

FORM
5

Application No. :
Reference No. :
(For official use)

FORM 5
ENVIRONMENTAL IMPACT ASSESSMENT ORDINANCE
(CHAPTER 499)
SECTION 13(1)

Application for Variation of an Environmental Permit

PART A PREVIOUS APPLICATIONS

- No previous application for variation of an environmental permit.
 The environmental permit was previously amended.

Application No. : VEP-501/2016

PART B DETAILS OF APPLICANT

B1. Name : (person or company)

SUEZ NWS R&R (HONG KONG) LIMITED

[Note : In accordance with section 13(1) of the Ordinance, the person holding an environmental permit or a person who assumes responsibility for the designated project may apply for variation of the environmental permit.]

B2. Business Registration No. :
(if applicable)

B3. Correspondence Address :

B4. Name of Contact Person :

B5. Position of Contact Person :

B6. Telephone No. :

B7. Fax No. :

B8. E-mail Address : (if any)

PART C DETAILS OF CURRENT ENVIRONMENTAL PERMIT

C1. Name of the Current Environmental Permit Holder :

SITA WASTE SERVICES LIMITED

C2. Application No. of the Current Environmental Permit : FEP-01/247/2006/A

C3. The Current Environmental Permit was Issued in : month / year

06 | 2016

Important Notes : Please submit the application together with
(a) 3 copies of this completed form; and
(b) appropriate fee as stipulated in the Environmental Impact Assessment (Fees) Regulation
to the Environmental Protection Department at the following address :
The EIA Ordinance Register Office,
27th floor, Southorn Centre, 130 Hennessy Road,
Wan Chai, Hong Kong.

Tick (✓) the appropriate box

EPD185



PART D

PROPOSED VARIATIONS TO THE CONDITIONS IN CURRENT ENVIRONMENTAL PERMIT

D1. Condition(s) in the Current Environmental Permit:	D2. Proposed Variation(s):	D3. Reason for Variation(s):	D4. Describe the environmental changes arising from the proposed variation(s):	D5. Describe how the environment and the community might be affected by the proposed variation(s):	D6. Describe how and to what extent the environmental performance requirements set out in the EIA report previously approved or project profile previously submitted for this project may be affected:	D7. Describe any additional measures proposed to eliminate, reduce or control any adverse environmental impact arising from the proposed variation(s) and to meet the requirements in the Technical Memorandum on Environmental Impact Assessment Process:
<p>Under Part B (Descriptions of Designated Project), Scale and Scope of Designated Project(s): <i>"The Project involves the operation of the area for storage tank and biological treatment. The grease trap waste treatment facility will be capable of handling average load of <u>500 cu.m.</u> per day."</i></p>	<p>Under Part B (Descriptions of Designated Project), Scale and Scope of Designated Project(s): <i>"The Project involves the operation of the area for storage tank and biological treatment. The grease trap waste treatment facility will be capable of handling average load of <u>600 cu.m.</u> per day."</i></p>	<p>To maintain the services of the GTWTF after ten years of operation. The increase in handling capacity can handle the expected increase in GTW generation in Hong Kong in the near future.</p>	<p>Environmental impacts were compared to the Project Profile PP-271/2005, VEP-501/2016 and operation record in Year 2018, no significant environmental changes are identified. Please refer to Section 2 of the Environmental Review Report for details.</p>	<p>Environmental impacts were compared to the Project Profile PP-271/2005, VEP-501/2016 and operation record in Year 2018, no significant environmental changes are identified. Please refer to Section 2 of the Environmental Review Report for details.</p>	<p>With the proposed variation on handling capacity of GTW and the associated upgrading works, environmental performance of the GTWTF is not breaching the values as stated in the Project Profile PP-271/2005. Please refer to Section 2 of the Environmental Review Report for details.</p>	<p>Please refer to the Environmental Review Report (ERR).</p>

PART E DECLARATION BY APPLICANT

E1. I hereby certify that the particulars given above are correct and true to the best of my knowledge and belief. I understand the environmental permit may be suspended, varied or cancelled if any information given above is false, misleading, wrong or incomplete.



Signature of Applicant



Full Name in Block Letters



Position



on behalf of SUBZ NWS R&R (HONG KONG) LIMITED. 22/11/2019
Company Name and Chop (as appropriate) Date

NOTES :

1. A person who constructs or operates a designated project in Part I of Schedule 2 of the Ordinance or decommissions a designated project listed in Part II of Schedule 2 of the Ordinance without an environmental permit or contrary to the permit conditions commits an offence under the Ordinance and is liable to a maximum fine of \$5,000,000 and to a maximum imprisonment for 2 years.
2. A person for whom a designated project is constructed, operated or decommissioned and who permits the carrying out of the designated project in contravention of the Ordinance commits an offence and is liable to a maximum fine of \$5,000,000 and to a maximum imprisonment for 2 years.



固廢資源管理 Recycling and Recovery

敬啟者：

“昇達廢料處理有限公司”公司名稱更改通知

本集團為了使用單一品牌“蘇伊士”作持續發展目的，集團控股母公司“蘇伊士環境集團”已於2016年4月更改其公司名稱為“蘇伊士”。昇達廢料處理有限公司作為蘇伊士旗下子公司，跟隨上述單一品牌的重塑，其公司名稱已於2019年2月25日正式更改為下述新名稱：

前公司名稱	現公司名稱
SITA Waste Services Limited 昇達廢料處理有限公司	SUEZ NWS R&R (Hong Kong) Limited 蘇伊士新創建廢物資源管理(香港)有限公司

是次改動僅為傳訊及形象上的名稱更改，名稱更改對公司法定地位並無改變。懇請 閣下更新其相應的資料庫和紀錄。

蘇伊士新創建廢物資源管理(香港)有限公司謹啟

2019年3月15日



回收與資源管理 Recycling and Recovery

15 March 2019

To whom it may concern,

Notification of Change of Company Name of "SITA Waste Services Limited"

For the purpose of continuity of implementation among the group of the single brand "SUEZ", our ultimate majority parent company has changed its company name from "SUEZ Environnement Company" to "SUEZ" in April 2016. Following the aforesaid rebranding of single name, SITA Waste Services Limited, being a subsidiary of SUEZ, has changed its name as follows and came into effect from 25 February 2019:

Previous Name	Current Name
SITA Waste Services Limited 昇達廢料處理有限公司	SUEZ NWS R&R (Hong Kong) Limited 蘇伊士新創建廢物資源管理(香港)有限公司

This action is a simple change of name only, for communication and image purpose. There will be no consequence whatsoever as to the corporate existence and legal personality of the Company after the name change. We kindly invite you to update your databases and records accordingly.

