

Proposed Interim Sewage Treatment Plant and Effluent Reuse Facility at Wo Shang Wai, Yuen Long

Project Profile

Profit Point Enterprises Limited

September 2015

Table of Contents

	Page
1 BASIC INFORMATION.....	1
1.1 Project Title	1
1.2 Purpose and Nature of the Project.....	1
1.3 Name of Project Proponent.....	1
1.4 Description and History of the Project	1
1.5 Location and Scale of the Project.....	1
1.6 Number and Types of Designated Projects Covered by the Project Profile.....	2
1.7 Name and Telephone Number of Contact Person(s)	2
2 OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME.....	3
2.1 Project Planning and Implementation.....	3
2.2 Project Implementation and Timetable	3
2.3 Interaction with Other Projects	3
3 MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT	4
3.1 Air Quality.....	4
3.2 Noise.....	4
3.3 Water Quality.....	4
3.4 Ecology	4
3.5 Landscape and Visual	4
3.6 Health and Hygiene	4
4 POSSIBLE IMPACTS ON THE ENVIRONMENT	5
4.1 Construction and Decommissioning Phases	5
4.2 Operation Phase	6
5 ENVIRONMENTAL MITIGATION MEASURES TO BE INCORPORATED.....	9
5.1 Construction and Decommissioning Phases	9
5.2 Operation Phase	11
6 USE OF PREVIOUSLY APPROVED EIA REPORTS.....	15

List of Tables

Table 2.1	Major Interface Project
Table 3.1	Representative Existing ASRs
Table 3.2	Representative Existing NSRs
Table 6.1	Similar Projects Related to the Reuse of Treated Sewage Effluent

List of Figures

Figure 1	Location Plan of the Project
Figure 2	Locations of Ecological and Water Quality Sensitive Receivers

List of Appendix

Appendix A	Process Flow Diagram and Layout of the Project
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1 BASIC INFORMATION

1.1 Project Title

- 1.1.1 Proposed Interim Sewage Treatment Plant and Effluent Reuse Facility at Wo Shang Wai, Yuen Long (hereinafter referred to as the “Project”).

1.2 Purpose and Nature of the Project

- 1.2.1 The Project will consist of an interim sewage treatment plant (STP) with an effluent reuse facility located within the site area of Comprehensive Development in Wo Shang Wai (hereinafter referred to as the “WSW Development”). The effluent reuse facility will involve the reuse of treated sewage effluent (TSE) from the interim STP for WSW Development. The proposed STP will be served as an interim measure to handle the sewage generated from the WSW Development and will be commissioned prior to the occupation of WSW Development. The location of the Project is shown in **Figure 1**.
- 1.2.2 The STP with handling capacity of about 1,446m³ and including TSE reuse facility is anticipated to cover an area of approximately 1,070m² and the TSE will be fully reused on site for toilet flushing and irrigation. In case of potential adverse weather condition (e.g. successive heavy rainy days) or maintenance period of landscape area, excessive treated effluent will be temporary stored in an additional on-site effluent storage buffer tank, which would not form part of the storage volume for regular operation of the STP. Any excessive treated effluent will be tankered away to public Sewage Treatment Works to prevent overflow of treated effluent. The Project will operate automatically on a 24 hours per day basis.

1.3 Name of Project Proponent

- 1.3.1 Profit Point Enterprises Limited

1.4 Description and History of the Project

- 1.4.1 The Project is located within the site of WSW Development of which the EIA Report (Register No.: AEIAR-120/2008) was approved on 31 July 2008 under the Environmental Impact Assessment Ordinance (EIAO). Following the approval of the EIA Report, an Environmental Permit (EP) was granted on 9 September 2008 (EP No: EP-311/2008) for the construction and operation of the WSW Development. Variations of environmental permit (VEP) were subsequently applied and the latest Environmental Permit (EP No: EP-311/2008/D) was issued by Director of Environmental Protection (DEP) on 20 March 2013.
- 1.4.2 As the implementation programme of the government sewerage network outside the WSW Development is uncertain at the current moment, it is therefore proposed to provide an on-site interim STP as an interim measure to handle the sewage generated from the WSW Development before the availability of public sewerage for connection. It is anticipated that the connection to the government sewerage system at Castle Peak Road is the permanent and long term measure of the WSW Development.
- 1.4.3 This Interim STP would be used to treat the sewage generated from the WSW Development. The treated effluent will be fully reused for toilet flushing and irrigation of landscape areas. The Project would be decommissioned after the connection of sewers at WSW Development to the aforesaid planned public sewer.

1.5 Location and Scale of the Project

- 1.5.1 The STP is located within the WSW Development (**Figure 1** refers) and the proposed TSE reuse facility will be entirely underground and located within the STP room. The WSW Development is bounded by Castle Peak Road – Mai Po and San Tin Highway to the east, with fish ponds to the north, Wo Shang Wai Village to the south-west, and residential developments, namely Royal Palms and Palm Springs, to the south. The Project falls within the area zoned “Other Specified Uses – Comprehensive Development to Include Wetland Restoration Area” on the Mai Po & Fairview Park Outline Zoning Plan No. S/YL-MP/6.

1.5.2 The STP is a 1-storey high building structure with the TSE reuse facility situated in basement level of the STP and enclosed within the STP room. The TSE reuse facility will be mainly comprised of the UV steriliser and treated water storage tank, accompanied with the associated pumping facilities and piping network. The layout plan of STP and a flow diagram of the operation of STP and TSE reuse facility are provided in **Appendix A**.

1.6 Number and Types of Designated Projects Covered by the Project Profile

1.6.1 The handling capacity of STP will be about 1,446m³ per day, which is less than 5,000m³ per day, and therefore the proposed STP is not classified as designated project under F.2 and F.3 (b) of Part 1, Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO). Only the reuse of treated sewage effluent from the Interim STP is classified as a designated project under F.4 of Part 1, Schedule 2 of the EIAO.

1.7 Name and Telephone Number of Contact Person(s)

1.7.1 All queries regarding the Project can be addressed to:

- Name: Mr. Kelvin Lau
- Company of Contact: Profit Point Enterprises Limited
- Address: 72-76/F Two International Finance Centre, 8 Finance Street, Central, Hong Kong
- Telephone: 2908-8114

2 OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

2.1 Project Planning and Implementation

2.1.1 The Project will be planned, implemented and decommissioned by Profit Point Enterprises Limited, together with external consultants and contractors.

