

14.1

INTRODUCTION

This EIA - Final Report has provided an assessment of the potential environmental impacts associated with the construction and operation of Sham Tseng Development (STD), based on the latest information available. The key environmental outcomes arising from this EIA are:

- a revised reclamation programme, which incorporates the recommended water quality mitigation measures (*Section 3.7.1*), which will protect the water sensitive receivers adjacent to the reclamation site from adverse water quality impact during the STD construction phase;
- the existing noise sensitive receivers at Lido Garden and the committed residential developments at the former San Miguel Brewery and Union Carbide will be protected from the adverse construction noise impact by the recommended noise mitigation and control measures (*Section 4.7.1*) during construction phase; and
- the existing noise sensitive receivers at Sea Crest Villa Phase 3, DD387 Lot 99, the Golden Villa, and the planned noise sensitive receivers at the residential development at Area 2, the school near the Castle Peak Road at Area 3 and CDAs sites at Areas 4 and 5 will be protected from adverse road traffic noise impact by the recommended noise mitigation and control measures (*Section 4.7.2*) during operational phase.

A summary of the potential impacts and recommendations of this EIA is summarised in *Table 14.1a*. An Environmental Outcome Profile is shown in *Table 14.1b*. The principal findings of this Report are summarised below:

14.2

HYDRODYNAMICS, WATER AND SEDIMENT QUALITY IMPACT

14.2.1

Construction Phase*Marine-based Impact*

The water quality impact during the reclamation of Sham Tseng Development was quantitatively assessed using the Delft3D Water Quality Model. Suspended sediment is identified as the most significant water quality parameter during the reclamation. The worst-case scenario during reclamation was assessed and it was predicted that potential water quality impact would only occur in waters at Gemini Beach, Tsing Lung Tau Beach, Golden Beach, Kadoorie Beach, New Cafeteria Beach and Dragon Beach. The water quality impact at these beaches could be effectively minimised with the implementation of the proposed mitigation measures. An environmental monitoring and audit programme is required to ensure the effectiveness of the proposed water quality mitigation measures.

The assessment of cumulative impacts was made by taking the results of previous computer modelling increases in suspended sediment concentrations at sensitive receivers for potentially concurrent projects. The results of the previous computation modelling were summed with the predicted increases in suspended solids concentrations from the STD at the sensitive receivers. It was determined that there would be an exceedance of the WQO for suspended solids at the Ma Wan Fish Culture Zone as well as beaches adjacent to the STD. Through mitigation of the STD construction the contribution of the STD construction to the total suspended solids concentration could be minimised to contribute only a small amount to the total predicted increase in concentrations. It was noted that the cumulative assessment was based on a very conservative assessment methodology, which meant that the likelihood of the predicted cumulative impacts occurring will be very small and the duration of the contribution of the STD construction to the elevated suspended solids concentrations could be small. Despite the conservative nature of the assessment it was determined that the predicted increases in suspended solids concentrations would not result in adverse effects on the fish stocks as well as aesthetic enjoyment of the swimmers and visitors of the beaches. It was therefore concluded that the predicted cumulative exceedance of the WQO would not be considered an adverse impact.

Land-based Impact

Water quality impacts from land-based construction, including the residential development, Sham Tseng Bypass construction, construction of Sewage Treatment Facilities for Sham Tseng Development and sewage pumping station, are associated with the surface runoff, effluent discharge from the site, and sewage from on-site construction workers. Impacts can be controlled to comply with the WPCO standards by implementing the recommended mitigation measures. No unacceptable residual impact on water quality is anticipated.

14.2.2 Operational Phase

Hydrodynamics

An assessment of the hydrodynamic impact due to the STD has been made using the Delft3D Upgraded model. With this quantitative modelling tool the impact has been assessed for the dry and wet seasons over a spring-neap tidal cycle. For both seasons, the baseline and operation simulations have been compared. It is concluded that:

- the influence of the proposed STD on the water level in the Study Area and in the vicinity is marginal;
- the influence on the current magnitude and direction in Ma Wan Channel mainly occurs in the immediate vicinity of the reclamation. In the dry season under spring tide conditions, the peak current speed may increase 4% during the ebb stream. The change is smaller for the neap tide and during the flood stream. In the wet season, the impact appears greater. During the ebb stream the increase in peak current magnitude can be 0.23 m s^{-1} , and about 0.07 m s^{-1} during flood stream. Nevertheless, the influence on peak currents is negligible in the centre of the Ma Wan Channel;

- the water fluxes through the Ma Wan Channel and other main channels are not notably affected by the STD;
- in the dry season the impact on the salinity is less than 0.1 ppt throughout the Study Area. In the wet season the short term impact will be about 1.0 ppt but on a long term scale the impact is less than 0.2 ppt; and
- based on the hydrodynamic modelling, the predicted cumulative water quality impact of the reclamation will be minimal.

