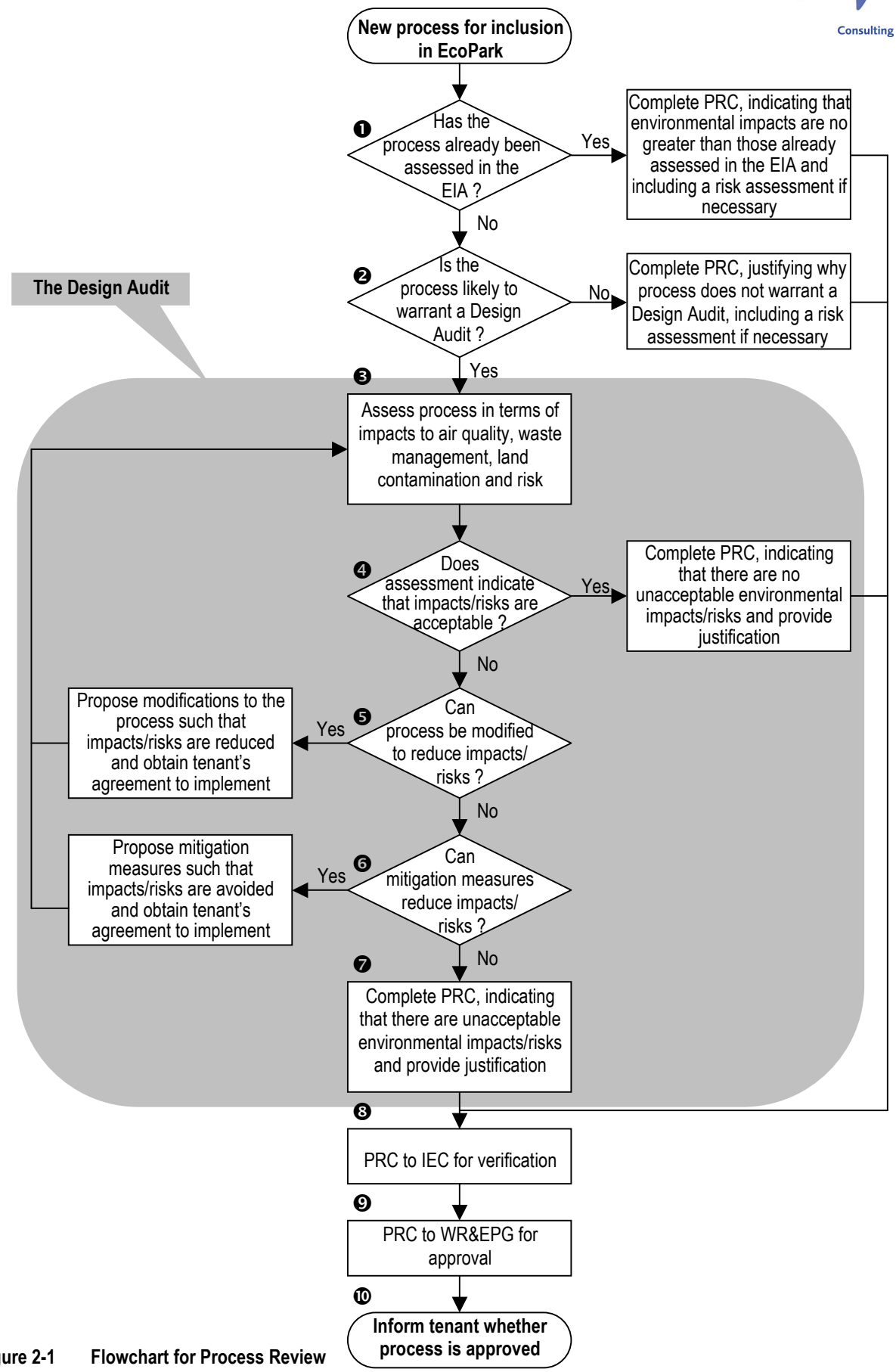


Figure 2-1 Flowchart for Process Review

Step 1 – Has the Process Already Been Assessed in the EIA

The Environmental Team (ET) will initially determine whether the proposed process has already been assessed in the EIA – reference may be made to Table 14.1 and D.1 (in Appendix D) of the EIA Report. The ET shall also confirm that proposed throughputs are no greater than those assessed in the EIA. If the process has already been assessed in the EIA, then the Process Review Checklist (PRC) will be completed to indicate that environmental impacts are no greater than those already assessed and to recommend that the process should be approved for operation in EcoPark. It should also be determined whether the storage or transportation of Dangerous Goods (DGs) poses a risk, and if so a hazard to life assessment should be carried out confirm that any risk is acceptable in terms of the Hong Kong Risk Guidelines (Annex 4 of the EIAO-Technical Memorandum).

Step 2 – Is the Process Likely to Warrant a Design Audit?

If the proposed process is minor in nature and, in the professional judgement of the ET, will not cause adverse environmental impact (including cumulative impacts with existing processes) or unacceptable risk (in terms of the Hong Kong Risk Guidelines) then the PRC will be completed to indicate that a Design Audit is not warranted and to recommend that the process should be approved for operation in EcoPark. Additional information shall be appended to the PRC providing full justification of this conclusion. It is suggested that the ET should obtain the IEC's informal agreement to this conclusion before officially requesting verification (Step 8). If in the opinion of the Independent Environmental Checker (IEC) a Design Audit should be carried out, then the ET should consider proceeding to Step 3.

