TEKNOLOGI ENVIRO-KIMIA (M) SDN. BHD.
(Company No. 350920-V)

Kuching : Lot 58, Section 22, Persiaran Mill, Jalan Tun Abang Haji Openg, 93000 Kuching, Sarawak. Tel: 082-238587 Fax: 082-244568 Email: teksb@tm.net.my

Bintulu : Lot 3681, Block 32, Kemena Land District, Jalan Sungai Nyigu, 97000 Bintulu, Sarawak. Tel: 086-313757 Fax: 086-339221 Email: tekbtu@pd.jaring.my tekbtu@tm.net.my

Kota Kinabalu: Lot 41-0 Block F, 1st Floor, Lorong Putera Jaya 1, Jalan Tuaran, Mile 13/14, 88450 Telipok, Kota Kinabalu, Sabah. Tel/Fax: 088-499316 Email: tekhfv@tm.net.my

11 September 2006

Pengarah,
Jabatan Alam Sekitar Negeri Sarawak,
Tingkat 7-9,
26, Jalan Datuk Abang Abdul Rahim,
93450 Kuching.

Dear Sir,

Re: Tradewinds Plantation Management Sdn Bhd
BINU PALM OIL MILL located at Lot 199, Bakong Land District, 98007, Miri.
CLEAN DEVELOPMENT MECHANISM (CDM) PROJECT

Our Company has been appointed by Tradewinds Plantation Management Sdn Bhd to apply on their behalf to your Department for approval for their proposed Clean Development Mechanism (CDM) Project for their Binu Palm Oil Mill to capture methane gas emitted from their anaerobic pond.

The CDM Project will only involve the re-construction of the Mill's existing Anaerobic Pond No. 1 and Anaerobic Pond No. 2 shall be used as a stand-by and control pond. The new effluent treatment system after completion of the CDM project, is still capable to achieve a BOD_3 of 20mg/l (kindly refer to Effluent Treatment Design Calculation during and after construction of CDM Project attached)

We are pleased to enclose the following documents and drawings in support of our application:-

1) Letter of Appointment from Tradewinds Plantation Management Sdn Bhd

2) DOE Form A.S.3

3) Proposed Clean Development Mechanism (CDM) Project

4) Effluent Treatment Process Flowchart

5) Effluent Treatment Design Calculation – During Construction of CDM Project

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6) Effluent Treatment Design Calculation – After Completion of CDM Project

7) Drawings:

	Drawing No.	Title
1	BPOM/CDM-01	Effluent Treatment Pond Layout & Effluent Flow During CDM Project construction on Anaerobic Pond No. 1
2	BPOM/CDM-02	Effluent Treatment Pond Layout & Effluent Flow After completion of CDM Project construction on Anaerobic Pond No. 1
3	BPOM/CDM-03	Binu Palm Oil Mill – Schematic Flow Drawing
4	BPOM/CDM-04	Binu Palm Oil Mill – Details of Anaerobic Pond No. 1
5	BPOM/CDM-05	Binu Palm Oil Mill – Tarpaulin Foundation Span Wires
6	BPOM/CDM-06	Foundation CH4 Escape

We hope that the above documents and drawings are sufficient and we would greatly appreciate for your kind consideration and approval as this is the 1st CDM project for Palm Oil Mill in Sarawak which would be able to reduce the emission of greenhouse gas into the atmosphere. We are looking forward to hearing from you soon.

Thank you and best regards.

Yours sincerely,
For Teknologi Enviro-Kimia (M) Sdn Bhd,

……………………………

David YC Ong
Director

Encl.

CLEAN DEVELOPMENT MECHANISM (CDM) PROJECT

Tradewinds Plantation Management Sdn Bhd, owner of Binu Palm Oil Mill, Miri has entered an Joint Venture Agreement with BioX Group Asia to embark a Clean Development Mechanism (CDM) Project at their Binu Palm Oil Mill. The CDM Project introduced by Kyoto Protocol is to capture methane gas (a greenhouse gas) emitted from the anaerobic ponds, an effort to reduce the greenhouse gas emission into the atmosphere causing the global warming effect.

