SUEZ NWS R&R (HK) Limited

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

GTWTF Operation Plan for EP No. FEP-01/247/2006/B

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ATKINS
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1 INTRODUCTION

This report presents the Operation Plan of the upgrading process at the Grease Trap Waste Treatment Facility (GTWTF) at West Kowloon Transfer Station (WKTS), in meeting the requirements of the Specific Condition 2.3 of the amended Environmental Permit No. FEP-01/247/2006/B.

Section 2 outlines the measures proposed to be implemented, to meet the operational performance as stated in the VEP Application Documents. An operational approach is presented, outlining the way the GTWTF will meet the requirements of the amended Environmental Permit, via adoption of suitable operational measures.

Section 3 presents the detailed Operation Plan, including the information as required under Condition 2.3 i) to v) of the amended Environmental Permit.

Section 4 then gives a brief conclusion of the environmental benefits of the proposed facility operational upgrade, and confirmation summary that the upgraded facility will meet the requirements of the VEP.

2 OUTLINED APPROACH

In accordance with the VEP-571/2019 application documents, 1 no. additional Dissolved Air Flotation (DAF) unit will be installed to increase plant availability, and therefore improve the overall GTWTF reliability and hence the GTW processing capability.

It is also proposed in the VEP application document that the diesel consumption will be capped to a maximum of 50 to 80 L/day on average and this could be achieved by replacing the 1 no. existing diesel hot water boilers with 1 no. new electric boilers. However, subsequent re-consideration of the cost effectiveness of such replacement, alternative measures have been explored to mitigate the environmental impact while achieving the increased GTW throughput. After review, diversion of a proportion of the Concentrated Fat for off-site processing is considered to be feasible and a more cost-effective solution. In the supporting document for VEP-501/2016, it was estimated that the diesel consumption for handing 500 cu.m GTW onsite would be about 70 – 100L per day. Under the present proposed approach, in order to achieve the improvement on air quality, it is proposed to reduce the diesel consumption on site through controlling the amount of concentrated fat feeding to the downstream process whereas a proportion of concentrated fat would be diverted from GTWTF for further processing. Consequently, the targeted diesel consumption, i.e. capping to a maximum of 50 to 80 L/day in average, as proposed in the VEP application document could be achieved accordingly.

As per the current process flow, the Concentrated Fat, after passing through the existing and new DAF units, will be transferred to the liquid sludge tank for temporary storage before being further processed by the centrifuges. It is now proposed to divert a major proportion of the Concentrated Fat for off-site processing by a designated contractor, and produce useful fat materials such as additive to energetic resources, biodiesel, or other industrial / manufacturing processes. The diversion will be implemented in phases considering the capabilities of the designated contractor, from 20 tpd gradually ramping up to about 80 tpd. With a reduced amount of Concentrated Fat to be processed on-site at GTWTF, the heating supply from the on-site diesel hot water boilers, and correspondingly the on-site air emissions, will thus be reduced.

Regarding odour emissions, as part of the Concentrated Fat will be diverted for off-site processing, the total odour loading to the on-site air scrubbing system will also be reduced, when compared to the VEP application. Similarly, the wastewater treatment throughput will also be reduced, when compared with the VEP application, as a major proportion of the Concentrated Fat will be diverted off-site, thus less wastewater will be generated from the Concentrated Fat processing on-site. Further details of the expected mass flow rates are included in figures 1.1 and 1.2.

In considering air quality odour impacts, the enhanced operation can be reviewed in terms of amount of raw GTW pre-processing and Concentrated Fat final processing on-site. As the incoming limit of raw GTW remains at the VEP application limit (i.e. 600 cu.m per day), no additional odour loading will be incurred with the diversion of a proportion of the Concentrated Fat for off-site processing. For the second part of the process, where the Concentrated Fat is processed into recycled oil, as a proportion of the Concentrated Fat is diverted for off-site processing, the on-site Concentrated Fat processing throughput will be reduced, thus also reducing corresponding odour generation. Hence, no additional measures are considered necessary, and the air quality control and odour mitigation requirements of VEP-571/2019 will remain in place, with the existing odour control systems at WKTS operating well within their design odour capacity and discharge concentrations. Furthermore, as stated in the Environmental Review Report of the VEP-571/2019 section 2.2.2, all treatment processes will continue to be conducted in enclosed condition and all exhaust gases will be treated by deodorization units under this operation plan, Besides, in order to avoid the roadside emission from the road transportation of Concentrated Fat by road tankers, the material will be transferred using standard ISO containers via WKTS marine vessels to the WENT Landfill Reception Area for collection by the designated contractor.