Step 3 – Assessment

The actual methodology shall be proposed by the Operator in his tender for the Management Contract but shall incorporate the following (additional assessments may be specified by the IEC or **WR&EPG** as appropriate) :

- Assessment of likely impacts to air quality in terms of TSP, RSP, SO_2, NO_2, CO, VOC, TAP (including but not limited to heavy metals, halogen compounds, dioxin and furans) and odour. Any other existing and planned/committed air pollution sources within 500m from the boundary of EcoPark should be included in determining the cumulative air quality impact at ASRs.
- Waste management implications in terms of quantities and composition of recyclable by-products, potential for vertical integration within processes already operating within EcoPark, quantity and composition of any non-recyclable materials that require off-site disposal / treatment.
- Potential for process to cause land contamination in terms of normal operations or accident.
- Determine the need for a hazard to life assessment and confirm that risk posed by the transportation or storage of any DGs is acceptable in terms of Hong Kong Risk Guidelines.

Each assessment shall not be carried out in isolation but shall take into consideration an overview of all other processes currently operating within EcoPark and those that are anticipated, based on the feedback from the Operator's promotional efforts. By considering the environmental impacts and/or risks of each process in this holistic manner, the Operator shall develop EcoPark as a single, integrated facility, rather than simply as a collection of disparate recycling operations. In this way, the flexibility inherent in the Umbrella Approach and Design Audit Approach can be fully utilised, while demonstrating and ensuring environmental protection and compliance with the findings of the EIA Report and the conditions of the EP.

Step 4 – Does the Assessment Indicate that Impacts or Risks are Acceptable?

If the assessment indicates that environmental impacts are acceptable (using the same criteria that were used in the EIA) or that risks are acceptable in terms of the Hong Kong Risk Guidelines, then the PRC will be completed to indicate that there are no unacceptable environmental impacts and/or risks and to recommend that the process should be approved for operation in EcoPark. Additional information (such as the assessment itself) shall be appended to the PRC providing full justification of this conclusion. It is suggested that the ET should obtain the IEC's informal agreement to this conclusion before officially requesting verification (Step 8). If in the opinion of the IEC impacts are not acceptable, then the ET should consider proceeding to Steps 5 and/or 6. Note that Step 6 can be carried out before Step 5, or in parallel, if required.

Step 5 – Can Processes be Modified to Reduce Impacts and/or Risks?

Working with the tenant, the ET shall propose modifications to the tenant's intended process such that environmental impacts and/or risks are avoided or reduced to an acceptable level. Modification could be through adoption of cleaner technology, reduction of throughputs, elimination of DGs, etc. The tenant's agreement to modification of the process should be obtained (in writing) together with an agreed timetable, if appropriate. The modified process shall then be re-assessed (Step 3).

Step 6 – Can Mitigation Measures Reduce Impacts and/or Risks?

Working with the tenant, the ET shall propose additional mitigation measures such that the environmental impacts and/or risks are reduced to an acceptable level. Mitigation could include air pollution control equipment (such as bag filters, electrostatic precipitators, etc.), agreement to develop the tenant's lot in such a way as to avoid potential for land contamination (such as provision of hardstanding and/or shelters), provision of improved storage facilities for DGs, etc. The tenant's agreement to install proposed mitigation should be obtained (in writing) together with an agreed timetable, if appropriate. The mitigated process shall then be re-assessed (Step 3).

Step 7 – Unacceptable Environmental Impacts and/or Risks Identified

Steps 3 to 6 can be repeated as many times as necessary, in an iterative manner. However, should the ET and/or tenant conclude that the process cannot be further modified or mitigated such that there are no unacceptable environmental impacts and/or risks, then the PRC will be completed to indicate that environmental impacts (individual and/or cumulative) and/or risks are unacceptable and to recommend that the process should not be approved for operation in EcoPark.

Step 8 – IEC Verification

The ET shall pass the completed PRC to the IEC for verification. The IEC shall verify that the conclusions reach by the ET are sound and that any justifications are sufficient to support the conclusions. Should the IEC disagree with the ET's conclusions or recommendations, then this shall be resolved between the IEC and ET.

Step 9 – WR&EPG Approval

The IEC shall pass the completed and verified PRC to the Waste Recycling and EcoPark Group (WR&EPG) for approval. WR&EPG shall approve the conclusions and recommendations of the ET based on the verification of the IEC. Should WR&EPG disagree with the ET's conclusions or recommendations, or with the IEC's verification, then this shall be resolved between the three parties.

Step 10 – Inform Tenant Whether Process is Approved

WR&EPG shall pass the completed, verified and approved PRC to the Operator and the Operator shall inform the tenant whether the proposed process is approved for operation in EcoPark or if approval has not been given. If the latter, the Operator shall give an explanation to the tenant as to why. Should the tenant make improvements to one or more parts of the process at a later date, then the process can be resubmitted for process review.

Since the Biodiesel process has not been assessed in the EIA Report (Step 1) and since the complexity of the process warrants a Design Audit (Step 2) then it is necessary to carry out a Design Audit and carry out Steps 3 to 7. When the Design Audit has been agreed by all parties, it will be appended to the PRC and Steps 8 to 10 will be followed.

The iterative nature of the Design Audit provides opportunities for the Environmental Team to work with the tenants and advise mitigation measures to reduce the operational environmental impacts or risks to the acceptable level at the stage of preliminary design. Therefore, the approved process will not have adverse impacts or risk to the EcoPark.

The following sections of this report are the core of the Design Audit.

3 The New Process – Biodiesel Production

3.1 About the Tenant

Champway Technology Limited (Champway) propose to recycle waste cooking oil into biodiesel. Champway will be located in lot EP07-03, as shown in ***Figure 3-1***, below. The proposed layout of this lot is shown in ***Figure 3-2***, below.

Champway purposes to obtain waste cooking oil from restaurant chains, such as McDonalds, Maxims, etc., and transport the waste oil to EcoPark for recycling. The finished biodiesel product is sulphur-free and hence a cleaner fuel than even low-sulphur diesel.