CDM Project – Construction Process

The proposed CDM project involves in capturing methane gas emitted from the anaerobic ponds. For Binu Palm Oil Mill, it was decided to capture methane gas from Anaerobic pond No. 1 which is the most active anaerobic pond emitting the most methane gas.

1. Desludging of Anaerobic Pond No. 1
   Raw effluent from the cooling/acidification ponds shall be diverted to Anaerobic pond No. 2. Then Desludging is carried out by "shooting and loosening up" the thickened sludge in Anaerobic pond No. 1 by using a high pressure effluent jet and a separate pump will be used to pump out the loosen effluent-sludge liquid mixture to the sludge holding pond. (The Effluent Flowchart during and after the desludging process is shown in Appendix I attached.) (Drawing No. BPOM/CDM-01 Effluent Flow during CDM Project construction on Anaerobic Pond No. 1)

2. Re-alignment of pond bottom of Anaerobic Pond No. 1
   After desludging, a layer of gravel will be laid at the pond bottom and aeration pipes will be laid on the gravel layer and the aeration pipes are covered with laval stones to increase the air diffusion efficiency. (Kindly refer to Drawing No. BPOM/CDM-04 Details of Anaerobic Pond No. 1)

3. Covering up of Anaerobic Pond No. 1
   The pond shall be covered up with Tarpaulin supported by stainless steel spanwire (as shown in Drawing No. BPOM/CDM-05 "Tarpaulin Foundation Span Wires").

4. Upon completion of re-construction of Anaerobic Pond No. 1, raw effluent from cooling/acidification ponds will be diverted to flow into Anaerobic Pond No. 1 and then to Anaerobic Pond No. 3 & 4. (Drawing No. BPOM/CDM-02 Effluent Flow after completion of CDM Project construction on Anaerobic Pond No. 1)

5. Anaerobic Pond No. 2 shall be kept as a stand-by control pond in the event whe repair and maintenance works or desludging works are carried out in Anaerobi Pond No. 1.

Capturing and release of Methane gas
Methane gas generated from the pond will be piped through a 12" pipe and then releasec through a 6 meter 12" escape pipe and flare it off (refer to Drawing No. BPOM/CDM-06 Foundation CH4 Escape).