Yours faithfully,

SUEZ NWS R&R (Hong Kong) Limited



SUEZ NWS R&R (HK) Limited

Application for Variation to the Environmental Permit
for the Grease Trap Waste Treatment Facility at
West Kowloon Transfer Station and Technical Design of
Enhancement Works

Environmental Review Report

November 2019

ATKINS

Member of the SNC-Lavalin Group

Client: SUEZ NWS R&R (HK) Limited	Contract No. (if any):
Project Title: Application for Variation to the Environmental Permit for the Grease Trap Waste Treatment Facility at West Kowloon Transfer Station and Technical Design of Enhancement Works	Project No.: 5190616
Document No.: 5190616-OR002-07	Controlled Copy No.:
Document Title: Environmental Review Report	
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1 INTRODUCTION

1.1 Project Background

- 1.1.1 The West Kowloon Transfer Station (WKTS) of the Environmental Protection Department receives municipal solid waste (MSW) for transferring to the West New Territories (WENT) Landfill for disposal. WKTS also includes a grease trap waste treatment facility (GTWTF), receiving grease trap waste (GTW) from restaurants and food processing establishments, for treatment and recycling.
- 1.1.2 WKTS was an Exempted Designated Project under the Environmental Impact Assessment Ordinance (EIAO) since it was developed prior to the enactment of the EIAO in 1998.
- 1.1.3 In considering whether setting up the GTWTF within WKTS would represent a material change, the scope of the project and its potential environmental impacts were described in the associated Project Profile (Register No. PP-271/2005), for Application for Permission to Apply Directly for an Environmental Permit (DIR). Setting up the GTWTF at WKTS was considered a material change, and Environmental Permit was therefore obtained (No.EP-247/2006). The GTWTF was subsequently installed at WKTS and commissioned in 2008. A variation of EP (VEP-501/2016) was submitted to and approved by the EIAO Authority in 2016, in respect of increasing GTWTF's handling capacity from originally 400 cu.m per day to 500 cu.m per day.
- 1.1.4 GTW received at GTWTF is treated by various processes and facilities, comprising screening, sand grit trap, dissolved air flotation (DAF) and centrifuge units. The primary objective is to recover the oil and fat fraction present in the grease trap waste. Two fat products are produced during the process, namely Concentrated Fat and Recycled Fat. They are suitable for various usages such as a potential material or additive for energy resources, biodiesel or other industrial and/or manufacturing process. The location plan of the GTWTF at WKTS is shown in **Figure 1.1**.
- 1.1.5 The original design capacity of the GTWTF when installed and commissioned in 2008 was 400 cu.m per day. As mentioned above, throughput capacity was subsequently increased to 500 cu.m per day following process improvements and associated VEP, in 2016.
- 1.1.6 In accordance with operational experience, the volume of grease trap waste received by the GTWTF shows both a weekly and yearly pattern. Typically, the volume received during Monday – Saturday is higher than that received on Sundays. The volume received is also higher in weeks or months coinciding with festivals. The operation of the GTWTF's component equipment is therefore required to cope with the fluctuating pattern of grease trap waste volume.
- 1.1.7 The trend of volume of GTW received by the GTWTF is increasing in recent years. In order to meet the expected increasing demand over the next few years, enhancement works are proposed, comprising installation of extra number of critical equipment, and / or recommendation on process re-engineering, with extended operating hours¹ for critical

¹ The opening hours for receiving grease trap waste will be maintained as 7:30 am – 8:00 pm throughout the year without changes.

parts of the process where necessary, to enhance the handling capacity of the GTWTF, up to 600 cu.m per day.

- 1.1.8 However, the current Environmental Permit: No. FEP 01/247/2006/A Part B specifies: “The Project involves the operation of the area for storage tank and biological treatment. The grease trap waste treatment facility **will be capable of handling average load of 500 cu.m per day.**”(<https://www.epd.gov.hk/eia/register/permit/latest/vep5012016.htm>)
- 1.1.9 Therefore, VEP will be required, to amend Part B of the EP to allow for the proposed increased GTWTF handling capacity.

1.2 Proposed Variation

1.2.1 In order to increase the handling capacity of GTW and to improve GTWTF treatment performance, the enhancement works design is proposed to comprise installation of extra number of critical equipment, as well as potential recommendations on process re-engineering and facility operational enhancements.

1.2.2 The proposed equipment upgrades include:

- installation of additional centrifuges and DAF unit to enhance overall treatment capacity and system reliability, by improving Oil & Grease, Water and Sediment separation effectiveness
- replacing one of the existing 380 kW diesel fuel hot water boilers with equivalent heat output electric water heater, to reduce potential air quality impacts

1.2.3 The proposed upgrading works are anticipated to be commenced in Q1 2020 and be completed in Q3/Q4 2020.

1.2.4 The proposed centrifuge upgrades are focused on improving GTWTF performance in relation to Concentrated Fat and Recycled Fat production, by reducing water content of the GTW and enhancing oil, water and waste solids separation effectiveness; and also by increasing the grease processing stream throughput capacity. The new preliminary stage 2-phase centrifuge will also enhance solids removal, protecting the downstream new and existing 3-phase centrifuges by reducing solids load on these units.

1.2.5 Installation of an additional DAF unit would increase plant availability, and therefore improve overall GTWTF reliability and hence GTW processing capability. In addition, replacement of one of the existing diesel fuel hot water boilers with electric heater unit would reduce potential localized air quality impacts that might arise, as a result of increased GTW processing and hence increased heating demand and diesel fuel combustion by the plant.

1.2.6 The Process Flow Diagram for the originally installed GTWTF is shown in **Figure 1.2**, and the revised PFD after the VEP application in 2016 is shown in **Figure 1.3**. **Figure 1.4** shows the proposed PFD for the enhanced GTWTF. The new quantities / throughput rates are based on a combination of the anticipated improvements due to the proposed equipment enhancements as described above, as well as previous process re-engineering improvements and the recorded operational parameters of the existing GTWTF.

1.2.7 A number of previous process re-engineering changes had already been implemented to

improve system reliability and operability since the previous upgrades and VEP in 2016, while maintaining the original operating principle of fat / water separation to generate recycled fat product to reduce fat quantities disposed of to landfill. Changes were based around simplification of the process arrangements by repurposing, reconfiguring or rearranging certain of the equipment to improve facility operability and treatment reliability.

- 1.2.8 As a result of the process re-engineering enhancements outlined above, the handling capacity of GTWTF can be enhanced to 600 cu.m per day average (equal to approx. 600 tonne per day, for GTW S.G. of around 1 tonne/m³).
- 1.2.9 The Project Proponent therefore proposes the scale and scope of the Project be changed from “an average load from 500 cu.m per day to 600 cu.m per day”.

1.3 Reason for Variations

- 1.3.1 As a result of process re-engineering and equipment upgrades, the throughput capacity of the GTWTF can be enhanced to an average load of 600 cu.m per day. This increased throughput capacity will be able to handle the expected increase in GTW generation in Hong Kong in the near future.

2 ENVIRONMENTAL REVIEW

2.1 Approach

2.1.1 This report reviews whether the envisaged GTWTF throughput capacity upgrades and process improvements at WKTS will result in any environmental changes from the Project Profile PP-271/2005 and the current Environmental Permit.

2.2 Air Quality

2.2.1 The main proposed changes in the treatment process are as follows:

- Decantation Tanks are now used as buffering storage instead of decantation
- 1 No. new DAF unit will be installed
- 1 No. new 3-phase centrifuge will be installed
- 1 No. new 2-phase centrifuge will be installed
- 1 No. new electric hot water heater will be installed, replacing one of the existing diesel fuel hot water boilers

2.2.2 All treatment processes are conducted in enclosed conditions (within plant rooms or covered tanks) and all the ventilation exhaust gases will be treated by deodorization units. Therefore, no adverse air quality and odour impact are expected due to the increased handling capacity of GTWTF.