Biodiesel produced by Champway will be sold directly to large diesel users, such as construction dump trucks, container trailers, delivery vans, etc. The by-products, such as inorganic salts, glycerine and heavy fraction biodiesel, can be turned into fertilizer and industrial grade biodiesel, and will be sold on by Champway.

3.2 About the Process

Biodiesel production provides an incentive for catering industry to participate in the Hong Kong Awards for Environmental Excellence (HKAEE) and encourages separation of organic waste at source. This reduces organic waste (waste cooking oil and grease trap waste) discharged into sewer (or disposed of to landfill) and provides raw material for the manufacture of biodiesel.

Figure 3-3, below, illustrates the proposed biodiesel process that has been assessed in this Design Audit.

Grease trap waste (GTW) is pretreated in West Kowloon Refuse Transfer Station but not waste cooking oil (WCO). Champway will directly utilize the GTW without pretreatment in Ecopark. Champway collects and transport WCO by road to EcoPark for pre-treatment. Such pre-treatment would involve heating up the WCO lightly to about $50^{O}C$ and separating the solid waste and waste water from WCO.

Waste oil arriving at Champway's facility in EcoPark is loaded into the continuous reactor units, to which alcohol, mineral acid and a catalyst are added as required. Within the reactor units, trans-esterification is achieved.

Champway propose to convert any wood/timber waste (procured through by-product exchange with other tenants in EcoPark) into biocharcoal through pyrolysis. This will reduce wood/ timber waste which will otherwise end up in landfill. The biocharcoal will substitute part of mineral acid used and thereby reduce mineral acid consumption.

The liquid from the continuous reactor units is then separated into two separate streams. The glycerine phase is denser than the biodiesel phase and the two can be separated by gravity. The glycerine phase is neutralized by mineral acid, which generates an inorganic salt that is subsequently separated from the

glycerine and which can be used as fertilizer. Glycerine of ~90% purity is produced after alcohol distillation and it can be used for industrial application. The recovered alcohol will be reused in the system.