Therefore, it is concluded that the STD will have minimal impact on the hydrodynamic regime of the Study Area and there will be no insurmountable hydrodynamic impacts.

Water Quality

The modelling results indicate that additional sewage discharge from the Sewage Treatment Facilities for Sham Tseng Development has minimal impact upon the marine water quality. The results also indicate that the water quality at the WSD sea water intakes at the STD, Tsing Yi and Tsuen Wan will be within the WSD water quality criteria for ammoniacal nitrogen, DO and *E. coli*. Minimal impact of SS (less than 0.5% from the baseline or 0.2 mg L⁻¹) are also predicted at these intakes. The results also indicate that the water quality at the WSD salt water intakes at the STD, Tsing Yi and Tsuen Wan will be within the WSD water quality criteria for ammoniacal nitrogen, DO and *E. coli*. Minimal impact of SS (less than 0.5% above the baseline or 0.2 mg L⁻¹) are also predicted at these intakes.

Based on the operational water quality modelling results reported, it is predicted that the suspended solids concentration at the intake point of the proposed STD salt water pumping station will exceed WSD water quality criterion (10 mgL⁻¹). It is also predicted that the SS contribution from the project to the water intake is negligible (less than 0.1mgL⁻¹), that is, the exceedance is a regional issue that could not be mitigated in this housing project nor should it prejudice the feasibility of the proposed development.

In the eventuality of failure of the TKSTSTW and STFSTD facilities, sewage discharge via the Emergency Bypass would be required which will cause local substantial water quality impact upon the bathing beaches adjacent to the STD. Failure should therefore be minimised and also kept to a limited duration if they do occur. Risk of failure should be controlled by regular maintenance of treatment facilities, and provision of backup power supply and standby units of key components of the TKSTSTW and STFSTD

Drainage Discharge

The hydraulic assessment from the Engineering Study indicates that the low lying areas around Sham Tseng West Nullah between Sham Tseng San Tsuen and Sham Tseng Kau Tsuen is presently susceptible to flooding of 700mm and the additional rise in flood level caused by the reclamation project will be slightly less than 100mm under a 200-year return period rainstorm with 10-year return period tide level. The extension of the Sham Tseng West Nullah is concluded to have small impact on the existing flooding problem. In order to mitigate the flooding impact, it is recommended to provide a proper channel with sufficient capacity to collect storm water collected from the upstream and the surface runoff of Sham Tseng San Tsuen and Sham Tseng Kau Tsuen, such

that no water inside the channel will overflow onto the surrounding areas. This can be achieved by clearance of squatter structures built on the channel bed, reconstruction of the damaged sections of channel walls and raising of original channel walls at the locations susceptible to flooding. A 3m width drainage reserve is required along the new channel walls and this requirement can be achieved in the area. New surface channels/pipes with non-return valves will be provided at the low-lying area. Non-return valves will be installed at existing drainage outlets. Proper maintenance of drains and channels is essential and a programme should be set up to carry out regular preventive maintenance and desilting of the channel. According to the hydraulic modelling results, the flood risk at the low-lying area caused by the reclamation will be fully mitigated after the implementation of the mitigation measures. There will also be an improvement to the existing flooding problem as the model results indicate that the mitigation measures will reduce the flood depth at certain locations by up to 300mm in 200-year return period storm events with 10-year tide level. Hydraulic assessment has also been carried out for 10-year return period storm event with 2-year return period tide level and it is noted that nearly the entire low-lying area will no longer be susceptible to flooding.

14.3 NOISE IMPACT

14.3.1 Construction Phase

Unmitigated construction activities of Sham Tseng Development would cause exceedances of the daytime construction noise criteria at most of the nearby NSRs during the normal working hours. The most affected areas are the residential buildings at Golden Villa, the former Union Carbide site, Lido Garden, DD 387 Lot 99, the former San Miguel Brewery site, Goldenville, Dragon Garden and Villa Alfavista.