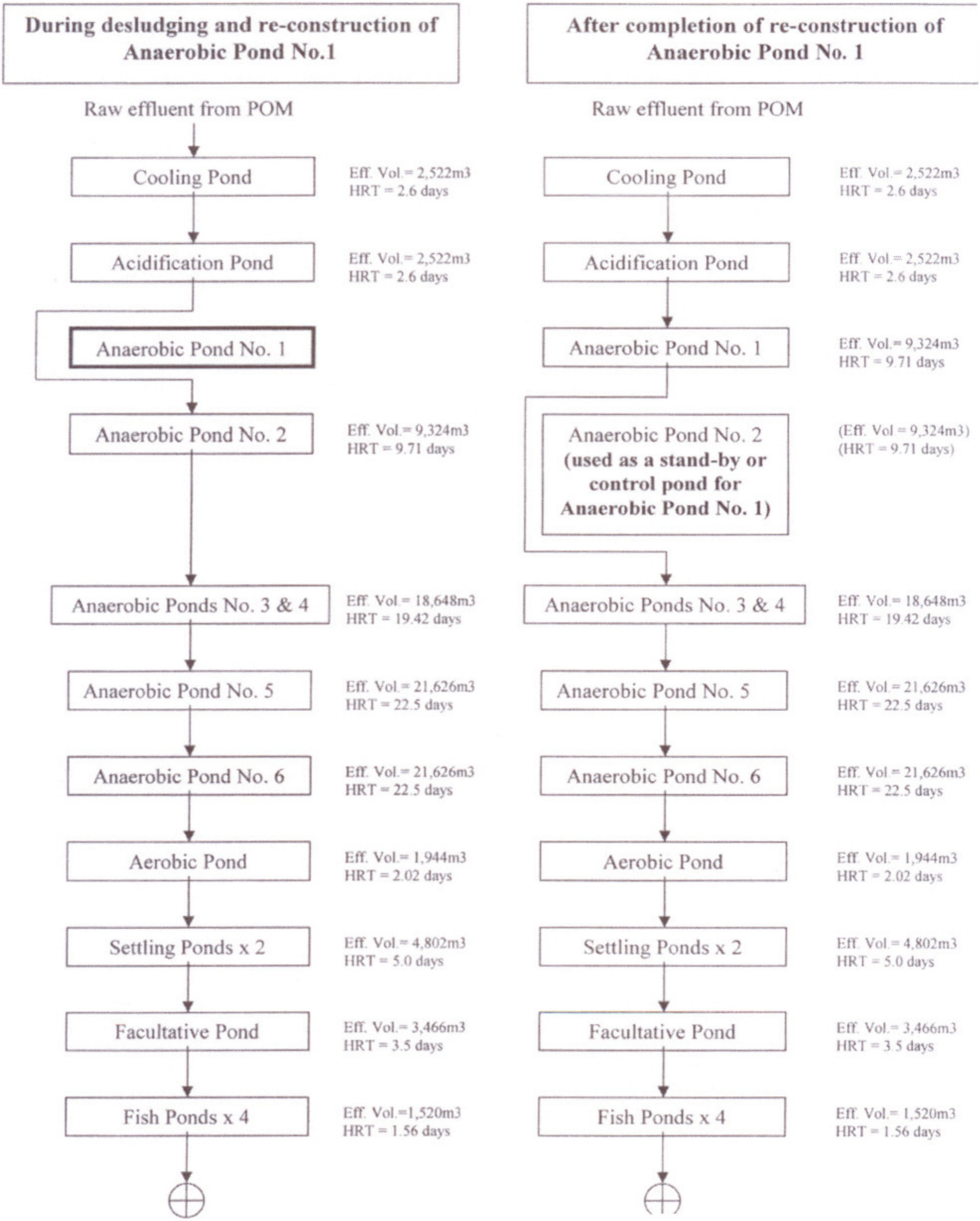
Until such time when the methane gas production becomes stable, the gas will be piped to a gas engine and flare system to generate power. (A separate application for DOE approval on the gas generator set shall be submitted later.)

POM Effluent Treatment and Final Discharge
The POM effluent still goes through the conventional ponding treatment system except the system will have one anaerobic pond less due to incorporation of the CDM Project. However, the system is still able to achieve a final discharge of BOD_3 of $\leq$ 20mg/l (kindly refer to the Design Calculation attached)

The position of the final discharge point still remains unchanged and the final treated effluent will eventually discharge into Sg. Sibuti.

Appendix I

BINU PALM OIL MILL
EFFLUENT TREATMENT PROCESS FLOWCHART



Binu Palm Oil Mill
During construction of CDM Project

DESIGN CALCULATION

RAW PALM OIL MILL WASTE WATER ANALYSIS RESULTS:

a) Flowrate : $960m^3$/day
b) pH : 4.0 ~ 5.0
c) BOD_3 @ 30°C : 25,000 mg/*l*
d) SS : 20,000 mg/*l*
e) Oil and Grease : 4,000 mg/*l*

EFFLUENT TREATMENT PONDING SYSTEM

1.	**Cooling Pond**	
	Dimension	54m (L) x 24m (W) x 4.5m (Depth)
	Slope	1 : 1.5
	Maximum water depth	3.5m
	Effective volume	(51 – 5.25)m x (21 – 5.25)m x 3.5m = 2,522 m^3 (~2,500m^3)
	Hydraulic Retention Time	2,500m^3 ÷ 960m^3 = 2.6 days
	Inlet temperature	50°C ~ 70°C
	Outlet temperature	Ambient (± 32°C)