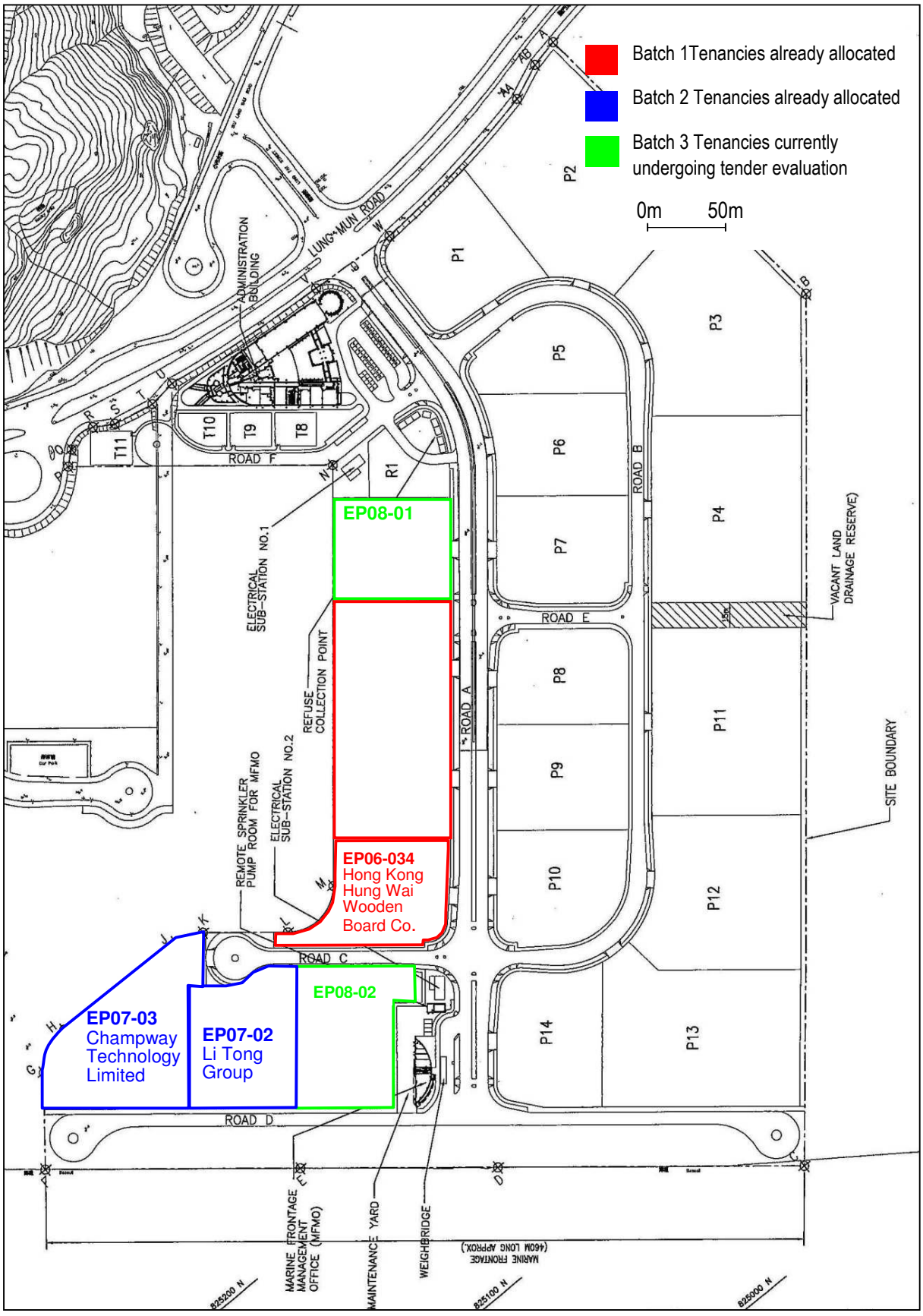


Figure 3-1 Location of Champway Lot in EcoPark

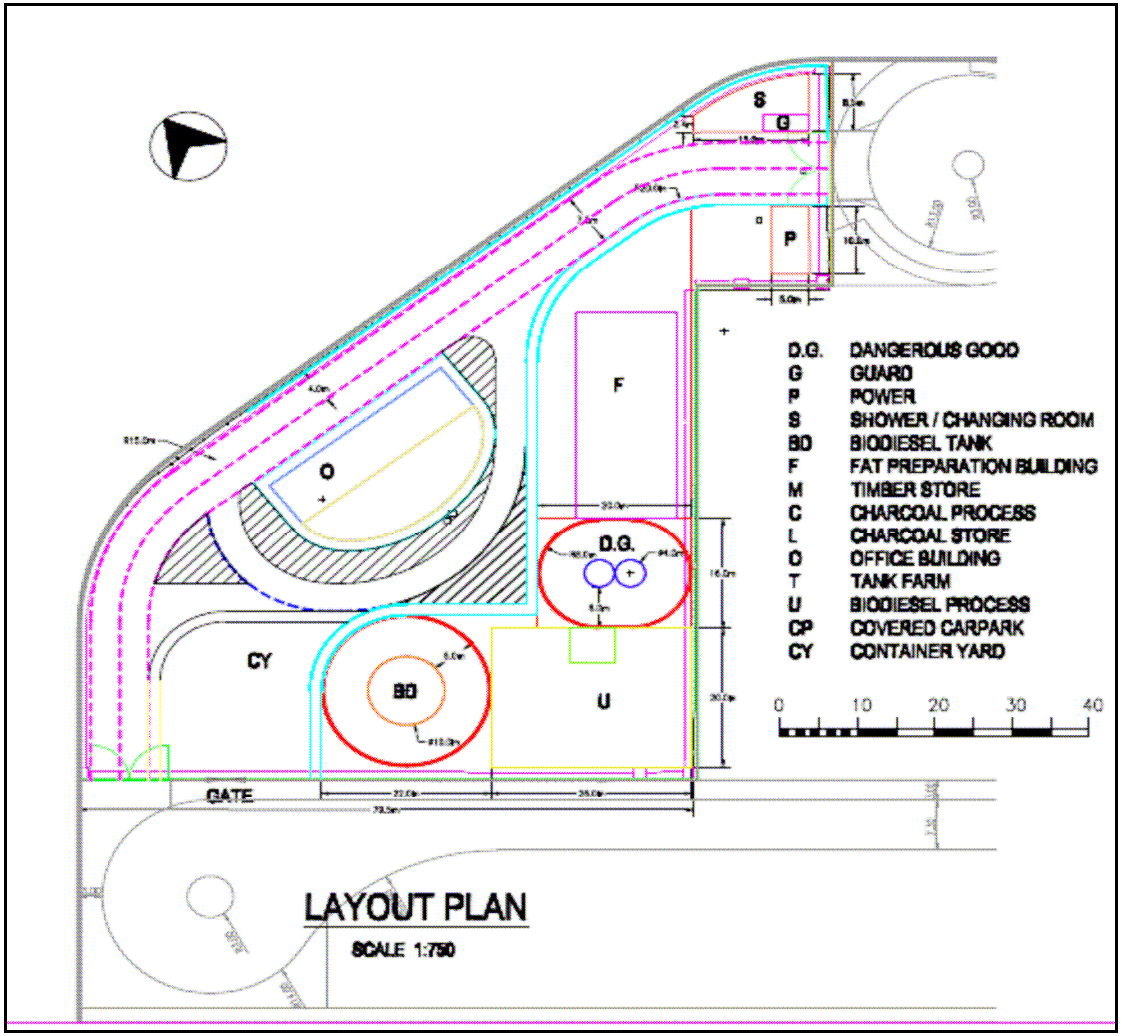


Figure 3-2 Proposed Ground Floor Layout of Champway's Lot (Not in Scale)