Therefore, noise mitigation measures will be necessary for the works to meet the criteria. Mitigation measures including the use of quiet plant, on-site movable noise barriers, limiting the number of plant operating concurrently and restricting the operating time usage of some of the plant will be required. It is also recommended that regular monitoring of noise at NSRs will be required during the construction phase.

14.3.2 Operational Phase

This assessment has predicted that the traffic noise levels from the proposed development at the year 2019 will result in exceedances of the road traffic noise criterion at the some of the existing NSRs in Sea Crest Villa, DD387 Lot 99 Golden Villa, Goldenville, Dragon Garden and the planned educational uses in Area 3.

The best practicable mitigation package is recommended to comply with the road traffic noise criterion, comprising a combination of 3 to 6 m high roadside vertical, cantilever noise barriers and semi-enclosure as shown in *Figures 4.7a* and *4.7d*.

According to the assessment result, it is estimated that approximately 575 existing NSRs dwellings would be affected by traffic noise impact and in which around 250 dwellings would be protected and benefited by the recommended noise mitigation measures. Residual impacts were predicted at about 325 dwellings due to existing road contribution.

With the implementation of the recommended mitigation measures, all the planned NSRs would be in compliance with the relevant road traffic noise criteria except for the planned NSRs in Area 3.

For the planned Area 3 NSRs for educational uses, it is predicted that approximately 13 noise sensitive rooms (NSRs N152 to N155) would require indirect technical remedies in the form of window insulation and air conditioning. Operational noise criterion for these premises is 65 dB(A).

Noise impacts from the identified fixed noise sources would not be insurmountable to the nearby NSRs provided that the sound power levels (SWLs) from the different fixed plants did not exceed the maximum permissible SWLs as indicated in *Table 4.6f*.

14.4 *AIR QUALITY IMPACT*

14.4.1 *Construction Phase*

Reclamation and Construction Works

Dust will be the principal pollutant during the construction phase of Sham Tseng Development. Reclamation, wind erosion over surcharge material, vehicle movements on haul roads and infrastructure construction are expected to be the principal dust sources. Air quality impact during construction phase has been assessed and dust level at all ASRs will comply with the dust criteria with the implementation of dust suppression measures in accordance with the *Air Pollution Control (Construction Dust) Regulation*. Dust monitoring has been recommended to ensure the efficacy of the control measures and to ensure that the dust criteria will not be exceeded at any ASRs during STD construction.

14.4.2 *Operational Phase*

Traffic and Industrial Impacts

Vehicle exhaust from existing and future roads and industrial emissions are the major pollutant sources during the operation of the Sham Tseng Development. The ASRs will be affected by road traffic emissions at low level (less than 30 m above ground) and by industrial emissions at high level (greater than 30 m above ground). The predicted results show that the AQO criteria will be satisfied at all ASRs at both low and high levels.

Sewage Treatment Facilities for STD and Sewage Pumping Station

To minimise odour nuisance from the operation of the proposed Ting Kau and Sham Tseng Sewage Treatment Works at Area 7 and the Sewage Treatment Facilities for Sham Tseng Development at Area 6, odour removal and treatment facilities will need to be installed to ensure compliance with EPD's odour criterion.

Developments above Reclamation

Odour impact from the nullahs on the reclamation is not expected as sewage discharged will be collected by the Ting Kau and Sham Tseng Sewage Master Scheme and treated at the sewage treatment works. In addition, the nullahs will be extended and decked-over through the STD. Odour nuisance from the proposed Refuse Collection Point at Area 6 will be avoided by proper waste

management. Adverse odour impact on the ASRs is not anticipated. With regard to the odour from the Garden Bakery, the predicted odour levels at all the planned ASRs would exceed the odour criterion of 5 units (based on an averaging time of 5 seconds) as stipulated in the TM of the EIAO. Therefore, re-planning of the development has been considered to reduce the extent of the odour impacts. However, the constraints and associated environmental problem arising from the roads in the immediate vicinity would preclude any further re-arrangement of the recommended layout to remove such exceedances. This was strengthened by the fact that the predicted odour level at ASR6 located at the western end of the reclamation farthest from the bakery still exceeds the criterion.