2.2 Project Implementation and Timetable

2.2.1 The proposed construction of the Project is scheduled to commence in Q4 2016, for completion and operation in early 2017. Upon availability of public sewerage network, the Project will be decommissioned, which will take approximately 4 months.

2.3 Interaction with Other Projects

2.3.1 Major concurrent committed projects in the vicinity which would interface with the Project are presented in **Table 2.1**. Potential cumulative impacts would be reviewed where appropriate.

Table 2.1 Major Interface Project

Project	Responsible Party	Anticipated Works period
Comprehensive Development at Wo Shang Wai, Yuen Long (WSW Development)	Profit Point Enterprises Limited	Q4 2009 – Q4 2017
Hong Kong Section of Guangzhou-Shenzhen-Hong Kong Express Rail Link (XRL)	MTR Corporation Ltd.	Q1 2010 – Q3 2018*

Note:

* Only the works area of Mai Po Ventilation Building (MPVB) proposed under the XRL Project is located within the study area of the Project, which would have potential concurrent impact. Based on on-site observation, the construction of the MPVB structure has been completed in 2014, it is therefore anticipated that no cumulative dust impact arising from the construction of the Project.

3 MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

3.1 Air Quality

- 3.1.1 The proposed interim STP is located within the project boundary of WSW Development, and will be surrounded by future residential houses and residential facilities. The identified nearest existing air sensitive receivers (ASRs) in the vicinity of the Project are summarized in **Table 3.1**, with their locations shown in **Figure 1**.

Table 3.1 Representative Existing ASRs

Description	Land Use
Royal Palms (Existing)	Residential
Palms Spring (Existing)	Residential
Mai Po San Tsuen Village House (Existing)	Residential

3.2 Noise

- 3.2.1 Site visit was conducted to identify the existing Noise Sensitive Receivers (NSRs) located closest to the Project site, i.e. first layer of NSRs which have been considered as the most critical locations. The WSW Development will be occupied after the operation of the Project, and thus the residential flats of WSW Development are considered as the nearest NSRs during operation of STP. A summary of representative existing NSRs is given in **Table 3.2**, with their locations shown in **Figure 1**.

Table 3.2 Representative Existing NSRs

Description	Land Use
Royal Palms (Existing)	Residential
Mai Po San Tsuen Village House (Existing)	Residential

3.3 Water Quality

- 3.3.1 Wetland Conservation Area (WCA), Wetland Buffer Area (WBA) and Inland water bodies adjacent to the Project site including fish ponds, Mai Po Culvert and downstream water courses, as well as Wetland Restoration Area proposed under WSW Development Project are identified as the water quality sensitive receivers (WSRs) during the construction, operation and decommissioning phases. The locations of WSRs are shown in **Figure 2**.

3.4 Ecology

- 3.4.1 The Project Site is located within the project boundary of WSW Development. Wetland Restoration Area within WSW Development, Wetland Conservation Area (WCA) and Wetland Buffer Area (WBA), located approximately 48m, 145m and 315m from the Project Site, are identified as the sensitive receivers during the construction, operation and decommissioning phases. Their locations are shown in **Figure 2**.

3.5 Landscape and Visual

- 3.5.1 Since the Project Site is located within the construction boundary of WSW Development, it is anticipated that there would be no landscape and visual impact arising from the construction phase, while there would be potential landscape and visual impact to the future visual sensitive receivers, landscape resources and landscape character areas at WSW Development during the operation and decommissioning phases of the Project.

3.6 Health and Hygiene

- 3.6.1 The future occupants of the Wo Sang Wai Development, as well as staff and workers of the Project are identified as the sensitive receivers during the operation phase.

4 POSSIBLE IMPACTS ON THE ENVIRONMENT

4.1 Construction and Decommissioning Phases

4.1.1 As the Project is located within Wo Shang Wai Development in Yuen Long (WSW Development), in addition to its small scale of facility, the associated construction and decommissioning works would be comparatively small scale, localised and transient. The potential environmental impacts arising from the construction and decommissioning of the Project are discussed in the following sections.

Air Quality

4.1.2 Construction works would be conducted from 7am to 7pm every day except on Sunday and public holiday. Neither construction nor decommissioning works will be carried out at any times during Sunday and public holiday. Possible air quality impacts during construction and decommissioning phases of the Project include:

- fugitive dust arising from site formation, excavation and backfilling, vehicular movement on open site, concreting, construction of superstructures, demolition works, as well as wind erosion of open sites and stockpiling areas; and
- emissions from powered mechanical equipment.

4.1.3 The nearest existing Air sensitive receivers (ASRs), Mai Po San Tsuen and Royal Palms, are located at 258m and 25m respectively from the Project site. Given that the works to be involved are small in scale, transient and localised, potential dust impact to these ASRs is not expected with adoption of appropriate dust suppression measures as stipulated in the *Air Pollution Control (Construction Dust) Regulation* (**Section 5** refers).

4.1.4 As mentioned in **Section 2.3**, there would be other concurrent construction works (i.e. WSW Development) in the vicinity. However, the contribution from the construction works of the Project is expected to be insignificant.

Noise

4.1.5 The major source of construction noise impact will be the operation of powered mechanical equipments (PMEs) for carrying out construction/decommissioning activities. The activities will be conducted from 7am to 7pm every day except on Sunday and public holiday. In view of the location and scale of the Project, the associated construction and decommissioning works would be minimal and localised. If necessary, appropriate mitigation measures would be adopted to mitigate any adverse cumulative noise impact during the construction and decommissioning phases.

Water Quality

4.1.6 Impacts on water quality concerns during construction and decommissioning phases of the Project will be associated with site runoff, wastewater, and sewage generated from construction/decommissioning activities. With the implementation of the site practices outlined in EPD's *Practice Note for Professional Persons on Construction Site Drainage ProPECC PN 1/94 "Construction Site Drainage"*, the potential surface runoff and the associated water quality impacts would be minimized. With the implementation of good site practices and mitigation measures recommended in **Section 5**, no adverse water quality impact during the construction and decommissioning phases is anticipated.

Waste Management Implication

4.1.7 Wastes generated by the construction and decommissioning works are likely to be construction and demolition (C&D) materials and general refuse.

