



## Contents

---

	Page
<b>15 Conclusion</b>	<b>1</b>
15.1 General	1
15.2 Air Quality	2
15.3 Noise	3
15.4 Water Quality	5
15.5 Sewerage and Sewage Treatment Implications	5
15.6 Waste Management Implication	6
15.7 Land Contamination	6
15.8 Ecological Impact	7
15.9 Fisheries Impact	8
15.10 Landscape and Visual Impact	9
15.11 Hazard	9
15.12 Overall	10

### Appendices

**Appendix 15.1** Key Assessment Assumptions and Limitation of Assessment

**Appendix 15.2** Summary of Environmental Impacts

## 15 Conclusion

---

### 15.1 General

**15.1.1.1** This Environmental Impact Assessment (EIA) Report has been prepared for Proposed Comprehensive Residential and Commercial Development atop Siu Ho Wan Depot in accordance with the requirements set out in the EIA Study Brief (ESB-294/2016) and the Technical Memorandum of Environmental Impact Assessment Ordinance (EIAO-TM).

**15.1.1.2** This EIA study mainly comprises the following works: (i) topside development including podium, development of residential towers with building height of about +86mPD to about +106mPD to provide 14,000 flats, along with commercial / retail facilities, schools and kindergartens, car parking and loading / unloading facilities, public transport interchange (PTI), utility plants rooms and other supporting facilities; (ii) upgrading of the sewerage network, including sewage pipes to Siu Ho Wan Sewage Treatment Works (SHWSTW), with installation of new sewage pumping stations to cater for sewage generated by the Project; (iii) a new Siu Ho Wan Station (SHO) and the associated track works; (iv) railway depot replanning works within the existing site boundary; and (v) construction of concrete slab within the existing depot for podium decking and property enabling works for the topside development.

**15.1.1.3** After the issue of EIA Study Brief (ESB-294/2016), further design development has been evolved to streamline the implementation strategy. According to the latest strategy, the key elements to be implemented in this Project only include the topside development and the upgrading of the sewerage networks with installation of new sewage pumping station and construction of rising mains. Other key elements including the railway depot replanning, construction of concrete slab above the depot, and the new SHO and the associated track works will be addressed in the EIA report for Siu Ho Wan Station and Siu Ho Wan Depot Replanning Works (Railway EIA), which would be submitted separately for approval under the Environmental Impact Assessment Process of the EIAO. Nevertheless, the relevant information and assessment results relating to Railway EIA have been suitably included in this EIA to fulfil the requirements in ESB-294/2016.

**15.1.1.4** The Project would also include the eastern connection access on Sham Shui Kok Drive and the western access via Tai Ho Wan Interchange. The eastern connection access on Sham Shui Kok Drive is an at-grade road of about 1000m while the western access via Tai Ho Interchange is a short viaduct of approximately 50m long. The environmental impacts of the eastern connection access and the western access during construction and operational stages have been included in this EIA study.

**15.1.1.5** Assessments of the potential environmental impacts associated with the construction and operation of the Project in various technical aspects have been conducted. The environmental aspects covered in this EIA study include:

- Air quality;
- Noise,
- Water quality;
- Sewerage and sewage treatment implications;
- Waste management implications;
- Land contamination;
- Ecological impact;
- Fisheries impact;
- Landscape and visual impact; and
- Hazard to life.

**15.1.1.6** This section summarises the assessment results of each technical aspect and concludes the acceptability of the overall environmental performance of the Project.

**15.1.1.7** The key assessment assumptions, limitation of assessment methodologies and all related prior agreements with Environmental Protection Department (EPD) on assessment of different environmental aspects are given in **Appendix 15.1**.

**15.1.1.8** A summary of environmental impacts identified in this EIA is provided in **Appendix 15.2** and the conclusions of technical chapters are described in the following sections.

## **15.2 Air Quality**

**15.2.1.1** The air quality assessment studies the potential air quality impacts on air sensitive receivers (ASRs) due to construction and operational of the Project, including dust, gaseous emissions and odour. Consideration is given to assessing the air quality impacts during different phases of the Project on the planned residents of the development and existing ASRs in the vicinity.