Indirect mitigation measures that could be applied are the installation of central air conditioning and deodourisation facilities for the fresh air intake at the nearby buildings. This may be applicable for some uses which rely on central air conditioning system for ventilation but cannot be applied to open areas and residential buildings which rely on openable windows for ventilation according to the Building Regulations. Therefore, indirect mitigation measures are not considered feasible.

Direct mitigation measures that could be applied to minimise the impact include reducing emissions by enclosure and installation of odour removal systems at the exhausts. Nevertheless, it should be noted that the site where Garden Bakery is presently located has been zoned to CDA for commercial/residential purposes. Thus, relocation of Garden Bakery before the first population intake in 2012 would be the long term solution to mitigate the odour problem. Whilst residual odour will occur before any relocation of the Garden Bakery, the odour impact will not cause any adverse public health effect or risk to life. The magnitude and extent of the odour impact are also considered not major and this is illustrated by a few complaints received (2 only) since 1995. Hence it is considered that the residual bakery odour is not a serious long term issue to the proposed Project.

It is concluded that residual impact will occur before any relocation of the Garden Bakery. However, the odour impact will not cause any adverse public health effect or risk to life. The magnitude and extent of the odour impact are also considered not major and this is illustrated by the lack of complaints received. Hence it is considered that the residual bakery odour is not a serious long term issue to the proposed Project. Thus, it can be considered that the criteria set out in the TM Section 4.5.1d can be met.

Air quality inside the proposed Public Transport Terminus should satisfy the *Public Transport Interchange Air Quality Guidelines*. Mechanical ventilation may be required and its design and operation should meet the requirements specified in the ProPECC PN 1/98.

14.5

SOLID WASTE MANAGEMENT

The following quantities of waste are expected to arise during the construction of the STD: Dredged materials (approximately 354 000 m³ if dredging only limited at seawall and marine basin), excavated materials (22 500m³ inert material and 2 500m³ C&D waste); demolition material (55 00m³ inert material and 500m³ C&D waste) and construction material (27 100m³ inert material and

6 800m³ C&D waste); chemical waste (a few hundred litres per month); and general refuse (240 kg per day).

Based on the land use arrangement of the revised MDP, the future domestic waste generation will be about 16 tonnes per day. No estimation for commercial waste generation can be made as the number of employees is not presently available. No adverse environmental impacts associated with the transportation and disposal of domestic waste is anticipated.

Mitigation measures relating to good site practice have been recommended to ensure that adverse environmental impacts are prevented and that opportunities for waste minimisation and recycling are followed.

Provided that the recommendations put forward in this Report are conscientiously acted upon, no unacceptable environmental impacts will result from the storage, handling, collection, transport, and disposal of wastes arising from the construction and operation of the STD.

14.6

VISUAL AND LANDSCAPE IMPACT

The proposed development will cause a significant change in the existing landscape character of Sham Tseng through redefinition of the coastal edge. It will create an intensified local urban landscape character of medium- and high-rise residential areas on the reclamation. This will be in-keeping with the existing general character of this area and much of the adjacent coastal areas. Importantly, the development addresses the shortfall of open space in the Sham Tseng area and will provide greater recreation opportunities and public open space for Sham Tseng residents.

The building layout has been designed to alleviate many of the potential visual impacts by retaining the view corridors, although residents of the Lido Garden, San Miguel Brewery CDA, Sea Crest Villa Phases I and II will experience significant impacts due to their proximity to the development and the narrowing of their view corridors. Additionally, the loss of Anglers' Beach is also a significant adverse impact both in terms of the landscape character and the visual amenity available to adjacent visually sensitive receivers. However, compensation will be achieved to an extent through the provision of recreational facilities including a Leisure Centre with swimming pool facilities and the extension of a pedestrian footpath to a small nearby beach. This footpath will be provided as an alternative recreation provision. Other recommendations include the creation of a waterfront public open space.

The proposed mitigation measures include the implementation of compensatory tree and shrub planting with an approximate total area of 2.7ha, the design of the proposed built forms to minimise visual impacts including the retention where possible of view corridors through the development area and the provision of open space. Anglers' Beach as a recreational resource will also be re-provisioned through the provision of an indoor public swimming pool within the government Leisure Centre in Area 6. In addition to this the coastal area to the immediate west of the reclamation will be left largely intact, with landscaping works to enhance the natural waterfront environment for the area. Footpath access will also be provided between the residential developments and the coastal area.