2.	**Acidification Pond**	
	Dimension	54m (L) x 24m (W) x 4.5m (Depth)
	Slope	1 : 1.5
	Maximum water depth	3.5m
	Effective volume	(51 – 5.25)m x (21 – 5.25)m x 3.5m = 2,522m^3 (~2,500m^3)
	Hydraulic Retention Time	2,500m^3 ÷ 960m^3 = 2.6 days
	Inlet BOD_3	25,000 mg/*l*
	Outlet BOD_3 * Decay coefficient k = 0.1^{d-1}	25,000 mg/*l* ÷ [1 + (0.1* x 2.6)] = 25,000 mg/*l* ÷ 1.26 = 19,841 mg/*l* (estimated average of 20,000mg/*l*)
	BOD reduction efficiency (%)	$\frac{\text{Inlet – Outlet}}{\text{Inlet}}$ x 100% =(25,000 – 20,000) ÷ 25,000 x 100% = 20%

3.	**Anaerobic Pond 2**	
	Dimension	120m (L) x 30m (W) x 5m (Depth)
	Slope	1 : 1.5
	Maximum water depth	4m
	Effective volume	(117 – 6)m x (27 – 6)m x 4m = 111m x 21m x 4m = $9,324m^3$
	Hydraulic retention time	$9,324m^3 \div 960m^3$ = 9.71 days
	Inlet BOD_3 (estimated)	20,000 mg/*l*
	Outlet BOD_3 * Decay coefficient k = 0.3^{d-1}	20,000 mg/*l* ÷ [1 + (0.3* x 9.71)] = 20,000 mg/*l* ÷ 3.91 = 5,116 mg/*l* (estimated average of 5,200mg/*l*)
	BOD reduction efficiency (%)	Inlet –Outlet x 100% Inlet =(20,000 – 5,200) ÷ 20,000 x 100% = 74%

4.	**Anaerobic Ponds (3 and 4)**	
	Dimension	120m (L) x 30m (W) x 5m (Depth)
	Slope	1 : 1.5
	Maximum water depth	4m
	Effective volume	(117 – 6)m x (27 – 6)m x 4m x 2 ponds = 111m x 21m x 4m x 2 = $18,648m^3$
	Hydraulic retention time	$18,648m^3 \div 960m^3$ = 19.42 days
	Inlet BOD_3 (estimated)	5,200 mg/*l*
	Outlet BOD_3 * Decay coefficient k = 0.3^{d-1}	5,200 mg/*l* ÷ [1 + (0.3* x 19.42)] = 5,200 mg/*l* ÷ 6.82 = 762 mg/*l* (estimated average of 800mg/*l*)
	BOD reduction efficiency (%)	Inlet –Outlet x 100% Inlet =(5,200 – 800) ÷ 5,200 x 100% = 84.6%

5.	**Anaerobic Pond 5**	
	Dimension	120m (L) x 50m (W) x 6m (Depth)
	Slope	1 : 1.5
	Maximum water depth	5m
	Effective volume	(117 – 7.5)m x (47 – 7.5)m x 5m = 109.5m x 39.5m x 5m = 21,626m^3 (~21,600m^3)
	Hydraulic retention time	21,600m^3 ÷ 960m^3 = 22.5 days
	Inlet BOD_3 (estimated)	800 mg/*l*
	Outlet BOD_3 * Decay coefficient k = 0.3^{d-1}	800 mg/*l* ÷ [1 + (0.3* x 22.5)] = 800 mg/*l* ÷ 7.75 = 103 mg/*l* (estimated average of 150 mg/*l*)
	BOD reduction efficiency (%)	Inlet –Outlet x 100% Inlet =(800 – 150) ÷ 800 x 100% = 81.2%