**15.2.1.2** Construction dust would be potentially generated mainly from the land-based at-grade construction works including soil excavation, backfilling, temporary storage, handling and transportation of material, and wind erosion of open sites. Since excavation would involve earthworks and dusty material handling, it is anticipated that there may be dust impacts as a result of these activities if mitigation measures are not implemented. In order to reduce dust emission, mitigation measures are recommended in **Section 3.4.6**. With the implementation of the

mitigation measures as stipulated in the Air Pollution Control (Construction Dust) Regulation, dust control measures, including watering once per hour on exposed worksites and haul road, and good site practices, the predicted 1-hour TSP, 24-hour and annual RSP / FSP concentrations on area in the vicinity of the construction sites would comply with the respective criteria. Hence, adverse residual air quality impacts during construction phase are not anticipated.

**15.2.1.3** Quantitative operational air quality assessment has been conducted taking into account the vehicular emission impacts associated with the Project and nearby existing road network, airport emissions associated with the Hong Kong International Airport (HKIA) including its three-runway system, and potential concurrent projects (including, but not limited to, induced traffic due to Hong Kong Link Road, Hong Kong Boundary Crossing Facilities and its potential topside development, Tuen Mun – Chek Lap Kok Link, Tung Chung New Town Extension, HKIA Three Runway System, HKIA North Commercial District, Road P1, etc.) in the vicinity. Cumulative impacts from far-field source contributions, including territory wide vehicular emission, power plants, marine emissions as well as regional emissions from Pearl River Delta (PRD), have also been taken into account. The modelled assessment results suggest that the air quality during the operational phase would comply with the AQO at the assessment year. Quantitative odour assessment has been conducted taking into account contribution from the Project (i.e. the proposed sewage pumping stations) and other odour sources (e.g. Siu Ho Wan Sewage Treatment Works (SHWSTW), North Lantau Refuse Transfer Station and Organic Waste Treatment Facility (OWTF)). The assessment results showed that odour contribution from the Project at existing ASRs is less than 0.1 OU. For planned ASRs, the odour impacts would comply with the relevant requirements. Therefore, it is anticipated that the odour impacts from the Project would be insignificant.

## 15.3 Noise

**15.3.1.1** The noise assessment studies the potential noise impacts on Noise Sensitive Receivers (NSRs) due to the construction and operational of the Project, including noise impacts from aircraft noise, rail noise, helicopter noise, road traffic, marine traffic and fixed noise sources.

**15.3.1.2** Construction noise impact assessment associated with the use of Powered Mechanical Equipment (PME) for different phases of construction has been conducted. With the implementation of practical mitigation measures including good site management practices, use of movable noise barrier and full enclosure, use of “quiet” plant and working method, the construction noise impacts at all representative planned residential noise sensitive uses would be controlled to acceptable levels. For the representative planned educational institutions, the construction noise impacts during school normal and examination periods would also comply with the relevant criteria.

Although there are no criteria for country parks, the mitigated noise levels are predicted to be low at the selected assessment points and adverse construction noise impacts are therefore not anticipated.

- 15.3.1.3** Operation road traffic noise impacts on planned and existing noise uses within 300m assessment area have been predicted. Results indicate that the noise impacts on representative planned NSRs can be mitigated by a combination of noise mitigation measures including acoustic windows, fixed glazing and arrangement of noise tolerant use in some buildings to within the respective noise criteria. Therefore, adverse road traffic noise impacts are not anticipated.
- 15.3.1.4** Fixed noise assessment has been conducted. Noise impacts from planned fixed plant could be effectively mitigated by implementing noise control measure at source during project implementation stage. With the adoption of the proposed maximum permissible sound power levels for the proposed fixed plant, the noise levels at representative planned NSRs due to both the existing and planned fixed plants complies with the relevant noise criteria. For existing NSR (i.e. Lantau North (Extension) Country Park), the predicted noise level due to both the existing and planned fixed plants is 59 dB(A). Given the transient nature of visitor using hiking trails, adverse fixed noise sources impacts are not anticipated.
- 15.3.1.5** According to the approved 3RS EIA (AEIAR-185/2014) findings, the predicted NEF 25 contours of the 3Rs would be away from site boundary in Year 2011, Year 2021, Year 2030 and Year 2032. Adverse aircraft noise impacts are not anticipated. Although not under the statutory requirements, the use of acoustic insulation in form of well-gasketted window to enhance the indoor living environment would be reviewed in the detailed design stage, as mentioned in **Section 2.4.3.13** of this report.
- 15.3.1.6** Rail noise assessment has been conducted. Rail noise impacts from shunting tracks entering/ leaving from SHD are anticipated, rail noise impact assessment results indicate that the noise impacts on NSRs would comply with the statutory requirements with noise mitigation measure including sections of canopy along the podium. For existing NSR (i.e. Lantau North (Extension) Country Park), the predicted noise level is 69 dB(A). Given the transient nature of visitor using hiking trails, adverse rail noise impacts are not anticipated.
- 15.3.1.7** Cumulative fixed and rail noise assessment has been conducted. With the implementation of the recommended mitigation measures, cumulative fixed and rail noise impacts on NSRs would comply with the relevant noise criteria.
- 15.3.1.8** Helicopter noise impacts on the planned noise sensitive uses have been predicted. According to the latest information, the flight path of helicopters would maintain sufficient separation distance from noise sensitive uses. Adverse helicopter noise impacts are not anticipated.