Although several significant adverse impacts have been identified, the recommendation of the mitigation measures aims to reduce these impacts to be as least significant as possible.

14.7 *MARINE ECOLOGICAL IMPACT*

A review of existing information supplemented with a summary of the results of recent intertidal surveys near Sham Tseng and Kwai Shek during 1998-99 indicate that the Study Area supports intertidal hard-bottom and soft-bottom assemblages and subtidal soft benthos. From the literature review, the Study Area was considered as important to one marine mammal, *Sousa chinensis*.

Direct impacts during the construction phase will occur through habitat loss in the area that is to be dredged or reclaimed and will affect the soft benthos as well as hard surface assemblages at Sham Tseng. The assemblages lost are of low ecological value and reclamation size is small (approximately 15.2 ha).

Indirect impacts during the construction phase such as an increase in suspended sediment concentrations and decrease in dissolved oxygen in the water column may impact filter feeders living on intertidal and subtidal habitats. However, these indirect impacts are anticipated to be localised and transient. The impacts to Chinese White Dolphin are predicted to be minimal and transient (dredging will last for approximately 18 weeks during the 50 months of reclamation works) such that they can resume normal activities after the reclamation works. In addition, any constraints on construction operations recommended to reduce impacts to water quality to acceptable levels are expected to also mitigate for effects on marine ecology. Impacts during the operational phase are predicted to be negligible and should not be a cause of concern.

The residual impact occurring as a result of construction and operation of the Sham Tseng Development is the loss of the intertidal hard bottom assemblages covering 200 m of natural coastline and 550 m of artificial coastline, intertidal soft bottom assemblages covering 50 m of natural sandy shore and 250 m of gazetted beach, and subtidal soft benthos covering an area of approximately 15.2 ha at the area of Sham Tseng Development.

The loss of the assemblages within the construction site can be mitigated through the subsequent recolonisation of fauna on the seawalls after construction. The monitoring and audit activities designed to detect and mitigate any unacceptable impacts to water quality (*Section 3*) will also serve to protect against unacceptable indirect impacts to ecologically valuable marine species and habitats. As no unacceptable impacts to marine ecology are expected to occur, the development and implementation of a monitoring and audit programme specifically designed to assess the effects associated with the Sham Tseng Development on marine ecology is not necessary.

14.8 *FISHERIES IMPACT*

A review of existing information on commercial fisheries resources located within and around the Sham Tseng Development area has identified the area

as supporting low abundances of fisheries resources and few vessels depend on the area for their catches.

Potential impacts to fisheries resources and operations may arise from disturbances to benthic habitats, changes in water quality and contaminant release. Detailed discussion of the potential water quality impacts is provided in *Section 3*. Disturbances to benthic habitats are predicted to be largely confined within the reclamation area and shall be in compliance with the relevant WQOs. Sediment deposition outside of the reclamation area is minimal and not anticipated to impact fisheries resources. As changes in water quality will be minimal and transient, adverse impacts to fisheries resources are not predicted to arise. Assessment of contaminant release has indicated minimal concentrations will be released and are not predicted to impact fisheries resources.

As impacts arising from the proposed reclamation works are thus predicted to be largely confined to the reclamation area, they are not expected to cause adverse impacts to any fishery grounds including the nearest Fish Culture Zone, Ma Wan, or species of importance to the fishery. While no special mitigation measures are required for fisheries resources, constraints on dredging operations recommended to control impacts to water quality to within acceptable levels are also expected to mitigate impacts to fisheries resources. Cumulative impacts predicted to arise from the proposed reclamation operations in conjunction with concurrent projects are not expected to result in greater adverse impacts to fisheries resources than impacts arising from the concurrent projects independently.

14.9 *MARINE ARCHAEOLOGICAL INVESTIGATION*

The Marine Archaeological Investigation indicates that no archaeological material is likely to be buried within the Study Area. Therefore, no impact to any archaeological deposit is expected and neither further archaeological investigation nor any mitigation measures are required.

14.10 *LAND USE IMPACT*

The potential land use impact during the reclamation, construction and operational phases of the Sham Tseng Development has been assessed. In spite of potential unmitigated on noise and air pollution caused by the construction works and the traffic, no insurmountable land use impact is identified after appropriate mitigation during the various phases of the Project.