6.	**Anaerobic Pond 6**	
	Dimension	120m (L) x 70m (W) x 6m (Depth)
	Slope	1 : 1.5
	Maximum water depth	5m
	Effective volume	(117 – 7.5)m x (47 – 7.5)m x 5m = 109.5m x 39.5m x 5m = 21,626m^3 (~21,600m^3)
	Hydraulic retention time	21,600m^3 ÷ 960m^3 = 22.5 days
	Inlet BOD_3 (estimated)	150 mg/*l*
	Outlet BOD_3 * Decay coefficient k = 0.1^{d-1} as biodegradability has decreased	150 mg/*l* ÷ [1 + (0.1* x 22.5)] = 150 mg/*l* ÷ 3.25 = 46.1 mg/*l* (estimated average of 50 mg/*l*)
	BOD reduction efficiency (%)	Inlet –Outlet x 100% Inlet =(150 – 50) ÷ 150 x 100% = 66.6%

7.	**Aerobic Pond**	
	Dimension	36m (L) x 27m (W) x 4.5m (Depth)
	Slope	1 : 1.5
	Maximum water depth	4m
	Effective volume	(33 – 6)m x (24 – 6)m x 4m = 27m x 18m x 4m = 1,944m^3
	Hydraulic retention time	1,944m^3 ÷ 960m^3 = 2.02 days
	Inlet BOD_3 (estimated)	50 mg/*l*
	Outlet BOD_3 * Decay coefficient k = 0.8^{d-1} (for aerobic pond)	50 mg/*l* ÷ [1 + (0.8* x 2.02)] = 50 mg/*l* ÷ 2.61 = 19.1 mg/*l* (estimated average of 20 mg/*l*)
	BOD reduction efficiency (%)	Inlet –Outlet x 100% Inlet =(50 – 20) ÷ 50 x 100% = 60%

8.	**Settling Ponds x 2**	
	Dimension	32m (L) x 32m (W) x 4.5m (Depth)
	Slope	1 : 1.5
	Maximum water depth	4m
	Effective volume	(30.5 – 6)m x (30.5 – 6)m x 4m x 2 = 24.5m x 24.5m x 4m x 2 = 4,802m^3 (~4,800m^3)
	Hydraulic retention time	4,800m^3 ÷ 960m^3 = 5.0 days
	Inlet BOD_3 (estimated)	20 mg/*l*
	Outlet BOD_3 * Decay coefficient k = 0.1^{d-1} as biodegradability has decreased	20 mg/*l* ÷ [1 + (0.1* x 5.0)] = 20 mg/*l* ÷ 1.50 = 13.3 mg/*l* (estimated average of 15 mg/*l*)
	BOD reduction efficiency (%)	Inlet –Outlet x 100% Inlet =(20 – 15) ÷ 20 x 100% = 25%

9.	**Facultative Pond (Algae Pond)**	
	Dimension	120m (L) x 60m (W) x 1m (Depth)
	Slope	1 : 1
	Maximum water depth	0.5m
	Effective volume	(119 – 0.5)m x (59 – 0.5)m x 0.5m = 118.5m x 58.5m x 0.5m = 3,466m^3 (~3,400m^3)
	Hydraulic retention time	3,400m^3 ÷ 960m^3 = 3.5 days
	Inlet BOD_3 (estimated)	15 mg/*l*
	Outlet BOD_3 * Decay coefficient k = 0.1^{d-1} as biodegradability has decreased	15 mg/*l* ÷ [1 + (0.1* x 3.5)] = 15 mg/*l* ÷ 1.35 = 11 mg/*l*
	BOD reduction efficiency (%)	Inlet –Outlet x 100% Inlet =(15 – 11) ÷ 15 x 100% = 26%