Regarding the noise matter, 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. 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.

Given that the Concentrated Fat will be transferred via marine transportation to the WENT Landfill Reception Area for collection by the designated contractor, there will be no additional vehicular traffic on road, nor road traffic noise impact induced at WKTS under the enhanced operational arrangement.

The WKTS vessels are capable of transporting up to 210 containers per journey to WENT. Under the proposed arrangement of transferring the Concentrated Fat for off-site processing at WENT Landfill via WKTS marine vessel, it is estimated that those 80 tpd of concentrated fat would only occupy 6 ISO containers, and thus no adverse impact to the marine transportation demand of WKTS.

Regarding wastewater matter, a total of 719 m^3/day of wastewater will be discharged to the public sewer, through Manhole No. FMH4018438, from WKTS as estimated in the VEP-571/2019 application documents for the upgrading works. This amount consists of sewage flow from WKTS staff and visiting drivers as well as wastewater generation from WKTS, vehicle washing and floor cleansing. The actual discharge volume will likely be further reduced after implementing the proposed Concentrated Fat diversion and continue to remain within the VEP-501/2016 approved value in 2016.

The estimated discharge volume is within the 1,000 m3/day limit for the Wastewater Treatment Plant imposed by Discharge License No. WT00029816-2017 issued to SITA under the Water Pollution Control Ordinance by EPD. Therefore, no adverse impact on the receiving sewer system is anticipated.

The Construction and Demolition waste (C&D waste) will be reduced when compared with the upgrade proposed in VEP-571/2019, as less equipment is being replaced and renewed. As stated in the Environmental Review Report of the VEP-571/2019 section 2.5.3, the C&D waste generated under this operation plan will be stored in enclosed bins.

3 OPERATIONAL PLAN

i. Time Programme of the upgrading process

The installation of the new 1 no. DAF unit is anticipated to be commenced on 22nd June 2020. The additional DAF unit is expected to be commissioned in August 2020.

Under the current arrangement, a portion of the Concentrated Fat i.e. 20 tpd is being arranged for off-site processing. It is proposed that a greater amount of the Concentrated Fat would be arranged for off-site processing under the enhanced operational arrangement. In order to receive the additional amount of Concentrated Fat, the designated contractor needs to upgrade its handling facilities in phases. Therefore, the diversion time programme would have to match with the upgrading works schedule at the designated contractor's facilities. Depending on the actual operating conditions, the final target of diverting 70 - 80 tpd of Concentrated Fat for off-site processing will be achieved by December 2020.

ii. Upgrading and Operation Processes of the Facility

After commissioning of the additional DAF unit and implementation of the enhanced operational arrangement, the plant availability and overall GTWTF reliability would be enhanced. The handling capacity of GTWTF can be enhanced to 600 cu.m per day average.

The process flow operation of the facility will remain mostly unchanged, including the raw GTW reception and screening, raw GTW pre-processing, oil / water separation at the DAF units, Recycled Fat production process, the wastewater treatment processes, waste solids processing and handling, and the ventilation and deodorisation systems.

After passing through the DAF units, around 82-85% of the water content is removed from the raw GTW, leaving Concentrated Fat of around 15-18% of the incoming volume. As per the current process flow, the Concentrated Fat will be transferred to the liquid sludge tank for temporary storage before being further processed by the centrifuges. Under the proposed enhanced operation arrangement, a large proportion of the Concentrated Fat will be diverted for off-site processing such that the heating requirement for on-site diesel hot water boilers will be reduced and the fuel consumption as committed in the VEP-571/2019 application documents can therefore be achieved. A reduced amount of Concentrated Fat will be processed by the centrifuges and the Recycled Fat production process will remain unchanged.