14.11 *BIOGAS ASSESSMENT*

Given that, at this stage, it is not possible to measure the rates of gas emission from the organic sediment within the area of the proposed STD, an estimate of the future rate of gas generation has been made from the results of analysis of the sediment for TOC and SOD.

Several assumptions and estimations have been made when making theoretical predictions about possible future rates of methane generation. The estimated average rate of methane gas generation is well within the suggested maximum rate of methane emission per unit area of 10 L m² day⁻¹ and the

limit of 84.7 L m² day⁻¹ recommended by the London Scientific Services. The former criterion provides a reasonable general guide for determining whether the rates of methane emission pose an unacceptable risk to unrestricted development on a potentially gassing site. The latter criterion represents the absolute “cut-off” level of methane flux which developments should be allowed to build on the potentially gassing site. It is therefore considered that the predicted rate of gas generation will not pose unacceptable risk and constraints to future developments on the reclamation.

Given the inherent uncertainties involved in estimating future rates of gas emissions from theoretical calculations of rates of gas generation and given that mitigation measures for avoiding the potential risks may be very expensive, it is recommended that monitoring of gas emission rates from the undredged area be undertaken following the reclamation works to confirm the findings of this assessment.

14.12

OVERALL CONCLUSIONS

The findings of this EIA have provided information on the nature and extent of environmental impacts arising from the construction and operation of the Sham Tseng Development. The EIA has, where appropriate, identified mitigation measures to ensure compliance with environmental legislation and standards.

Overall, the EIA Final Report for the development of Sham Tseng Development has predicted that the Project will generally comply with all environmental standards and legislation after the proposed construction and operational stage mitigation measures are implemented. The reclamation will improve the environmental quality as illustrated in Section 2.2.2 and the EIA has also demonstrated the bakery odour can be mitigated and will not cause any long term serious environmental implication. Thus the EIA has demonstrated the acceptability of any residual impacts from the Project and the protection of the population and environmentally sensitive resources. Environmental monitoring and audit mechanisms have been recommended before and during construction and operation, where necessary, to verify the accuracy of the EIA predictions and the effectiveness of recommended mitigation measures.

The environmental planning input to the Study has provided continuous environmental input, from the Study Inception to ensure that necessary environmental consideration has been incorporated into the STD design, construction and operation.

Table 14.1a *Summary of the Potential Impact and Recommended Environmental Measures of Various Pollution Activities*

Pollution Activity	Key Potential Impact	Mitigation Measure	EIA Reference
Dredging and Reclamation	Adverse water quality impact upon the adjacent beaches	<ul style="list-style-type: none"> control the dredging and filling rates; sandfilling behind the constructed seawall; sandfilling within the 'cell' of embayed water body formed by the permanent and temporary seawall; revise the reclamation programme to incorporate the proposed water quality mitigation measures. 	<p>Section 3.7.1</p> <p>Section 3.7.1</p> <p>Section 3.7.1</p> <p>Section 3.7.1</p>
Sham Tseng Bypass including connections to the Castle Peak Road and the Castle Peak Road Underpass	Adverse road traffic noise impact upon the existing and planned noise sensitive receivers	<ul style="list-style-type: none"> waterfront promenade above the Bypass to prevent noise impact upon the housing sites at Areas 2, 4 and 5; Vertical and cantilever barriers and semi-enclosure at the Bypass and Castle Peak Road to minimise noise impact upon the existing sensitive receivers 	<p>-</p> <p>Section 4.7.2</p>
Sewage Treatment Facilities for Sham Tseng Development (STFSTD)	Odour and noise impact upon the adjacent planned sensitive receivers	<ul style="list-style-type: none"> a 30 m buffer distance between the STFSTD and the CDA site at Area 5 has been reserved; installation of deodorisation units at the STFSTD; installation of deodorisation units at the air vents of the central air-conditioning facilities of the government complex at Area 6; control of maximum permissible sound power level at the STFSTD. 	<p>-</p> <p>Section 5.7.2</p> <p>Section 5.7.2</p> <p>Section 4.6.3</p>
Underground Sewage Pumping Station	Odour and noise impact upon the adjacent planned sensitive receivers	<ul style="list-style-type: none"> installation of the odour removal facilities at the air vent of the sewage pumping station; control of maximum permissible sound power level to 85 dB(A) and 75 dB(A) for daytime and night time respectively at the underground sewage pumping station. 	<p>Section 5.7.2</p> <p>Section 4.6.3</p>
Dredging of marine basin, pier structures and berthing facilities	Adverse water quality impact upon the adjacent beaches	<ul style="list-style-type: none"> control the dredging rate. 	Section 3.7.1
Operation of the Combined Outfall	Adverse water quality impact during emergency discharge	<ul style="list-style-type: none"> regular maintenance of sewage treatment facilities; provision of standby equipment and key components of the STFSTD; provision of dual power supply 	<p>Section 3.7.2</p> <p>Section 3.7.2</p> <p>Section 3.7.2</p>