10.	**Fish Ponds x 4**	
	Dimension	20m (L) x 20m (W) x 1.7m (Depth)
	Slope	1 : 1
	Maximum water depth	1.2m
	Effective volume	(19 – 1.2)m x (19 – 1.2)m x 1.2m x 4 = 17.8m x 17.8m x 1.2m x 4 = 1,520m^3 (~1,500m^3)
	Hydraulic retention time	1,500m^3 ÷ 960m^3 = 1.56 days
	Inlet BOD_3 (estimated)	11 mg/*l*
	Outlet BOD_3 * Decay coefficient k = 0.1^{d-1} as biodegradability has decreased	11 mg/*l* ÷ [1 + (0.1* x 1.56)] = 11 mg/*l* ÷ 1.156 = 9.5 mg/*l* (estimated average of 10 mg/*l*)
	BOD reduction efficiency (%)	Inlet –Outlet x 100% Inlet =(11 – 10) ÷ 10 x 100% = 10%

Binu Palm Oil Mill …
After completion of CDM Project

DESIGN CALCULATION

RAW PALM OIL MILL WASTE WATER ANALYSIS RESULTS:

a)	Flowrate	:	$960m^3$/day
b)	pH	:	4.0 ~ 5.0
c)	BOD_3 @ 30°C	:	25,000 mg/l
d)	SS	:	20,000 mg/l
e)	Oil and Grease	:	4,000 mg/l

EFFLUENT TREATMENT PONDING SYSTEM

1.	**Cooling Pond**	
	Dimension	54m (L) x 24m (W) x 4.5m (Depth)
	Slope	1 : 1.5
	Maximum water depth	3.5m
	Effective volume	(51 – 5.25)m x (21 – 5.25)m x 3.5m = 2,522 m^3 (~2,500m^3)
	Hydraulic Retention Time	2,500m^3 ÷ 960m^3 = 2.6 days
	Inlet temperature	50°C ~ 70°C
	Outlet temperature	Ambient (± 32°C)

2.	**Acidification Pond**	
	Dimension	54m (L) x 24m (W) x 4.5m (Depth)
	Slope	1 : 1.5
	Maximum water depth	3.5m
	Effective volume	(51 – 5.25)m x (21 – 5.25)m x 3.5m = 2,522m^3 (~2,500m^3)
	Hydraulic Retention Time	2,500m^3 ÷ 960m^3 = 2.6 days
	Inlet BOD_3	25,000 mg/l
	Outlet BOD_3 * Decay coefficient k = 0.1^{d-1}	25,000 mg/l ÷ [1 + (0.1* x 2.6)] = 25,000 mg/l ÷ 1.26 = 19,841 mg/l (estimated average of 20,000mg/l)
	BOD reduction efficiency (%)	$\frac{\text{Inlet – Outlet}}{\text{Inlet}}$ x 100% =(25,000 – 20,000) ÷ 25,000 x 100% = 20%

3.	**Anaerobic Pond 1**	
	Dimension	120m (L) x 30m (W) x 5m (Depth)
	Slope	1 : 1.5
	Maximum water depth	4m
	Effective volume	(117 – 6)m x (27 – 6)m x 4m = 111m x 21m x 4m = 9,324m^3
	Hydraulic retention time	9,324m^3 ÷ 960m^3 = 9.71 days
	Inlet BOD_3 (estimated)	20,000 mg/*l*
	Outlet BOD_3 * Decay coefficient k = 0.3^{d-1}	20,000 mg/*l* ÷ [1 + (0.3* x 9.71)] = 20,000 mg/*l* ÷ 3.91 = 5,116 mg/*l* (estimated average of 5,200mg/*l*)
	BOD reduction efficiency (%)	Inlet –Outlet x 100% Inlet =(20,000 – 5,200) ÷ 20,000 x 100% = 74%

Anaerobic Pond No. 2 will not be part of the daily effluent treatment ponding process but is used as a back-up or control pond for Anaerobic Pond No. 1 when maintenance or desludging works are carried out in Anaerobic Pond No. 1.