Gaseous Emissions

2.2.3 Gaseous emissions will be generated from the biogas flare stack, fuel boiler and GTW collection vehicles. Quantities of gaseous emissions generated are summarised in the table below:

Parameters	Project Profile, PP-271/2005 ^[1]	Assumption in VEP-501/2016 ^[2]	Proposed Value in VEP application ^[3]
Biogas to be flared (Nm³/h)	100	26.3	26.3 (Value in ERR for VEP-501/2016)
Diesel Fuel Combustion (L/day)	650	70 to 100	50 to 80^[4]
GTW Collection Vehicles (Vehicles/day)	58	58	70

Note:

1. Corresponding GTW quantity: 400 m³/day
2. Corresponding GTW quantity: 500 m³/day.
3. Corresponding GTW quantity: 600 m³/day.
4. Diesel fuel reduction by replacement of the one diesel fuel hot water boilers with electric heater unit. The electric heater unit will be used as the primary heater, supplemented by diesel boiler only when electric heating is not enough. Diesel fuel supplementary heating requirement will depend on Recycled Fat production, which will depend on market demand, but will generally be low to zero at current market demand production rates.

2.2.4 The number of GTW collection vehicles visiting the WKTS may change, though this is not directly driven by the GTWTF throughput capacity upgrade and process improvements. If the number of GTW collection vehicles does increase along with the GTWTF upgrading

exercise, corresponding increase in exhaust emissions from GTW collection vehicles would be expected. According to the Section 4.3.2 of Project Profile PP-271/2005, the Detailed Environmental Impact Assessment of the WKTS (DEIA) indicated that in order to maintain the air quality in the tipping hall, the designed ventilation rates are based on a maximum peak refuse collection vehicles (RCV) arrival rate of 111 vehicles per hour. Based on the operation record in year 2018, the maximum refuse collection vehicles (RCV) arrival rate is 880 per day (on Chinese New Year's Eve). 88 RCVs is estimated by the peak factor for peak hour during the Chinese New Year's Eve.

- 2.2.5 Due to the limited handling capacity of GTW collection vehicles at the tipping hall, the maximum number of GTW collection vehicles per hour is 7 vehicles, which remains the same as in the Project Profile PP-271/2005. Therefore, the estimated number of GTW collection vehicle for proposed variation is well within the designed peak traffic flow. The increased level of exhaust emissions is expected to lie within acceptable range.
- 2.2.6 To mitigate against potential increased diesel fuel combustion due to additional heating demand from increased GTW processing, one of the existing 3 No. 380 kW diesel fuel hot water boilers (which operate as Duty/Duty/Standby) will be replaced with an equivalent heat output electric heater unit. The electric heater will be used as the primary (Duty) hot water heater, and would be supplemented by the diesel boiler (operating as an Assist unit) only when electric heating alone is not enough. The remaining other diesel boiler will act as a Standby unit only. This will reduce potential localized air quality (NO_x emissions) impacts that might otherwise arise. The diesel boiler would only operate on occasions of very high Concentrated Fat processing, with the electric heater alone normally providing adequate heating for current and moderately increased Recycled Fat production (which will depend on market demand). This will reduce potential localized air quality (NO_x emissions) impacts that might otherwise arise.
- 2.2.7 The small amounts of biogas generated by the anaerobic WWTP reactor receiving the GTWTF wastewater are currently flared off. The originally installed GTWTF was expected to produce significant volumes of biogas, so was installed with a micro-turbine electricity generator, to generate power for use within the WKTS facility. However, biogas generated in practice are significantly less than the original expectations. This could be attributable to various factors, such as the amount and nature of wastewater organic loads within the GTW effluent and broken down within the anaerobic reactor system – noting that treated effluent quality remains within the Discharge Licence required standard. As confirmed by the design system engineer, the volume of biogas to be flare is lower than the 26.3Nm³/h. Therefore, the proposed value in VEP application is remain unchanged (i.e. 26.3Nm³/h). At the low volumes of biogas generated in practice, operation of the micro-turbine electricity generator has been found to be impracticable and producing minimal amounts of useful power, so the unit is no longer operated.

Dust

- 2.2.8 No new major construction works (i.e. drilling, piling or demolition) are required for the GTWTF throughput capacity upgrade and process improvements at the WKTS.
- 2.2.9 There are no dusty activities associated with the GTWTF during operational phase. As such, no adverse operational dust air quality impact is anticipated.

Odour

- 2.2.10 Odour load from the GTWTF is expected to be increased slightly due to the increase in GTW quantity received. At maximum the increase in odour from the processing units would be in proportion to the increased GTW throughput (i.e. by a factor of 600 tpd / 500 tpd, 1.2) although generally the increase will be less, as process units are either enclosed units, or operate with the same exposed surface area regardless of GTW throughput. Overall odour load to the WKTS odour control units will however increase by only a much smaller proportion, as the majority of the ventilation flow and odour load is from the much larger transfer station tipping hall, compactor hall, aerobic (leachate) WWTP area, etc.
- 2.2.11 The proposed works include enhancement works, installation of extra number of critical equipment and the process re-engineering will not increase odour emission area. The installation of extra number of critical equipment is used for the contingency use. Therefore, the proposed works will not affect the odour emission of the plant and proposed factor (1.2) is appropriate in the assessment.
- 2.2.12 With the current odour control system, odour emissions arising from the delivery, unloading and treatment of GTW (as well as from the WKTS overall) are effectively alleviated. All air extracted from the GTWTF passes through the odour control system 2-stage air scrubbers, designed to remove 99.9% of Hydrogen Sulphide (H₂S) and 90% of Ammonia (NH₃) before discharging to the external environment. The system design engineer confirmed that the H₂S and NH₃ outlet concentrations will remain below the design outlet guarantee of the odour control system (i.e <0.05ppm of H₂S and <0.1ppm of NH₃).
- 2.2.13 According to the odour patrol results in Year 2018, odour intensity at the detection locations was on the majority of occasions recorded as “Not Detected”, with only occasional “Slight” odour levels detected. Odour levels were never detected at Moderate intensity or above. The odour performance can therefore reasonably be taken as complying with the odour requirement under the EP of 2 OU within the site boundary.
- 2.2.14 The table below shows that the odour control system outlet H₂S and NH₃ levels would be expected to remain well within the 2016 VEP levels, and also well within the original Project profile levels, even for a worst case factor of 1.2 increase in odour load as discussed above, with the system operating at current removal efficiencies. This therefore demonstrates that the existing odour control system has sufficient capability to comfortably handle the potential increased odour load from the proposed increased GTW throughput capacity. As confirmed by the design system engineer, the increase in overall odour emission concentration and air flowrate from the GTWTF would still be handled in a capable manner by the current odour removal system and be within the design guarantee of the odour emission at the outlet. Therefore overall odour performance is expected to remain within the EP requirement.