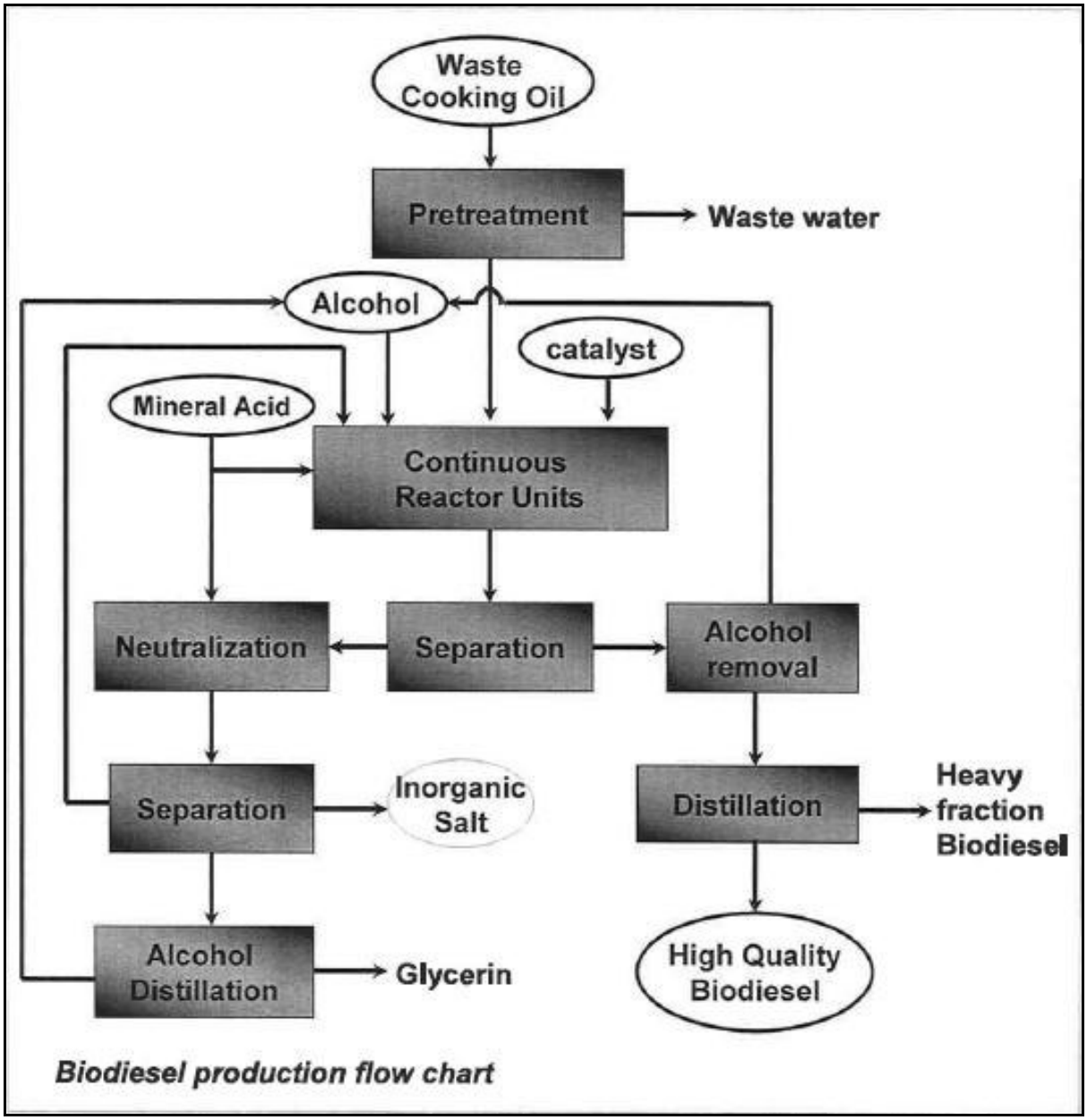


Figure 3-3 Champway's Waste Cooking Oil Recycling Process

After alcohol removal, the biodiesel phase is distilled to separate high quality biodiesel and heavy fraction biodiesel. The recovered alcohol will be reused in the system. The heavy fraction biodiesel can be blended with glycerine to give industrial grade biodiesel.

Table 3-1, below, summarizes the material balance of waste cooking oil recycling process.

Parameter	Input Amount (kg)	Output Amount (kg)
Wastewater		10 – 20
Purified waste cooking oil	980 – 990	
Alcohol input	190	
Recycled alcohol	95	
Catalyst	10 – 15	
Mineral acid	9 – 13	
Inorganic salt		16 – 23
Crude glycerine		98 – 99
Heavy fraction biodiesel		49 – 50.5
Biodiesel		931 – 940.5

Table 3-1 Mass Balance for Every 1,000 kg of Waste Cooking Oil Processed

The process is very efficient with 98% to 99% of the waste cooking oil converted to biodiesel (both heavy and light fractions) produced.

The process is essentially a “closed-loop” with minimal air or wastewater emissions. All oil from drip trays, other collection devices and treatment equipment is returned to the process. The by-products are considered products that will be re-sold and so there is also very little actual waste produced from the process.

4 Impact Assessment

The impact assessment follows the key impacts assessed in the EIA Report, namely, air quality, water quality, waste management implications, prevention of contaminated land and hazard to life (in terms of off-site fatalities).

4.1 Air Quality

4.1.1 Sources and Potential Impacts

The collection of organic waste, such as waste cooking oil, waste lipid and grease trap waste, may give rise to unpleasant odour. Fugitive emissions may also arise from collection, transportation and handling of reagents, such as methanol and mineral acid.

Prior to continuous trans-esterification, odour may emit during pre-treatment. During the manufacture of biodiesel, air pollutants may be emitted from plant or equipment is avoided by employing a closed system. Fugitive emission of VOCs, however, may occur during storage and transfer of reagents.

Process heat will be provided from electrical sources, not fuel combustion, so there is no adverse impact to air quality.

The transportation of finished biodiesel and industrial grade biodiesel by vehicle or fleet may induce air pollution. Improper maintenance of vehicles, plant or equipment may lead to higher emission of air pollutants and fuel consumption.

4.1.2 Mitigation Measures

To minimise odour emissions arising from collection of organic waste, pump trucks should be employed to transfer the waste cooking oil, waste lipid and grease trap waste directly to the reactor units, without exposure to air.

The pre-treatment process would be performed within an enclosed room as indicated “F” on Figure 3-2. The pre-treatment room will be subjected to a light negative pressure so that fugitive emission (odour), if any, would be collectively pump out of the room and through an activated carbon filter system prior to release into atmosphere.

During the manufacturing process, an air extraction system shall be in place to collect odorous gases. The gas will pass through an algae tube for CO_2 and odour removal. Odour removal will be supplemented by an activated carbon filter system. A closed system is employed to avoid emission of air pollutants from plant or equipment. Jacket pipes should be used for transfer of reagents to minimise fugitive emission.

Proper and regular maintenance of activated carbon filter, algae tube, vehicle, fleet, plant and equipment is recommended to control their emission and fuel consumption. Logistic planning for collection of organic waste would be initiated to minimize fuel consumption so as to reduce fleet and vehicle emission.