As the dimension and effective volume of Anaerobic Pond No. 2 in exactly the same as Anaerobic Pond No. 1, the overall design calculation for the effluent treatment shall be the same with either Anaerobic Pond No. 1 or Anaerobic Pond No. 2.

4.	***Anaerobic Pond 2***	
	Dimension	*120m (L) x 30m (W) x 5m (Depth)*
	Slope	*1 : 1.5*
	Maximum water depth	*4m*
	Effective volume	*(117 – 6)m x (27 – 6)m x 4m* *= 111m x 21m x 4m* *= 9,324m^3*
	Hydraulic retention time	*9,324m^3 ÷ 960m^3 = 9.71 days*
	Inlet BOD_3 (estimated)	*20,000 mg/l*
	Outlet BOD_3 * *Decay coefficient k = 0.3^{d-1}*	*20,000 mg/l ÷ [1 + (0.3* x 9.71)]* *= 20,000 mg/l ÷ 3.91* *= 5,116 mg/l (estimated average of 5,200mg/l)*
	BOD reduction efficiency (%)	*Inlet –Outlet x 100%* *Inlet* *=(20,000 – 5,200) ÷ 20,000 x 100%* *= 74%*

5.	**<u>Anaerobic Ponds (3 and 4)</u>**	
	Dimension	120m (L) x 30m (W) x 5m (Depth)
	Slope	1 : 1.5
	Maximum water depth	4m
	Effective volume	(117 – 6)m x (27 – 6)m x 4m x 2 ponds = 111m x 21m x 4m x 2 = 18,648m^3
	Hydraulic retention time	18,648m^3 ÷ 960m^3 = 19.42 days
	Inlet BOD_3 (estimated)	5,200 mg/*l*
	Outlet BOD_3 * Decay coefficient k = 0.3^{d-1}	5,200 mg/*l* ÷ [1 + (0.3* x 19.42)] = 5,200 mg/*l* ÷ 6.82 = 762 mg/*l* (estimated average of 800mg/*l*)
	BOD reduction efficiency (%)	<u>Inlet –Outlet</u> x 100% Inlet =(5,200 – 800) ÷ 5,200 x 100% = 84.6%

6.	**<u>Anaerobic Pond 5</u>**	
	Dimension	120m (L) x 50m (W) x 6m (Depth)
	Slope	1 : 1.5
	Maximum water depth	5m
	Effective volume	(117 – 7.5)m x (47 – 7.5)m x 5m = 109.5m x 39.5m x 5m = 21,626m^3 (~21,600m^3)
	Hydraulic retention time	21,600m^3 ÷ 960m^3 = 22.5 days
	Inlet BOD_3 (estimated)	800 mg/*l*
	Outlet BOD_3 * Decay coefficient k = 0.3^{d-1}	800 mg/*l* ÷ [1 + (0.3* x 22.5)] = 800 mg/*l* ÷ 7.75 = 103 mg/*l* (estimated average of 150 mg/*l*)
	BOD reduction efficiency (%)	<u>Inlet –Outlet</u> x 100% Inlet =(800 – 150) ÷ 800 x 100% = 81.2%

7.	**Anaerobic Pond 6**	
	Dimension	120m (L) x 70m (W) x 6m (Depth)
	Slope	1 : 1.5
	Maximum water depth	5m
	Effective volume	(117 – 7.5)m x (47 – 7.5)m x 5m = 109.5m x 39.5m x 5m = 21,626m^3 (~21,600m^3)
	Hydraulic retention time	21,600m^3 ÷ 960m^3 = 22.5 days
	Inlet BOD_3 (estimated)	150 mg/*l*
	Outlet BOD_3 * Decay coefficient k = 0.1^{d-1} as biodegradability has decreased	150 mg/*l* ÷ [1 + (0.1* x 22.5)] = 150 mg/*l* ÷ 3.25 = 46.1 mg/*l* (estimated average of 50 mg/*l*)
	BOD reduction efficiency (%)	Inlet –Outlet x 100% Inlet =(150 – 50) ÷ 150 x 100% = 66.6%