**15.3.1.9** Since there is no existing and planned marine route within 300m assessment area, marine traffic noise impacts are not anticipated.

## **15.4 Water Quality**

**15.4.1.1** Construction site runoff and sewage arising from the on-site construction workforce are the key identified environmental impacts in construction phase. According to the current design, the construction works would be land-based and there would not be any marine works. Good site practices in accordance to Practice Note for Professional Persons on Construction Site Drainage, Environmental Protection Department, 1994 (ProPECC PN 1/94) would be implemented and proper temporary sanitary facilities (e.g. portable chemical toilet) would be provided to properly collect the on-site sewage generated from the construction workers. With proper implementation of the proposed mitigation measures, it is anticipated that there would be no residual adverse water quality impact.

**15.4.1.2** During the operational phase, drainage discharge, surface runoff, sewage from residential and commercial development are the key identified environmental impacts. The sewage from the proposed development would be conveyed to SHWSTW for treatment. To minimise emergency discharge from sewage pumping station, additional facilities such as standby pumps, twin rising mains and emergency storage tanks would be provided. With the mitigation measures implemented, residual adverse environmental impacts are not anticipated.

## **15.5 Sewerage and Sewage Treatment Implications**

**15.5.1.1** A new sewerage system will be provided to serve the proposed development. It is currently proposed that the sewage generated from the proposed development will be discharged to the proposed ultimate sewage pumping station located within the development and will be connected to SHWSTW.

**15.5.1.2** To enhance the reliability of the sewerage network and to minimize environmental impacts due to system failure or in case of emergency situations, twin rising mains would be provided and it is proposed that high density polyethylene (HDPE) pipe or ductile iron pipe would be adopted. To reduce the chances of emergency discharge, several mitigation measures including 100% standby pumping capacity, dual-feed power supply and provision of emergency storage tank providing up to 3-hour ADWF capacity would be adopted.

**15.5.1.3** Besides, a break pressure chamber for connecting the proposed DN450 rising mains to SHWSTW is proposed. It is recommended to modify the proposed rectangular channel to cater for the additional sewage flow from the proposed development atop Siu Ho Wan depot. As a new sewerage system will be provided, it is anticipated that no sewage flow

from the proposed topside development will discharge directly to existing sewers and rising mains and thereby there will be no impacts on them. Sewage generated from the SHO and SHD operations will be discharged into the existing sewers and rising mains according to details provided in the Railway EIA Report.

**15.5.1.4** The Government has identified available capacity of about 13,400m<sup>3</sup>/day for accepting the sewage arising from the proposed development atop Siu Ho Wan depot and the Siu Ho Wan Depot site for treatment at the SHWSTW. This available capacity is sufficient to cater sewage arising from the SHD Topside Development and SHO and SHD Replanning Works as the total sewage discharge is 13,329 m<sup>3</sup>/day. With the sufficient capacity identified at SHWSTW, provision of a new sewerage system and provision of facilities to minimise the possibility of emergency discharge, it is anticipated that the Project would not have adverse impacts on sewerage and sewage treatment implications.

## 15.6 Waste Management Implication

**15.6.1.1** Potential waste management implications from the generation of waste during the construction phase have been evaluated. Strategic mitigation measures, including the opportunity for on-site sorting, reusing construction and demolition (C&D) materials, etc., are devised to minimise the surplus materials to be disposed. Recommendations have been made for implementation by the Contractor during the construction period to minimise waste generation and off-site disposal. With the proper implementation of the recommended mitigation measures, adverse environmental impacts from waste management are not anticipated.