Pollution Activity	Key Potential Impact	Mitigation Measure	EIA Reference
Main Development Area	Impacts on landscape resources	<ul style="list-style-type: none"> • Minimisation of slope works and reprofiling to tie in with existing gradient. • Tree survey and felling application in accordance with WBTC No. 24/94, Tree Preservation. • Compensatory tree planting to restore vegetation cover and screen (minimum 0.05ha) 	Section 7.16
	Impacts on landscape character	<ul style="list-style-type: none"> • Tree survey and felling application in accordance with WBTC No. 24/94, Tree Preservation.. • Compensatory tree planting to restore vegetation cover and screen noise barrier (approximately 0.5ha). • Minimisation of slope cutting. • Reprovision of publicly accessible waterfront including open space and planting on elevated promenade and on edge of marine basin in Western Coastal Park • Retention and protection of Gemini Beach headland during works 	Section 7.16
	Visual Impact of the proposed development site	<ul style="list-style-type: none"> • Careful positioning of public open space and low rise buildings (schools) for retention of some view corridors between sites 2 and 4 and between sites 4 and 5 such that as many sea views as possible are retained • The design of noise attenuation structures to minimise visual impact and integrate as far as possible into the future landscape context. • Minimisation of height of Leisure Centre to retain views of water (NB Leisure Centre screens views of STW extension) • Tree planting to screen low level views and integrate proposals into overall landscape framework for more elevated views. 	Section 7.16
DP 1 Reclamation area	Change to character setting due to extension of manmade waterfront	<ul style="list-style-type: none"> • Retention of marine basin on the village side of the bypass to retain coastal landscape character as far as possible. 	Section 7.16 and Table 7.18a
	Visual intrusion of construction stage reclamation	<ul style="list-style-type: none"> • No mitigation possible as many of the VSRs are medium-high rise buildings. Temporary hoarding should be used to screen low-level views. • Apply hydroseeding to areas within site, which will be left vacant for more than one year. • The top dressing of 'selected fill' should be applied at the earliest opportunity to minimise the duration of visual impact cause by exposed public fill material 	Section 7.16 and Table 7.18a

Pollution Activity	Key Potential Impact	Mitigation Measure	EIA Reference
DP 2 Sham Tseng Bypass	Loss of vegetation and slope re-profiling (0.3ha)	<ul style="list-style-type: none"> • Minimisation of slope works and reprofiling to tie in with existing gradient. • Tree survey and felling application in accordance with WBTC No. 24/94, Tree Preservation. • Replacement tree and shrub planting to restore vegetation cover (Minimum of 0.3ha) 	Section 7.16 and Table 7.18b
	Visual impact caused by noise mitigation measures at connection with Castle Peak Road: full / semi-enclosure and barriers Visual impact caused by construction stage works and operational road	<ul style="list-style-type: none"> • Road enclosure/barrier designed to be visually recessive (transparent panels etc). Soften appearance using tree planting alongside structure. • Construction stage: No mitigation possible as many of the VSRs are medium-high rise buildings. Temporary hoardings may be used to screen low-level views. • Central section of bypass will be covered with a deck designed as a waterfront promenade accessible to the public, effectively screening the road. • Western end, the bypass will be on a bridge across the marine basin 	Section 7.16 and Table 7.18b
DP3 Sewage Pumping Station	Extension of built form adjacent to high-rise areas	<ul style="list-style-type: none"> • Architectural finishes and design/position integrated with adjacent buildings to reduce visual clutter. 	Section 7.16 and Table 7.18c
	Introduction of SPS in front of VSRs	<ul style="list-style-type: none"> • Screen planting at the boundary of plant 	Section 7.16 and Table 7.18c
DP 4 Underpass below Castle Peak Road	Loss of vegetation and slope re-profiling (0.1ha) (note – most disturbance is caused by the Bypass)	<ul style="list-style-type: none"> • Minimisation of slope works and reprofiling to tie in with existing gradient. • Tree survey and felling application in accordance with WBTC No. 24/94, Tree Preservation. • Replacement tree and shrub planting to restore vegetation cover (Minimum of 0.1ha) 	Section 7.16 and Table 7.18d
	Visual impact caused by construction stage works and operational road	<ul style="list-style-type: none"> • Construction stage: No mitigation possible as the VSRs are medium or high rise buildings. Temporary hoardings may be used to screen low-level views. • On completion underpass will primarily be a depressed and covered road so impacts reducing impacts in long term, although consideration should be given to underpass portal 	Section 7.16 and Table 7.18d