8.	**Aerobic Pond**	
	Dimension	36m (L) x 27m (W) x 4.5m (Depth)
	Slope	1 : 1.5
	Maximum water depth	4m
	Effective volume	(33 – 6)m x (24 – 6)m x 4m = 27m x 18m x 4m = 1,944m^3
	Hydraulic retention time	1,944m^3 ÷ 960m^3 = 2.02 days
	Inlet BOD_3 (estimated)	50 mg/*l*
	Outlet BOD_3 * Decay coefficient k = 0.8^{d-1} (for aerobic pond)	50 mg/*l* ÷ [1 + (0.8* x 2.02)] = 50 mg/*l* ÷ 2.61 = 19.1 mg/*l* (estimated average of 20 mg/*l*)
	BOD reduction efficiency (%)	Inlet –Outlet x 100% Inlet =(50 – 20) ÷ 50 x 100% = 60%

9.	**Settling Ponds x 2**	
	Dimension	32m (L) x 32m (W) x 4.5m (Depth)
	Slope	1 : 1.5
	Maximum water depth	4m
	Effective volume	(30.5 – 6)m x (30.5 – 6)m x 4m x 2 = 24.5m x 24.5m x 4m x 2 = 4,802m^3 (~4,800m^3)
	Hydraulic retention time	4,800m^3 ÷ 960m^3 = 5.0 days
	Inlet BOD_3 (estimated)	20 mg/*l*
	Outlet BOD_3 * Decay coefficient k = 0.1^{d-1} as biodegradability has decreased	20 mg/*l* ÷ [1 + (0.1* x 5.0)] = 20 mg/*l* ÷ 1.50 = 13.3 mg/*l* (estimated average of 15 mg/*l*)
	BOD reduction efficiency (%)	Inlet –Outlet x 100% Inlet =(20 – 15) ÷ 20 x 100% = 25%

10.	**Facultative Pond (Algae Pond)**	
	Dimension	120m (L) x 60m (W) x 1m (Depth)
	Slope	1 : 1
	Maximum water depth	0.5m
	Effective volume	(119 – 0.5)m x (59 – 0.5)m x 0.5m = 118.5m x 58.5m x 0.5m = 3,466m^3 (~3,400m^3)
	Hydraulic retention time	3,400m^3 ÷ 960m^3 = 3.5 days
	Inlet BOD_3 (estimated)	15 mg/*l*
	Outlet BOD_3 * Decay coefficient k = 0.1^{d-1} as biodegradability has decreased	15 mg/*l* ÷ [1 + (0.1* x 3.5)] = 15 mg/*l* ÷ 1.35 = 11 mg/*l*
	BOD reduction efficiency (%)	Inlet –Outlet x 100% Inlet =(15 – 11) ÷ 15 x 100% = 26%

11.	**Fish Ponds x 4**	
	Dimension	20m (L) x 20m (W) x 1.7m (Depth)
	Slope	1 : 1
	Maximum water depth	1.2m
	Effective volume	(19 – 1.2)m x (19 – 1.2)m x 1.2m x 4 = 17.8m x 17.8m x 1.2m x 4 = 1,520m^3 (~1,500m^3)
	Hydraulic retention time	1,500m^3 ÷ 960m^3 = 1.56 days
	Inlet BOD_3 (estimated)	11 mg/*l*
	Outlet BOD_3 * Decay coefficient k = 0.1^{d-1} as biodegradability has decreased	11 mg/*l* ÷ [1 + (0.1* x 1.56)] = 11 mg/*l* ÷ 1.156 = 9.5 mg/*l* (estimated average of 10 mg/*l*)
	BOD reduction efficiency (%)	$\frac{\text{Inlet – Outlet}}{\text{Inlet}}$ x 100% =(11 – 10) ÷ 10 x 100% = 10%