4.1.8 Provided that good site practices and mitigation measures as stated in **Section 5** will be strictly followed during handling and transportation of construction wastes generated, no adverse environmental impacts are anticipated during the construction/decommissioning of the Project.

Ecology

- 4.1.9 Since the Project will be located within the project boundary of WSW Development, the surroundings of the Project site have been developed as construction site, only insignificant indirect ecological impacts, e.g. dust, noise, disturbance, etc, are anticipated during the construction phase of the Project. During decommissioning phase, the Project site will be surrounded by residential houses of WSW Development (i.e. developed area) and is setback from Wetland Restoration Area (WRA), therefore there may be potential indirect ecological impacts during the decommissioning phase of the Project.

Landscape and Visual

- 4.1.10 The Project will be entirely located within the construction boundary of WSW Development, it is anticipated there would be no significant landscape impact arising from the construction of the Project.
- 4.1.11 During the decommissioning phase of the Project, potential temporary landscape and visual impact would arise from the decommissioning works to the residential houses of WSW Development surrounding the Project. Given the small scale and short duration of the localized nature of works, the visual impact due to the decommissioning work is anticipated to be insignificant with adoption of appropriate measures.
- 4.1.12 Nevertheless, mitigation measures are recommended to ameliorate the landscape and visual impacts during the construction and decommissioning of the Project, which are detailed in **Section 5**.

Cultural Heritage

- 4.1.13 As the Project is entirely located within the project boundary of WSW Development, any potential impact to cultural heritage was assessed in the WSW EIA. As such, no adverse impact to cultural heritage is anticipated from the construction and decommissioning of the Project.

Health and Hygiene

- 4.1.14 Impacts on health and hygiene are not anticipated during the Project construction and decommissioning phases.

Hazard to Life

- 4.1.15 Hazards to life is not anticipated during the construction phase.

4.2 Operation Phase

Air Quality

- 4.2.1 During the operational phase, the operation of STP, the handling and storage of sewage sludge within the STP, as well as the chlorination process of the disinfection tank, may produce odour issue. Only a small amount of sodium hypochlorite will be stored in the storage tank of the dosing system of the TSE reuse facility but within an enclosed structure. Sodium hypochlorite reacts with TSE for disinfection and would not generate chlorine gas, which may otherwise cause odour impacts. The entire chlorination process, as part of the TSE reuse facility, will be accommodated underground inside an enclosed building (i.e. STP of WSW Development) and deodourization unit will be installed at STP to avoid potential odour from the exhaust air, so there would be no significant odour impacts expected. No other emissions from the treatment process of the TSE reuse facility during the operational phase of the Project are anticipated.

Noise

- 4.2.2 The Project would operate for 24 hours a day. Electrical and mechanical equipment, such as mechanical screens and sewage pumps are the potential noise sources during operation phase of the Project.

- 4.2.3 Appropriate measures will be adopted to minimise the potential cumulative fixed noise impact from the operation of the Project and other concurrent projects to the nearby sensitive receivers.

Water Quality

- 4.2.4 The major concern upon the operation of the Project would be its discharge of treated effluent into the water system of Deep Bay. As stipulated in the Town Planning Board Guideline (TPB PG-No. 12C), "no net increase of pollution load to Deep Bay" should be achieved and thus no overflow of either raw sewage or treated effluent should be allowed from the proposed TSE reuse facility. With all treated sewage effluent fully reused on-site, the proposed development will not cause any net increase in pollution flow and load to the Deep Bay area.

- 4.2.5 Under adverse weather condition, such as successive heavy rainy days or maintenance period of landscape area, there may be a risk of sewage overflow via the nearby stormwater drainage system. Precaution measures will be adopted in the Project to prevent any overflow of treated effluent. Any excessive treated effluent will be tankered away to public Sewage Treatment Works to prevent overflow of treated effluent.

Waste Management Implication

- 4.2.6 The sludge generated from the STP will be properly collected and stored on site to avoid potential environmental impact arising from the handling and storage of sludge during the operation of the Project. The collected sludge will be transported to public sewage treatment works by designated sewage tankers for disposal. Other wastes generated during the operation phase would be a small amount of screenings. The screenings would be properly packed and handled within the STP to avoid odour and hygienic nuisance. The screenings will then be transported to strategic landfills for disposal. No adverse waste management implication is expected given proper handling and disposal during the operational phase of the Project.

Ecology

- 4.2.7 Since there would be no discharge from the Project to the Deep Bay WCZ, no ecological impact during the operation of the Project is anticipated.

Landscape and Visual

- 4.2.8 The STP including the TSE facility is only 1-storey high building structure above ground level, the potential visual impact is therefore considered to be slight and only a few visually sensitive receivers (VSRs) would have direct view to the STP. The Project is expected to be visually compatible with the surrounding environment with the adoption of appropriate landscape and visual mitigation measures.

Health and Hygiene

- 4.2.9 Since the TSE reuse facility only generates water for non-potable usage, potential impact on human health and hygiene would not be expected with appropriate connection adopted for the TSE reuse pipe system and potable water pipe system. With the implementation of mitigation measures recommended in Section 5, potential impact on human health and hygiene is minimal.

Hazard to Life

- 4.2.10 Only a small amount of chemicals (i.e. sodium hypochlorite) will be stored on-site for the disinfection. Sodium hypochlorite is classified as a Category 4 poisonous substance under the Dangerous Goods Ordinance (Cap 295) but it is not acutely toxic, flammable, or explosive substances, hazardous gas would only be generated if it is accidentally mixed with incompatible chemicals. Based on the operation process of TSE reuse facility, the possibility of mixing sodium hypochlorite with incompatible chemicals is not expected. The use of sodium hypochlorite in the TSE reuse facility would not constitute a potentially hazardous installation in accordance with Chapter 12.4 of Hong Kong Planning Standards & Guidelines.

Appropriate measures as discussed in **Section 5** would be adopted to avoid potential impact. As such, no hazard impact is anticipated during the operation of the Project.