The GTWTF and other facilities at the WKTS, including the ventilation and deodorisation systems, the wastewater treatment processes, and the waste solids processing and handling arrangements will continue to operate as at present, therefore potential environmental impacts from these areas will remain unchanged and in line with the stated performance levels in the VEP application documents.

iii. Updated Layout Plan of the Facility

The new DAF unit will be located on the North-East side of the tipping hall, as shown on the updated layout plan on Figure 2.1.

iv. Updated design / operating parameters of the Facility

After commissioning of the additional DAF unit and implementation of the enhanced operational arrangement, the handling capacity of GTWTF would be increased from 500 cu.m to 600 cu.m per day in average, with the following key design/operating parameters:

Key design / operating parameters	**Value**
GTW Handling Capacity	600 tonnes / day
GTW Collection Vehicles	70 / day
Ventilation Flow Rate at GTWTF Area	Min. 8325 m3/hour
Gas Inlet Concentration H_2S	Max 50 ppm
Gas Inlet Concentration NH_3	1.2 ppm
Gas Outlet Concentration H_2S	<0.05 ppm
Gas Outlet Concentration NH_3	<0.1 ppm
Leachate from WKTS [Note]	212 m^3/day (<250m^3/day, Value in ERR for VEP-571/2019)
GTW Treatment Process Wastewater [Note]	507 m^3/day (<583m^3/day, Value in ERR for VEP-571/2019)
Overall Wastewater Generation [Note]	719 m^3/day (<833m^3/day, Value in ERR for VEP-571/2019)
Recycled Fat Product	3 tpd
Diesel Heating Fuel Consumption	50-80 L/day in average on a monthly basis
Total Number of DAF Units	3
Total Number of 3-stage Centrifuges	3
Biogas to be flared	26.3 Nm^3/hour
Waste /Screenings Generation	31.5 tonnes / day

Note: The value presented is for reference only and the actual figures would be subject to the incoming waste quality and quantity.

v. Updated Environmental Mitigation Measures for the Facility

The schedule for implementation of the updated environmental mitigation measures is as follows:

Mitigation Measure	Party Responsible	When Implemented	Where Implemented	Requirements	Reference of the Mitigation Measures
1. Reduce the diesel fuel consumption and arrange offsite processing of concentrated fat to control the gaseous emissions	Permit Holder	Commence along with the diversion of the concentrated fat, and reach the reduction target from December 2020	WKTS	Diesel consumption reaching below 50-80L/day starting from December 2020	Section 2 of this Operation Plan
2. Report the diesel consumption of the boiler system	Permit Holder	For first 12 months following the full implementation of the enhanced operational arrangement (i.e. December 2020 to November 2021)	WKTS	Diesel consumption reduced to 50-80L/day starting from December 2020	Condition 2.4(ii) of FEP-01/247/2006/B
3. Ensure proper operation and maintenance of the air scrubbing system	Permit Holder	Implemented and will remain in place	WKTS	Odour removal efficiency of at least 99.9% for hydrogen sulphide and at least 90% for ammonia	Condition 2.2 of FEP-01/247/2006/B
4. Report the measurements of concentrations for hydrogen sulphide and ammonia at the outlet of the system	Permit Holder	For first 3 months following the full implementation of the enhanced operation plan (i.e. Dec 2020 to Feb 2021)	WKTS	Odour removal efficiency of at least 99.9% for hydrogen sulphide and at least 90% for ammonia	Condition 2.4(i) of FEP-01/247/2006/B
5. Ensure proper diversion of the GTW is carried out by fully enclosed tankers	Permit Holder and the Designated Contractor	Implemented and will remain in place	WKTS and off-site processing	Fully enclosed tankers shall be used to transfer Concentrated Fat and avoid any odour issue	Section 2 of this Operation Plan

6. Employ a qualified odour panellist to patrol and monitor the odour level at the site boundary of the WKTS three times per day	Permit Holder	Implemented and will remain in place	WKTS	Ensure compliance with the odour limit of 2 Odour Units within the site boundary of the WKTS	Condition 2.1 of FEP-01/247/2006/B

Adoption of good site practice in genera will be exercised at all times, during operation and maintenance activities, to ensure the effectiveness of the aforementioned mitigation measures.

4 CONCLUSION

Following the approval of the VEP-571/2019 application, mitigation measures to alleviate the potential environmental impacts due to increased GTW throughput are required. In regard of potential localized air quality (NOx) impacts, diversion of a proportion of the Concentrated Fat from WKTS for off-site processing is a feasible alternative option which will correspondingly reduce the heating supply from the diesel boiler. As a result, the amount of diesel will be reduced while the GTW throughput will not be affected.