Parameters	Project Profile, PP-271/2005 ^[1]	Assumption in VEP-501/2016 ^[2]	Proposed Value in VEP application ^[3]
Ventilation Flow Rate at GTWTF Area (m ³ /h)	8325	Min 8325	Min 8325 (Value in ERR for VEP-501/2016)
Corresponding GTW Quantity (tpd)	400	500	600
Gas Inlet Concentration H ₂ S (ppm)	Max 50 ppm	0.87	Max 50 ppm (Value in the Project Profile, PP-271/2005) ^[4]
Gas Inlet Concentration NH ₃ (ppm)	-	1.20	1.20 (Value in ERR for VEP-501/2016) ^[4]
Gas Outlet Concentration H ₂ S (ppm)	0.5	<0.05	<0.05 (Value in ERR for VEP-501/2016) ^[4]
Gas Outlet Concentration NH ₃ (ppm)	-	<0.1	<0.1 (Value in ERR for VEP-501/2016) ^[4]

Note:

1. Corresponding GTW quantity: 400 m³/day
2. Corresponding GTW quantity: 500 m³/day.
3. Corresponding GTW quantity: 600 m³/day.
4. Corresponding GTW quantity: 600 m³/day. The additional GTW received has the same characteristics as the existing GTW received (i.e. waste collected from grease trap in restaurants and food processing industries).

It is assumed that comparing the existing condition to the situation after proposed variation, the odour generation at maximum would be proportional to GTW quantity received, i.e. 600m³/d / 499m³/d = a factor of 1.20; however the GTWTF contributes only a small proportion of the overall ventilation flow and load at the transfer station so increase will tend to be much less.

Operation Record (Year 2018) - Corresponding GTW quantity: 499 m³/day:

Average Gas Outlet Concentration H₂S = 0.008 ppm

Average Gas Outlet Concentration NH₃ = 0.014 ppm

* The record of measurement of the gas outlet concentration (Year 2018) is shown in **Appendix B**.

Predicted Maximum Increase for Proposed Scenario - Corresponding GTW quantity: 600 m³/day:

Average Gas Outlet Concentration H₂S = 0.008 x 1.20 = 0.0096 ppm

Average Gas Outlet Concentration NH₃ = 0.014 x 1.20 = 0.0168 ppm

The projected H₂S and NH₃ inlet concentrations are well below the design inlet concentration limit of the scrubber system (i.e. 50ppm for both H₂S and NH₃), Hence, the predicted H₂S and NH₃ outlet concentrations would be well below the design outlet guarantee of the odour control system (i.e. <0.05ppm for H₂S and <0.1ppm for NH₃)

5. The system design engineer also confirmed that the increase in overall odour emission concentration and air flowrate from the GTWTF would still be within the design guarantee of the odour emission at the outlet.

3.0 Design Calculation

Scrubber Process Design Calculation

Acid Scrubber

Air flow rate/each	72,000 m ³ /hr or 20 m ³ /s
NH ₃ inlet concentration	20 ppm average, 50 ppm (max.)
Design removal efficiency	90%

Alkaline Scrubber

Air flow rate/each	72,000 m ³ /hr or 20 m ³ /s
H ₂ S inlet concentration	20 ppm average, 50 ppm (max.)
Design removal efficiency	99.9%
Discharge limit	0.05 ppm

2.2.15 To ascertain the gas outlet concentrations and the diesel consumption of the boiler system during operation, report would be submitted to EPD as follows:

- a) Reporting the measurement of gas outlet concentrations for H₂S and NH₃ for the first three months after the upgrading works;
- b) Reporting the diesel consumption of the boiler system for the first year after the upgrading works.

2.3 Noise

- 2.3.1 No existing Noise Sensitive Receiver (NSR) is identified within 300m radius of WKTS. Also, according to the Stonecutters Island Outline Zoning Plan (S/SC/10), there are no noise sensitive uses planned in the vicinity.

Fixed Plant Noise Impact

- 2.3.2 All fixed noise sources (i.e. pumps and centrifuges) are located indoors. With no existing and planned NSR identified within 300m radius of WKTS, there will be no off-site fixed noise impact.

Construction Noise Impact

- 2.3.3 No major construction works (i.e. drilling, piling or demotion works) will be required for the upgrading works. No construction noise impact is anticipated.

Road Traffic Noise Impact

- 2.3.4 The number of GTW collection vehicles visiting WKTS may increase along with the GTWTF throughput capacity upgrade.
- 2.3.5 According to the Project Profile PP-271/2005, there were around 58 truck trips per day visiting the WKTS. Based on the estimated scenario, there will be about 70 trucks trips per day visiting the WKTS after the upgrading works.
- 2.3.6 This averages at less than 1 additional truck trip per hour after the upgrading works, which can be considered as a minor change. Besides, the Project Profile PP-271/2005 concluded that traffic noise impacts associated with the GTW collection vehicles are insignificant compared with the background industrial and traffic noise. Therefore, adverse traffic noise impact associated with the operation of WKTS is not expected to occur.

2.4 Water Quality

2.4.1 The quantities of effluents associated with the operation of WKTS are summarized in the table below:

Parameters (all m ³ /d)	Project Profile, PP-271/2005 ^[1]	Assumption in VEP-501/2016 ^[2]	Proposed Value in VEP application ^[3]
Leachate from WKTS (i.e. floor cleansing/ vehicle washing)	120	350	250
GTW Treatment Process Wastewater	386	483	583
Overall Wastewater Generation	506	833	833 (Value in ERR for VEP-501/2016)

Note:

1. Corresponding GTW quantity: 400 m³/day
2. Corresponding GTW quantity: 500 m³/day.
3. Corresponding GTW quantity: 600 m³/day.
4. Proposed Scenario - Corresponding GTW quantity: 600 m³/day. The additional GTW received has the same characteristics as the existing GTW received (i.e. waste collected from grease trap in restaurants and food processing industries). It is assumed that comparing the existing condition to the situation after proposed variation, the overall wastewater generation from the GTWTF will be increased in proportion to GTW quantity received, i.e. 600 m³/d / 499 m³/d = a factor of 1.20
Operation Record (Year 2018) - Corresponding GTW quantity: 499 m³/day:
Leachate from WKTS (i.e. floor cleansing/ vehicle washing) = 212 m³/day
GTW Treatment Process Wastewater = 422 m³/day
Predicted Value for Proposed Scenario - Corresponding GTW quantity: 600 m³/day:
Leachate from WKTS (i.e. floor cleansing/ vehicle washing) = 212 m³/day (unchanged)
GTW Treatment Process Wastewater = 422 m³/day x 1.20 = 507 m³/day
Overall Wastewater Generation = 212 m³/day + 507 m³/day = 719 m³/day (<833 m³/day, Value in ERR for VEP-501/2016)

2.4.2 It is estimated that a total of 719 m³/day of wastewater (approximate 212 m³/d of Leachate based on 507 m³/d GTW wastewater to the IC Reactor) will be discharged to the public sewer, through Manhole No. FMH4018438, from WKTS. The value consists of sewage flow from WKTS staff and visiting drivers as well as wastewater generation from WKTS, vehicle washing and floor cleansing. The breakdown of water quantities from WKTS leachate and from GTW treatment process wastewater have been updated based on recent operating records, however the current total effluent volume remains within the 2016 VEP approved value, and the proposed volume will also continue to remain within this value.