5 ENVIRONMENTAL MITIGATION MEASURES TO BE INCORPORATED

5.1 Construction and Decommissioning Phases

Air Quality

5.1.1 Construction dust would be minimized with the implementation of proper dust control and suppression measures as stipulated in the Air Pollution Control (Construction Dust) Regulation. The following dust suppression measures should be carried out, where applicable, to minimize construction dust impact:

- any excavated dusty materials or stockpile of dusty materials should be covered entirely by impervious sheeting or sprayed with water so as to maintain the entire surface wet, and recovered or backfilled or reinstated within 24 hours of the excavation or unloading;
- all dusty materials to be sprayed with water prior to any loading, unloading or transfer operation so as to maintain the dusty material wet;
- the load of dusty materials carried by vehicle leaving a construction site should be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle; and
- the excavation area should be sprayed with water immediately before, during and immediately after (as necessary) the works so as to maintain the entire surface wet.

Noise

5.1.2 To minimize the construction noise impact to the nearby sensitive receivers, the following good site practices and noise management should be adopted, where applicable, during construction and decommissioning phases:

- only well-maintained plant should be operated on-site and the plant should be serviced regularly during the construction programme;
- machines and plant that may be intermittent in use should be shut down between work periods or should be throttled back to a minimum;
- plant known to emit noise strongly in one direction, should, where possible, be oriented so that the noise is directed away from nearby NSRs;
- silencers or mufflers on construction equipment should be utilised and should be properly maintained during the construction period;
- mobile plant should be sited as far away from NSRs as possible;
- material stockpiles and other structures should be effectively utilised, where practicable, to screen noise from on-site construction activities; and
- the Contractor shall at all times comply with all current statutory environmental legislation.

Water Quality

5.1.3 During construction and decommissioning phases of the Project, the practices outlined in EPD's *Practice Note for Professional Persons on Construction Site Drainage ProPECC PN1/94*, as well as other good site management practices to avoid site runoff and minimize the potential water pollution will be implemented. Recommended mitigation measures for minimizing potential water quality impact listed below should be followed throughout the construction and decommissioning phases:

- the site should be confined to avoid silt runoff from the site;
- no discharge of silty water into the drainage channel within and in the vicinity of the site;
- any soil contaminated with chemicals/oils shall be removed from site and the void created shall be filled with suitable materials;

- excavated soil which needs to be temporarily stockpiled should be stored in a specially designated area that should not obstruct existing overland flow. Tarpaulin sheet should also be provided to cover and avoid runoff into the drainage channels;
- stockpiles to be covered by tarpaulin to avoid spreading of materials during rainstorms;
- storage areas shall be selected at safe locations on site and adequate space shall be allocated to the storage area;
- any construction plant which causes pollution to the water system due to leakage of oil or fuel shall be removed off-site immediately;
- regular clearance of domestic waste generated in the temporary sanitary facilities to avoid waste water spillage; and
- temporary sanitary facilities to be provided for on-site workers during construction.

5.1.4 Recommended mitigation measures for minimizing potential water quality impact listed below should be followed for surface construction works in close proximity of Mai Po Tributary:

- The proposed surface construction works should be carried out in dry season as far as practicable where the flow in the river channel or stream is low.
- Temporary sewerage system should be designed to prevent wastewater from entering the river, streams and sea.
- Temporary storage of materials (e.g. equipment, filling materials, chemicals and fuel) and temporary stockpile of construction materials should be located well away from any water courses during carrying out of the construction works.
- Stockpiling of construction materials and dusty materials should be covered and located away from any water courses.
- Construction debris and spoil should be covered up and/or disposed of as soon as possible to avoid being washed into the nearby water receivers.
- Construction activities, which generate large amount of wastewater, should be carried out in a distance away from the waterfront, where practicable.
- Mitigation measures to control site run-off from entering the nearby water environment should be implemented to minimize water quality impacts. Surface channels should be provided along the edge of the waterfront within the work sites to intercept the run-off.
- Construction effluent, site run-off and sewage should be properly collected and/or treated.
- Proper shoring may need to be erected in order to prevent soil or mud from slipping into the watercourses.
- Supervisory staff should be assigned to station on site to closely supervise and monitor the works.

Waste Management Implication

5.1.5 To minimize generation waste and C&D materials, standard waste management measures and good site practices in waste handling, disposal and transportation as stated below will be implemented:

Excavated Material/Construction & Demolition Materials

- stockpiling of excavation material during the wet season should be avoided as far as practicable;
- careful design, planning and good site management can minimize over-ordering and generation of waste materials such as concrete, mortars and cement grouts. The design of formwork should maximise the use of standard wooden panels so that high reuse levels can be achieved. Alternatives such as steel formwork or plastic facing should be considered to increase the potential for reuse; and

- the Contractor should recycle as much of the C&D material as possible on-site. Proper segregation of wastes on site will increase the feasibility of recovery of certain components of the waste stream by recycling contractors.

General Refuse

- general refuse should be stored and disposed of separately from general construction waste and chemical waste;
- storage bins for general refuse would be provided with lids, which should be kept closed to avoid odour nuisance and windblown litter;
- general refuse would be removed regularly and disposed of to licensed landfills; and
- the Contractor should employ a reputable waste collector to remove general refuse from the Project Area, separate from C&D materials and chemical wastes, on a regular basis to minimize odour, pest and litter impacts.

Ecology

- 5.1.6 The mitigation measures stated in the approved WSW EIA report and its approved application of Variation of Environmental Permit (VEP-393/2013) are applicable to the Project to avoid excessive water drawdown and to abate potential disturbance to surrounding habitats and wildlife. No additional mitigation measures are therefore required during construction phase under the Project context. Good site practice in relation to dust control, noise and water quality mitigation as well as waste management as stated above would be followed to reduce potential disturbance impacts and pollution.

Landscape and Visual

- 5.1.7 Mitigation measures are recommended to ameliorate the landscape and visual impacts during the construction and decommissioning of the Project, including:
- the construction area and contractor's temporary works areas should be minimized;
 - screening of construction works by hoardings/ noise barriers;
 - topsoil, where identified, should be stripped and stored for re-use; and
 - control night-time lighting and glare by hooding all lights.

5.2 Operation Phase

Air Quality

- 5.2.1 To minimize potential odour impact during operation phase of the Project, the inlet chamber and wet well will be located underground and enclosed by air tight covers. It is recommended that air ventilated from the enclosed structure of the proposed pumping would be treated by deodorizers before discharging to the atmosphere.