4.2 Water Quality

4.2.1 Sources and Potential Impacts

Pretreatment of waste cooking oil will generate wastewater and it will amount to 2% respectively by weight. Champway do not intend to construct wastewater pre-treatment plant within their lot but instead will discharge wastewater directly to sewer. The wastewater would be discharge into sewage system within the EcoPark.

Water quality impacts may arise as a result of the discharge of industrial effluents to the drainage system, sewerage system or water bodies nearby. The operation, however, is not expected to generate a substantial volume of effluent as the process involved will either generate little liquid effluent or will recirculate process water in a closed system. Wastewater will be generated during cleaning and processing of containers.

Accidental spillage of organic waste, reagents, products and by-products may occur but would be trapped first by collection devices within the plant (see ***Photograph 4-1***), particularly for oils, since these are valuable and can easily be recycled back into the process. Any other spillages would be trapped by the perimeter drainage system of the lot and would be prevented from entering the EcoPark drainage system by the use of stop logs.

Photograph 4-1 Drip trap to Collect and Recycle Oil (at the pilot plant)

4.2.2 Mitigation Measures

Container washing water should be collected and discharged into foul sewer. The quality of discharge shall fully comply with the *Technical Memorandum on Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters* (WPCO-TM) issued under Section 21 of the Water Pollution Control Ordinance (WPCO) (Cap 358). Champway shall register under the WPCO and obtain a discharge licence from the relevant authority.

Wastewater shall be discharged into the sewer in compliance with statutory/ WPCO discharge license requirements.

Spillage of organic waste, reagents, products and by-products can cause water pollution and should be avoided by measures in ***Section 4.4.2***.

4.3 Waste Management

4.3.1 Sources and Potential Impacts

The estimated processed organic waste is 10,000 tonnes per quarter. The nature of solid waste generated by pretreatment would be similar to domestic waste and the amounts is very small in quantities (about 0.01% by weight). The solid waste would be disposed via refuse collection.

According to ***Table 3-1***, by-products such as inorganic salt (16 to 23 kg per 1,000 kg waste cooking oil), glycerine (98 to 99 kg per 1,000 kg waste cooking oil) and heavy fraction biodiesel (49 to 50.5 kg per 1,000 kg waste cooking oil) will be generated during manufacture of biodiesel. These by-products (ranging from 1,630 to 1,725 kg per quarter) which, if disposed, will contribute to waste production.

Packaging waste such as containers will arise from collection of organic waste and procurement of reagents.

4.3.2 Mitigation Measures

Glycerine, as a by-product, is of ~90% purity and it can be used as industrial grade glycerine. Glycerine can also be blended with heavy fraction biodiesel to produce industrial grade biodiesel. Inorganic salt can be used as fertilizer in landscape work, possibly within EcoPark.

In order to reduce packaging waste, containers can be reused (after cleaning). Surplus metal containers can be collected by metal recycling companies.

As such, the by-products that do arise from the process are reused and so the quantity of waste that is generated is minimal.

4.4 Land Contamination

4.4.1 Sources and Potential Impacts

Land contamination may arise from accidental spillage or leakage of organic waste, reagents, products or by-products.

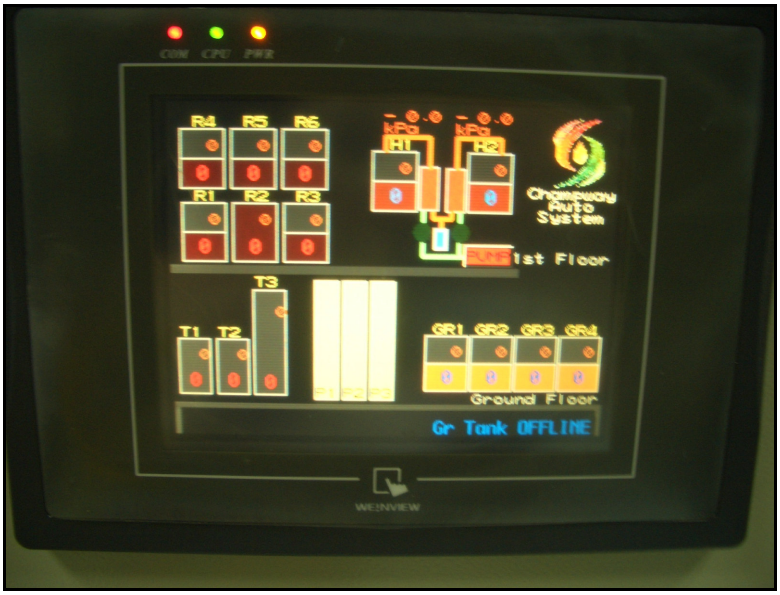
4.4.2 Mitigation Measures

Impermeable concrete flooring should be installed in all areas (both inside and outdoors) where there is a chance that spillage of organic waste, reagents, products and by-products could occur. Any spills should be cleaned up immediately in accordance with Champway's Emergency Response Plan.

Spillage of organic waste, reagents, products and by-products can be avoided by:

- Stainless steel pipes and conduits connecting to equipment to resist corrosion;
- Drip trap at joints between pipes/ conduits and equipment to recycle spilled substances back to the system (***Photograph 4-1***);
- Concrete paving of chemical storage with bund to contain spillage;

  (The design capacity should be adequate and the design should be made by Champway);
- Monitoring the amount of organic waste, reagents, products and by-products by an automated process control system with on-screen visualization (***Photograph 4-2***) that will detect material loss from leakage;
- Provision of training to staff who will handle organic waste, reagents, products and by-products on how to prevent and control spillage;
- Conducting regular drills on accidental spillage with the use of spill control kit and operation of the stop-logs.