This Operation Plan describes the operational changes in relation to the diversion of Concentrated Fat for off-site processing, such that the diesel fuel consumption will be reduced to 50-80 L/day in average starting from December 2020. The production of the Recycled Fat by the GTWTF will continue, but at a reduced throughput of around 3 tpd (subject to the incoming GTW characteristics). As a result, the amount of diesel fuel consumption will be lowered to 50-80 L/day in average, thus reducing the air pollutant (NOx) emissions and odour impact to the nearby area, in line with the requirements of VEP-571/2019.

Figures

Figure 1.1 – Proposed GTWTF Process Flow Diagram (VEP-57/2019 Application)

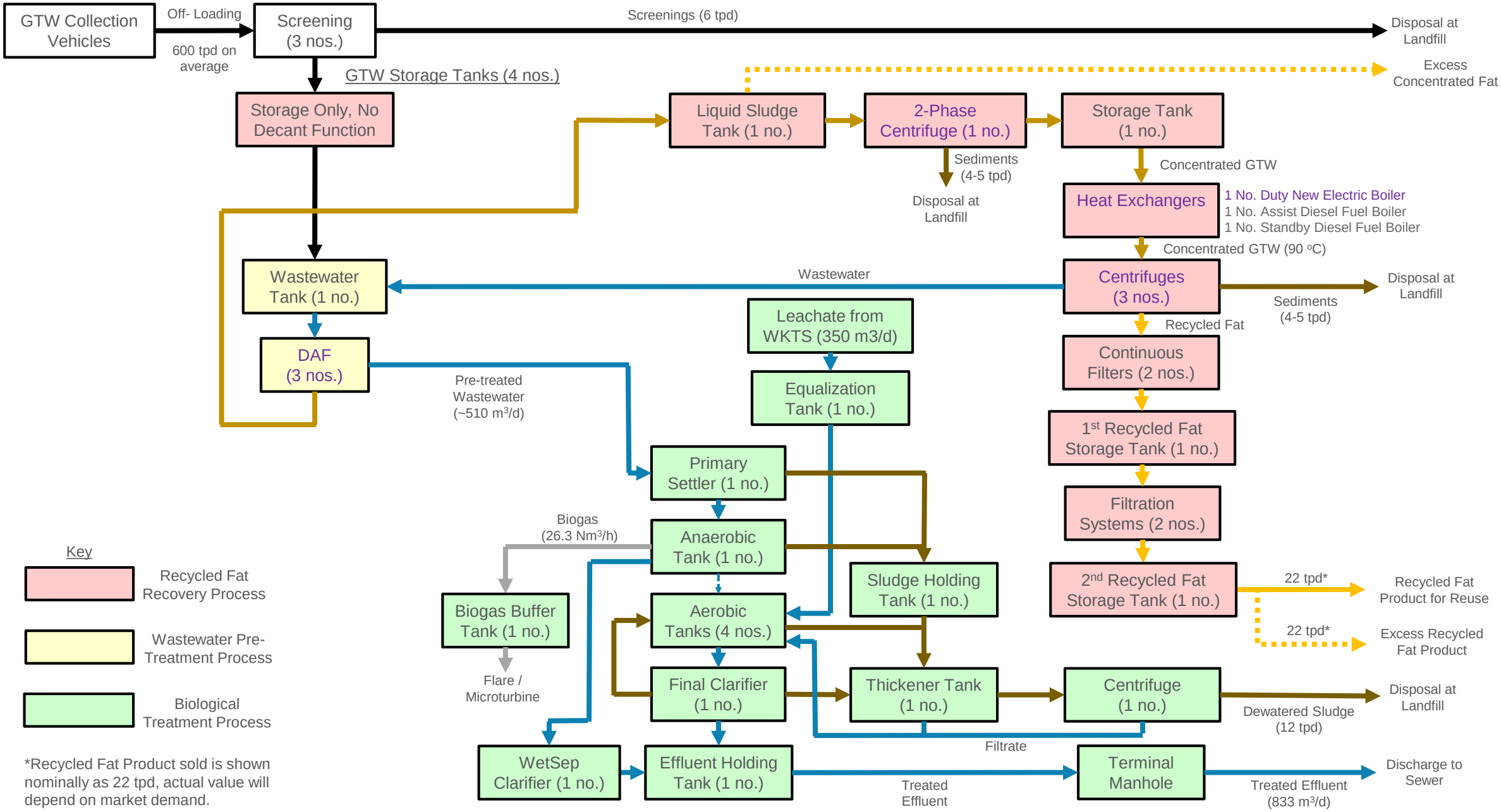
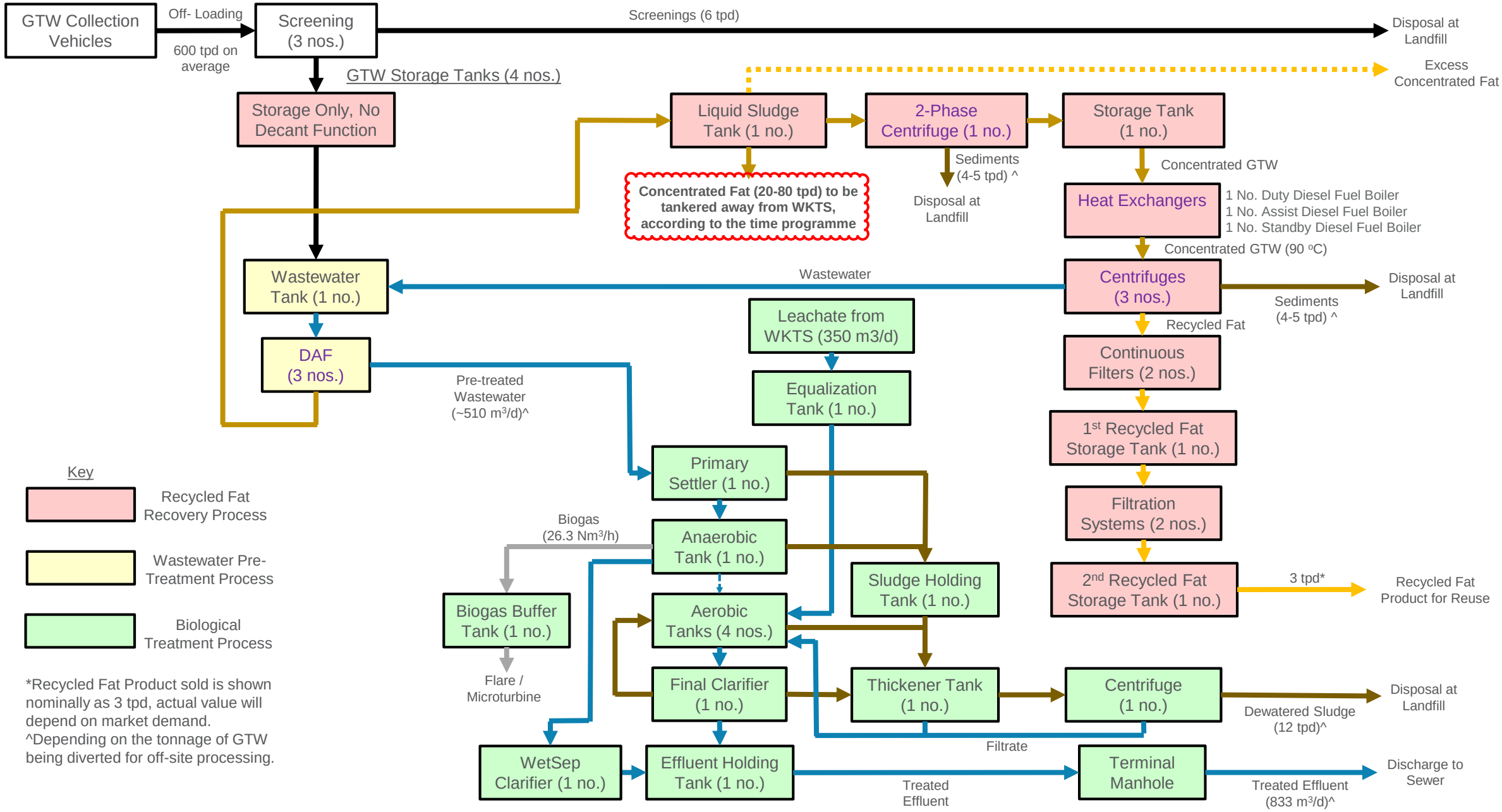