Noise

- 5.2.2 To minimize potential operational noise impacts from the fixed plant noise sources, these noise sources will be located underground as far as practicable, such that there is no direct line of sight to the nearby NSRs. The exhaust fans of the ventilation system are also proposed to be located away from the NSRs as far as practicable. The noise mitigation treatment, if required, will be provided in the form of silencers, fitted to the discharge sides of fans to ensure that the noise levels at NSRs comply with the stipulated noise criteria.

Water Quality

- 5.2.3 With "no net increase of pollution load to Deep Bay" requirement, no overflow of either raw sewage or treated effluent should be allowed in the proposed TSE reuse facility. The following

mitigation measures will be implemented to ensure no overflow of raw sewage / treatment effluent and avoid potential emergency discharge of STP at any times:

Prevention of overflow of raw sewage: -

- Provision of equalization tank to store up 3 times of ADWF for a period of 4 hours;
- Dual or standby power supply;
- Dual unit for major equipment to allow for partial shut down for maintenance;
- Flow measurement and level sensors connected with alarm signaling system will be installed to keep monitoring on inflow rate to avoid sewage overflow; and
- Raw sewage will be tankered away to public Sewage Treatment Works in case the operation of STP could not be resumed after all the above mitigation measures utilized.

Prevention of overflow of treated effluent: -

- Provision of an effluent storage tank to store excessive treated effluent in case of emergency (e.g. extreme adverse weather) or maintenance of landscape area;
- Effluent storage tank will be partitioned into several compartment to allow partial shut-down of the tank for maintenance;
- Level sensors connected with alarm signaling system will be installed to keep monitoring on storage volume of treated effluent to avoid overflow of treated effluent. The warning signal will be automatically generated and sent to the Estate Manager when the flow in the tank reached as pre-set level so as to allow the Estate Manager to have sufficient time (e.g. 1 day) for arranging and mobilizing tanker service to tank away the excessive treated effluent with 1-day effluent storage capacity reserved as contingency; and
- Any further excessive treated effluent will be tankered away to public Sewage Treatment Works when irrigation is stopped due to continuous adverse weather or prolonged suspension of irrigation or flushing water supply systems for maintenance / repairing.

5.2.4 With the implementation of preventive measures, overflow of raw sewage / treated effluent is unlikely and water quality impact is not anticipated.

5.2.5 The preventive measures as discussed in **Section** Error! Reference source not found. would also be adopted for prevention of cross contamination between reclaimed water and freshwater supplied from WSD, and misuse of reclaimed water and excessive irrigation for portable use.

5.2.6 *Preventive Measures for Cross Contamination and Mis-use of Reclaimed Water (Engineering Measures): -*

- Water to be supplied for portable use, toilet flushing and irrigation should be stored in three different tanks in different colors and clearly labeled;
- All pipes and fittings used for the reclaimed water supply and associated distribution system should be purple in color (exact color code to be reviewed) for distinguishing them from the pipes and fittings used for fresh water supply and its distribution systems;
- Regular checking / inspections of the reclaimed water supply and associated distribution systems should be carried out to identify any possible cross connection to the fresh water supply and distribution system. Non-toxic dye may be adopted in the checking / inspections;
- Non-return valves should be installed on both the inlet pipes feed from effluent storage tank and WSD's supply mains, to the toilet flushing and irrigation waters storage tanks; and
- All precaution measures should be clearly stated in the O&M manual of the STP, toilet flushing and irrigation systems.

Preventive Measures for Cross Contamination and Mis-use of Reclaimed Water (Management Measures): -

- Warning plate with sign and letter “NOT FOR PORTABLE USE 不能飲用” would be shown on the toilet flushing and irrigation water storage tanks, and tagged on all accessible water taps supplying reclaimed water if any within the developments, notifying the staff, visitors and the public at large that treated effluent is being used and is not suitable for drinking;
- All water taps of reclaimed water at communal areas, if any, should be locked in order to avoid mis-use of reclaimed water for other non-planned use;
- Proper signage, promotion and training workshops will be provided periodically to all management and operation staffs of the Development, as well as future land owners, on the proper use of reclaimed water and portable water; and
- All precaution measures should be clearly stated in the management manual of the Development.

Preventive Measures for Excessive Irrigation: -

- A preset semi-automatic control irrigation system would be adopted with provision of underground drip pipes (about 200mm below soil level) to prevent irrigation water entering into surface drains; and
- Irrigation system should only be operated by designated landscape maintenance team, following the procedures as stated in the O&M manual.

5.2.7 With the implementation of preventive measures, cross contamination, mis-use of reclaimed water and excessive irrigation are unlikely and water quality impact is not anticipated.

Waste Management Implications

- 5.2.8 The sludge would be collected and temporarily stored on-site, and then transported to public sewage treatment works by designated sewage tankers for disposal in a regular manner to minimize nuisance to surrounding residents. The screenings would be properly packed in plastic bags and handled within the STP to avoid odour and hygienic nuisance. The screenings will then be transported to strategic landfills for disposal.
- 5.2.9 The waste collection chambers should be properly maintained and licensed collectors should be employed for the collection and disposal of sewage and waste on a regular basis.

Landscape and Visual

5.2.10 The Project is expected to be visually compatible with the surrounding environment with the adoption of appropriate landscape and visual mitigation measures such as appropriate (visually unobtrusive) building materials/ colours and screen planting.

Health and Hygiene

- 5.2.11 The TSE will receive tertiary treatment through chlorination to ensure no bacteria re-growth and no bacterial contamination will occur during the transmission of TSE to the point of usage for toilet flushing and irrigation. The proposed chlorine dosing system using sodium hypochlorite will meet the ≥ 1 mg/L level of total residual chlorine recommended by the WSD for reducing odour and bacterial growth in the distribution system for TSE reuse. Pipes for the TSE will be easily differentiable from potable water pipes (i.e. warning signs, colour-coded, different pipe sizes) to avoid potential impacts on health and hygiene from possible incorrect connections and contamination of potable water and TSE pipes. Operation and maintenance manuals will include appropriate provisions to test and ensure no incorrect connections of potable water and TSE pipe connections will occur.
- 5.2.12 Operators of landscape irrigation should be required to wear protective gears to minimize contact with the treated MBR effluent whilst carrying out the irrigation works.