Photograph 4-2 Automated Process Control System

4.5 Hazard to Life

4.5.1 Dangerous Goods

Biodiesel, alcohol and mineral acid are DGs. The manufacture, storage, conveyance, and use of dangerous goods are controlled by license issued by Fire Services Department (FSD). Champway is required to obtain the license if the amount of dangerous goods exceeds the exempted quantities under the Dangerous Goods Ordinance (DGO).

Biodiesel

Diesel is a Category 5, Class 3 DG, which gives off flammable vapour and has a flash point of 66^{O}C or higher. Under the DGO, diesel storage of less than 2,500ℓ is exempted for a license.

Uncontrolled combustion or heat of a diesel fire may produce hazardous decomposition products and vapours such as CO and CO_2. Liquid evaporates and forms vapours which can catch fire with violent burning. High heat, open flames and other sources of ignition materials should be avoided, as should contact with strong oxidizing agents.

Diesel is a water pollutant and spillage should be prevented. Any spilled diesel should be contained within perimeter drainage system and cleaned up by appropriate spill control technique such as using absorbents. Underground leaks, which could cause land contamination, can be avoided by good design of tanks and pipework as mentioned in ***Section 4.4.2***, or the use of above-ground tanks.

The estimated quantity of organic waste to be processed is 10,000 tonnes per quarter. Biodiesel will be stored on site after production, prior to being transported out of EcoPark. The biodiesel storage tank will have a capacity of

1,000m^3 (1,000,000ℓ), although the actual quantity stored depends on logistic arrangement and on site demand. Since this capacity exceeds 2,500ℓ, a license from FSD will be required under the DGO.

Diesel shall be stored in licensed DG stores that comply with relevant fire services requirements. The storage tank shall be tested by a competent authorized by the Director of Fire Services (DFS). Pursuant to Regulation 125 of the DG (General) Regulations, the tankage, ancillary container, fuel pipeline, filling and dispensing facility or pumping equipment shall be installed according to the approved designs and specifications and for the satisfaction of the DFS.

In case of fire, the area should be evacuated and any above-ground tanks cooled with water spray. Standard fire extinguishers should be used including water, CO_2, foam and water-fog and fire should be treated as a hydrocarbon fire. For large fires, Champway's and/or the Operator's Emergency Response Plan (ERP) should be followed.

Alcohol

Alcohol is a Category 5, Class 1 DG which has a flash point below 23^{O}C. According to Fire Protection Notice No.4, the exempted quantity is 25L. If the storage exceeds the limit, license should be obtained under DGO.

Mineral acid is a Category 3 DG due to its corrosive nature and acidic property. Statutory requirements under the DGO are to be complied by Champway. As they are inputs in biodiesel production, they are contained in the closed system. Spillage or leakage shall be contained by perimeter drainage and avoided by measures in ***Section 4.4.2***

4.5.2 Building Height Restriction

According to EP Condition 4, to mitigate off-site hazard to life impact, building height restrictions adjacent to the Permanent Aviation Fuel Facility (PAFF) are imposed and shown at ***Table 4-1***, below. These constraints were based on the recommendations of the original PAFF EIA Report.

Distance of Building from closest PAFF Boundary (m)	Maximum Height (H) of Building (where people work at elevated levels) (m)
0	0.0
10	5.8
20	11.5
30	17.3
40	23.1
50	28.9

Source: Table 10.2 from the EIA Report for EcoPark (AEIAR- 086/2005), based on the recommendations of the original PAFF EIA Report

Table 4-1 Building Height Restrictions Adjacent to the PAFF Proposed in the EIA Report

As a result of the judicial review of the PAFF EIA, the EIA Report was updated and revised in 2007 and the new report makes changes to the building height restrictions, based on a smoke plume envelope from a bund fire at the PAFF in a 5m/s wind. The revised building height restrictions are shown in ***Table 4-2***, below. It is recommended that the new height restrictions be used, since these are based on the revised PAFF EIA Report and not on the original report, which has been withdrawn.

Distance of Building from closest PAFF Boundary (m)	Maximum Height (H) of Building (where people work at elevated levels) (m)
0	0
5	6
10	13
20	26
30	39
40	52
50	66

Source: Revised PAFF EIA Report (AEIAR-107/2007)

Table 4-2 Revised Building Height Restrictions Adjacent to the PAFF

The height restriction applies to the distance between PAFF and structures in which people will work at elevated levels such as office building. The office building within the Champway lot will have three storeys (about 12m high). The office building is located 10m horizontal distance from the PAFF boundary, as shown in ***Figure 4-1***. The allowable height for the first floor, according to ***Table 4-2***, is 13m. The height of the office building will not exceed the restriction.

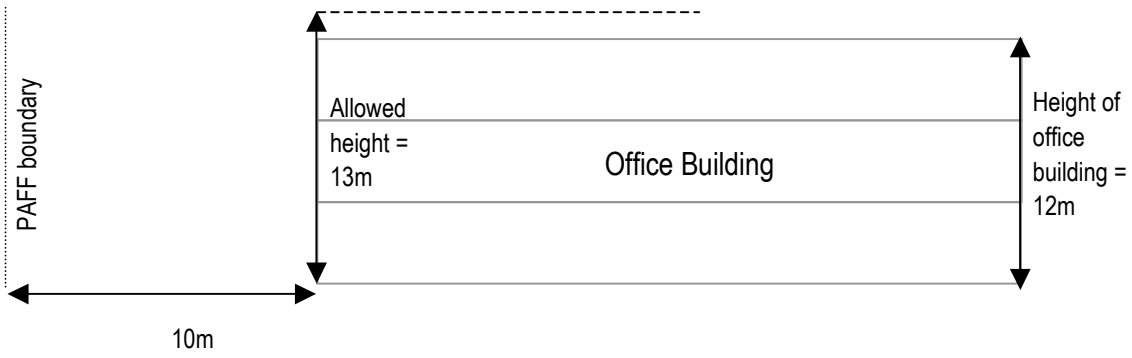


Figure 4-1 Cross-section View of the Office Building Showing Maximum Building Height

5 Conclusions and Recommendations

5.1 Air Quality

There are not considered to be any significant impacts to air quality resulting from the proposed processes. The impacts that do occur are considered to be no greater than those already assessed in the EIA Report.