2.4.3 The estimated discharge volume is within the 1,000 m³/day limit for the Wastewater Treatment Plant imposed by Discharge License No. WT00014885-2012 issued to SITA under the Water Pollution Control Ordinance by EPD. Therefore, no adverse impact on the receiving sewer system is anticipated.

2.4.4 Regarding existing measures for preventing pollution of the storm-drain system due to potential spillage of wastewater or oily / greasy matter from the existing GTW processing, storage tank and biological effluent treatment areas.

2.4.5 The majority of the GTWTF is located within the WKTS waste tipping hall (and immediately adjacent inter-connected buildings), which has a contained foul water / leachate drainage

system, which discharges to the aerobic WWTP at WKTS. In addition, the GTW buffer storage tanks and pumps and the anaerobic WWTP are located outside within bunded areas, so any spillages would also be contained and discharged to the WKTS foul water drainage system. There is therefore negligible risk of spillage and pollution entering the storm-drain system.

- 2.4.6 No enhancement of the existing measures to prevent pollution of storm-drain system due to the proposed variation are therefore required.

2.5 Waste Management

Construction Phase

- 2.5.1 Given that there would be no major construction activities taking place at WKTS for the proposed process enhancement works, and only installation of additional equipment and minor mechanical and electrical modification works, no construction and demolition material (C&D materials) and chemical waste would be produced. The equipment installation works would generate C&D wastes comprising equipment packaging and minor installation waste (cable cuttings and fixing debris), and general refuse from work force comprising food scraps, waste paper, empty containers, etc.
- 2.5.2 It is estimated that 500kg general refuse and C&D waste would be generated during construction phase.
- 2.5.3 C&D waste and general refuse should be stored in enclosed bins. Also, to minimize the final disposal quantities of C&D waste and general refuse and encourage recycling, provisions of recycle bins for different types of recyclable waste should be provided together with a general refuse bin. A reputable waste collector should be employed by the contractor to remove C&D waste and general refuse at the facility. An enclosed and covered area for any C&D waste and general refuse is preferred to reduce the occurrence of 'wind-blown' light material.
- 2.5.4 With the implementation of the recommended waste management practices at the site, adverse waste management implications are not expected during construction (equipment installation) phase.

Operational Phase

- 2.5.5 The estimated quantities and changes in the waste generation resulting from the envisaged GTWTF throughput capacity upgrade and process improvements are summarized in the table below:

Parameters (all tpd) ^[1]	Project Profile, PP-271/2005 ^[2]	Assumption in VEP-501/2016 ^[3]	Proposed Value in VEP application ^[4]
Recycled Fat Product	14.0	5.0	44.0 ^[5]
Excess Recycled Fat Product	13.0	Nil	
Screenings/ Sediments/ Dewatered Sludge	31.5	23.0	31.5 ^[6] (Value in Project Profile, PP-271/2005)
<p>Note:</p> <ol style="list-style-type: none"> Assuming a GTW density of 1 tonne/m³. Corresponding GTW quantity: 400 m³/day Corresponding GTW quantity: 500 m³/day. Corresponding GTW quantity: 600 m³/day. The actual sales of Recycled Fat Products will depend on market demand. Screenings, sediments and sludge quantities will increase compared to VEP 2016 case with increase in GTW processed at the facility. In proportion with the proposed increase in GTW throughput capacity from 500 to 600 tpd, i.e. an increase by a factor of 1.2 from the VEP 2016 value, around 27.6 tpd of screenings, sediments and dewatered sludge will be 			

disposed of at landfill from WKTS after the GTWTF throughput capacity upgrade and process improvements. This value remains below the value in Project Profile PP-271/2005.

- 2.5.6 In proportion with the proposed increase in GTW throughput capacity from 500 to 600 tpd, i.e. an increase by a factor of 1.2 from the VEP 2016 value, around 27.6 tpd of screenings, sediments and dewatered sludge will be disposed of at landfill from WKTS after the GTWTF throughput capacity upgrade and process improvements. Disposal of screenings, sediments and dewatered sludge at landfill will be therefore be increased by around 4.6 tpd compared to the 2016 VEP value. The value in the VEP application will be proposed to remain consistent with the Value in the Project Profile (PP-271/2015), which is 8.5 tpd higher than the 2016 VEP value, to adequately allow for the increased screenings, sediments and dewatered sludge wastes that will be generated from increased volumes of GTW received.
- 2.5.7 While the WKTS Contractor has been exercising the best efforts in marketing and selling the fat products, a portion of the fat product could not be absorbed by the market given the latest market situation. Therefore, once the on-site product storage has been exhausted and the buyer has confirmed that they could not collect the product, the unsold portion would be treated to a minimum of 30% dry solids content to meet the requirements from landfill authority in parallel with the specifications of the WKTS Contract. However, typically (e.g. with reference to approved EIA reports) waste delivered for landfill disposal should contain no free water and the liquid content should not exceed 70% by weight (i.e. 30% dry solids, also as per the WKTS Follow-on Contract (FOC) specification for landfill disposal.)
- 2.5.8 It is not anticipated that the disposal of screenings, sediments, dewatered sludge and excessive recycled fat products at landfills will have adverse impact on the operation of the landfills. However, the operation of the GTWTF will allow the possibility to reuse the recovered oil and grease, and hence reduce the amount of solid residues to be disposed of at landfills.
- 2.5.9 As described in the Project Profile, the interim GTWTF previously installed at WENT landfill processed around 380 tpd GTW, and generated around 125 tpd waste residues for disposal to landfill. The originally installed GTWTF at WKTS was to reduce the solid wastes to landfill to around 23.5-31.5 tpd waste sediments alongside with 13 tpd excess recycled fat product, or around 64-71% reduction, and generate around 14 tpd recycled fat product. For the proposed increased capacity and enhanced GTWTF treatment process proposed under this VEP, around 27.6 tpd waste sediments will be generated (as noted above), alongside a potential 44 tpd recycled fat product (depending on market demand).
- 2.5.10 Comparing to the original GTWTF at WKTS, processing up to 400 tpd GTW, the original process would have been expected to produce up to around 31.5 tpd waste residues for landfill disposal. Therefore, the proposed enhanced GTWTF at WKTS has the potential to reduce solid waste residues to landfill by some 12% to 27.6 tpd, i.e. slightly better than the originally installed facility (recycled fat product disposed of to landfill will depend on market demand, as mentioned above.) This is as a result of the improved separation and dewatering performance of the new centrifuge units, increasing the amount of high grade recycled fat product with higher market and recycle value, and reducing water content and hence reduced the overall quantity of waste sediments generated.
- 2.5.11 The GTWTF will continue to meet its objective under the original Project Profile by reducing

landfill disposal and recycling GTW as recycled fat product. The proposed enhancement works under the current VEP application will also further enhance the grease trap waste treatment and oil and grease recycling efficiency of the facility.

- 2.5.12 With implementation of the mitigation measures as recommended in the Project Profile, adverse waste management implications are not anticipated during operational phase of the GTWTF.