Hazard to Life

- 5.2.13 Requirement of Fire Services Department (FSD) for bulk storage of sodium hypochlorite solution (liquid chlorine) or chlorine gas cylinders for STP operation shall be properly observed under the Dangerous Goods Ordinance (Cap. 295) to prevent potential hazard to life.

6 USE OF PREVIOUSLY APPROVED EIA REPORTS

6.1.1 The following EIA Reports and Project Profile have been reviewed during the preparation of this PP:

- Hong Kong Section of Guangzhou - Shenzhen - Hong Kong Express Rail Link (Register No.: AEIAR-143/2009);
- Proposed Comprehensive Development at Wo Shang Wai, Yuen Long (Register No.: AEIAR-120/2008) and Environmental Review Report (ERR) (No.: 221005/ENL/AB/04/E) submitted for Variation of Environmental Permit (Application No.: VEP-393/2013); and
- Project Profile for Drainage Works at Mai Po (Register No.: PP-504/2014).

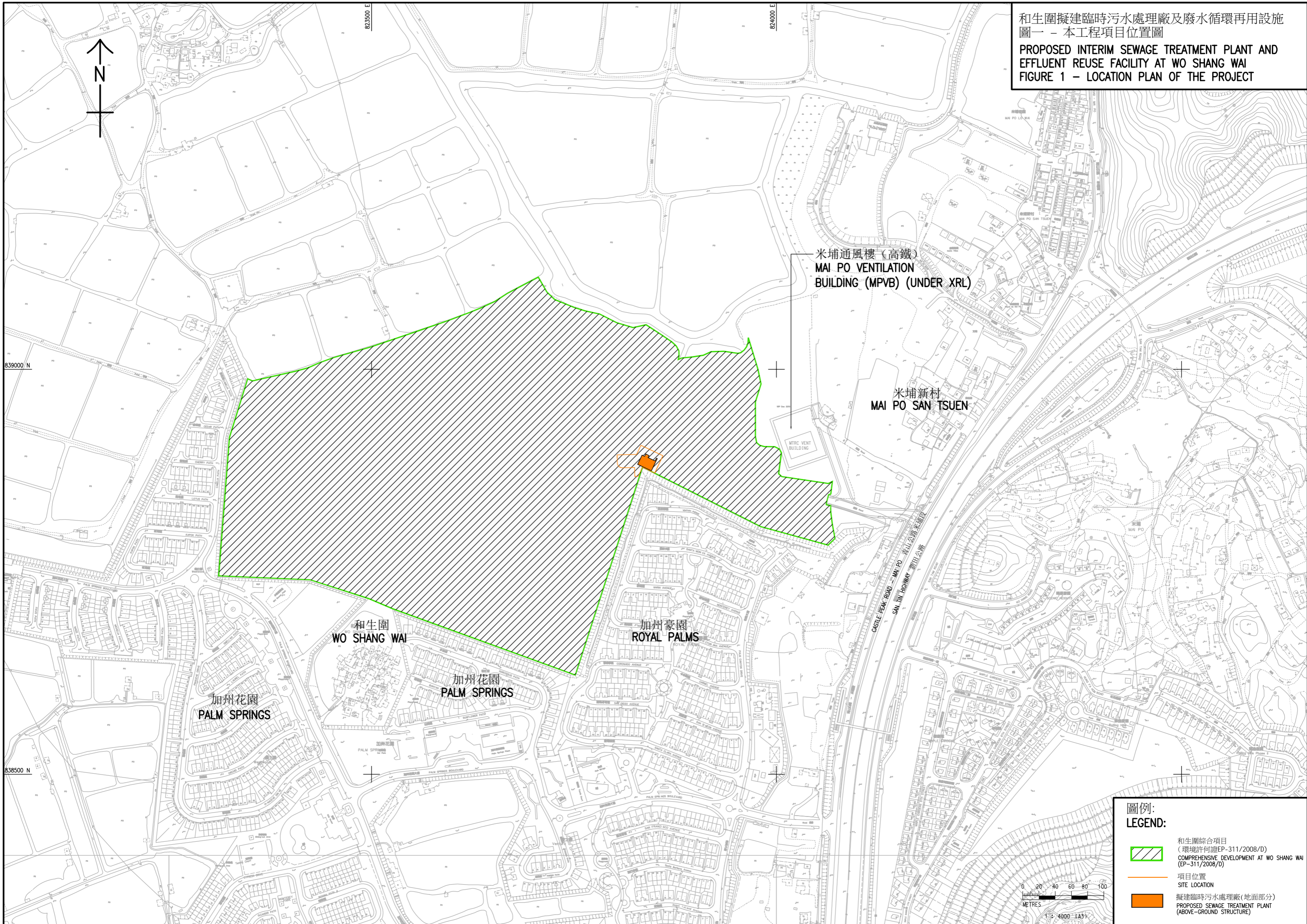
6.1.2 **Table 6.1** presents similar projects related to the reuse of treated sewage effluent in Hong Kong.