**15.6.1.2** The types of waste that would be generated during the operational phase would be dominated by the Municipal Solid Waste (MSW) generated from the residential and commercial developments. It is estimated that 81tpd of MSW will be generated during the operational phase where 28tpd of which will be recycled whilst the remaining 53tpd will require disposal. Recommendations have been made to ensure proper treatment and disposal of these wastes. With the proper implementation of the recommended mitigation measures, adverse environmental impacts from waste management are not anticipated.

## 15.7 Land Contamination

**15.7.1.1** This EIA study has examined the potential contaminative land uses for the proposed sewage pumping station, the utilities outside site boundary, eastern connection access on Sham Shui Kok Drive and western access via Tai Ho Interchange. It is anticipated that no potential land contamination issues has occurred within these areas as there has been no potential contaminative activities since the reclamation of the area. Hence no further site investigation (SI) is required.

**15.7.1.2** The land contamination issues within SHO and SHD Replanning Works area have been assessed under the Railway EIA Report. All necessary SI works, remediation works and preparation of relevant submissions regarding land contamination assessment within SHO and SHD Replanning Works would be conducted under the SHO and SHD Replanning Works. These works, if required, will be completed prior to the commencement of construction works at the contaminated areas for the SHO and SHD Replanning Works.

## **15.8 Ecological Impact**

**15.8.1.1** The ecological impact assessment evaluates the potential terrestrial and marine ecological impacts associated with the construction and operation of the Project. The purpose of the assessment is to evaluate the acceptability of predicted impacts to terrestrial and marine ecological resources and sensitive receivers. Findings of literature review and dedicated baseline field surveys have provided information for the evaluation of species of conservation importance and ecological importance of various habitats within the Assessment Area.

**15.8.1.2** The Subject Site and other terrestrial habitats within the Assessment Area are mainly of very low to low ecological value, except for the woodland, shrubland/grassland, natural section of watercourse, and subtidal habitats of low to moderate ecological value, while coastal water is ranked as moderate ecological value and mudflat and mangrove which are ranked as moderate to high value. Apart from these habitats, Lantau North (Extension) Country Park, Tai Ho Priority Site for Enhanced Conservation, and The Brothers Marine Park are located within the Assessment Area but no development works would encroach onto these recognised sites of conservation importance. Also, no species of conservation importance are identified within the Subject Site. Hence, no direct and indirect impact to any sites or species of recognised conservation importance is anticipated.

**15.8.1.3** During the construction phase, construction activities would only have direct impacts on urbanized/disturbed area, whereas indirect impacts on wildlife include disturbances of dust and noise. As the urbanized/disturbed area would be replaced by the same habitat type after the development, the direct impact of habitat loss is considered insignificant. On the other hand, the wildlife are mostly separated from the Subject Site by the NLH and should either have adapted to or avoided the highly disturbed area. Hence the potential indirect impact due to disturbances of dust and noise is considered insignificant.

**15.8.1.4** During the operational phase, indirect impacts including noise, traffic, human activities and artificial lightings might affect the wildlife in the vicinity. However, due to the existing disturbance in the urbanized /disturbed habitat and distance from the natural habitats, the potential impact due to these sources in operational phase is ranked as insignificant. As there are no large number of waterbirds and no

egretries in the vicinity, the potential impacts to barrier effect to flight paths of birds is ranked as insignificant.

**15.8.1.5** For marine ecological impact, as there will be no marine works, marine traffic and chances of emergency discharge to marine waters are minimised, no adverse impact to marine ecology is anticipated. As the use of percussive piling would be avoided, the effects of underwater noise to Chinese White Dolphin are not expected.

**15.8.1.6** As there will be neither marine works nor marine traffic, no cumulative impacts to marine ecology are anticipated. With the implementation of the recommended mitigation measure and/or design approach in the respective projects, significant cumulative impact on terrestrial ecology is not anticipated.

**15.8.1.7** With the implementation of the proposed mitigation measures, no adverse residual impact due to the land-based construction of proposed development, access road and the utility is anticipated.

## **15.9 Fisheries Impact**

**15.9.1.1** Fisheries production within the Assessment Area is ranked low and the shortest separation distance of the spawning area is over 2 km from the Subject Site. The potential fisheries impacts on fishing grounds, spawning and nursery grounds, and fisheries and mariculture activities, due to construction and operation of the Project are assessed.

**15.9.1.2** During construction phase, surface runoff will be collected either by the existing drainage system or the temporary construction drainage system. It is anticipated that the change of runoff released to marine habitats will be very low. With implementation of comprehensive control measures of construction site runoff, it is anticipated that the indirect impacts of construction site runoff to marine waters would not be significant.