To comply with the Condition 4.7 of the EP, ultra-low sulphur diesel (diesel with 0.005% sulphur content by weight) or other cleaner fuels shall be used to minimize SO_2 emission from fuel combustion. While process heat will be provided from electrical sources, not fuel combustion, the biodiesel produced by this process is sulphur-free and so could be used as a source of process heat without any adverse air quality impact. Similarly, the use of biodiesel in Champway's vehicle fleet is recommended and other EcoPark tenants should be encouraged to use this product in their diesel vehicles.

5.2 Water Quality

None of the activities proposed by Champway will generate significant wastewater. As such, Champway do not intend to construct wastewater pre-treatment plant within their lot but instead will discharge wastewater directly to sewer. As such, Champway should register under the WPCO and obtain a discharge licence from the relevant authority – the quality of discharge shall fully comply with the WPCO-TM issued under Section 21 of the WPCO.

There is nothing considered to be any significant impact to water quality resulting from the proposed processes. The impacts that do occur are considered to be no greater than those already assessed in the EIA Report.

5.3 Waste Management

Although the biodiesel production process is 98% to 99% efficient, with a quarterly throughput of 10,000 tonnes of waste oil, there is still the potential for waste to be generated from by-products – if disposed of, these by-products could amount to between 1,630 and 1,725kg per quarter.

However, glycerine, as a by-product, is of ~90% purity and it can be used as industrial grade glycerine. Glycerine can also be blended with heavy fraction biodiesel to produce industrial grade biodiesel. Inorganic salt can be used as fertilizer in landscape work, possibly within EcoPark.

Overall, therefore, there are not considered to be any significant waste management impacts resulting from the proposed processes. The impacts that do occur are considered to be no greater than those already assessed in the EIA Report.

5.4 Prevention of Land Contamination

Land contamination may arise from accidental spillage or leakage of organic waste, reagents, products or by-products.

Impermeable concrete flooring should be installed in all areas (both inside and outdoors) where there is a change that spillage of organic waste, reagents, products and by-products could occur. Any spills should be cleaned up immediately in accordance with Champway's Emergency Response Plan. Other mitigation measures were also recommended.

Overall, it is considered that land contamination can be prevented through the use of appropriate protective materials and devices, and through appropriate operational practice. The impacts that do occur are considered to be no greater than those already assessed in the EIA Report.

5.5 Hazard to Life

In terms of DGs, the proposed process required storage of diesel and possibly mineral acid in quantities above the exempted quantities in the DGO. As such, Champway will be required to obtain appropriate licence(s) from FSD. The granting of the DG licence(s) means that DFS is satisfied as to the risk posed by the storage of DGs with the lot.

In terms of layout and building height, the proposed layout of the lot complies with the recommendations made in the EIA Report. Building heights within the lot comply with the recommendations made in the revised PAFF EIA Report in 2007, which are the recommended guidelines and should supersede those stated in the EIA Report (which were based on the original PAFF EIA Report that was subsequently withdrawn).

Overall, it is considered that the hazard to life, in terms of off-site fatality (as required in the EIA Report), are no greater than those already assessed in the EIA Report.

5.6 Overall

Biodiesel production provides an incentive for catering industry to participate in the Hong Kong Awards for Environmental Excellence (HKAEE) and encourages separation of organic waste at source. This reduces organic waste (waste cooking oil and grease trap waste) discharged into sewer (or disposed of to landfill) and provides raw material for the manufacture of biodiesel.

The impact assessment of the proposed process follows the key impacts assessed in the EIA Report, namely, air quality, water quality, waste management implications, prevention of contaminated land and hazard to life.

For each of these criteria, it has been concluded that the impacts posed by the assessed process are no greater than those already assessed in the EIA Report. As such, the process is deemed to meet the requirements of the EIA Report and should therefore be allowed to operate within EcoPark.

Appendix 4

Summary of EcoPark Throughputs

Throughput of Hong Kong Hung Wai Wooden Board Company (EP06-034)

Date	Waste Input (kg)		Product Output (kg)*		Waste Disposal (kg)*	
	Waste Wood	Cumulative	Wooden	Cumulative	General	Cumulative
Jun-08	21,000	**21,000**		-		-
Jul-08	7,000	**28,000**		-		-
Aug-08	-	**28,000**		-		-
Sep-08	8,000	**36,000**		-		-
Oct-08	1,000	**37,000**		-		-
Nov-08	1,000	**38,000**		-		-
Dec-08	-	**38,000**		-		-

Note: * Tenant has not yet commenced actual recycling activities within the lot.

Throughput of Champway Technology Limited (EP07-03)

Date	Waste Input (kg)				Product Output (kg)*				Waste Disposal (kg)*		
	Cooking Oil	Grease Trap	Total	Cumulative	Biodiesel	Glycerin	Total	Cumulative	Inorganic	Total	Cumulative
Oct-08	120,000		**120,000**	**120,000**			**-**	**-**		**-**	**-**
Nov-08	8,000		**8,000**	**128,000**			**-**	**-**		**-**	**-**
Dec-08	2,000		**2,000**	**130,000**			**-**	**-**		**-**	**-**

Note: * Tenant has not yet commenced actual recycling activities within the lot.