Table 6.1 Similar Projects Related to the Reuse of Treated Sewage Effluent

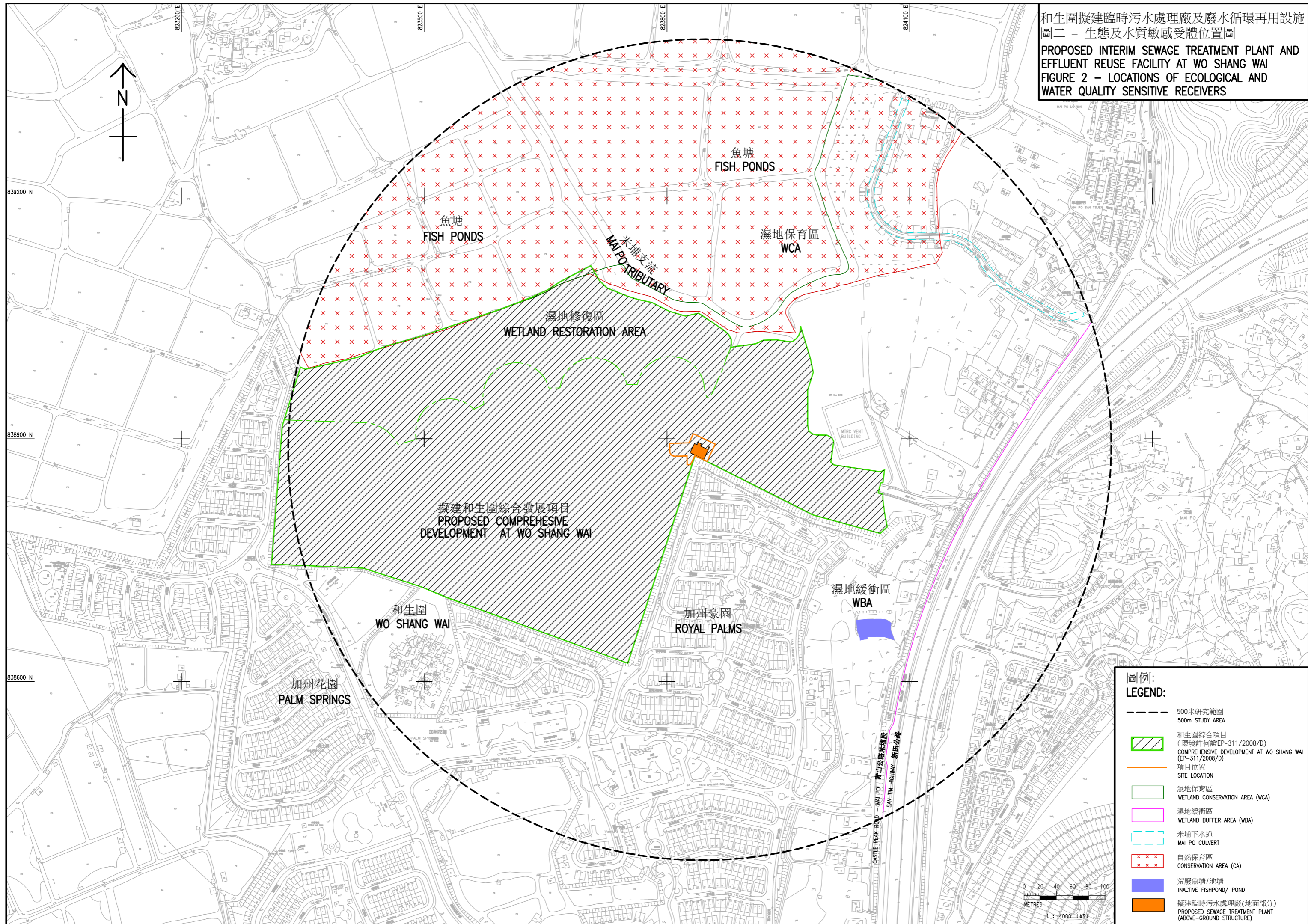
Application No.	Project Title
DIR-080/2003	Reuse of Treated Effluent from Ngong Ping Sewage Treatment Plant for Toilet Flushing
DIR-125/2005	Demonstration Scheme on Reclaimed Water Uses in the North District
DIR-137/2006	Tseung Kwan O Area 86 Property Development - Rainwater and Grey Water Recycling
DIR-174/2008	Reuse of Treated Sewage Effluent from Redeveloped Lo Wu Correctional Institution
DIR-177/2009	Water Reclamation Facilities in Shatin Sewage Treatment Works
DIR-181/2009	Water Reclamation Facilities in Pumping Station and Preliminary Treatment Works of Drainage Services Department
DIR-182/2009	Water Reclamation Facilities for Yuen Long, Sai Kung and Stanley Sewage Treatment Works
DIR-183/2009	Water Reclamation Facilities for Stonecutters Island, Siu Ho Wan and Sham Tseng Sewage Treatment Works
DIR-214/2011	Water Reclamation Facility in Tai Po Sewage Treatment Works
DIR-232/2013	Reuse of Treated Wastewater for Cooling Tower make up in Planned Food Factory at No. 3 Dai Shun Street Tai Po Industrial Estate

FIGURES

和生圍擬建臨時污水處理廠及廢水循環再用設施
 圖一 - 本工程項目位置圖
 PROPOSED INTERIM SEWAGE TREATMENT PLANT AND
 EFFLUENT REUSE FACILITY AT WO SHANG WAI
 FIGURE 1 - LOCATION PLAN OF THE PROJECT



和生圍擬建臨時污水處理廠及廢水循環再用設施
 圖二 - 生態及水質敏感受體位置圖
 PROPOSED INTERIM SEWAGE TREATMENT PLANT AND
 EFFLUENT REUSE FACILITY AT WO SHANG WAI
 FIGURE 2 - LOCATIONS OF ECOLOGICAL AND
 WATER QUALITY SENSITIVE RECEIVERS