Figure 1.2 – Proposed GTWTF Process Flow Diagram (Operation Plan)



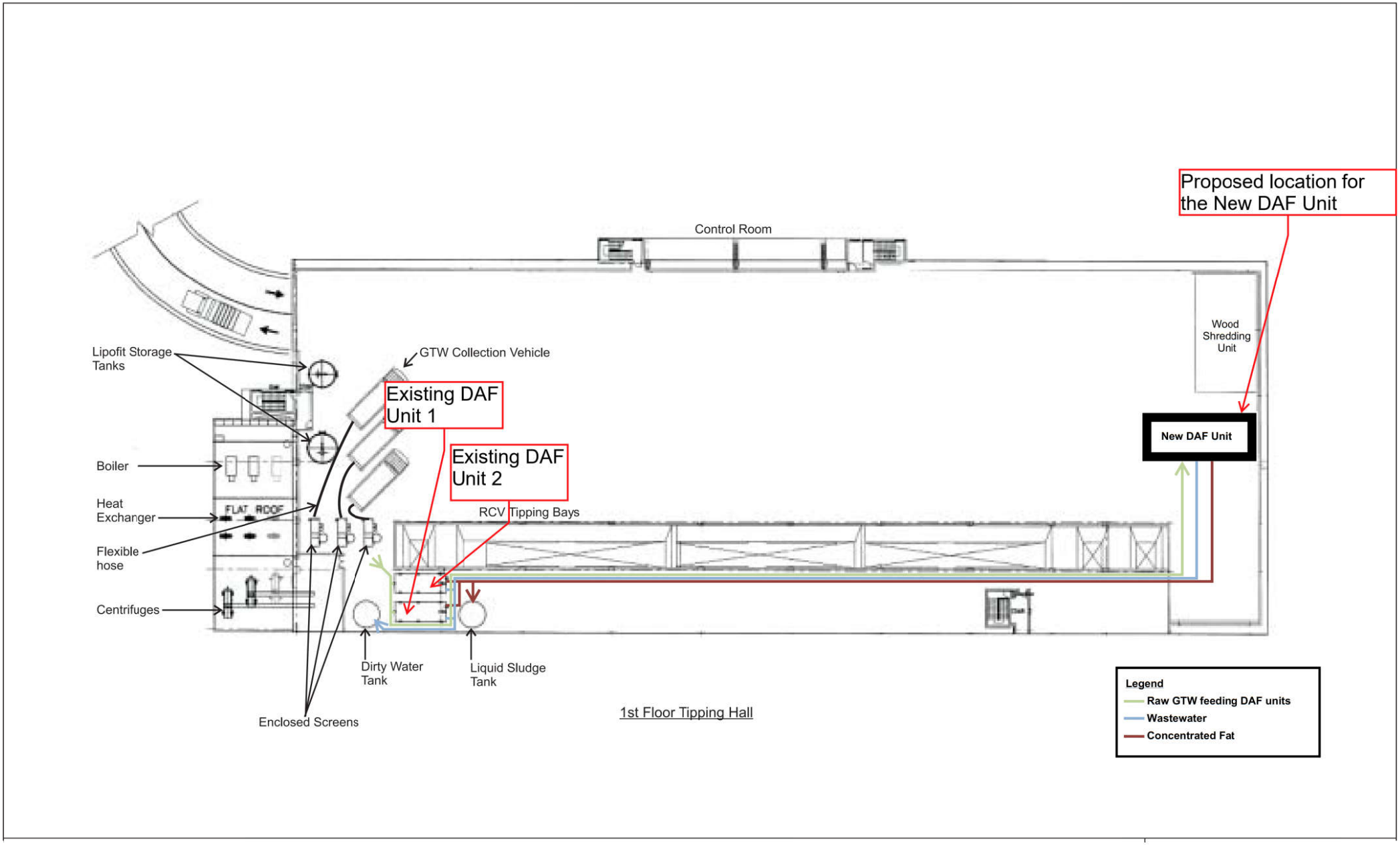


Figure 2.1 – Updated Layout Plan

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