**15.9.1.3** The Project is only land-based in nature and there will be neither marine works nor construction phase marine traffic for the Project. There will be no loss of marine waters, either permanent or temporary, within the Assessment Area during construction phase. There will be neither direct impacts on the fisheries resources as well as fishing ground loss, nor indirect impacts such as change in fishing operation locations during construction phase.

**15.9.1.4** As the Project is only land-based in nature and with the implementation of comprehensive measures to minimise the chances of emergency discharge from Sewage Pumping Station to marine waters, there would be no direct / indirect impacts on the fisheries resources as well as fishing ground during operational phase.

## 15.10 Landscape and Visual Impact

**15.10.1.1** The Project will inevitably result in some landscape and visual impacts during construction and operational phases, which are identified and addressed in this EIA with the aim of minimising such impacts to within acceptable levels. There are opportunities, at the Project's design, construction and operational stages, for incorporating environmental mitigation measures into the Project. These include providing sensitive treatments of its external appearance and associated planting works.

**15.10.1.2** Cumulative landscape and visual impact during the construction and operational phases from SHO and SHD Replanning works and other concurrent projects which include, Tuen Mun-Chak Lap Kok Link (TM-CLK Link) and Tung Chung New Town Extension (TCNTE) are assessed. These concurrent projects would not cause any insurmountable cumulative landscape and visual impact.

**15.10.1.1** On review of the likely residual impacts and possibility to reduce most of them to slight/ moderate to slight level by operation year 10 when the mitigation measures have matured and taken effect. Based on the above assessment, it is considered that in accordance with the criteria and guidelines for evaluating and assessing impacts as stated in Annex 10 and 18 of the EIAO-TM, the overall residual landscape and visual impacts of the proposed Project are acceptable with mitigation during the construction and operational phases.

## 15.11 Hazard

**15.11.1.1** The potential hazardous sources include SHWWTW and Sham Shui Kok (SSK) Chlorine Transshipment Dock. SHWWTW is the only PHI with its consultation zone (CZ) marginally encroached into the site boundary of the proposed development. The proposed development scheme has completely avoided locating additional residential population within the CZ to minimise potential risk. As confirmed with WSD, the latest  $1 \times 10^{-6}/\text{yr}$  risk contour from the SSK Dock would not encroach onto the proposed development including the Eastern Connection Road. Furthermore, potential risk due to operation of the SSK Chlorine Transshipment Dock will only happen to a small number of vehicles using the service road over a short time period if the Road P1(SHW Section) is not available in time for connection to the eastern access of the topside development. Hence, the risk associated with SSK dock would be insignificant.

**15.11.1.2** For the SHWWTW, Quantitative Risk Assessment has been conducted to the proposed development and its associated connection accesses.

**15.11.1.3** According to the assessment, the proposed site does not encroach into the  $10^{-5}/\text{year}$  criteria, which does not exceed the maximum level of off-site individual risk.

**15.11.1.4** F-N curve in the societal risk plot indicated that the overall risk from SHWWTW, inclusive of the proposed development, would fall within the “ALARP” region. Investigation of potential mitigation measures options are subject to the cost benefit analysis evaluation. The results indicate that no mitigation measures options related to the operation of SHWWTW are cost effective. However, emergency planning, training and drills for construction workers would be recommended as precautionary measures for construction phase to reduce the risks from SHWWTW.

## 15.12 Overall

**15.12.1.1** This EIA Study has demonstrated overall environmental acceptability of the proposed comprehensive residential and commercial development atop Siu Ho Wan Depot, in accordance with the Study Brief (ESB-294/2016) and the EIAO-TM. The Project is expected to meet all relevant environmental standards with the implementation of suitable mitigation measures during both construction and operational stages.

**15.12.1.2** The Project supports Government’s policy initiatives by optimising the utilisation of existing railway land for housing supply. With reference to the Sustainable Building Design Guidelines, a technically feasible development scheme has been formulated for a self-contained community of about 14,000 residential units, supported by a new MTR Station along the Tung Chung Line for environmentally friendly transport.

**15.12.1.3** By providing a landscaped deck over the entire depot site, the Project will bring environmental benefits to the community by containing the existing industrial operation, while acting as a focal point with new commercial/retail, educational and public transport facilities to allow flexibility for future land use planning of the Siu Ho Wan area which supports the Government’s strategic planning direction for North Lantau.