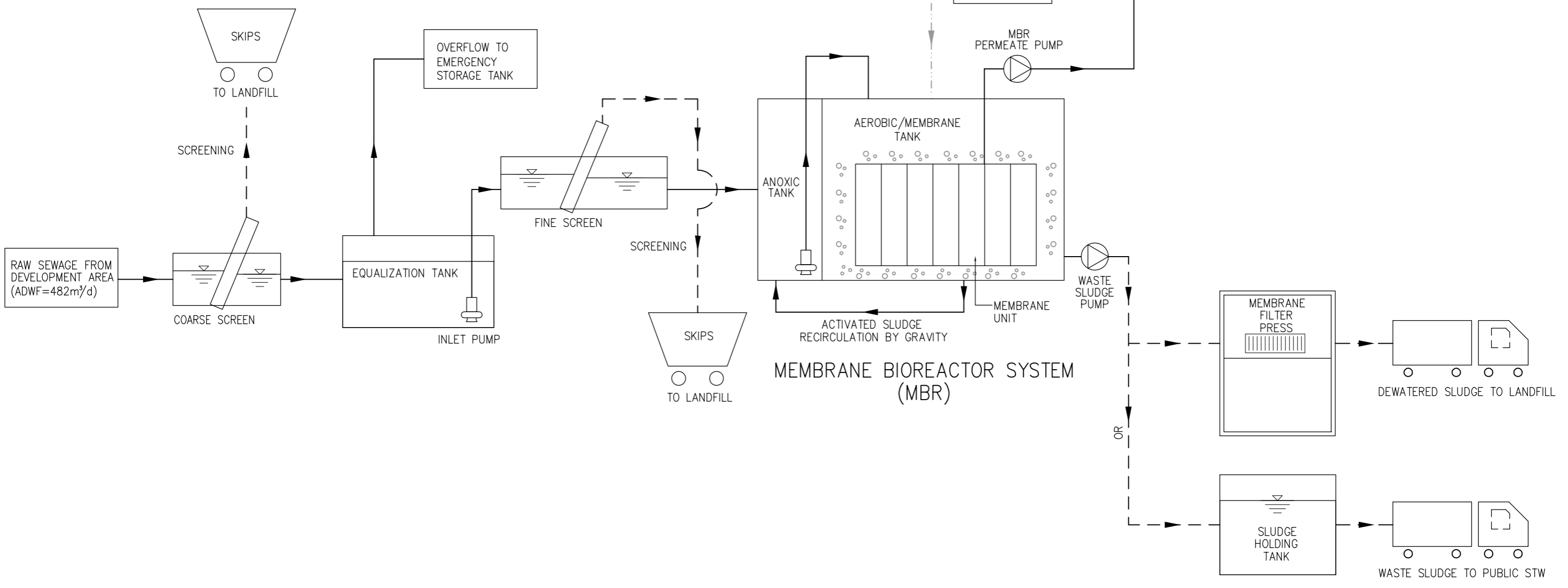
APPENDIX A

Process Flow Diagram and Layout of the Project

LEGEND:

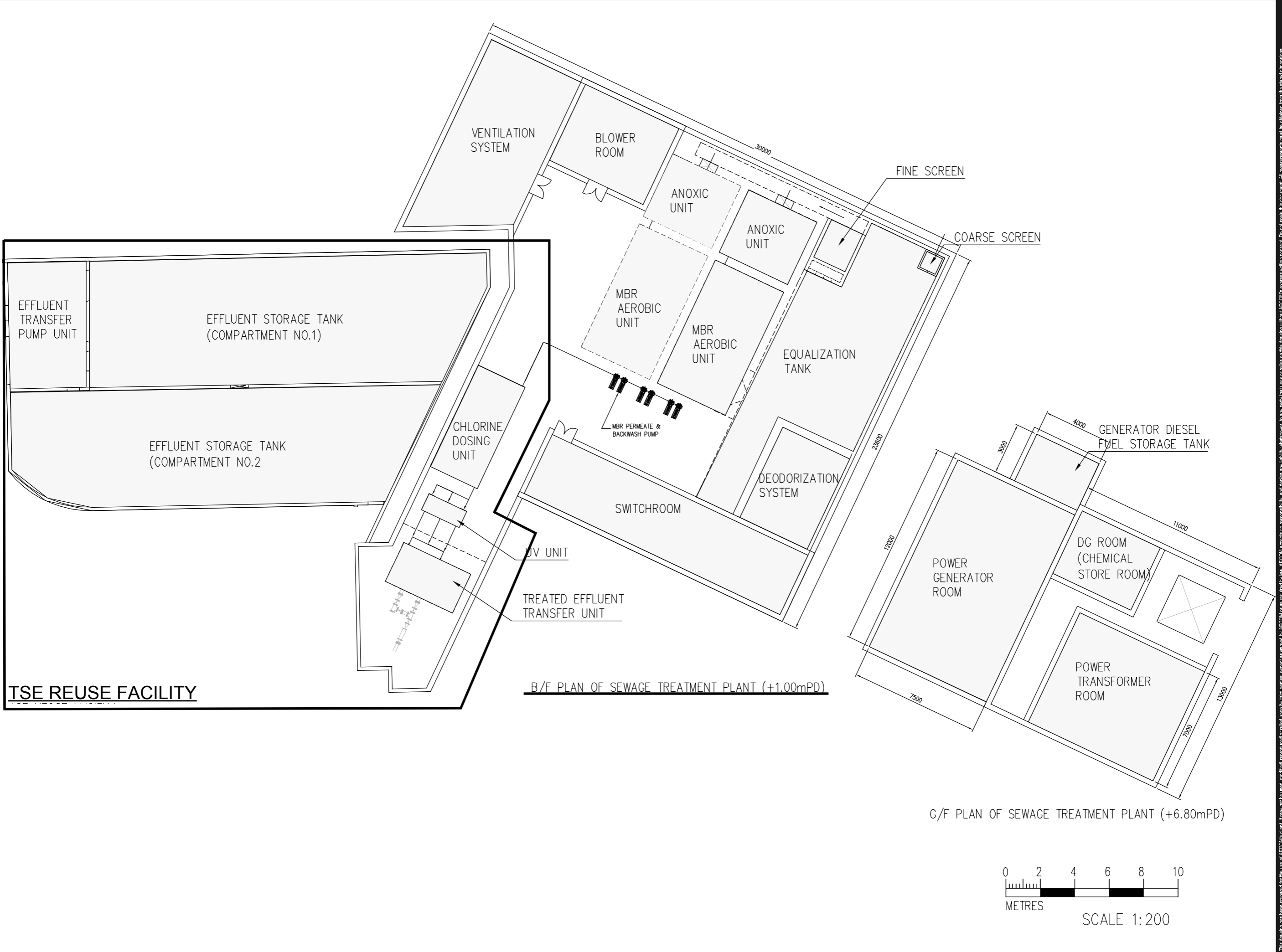
- SEWAGE FLOW
- - - - SLUDGE/SCREENING/GRIT FLOW
- · · · · AIR FLOW

TSE REUSE FACILITY



PROPOSED COMPREHENSIVE DEVELOPMENT IN WO SHANG WAI
**PROPOSED PROCESS FLOW DIAGRAM OF INTERIM ON-SITE
 SEWAGE TREATMENT PLANT**

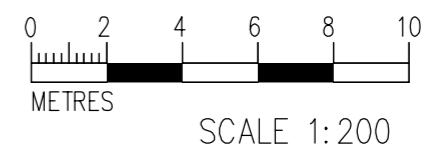
SCALE	N.T.S.	DATE	OCT. 2014
CHECK	-	DRAWN	WDF
JOB No.	60097289	DRAWING No.	FIGURE 6
		REV	-



TSE REUSE FACILITY

B/F PLAN OF SEWAGE TREATMENT PLANT (+1.00mPD)

G/F PLAN OF SEWAGE TREATMENT PLANT (+6.80mPD)



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**FINAL LAYOUT OF FURTHER EXPANDED SWHSTW
(UPON COMPLETION OF PHASE 2)**