2.6 Other Possible Impacts on the Environment

- 2.6.1 The key potential impacts in air quality, noise, water quality and waste management have been addressed in the above sections. Other possible impacts on the Environment as identified in the Project Profile PP-271/2005 (such as ecology, landscape and visual, land contamination, etc.) have also been reviewed and no change from the Project Profile PP-271/2005 has been identified. No adverse environmental impacts caused by the subject project are anticipated.
- 2.6.2 It could also be taken into consideration that, if the GTWTF were not enhanced in capacity, the extra GTW generated in Hong Kong might not be disposed of properly. Some GTW might thus end up being discharged illegally without treatment, which would create a significant adverse environmental impact.

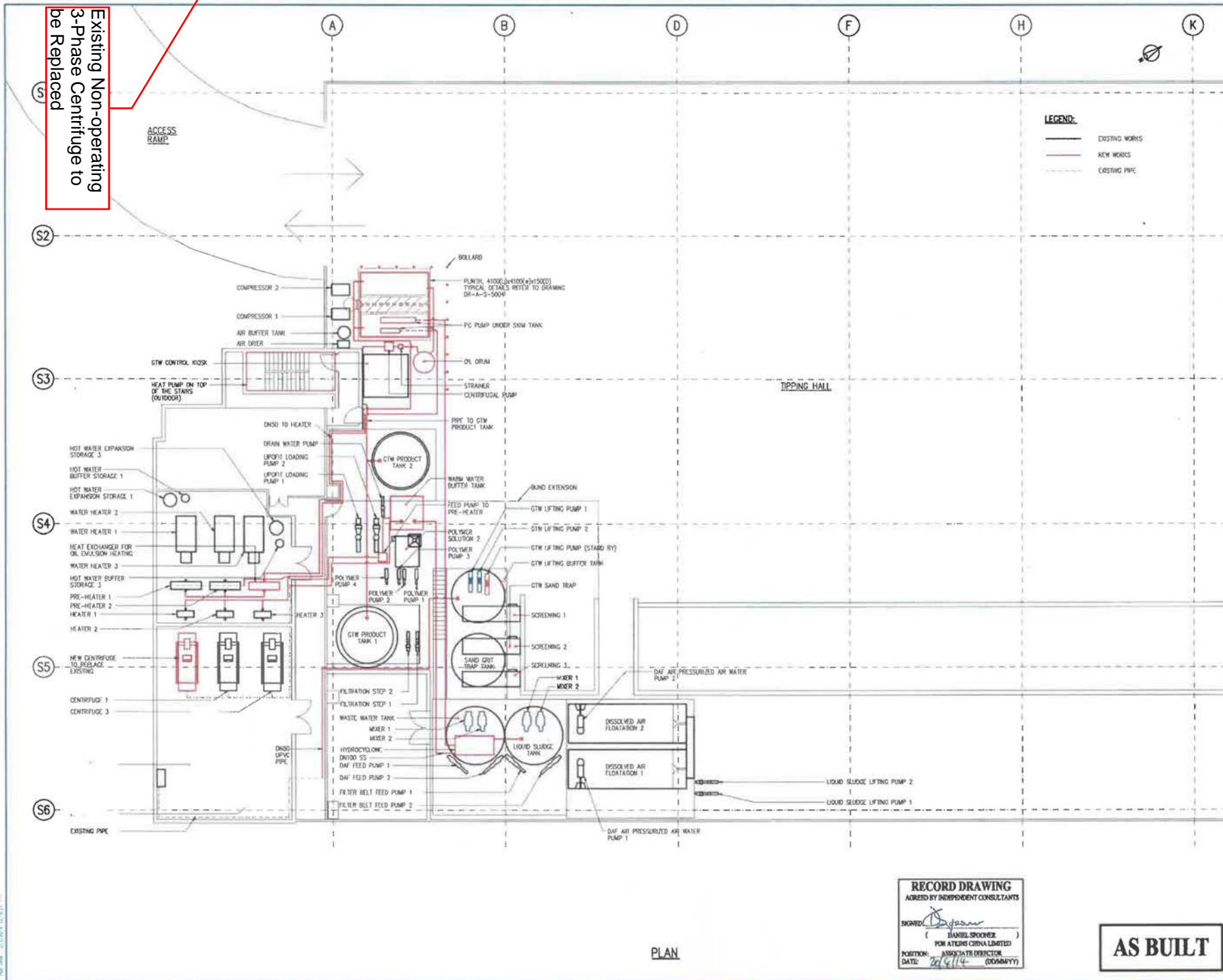
3 CONCLUSION

- 3.1.1 In summary, the environmental impacts arising from the operation of the GTWTF (after proposed variation) described, are expected to meet the requirements of the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM).

Figures



Existing Non-operating 3-Phase Centrifuge to be Replaced



- NOTES:**
1. ALL DIMENSIONS ARE IN MILLIMETRES.
 2. ALL LEVELS ARE IN mPDGM.
 3. PIPES AND CONNECTIONS ARE NOT SHOWN ON THIS DRAWING FOR CLARITY.
 4. LOCATIONS OF EXISTING DUCT SUPPORTS ARE NOT SHOWN ON THIS DRAWING FOR CLARITY.

LEGEND:

- EXISTING WORKS
- NEW WORKS
- - - EXISTING PIPE

REV	DATE	BY	APP	DESCRIPTION
F	02/14	ATE	EST	RECORD DRAWING
E	01/13	A	DP	ISSUED FOR SUBMISSION

CLIENT
 GOVERNMENT POLICE DEPARTMENT
 GOVERNMENT OF THE HONG KONG

CLIENT'S CONSULTANT
AECOM
 AECOM ASIA CO. LTD.