Table 14.1b *Environmental Outcome Proforma*

The Project

Project Scope

- Reclamation of about 15.2 ha of land using public filling materials and / or sand fill material supplied by the Contractors;
- Construction of 1100 m seawall;
- Construction of Sham Tseng Bypass (about 2400 m) including connections to the proposed widening of Castle Peak Road;
- Construction of about 875 m long waterfront promenade integrated with and located above the Sham Tseng Bypass;
- Construction of a government complex (as compension of existing Anglers' Beach) to accommodate a leisure centre, with swimming pool and other sports facilities, and social welfare facilities;
- Construction of sewage treatment facilities with a flow capacity of about 4600 m³ per day based on chemically enhanced primary treatment;
- Construction of a sewage pumping station and sewerage pipework;
- Construction of about 450 m of nullah and infrastructure drainage works;
- Construction of about 900 m of access roads;
- Construction of a footbridge;
- Construction of a stub pier to replace an existing 'kaito' pier;
- Diversion of an existing 200 mm diameter submarine water pipeline and extension of a 300 mm diameter water main adjacent to Castle Peak Road;
- Construction of a public transport terminus (PTT) and a public toilet; and
- Construction of environmental mitigation measures, including roadside noise barriers.

Total Project Cost

HK\$ 2685.6 Million

Environmental Outcomes

Population Protected

The existing noise sensitive receivers at Lido Garden and the committed residential developments at the former San Miguel Brewery and Union Carbide will be protected from the adverse construction noise impact by the recommended noise mitigation and control measures (*Section 4.7.1*) during construction phase;

The existing noise sensitive receivers at Sea Crest Villa Phase 3, DD387 Lot 99, the Golden Villa, and the planned noise sensitive receivers at the residential development at Area 2, the school near the Castle Peak Road at Area 3 and CDAs sites at Areas 4 and 5 will be protected from adverse road traffic noise impact by the recommended noise mitigation and control measures (*Section 4.7.2*) during operational phase; and

Traffic noise impact may affect approximately 575 residential dwellings. However, around 250 dwellings would be protected and also around 250 dwellings would be benefited by the recommended noise mitigation measures.

Problems Avoided

- Buffer distances between the planned sensitive receivers and the air pollution / noise sources have been reserved in the MDP to minimise the air quality / noise impact upon the sensitive receivers;
 - A revised reclamation programme, which incorporates the recommended water quality mitigation measures (*Section 3.7.1*), which will protect the water sensitive receivers adjacent to the reclamation site from adverse water quality impact during the STD construction phase; and
 - The Projects's reclamation will require a large amount of fill material and therefore offer a very good opportunity to utilise the public fill generated in the SAR. The use of public fill will not only alleviate the demand for virgin fill material but also reduce the pressure of
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disposing inert Construction and Demolition Material at the strategic landfills.

Environmental Friendly Design

- A comprehensive and well integrated landscape and open space framework will be provided by the reclamation. This will enhance the image of Sham Tseng as a prestigious and vibrant residential area and improve the overall environment and quality of life of the township;
- The semi-enclosed promenade above the proposed Sham Tseng Bypass will not only protect the residential towers (which are behind the promenade) from the road traffic noise along the Bypass, but also provide a waterfront public open space for leisure and better landscaping; and
- The proposed Sham Tseng Bypass will remove through traffic from Castle Peak Road in the vicinity of Sham Tseng township and will offer a more pleasant environment to the local resident particularly on noise and air quality.

No. of ESGM convened

Four