CONTRACTOR
SITA
 SITA WASTE SERVICES LIMITED

LEAD DESIGNER
ARUP
 One Arup & Partners Hong Kong Limited

INDEPENDENT CONSULTANTS
ATKINS
 ATKINS CHINA LIMITED

PROJECT
 WEST KOWLOON TRANSFER STATION
 FOLLOW-ON CONTRACT
 EP/SP/64/11

STATUS
 RECORD DRAWING

DRAWING TITLE
 LAYOUT PLAN FOR
 GTW MODIFICATION

DRAWN	CHECKED	APPROVED
ST	SK	SK
SCALE	1:100 @ A1	DWG
JOB NO	DRAWING NO	REV
227807	DR-A-P-1107	F

RECORD DRAWING
 AGREED BY INDEPENDENT CONSULTANTS

SIGNED: DANIEL SROCHER
 FOR ATKINS CHINA LIMITED

POSITION: ASSOCIATE DIRECTOR (DOMESTIC)
 DATE: 2014/11/14

AS BUILT

PLAN

No. of Set: 10
 Plot Date: 11/13/2014 10:28:31 AM

Figure 1.2 - GTWTF Process Flow Diagram at 2008 Project Profile

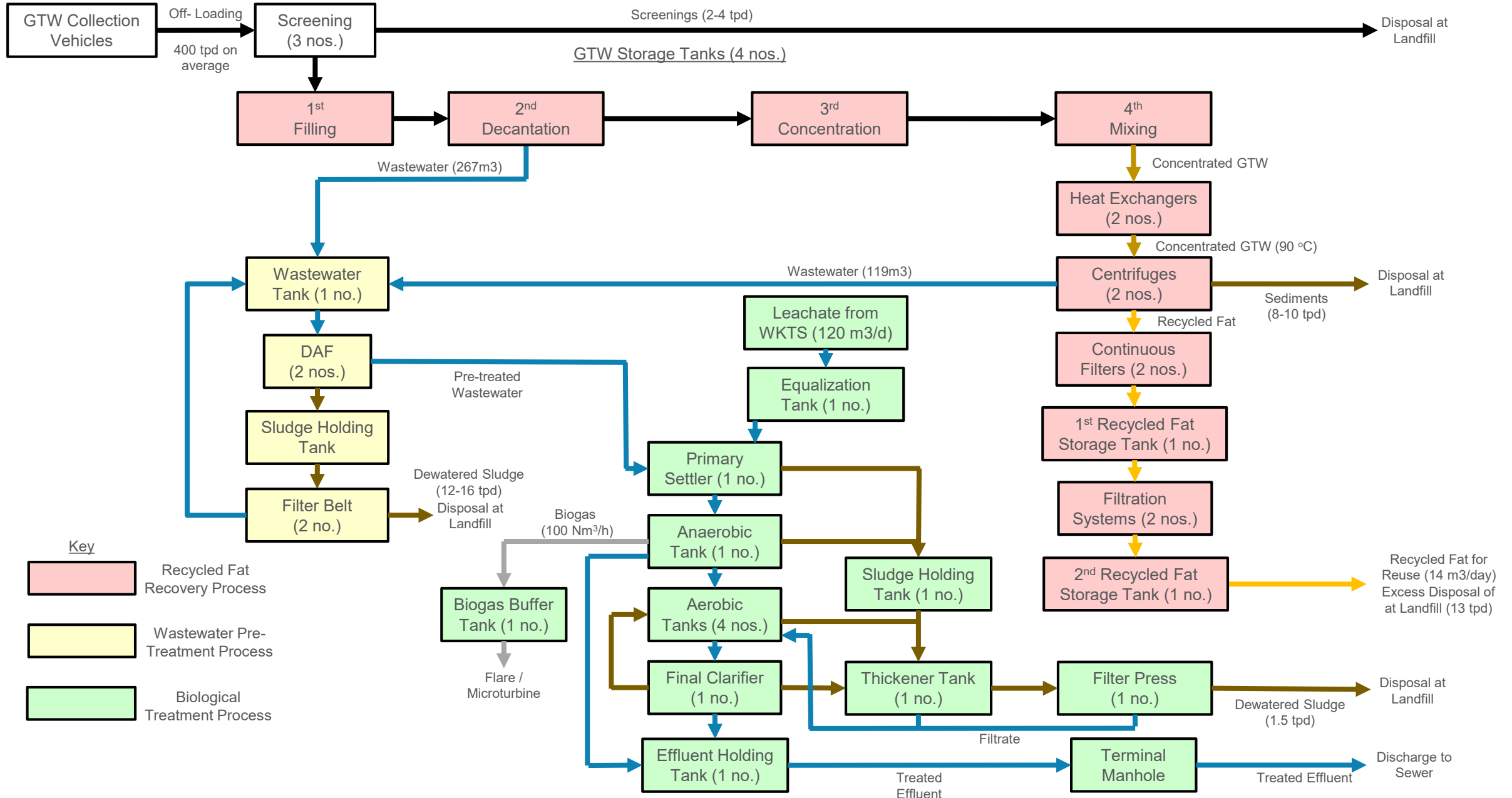


Figure 1.3 - GTWTF Process Flow Diagram at 2016 VEP Application

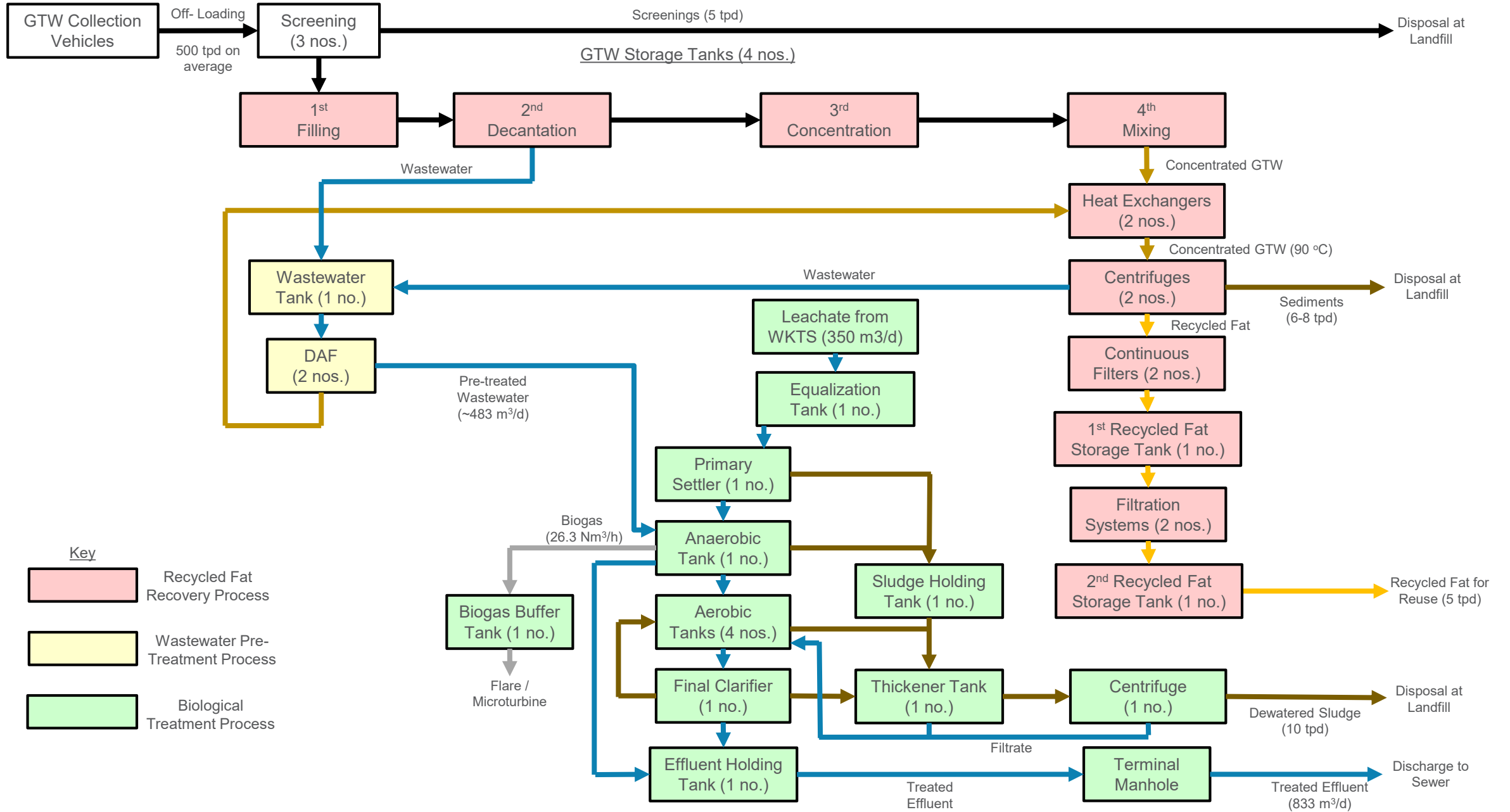
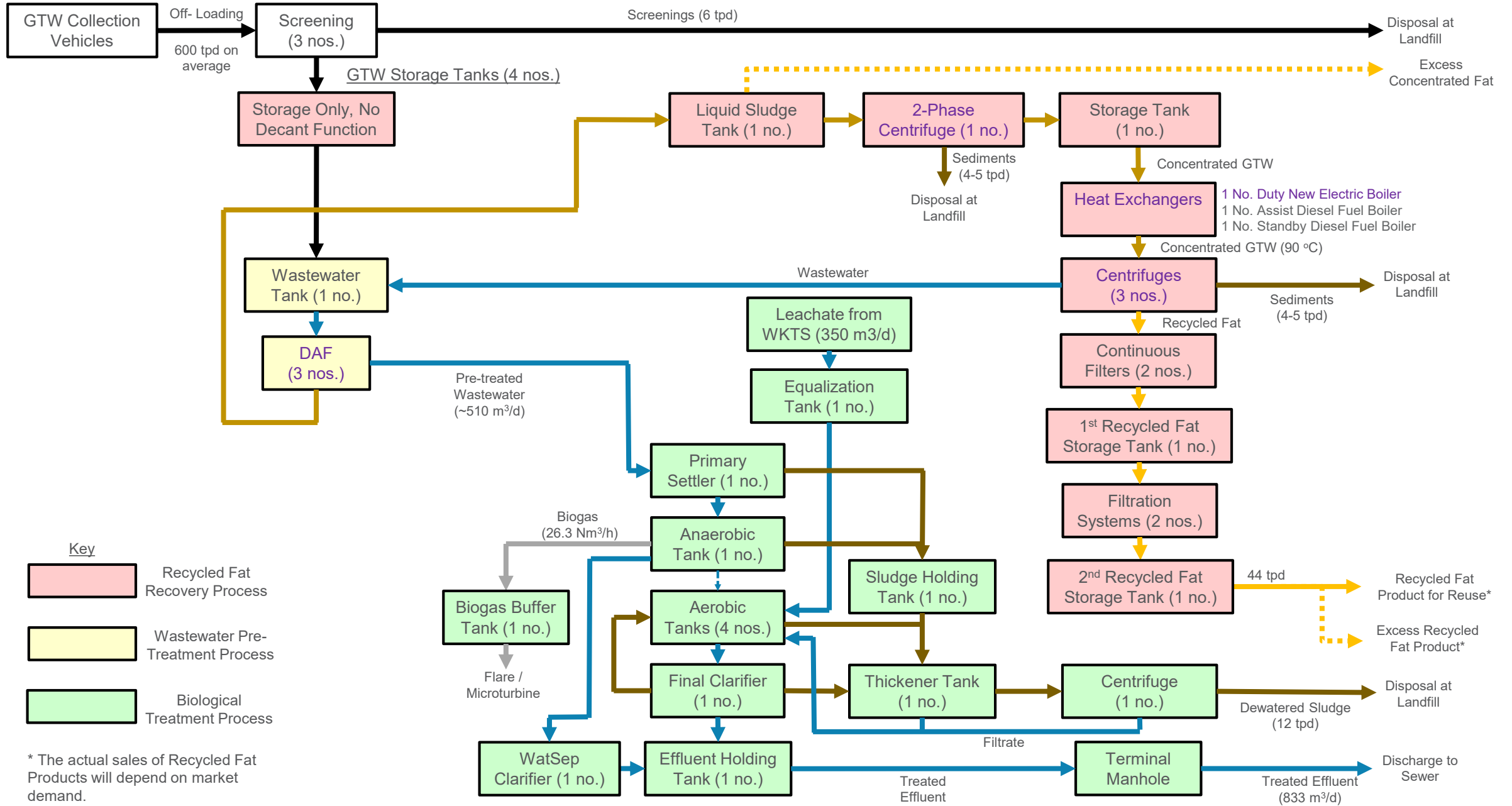


Figure 1.4 – Proposed GTWTF Process Flow Diagram



Appendix A

VEP Application Summary Table of Proposed Variations

PART D PROPOSED VARIATIONS TO THE CONDITIONS IN CURRENT ENVIRONMENTAL PERMIT

D1. Condition(s) in the Current Environmental Permit:	D2. Proposed Variation(s):	D3. Reason for Variation(s):	D4. Describe the environmental changes arising from the proposed variation(s):	D5. Describe how the environment and the community might be affected by the proposed variation(s):	D6. Describe how and to what extent the environmental performance requirements set out in the EIA report previously approved or project profile previously submitted for this project may be affected:	D7. Describe any additional measures proposed to eliminate, reduce or control any adverse environmental impact arising from the proposed variation(s) and to meet the requirements in the Technical Memorandum on Environmental Impact Assessment Process:
<p>Under Part B (Descriptions of Designated Project), Scale and Scope of Designated Project(s): <i>“The Project involves the operation of the area for storage tank and biological treatment. The grease trap waste treatment facility will be capable of handling average load of 500 cu.m. per day.”</i></p>	<p>Under Part B (Descriptions of Designated Project), Scale and Scope of Designated Project(s): <i>“The Project involves the operation of the area for storage tank and biological treatment. The grease trap waste treatment facility will be capable of handling average load of 600 cu.m. per day.”</i></p>	<p>To maintain the services of the GTWTF after ten years of operation. The increase in handling capacity can handle the expected increase in GTW generation in Hong Kong in the near future.</p>	<p>Environmental impacts were compared to the Project Profile PP-271/2005, VEP-501/2016 and operation record in Year 2018, no significant environmental changes are identified. Please refer to Section 2 of the Environmental Review Report for details.</p>	<p>Environmental impacts were compared to the Project Profile PP-271/2005, VEP-501/2016 and operation record in Year 2018, no significant environmental changes are identified. Please refer to Section 2 of the Environmental Review Report for details.</p>	<p>With the proposed variation on handling capacity of GTW and the associated upgrading works, environmental performance of the GTWTF is not breaching the values as stated in the Project Profile PP-271/2005. Please refer to Section 2 of the Environmental Review Report for details.</p>	<p>Please refer to the Environmental Review Report (ERR).</p>

Appendix B

Record of the Gas Outlet Concentration in Year 2018

Record of the Gas Outlet Concentration in Year 2018

	H₂S Out (ppm)	NH₃ Out (ppm)
January	0.005	0.011
February	0.004	0.008
March	0.005	0.014
April	0.006	0.009
May	0.008	0.016
June	0.010	0.014
July	0.008	0.015
August	0.007	0.015
September	0.006	0.014
October	0.005	0.014
November	0.012	0.017
December	0.018	0.019
Average	0.008	0.014
Design Outlet Guarantee	<0.05	<0.1
Note:	H ₂ S and NH ₃ outlet concentrations remain below the design outlet guarantee of the odour control system	

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