CONCLUSION

14.1 Introduction

14.1.1 A local sewage treatment facility is proposed at Po Toi O, which is currently served by septic tanks. The sewage treatment plant will be built on a cut-slope away from residence, with much of the noisy plant equipment hidden underground within the concrete structure. Gravity sewers and rising mains will be buried along the footpath between houses.

14.1.2 The proposed facility will collect the sewage from residence and restaurants and treat to meet the EPD’s effluent discharge standard. The effluent will be discharged through a submarine outfall at the outer water of Po Toi O bay. This Project is expected to bring improvement in environmental hygiene in the Po Toi O area.

14.2 Air Quality

14.2.1 Dust generating activities were identified and evaluated. Based on the best available information at time of preparation of this EIA, there is no concurrent project in Po Toi O area in the construction phase of the Project. Given the small scale of the works involved in the Project, extensive excavation and transportation of dusty material are highly unlikely. Mitigation measures including watering of on-site construction area are expected to limit fugitive dust levels to acceptable levels. With proper implementation of mitigation measures, construction dust emissions impacts are anticipated to be acceptable. An EM&A programme will be implemented to ensure construction dust impacts are controlled to acceptable level.

14.2.2 Due to the limited quantity of excavated soil for the Project, odour impact during the construction phase of Project is acceptable if control measures are implemented.

14.2.3 During the operational phase of the Project, all the potential odour generating facilities would be enclosed by building structure. The deodorization facility is designed to be able to achieve an odour removal efficiency of 99.5% for the exhaust of the sewage treatment plant. During sludge transportation, it is recommended that the sludge should be carried in enclosed containers to avoid unacceptable odour nuisance. Membrane and filter in the STP should be regularly cleaned and replace to maintain the efficiency of sewage treatment and odour removal. With proper mitigation measures incorporated into the design, odour impacts arising from the proposed sewage treatment plant will be significantly reduced, and odour impacts are anticipated to be acceptable.

14.3 Noise

14.3.1 Construction noise arising from typical types and numbers of powered mechanical equipment items (PME) for the construction of sewage treatment plant and rising mains/sewer installation have been assessed. Based on the effective sound power levels of the PMEs and the notional noise distance to the noise sensitive receivers, unmitigated construction noise levels would exceed the 75dB(A) guideline level for the non-restricted hours for all NSRs. At source mitigation measures have been
proposed including the use of quality plants, use of mobile noise barriers, semi-enclosure, strategic work scheduling and good site practice. With the proposed mitigation measures, no noise exceedances is expected at the NSRs.

14.3.2 Most of the noisy equipment items in the sewage treatment plant would be fully underground or enclosed by concrete structure. With noise reduction due to distance between the STP and the nearest NSR, operational noise impact is anticipated to be acceptable.

14.4 Water Quality

14.4.1 Major water quality impact is expected from the release of suspended solids during dredging and backfilling at the proposed diffuser location during the construction phase. By confining these works within fully enclosed cofferdam and dredging by closed-grab dredger anchored outside the cofferdam, no sediment loss and thus significant water quality impact is expected.

14.4.2 During normal operation of the Po Toi O Sewage Treatment Works (PTO STW), no substantial change in water quality in Po Toi O bay is expected. All water quality parameters would comply with the WQO except TIN, which is attributed to the background level.

14.4.3 Considering the project scale, risk of emergency condition, construction difficulties and cost, the following provisions are the most appropriate and practical mitigation measures in case of plant/power failure:

- Delivery of an emergency generator to PTO STP within 4 hours from plant failure;
- Provision of dual power by CLP;
- Provision of a Supervisory control and data acquisition system (SCADA), which signals to the operation and maintenance personnel for emergency attendance in case of plant failure;
- Provision of a standby pump and screen at the PTO STP;
- Provision of emergency storage of 4-hr ADWF sewage retention time;
- Arrangement of tankers for removing incoming sewage to other sewage treatment plants for treatment continuously to ensure a sufficient buffer for emergency storage.

14.4.4 Based on these provisions, emergency discharge is not expected, and thus no adverse impact on water quality due to emergency discharge is anticipated.

14.4.5 With proper implementation of mitigation measures, no insurmountable water quality impact due to this Project is expected.
14.5 Terrestrial Ecology

14.5.1 Ecological sensitive areas recorded in the Study Area (500m from work boundary) included the Clear Water Bay Country Park. 3 avifauna species of conservation importance were recorded in past studies, while 6 plants, 11 avifauna, 1 snake and 2 butterfly species of conservation importance were recorded in recent surveys.

14.5.2 A small area of shrubland (893 m²) on Conservation Area will be impacted directly due to the establishment of sewage treatment plant (STP) and road facilities (footpath and public parking spaces). One common plant species of conservation importance growing on this shrubland is also expected to be impacted directly.

14.5.3 Small area of woodland in Conservation Area and developed area (350 m² & 2,100 m² respectively) will also be lost temporarily for the establishment of associated land-based pipes. In addition, 750 m² of rocky shore (above high tide level) on Coastal Protection Area will be lost temporarily for constructing the pipeline of submarine outfall. Nevertheless, direct impact caused by the establishment of associated land-based pipes and pipeline of submarine outfall would be reversible.

14.5.4 All habitats and fauna species of conservation importance are expected to be impacted indirectly by water quality and/or noise impacts in construction phase. As in operational phase, noise impact from sewage treatment works will be limited.

14.5.5 With proper implementation of mitigation measures, residual impact is expected to be acceptable. Regular site audit would only be required in construction phase.

14.5.6 The overall impact on terrestrial ecology is considered as acceptable.

14.6 Marine Ecology

14.6.1 Coral communities were recorded in past study, while 4 avifauna, 1 amphioxus and 19 hard coral species of conservation importance were found in recent surveys. Besides, a major amphioxus habitat was recorded in recent surveys.

14.6.2 Although the muddy seabed where the diffuser will be located on will be lost during construction phase, no species of conservation importance will be directly affected. There will be permanent loss of 5 m² in area at the diffuser location. However, impact on the remaining works area (495 m²) would be reversible. Indirect impact due to water deterioration will be minimal as dredging works will be confined within fully enclosed cofferdam. No sediment release into water bodies is anticipated. No cumulative impact is expected as no project is known to be carried out concurrently with this Project. The overall construction phase impact is considered low and acceptable.

14.6.3 As sewage will be collected and treated before discharge, no substantial change in water quality is expected for normal operation of the Po Toi O Sewage Treatment Works. No discharge of raw sewage in case of emergency plant failure is anticipated as mentioned in Section 14.4.3. The overall operational phase impact on
maritime ecology is considered low and acceptable.

14.6.4 With proper implementation of mitigation measures, residual impact is expected to be acceptable. No specific monitoring and audit programme is required for marine ecology.

14.7 Fisheries

14.7.1 Fisheries resources in the Study Area (covering Po Toi O bay, Clearwater Bay and waters surrounding Steep Island) included the Po Toi O Fish Culture Zone, Artificial Reefs, fishing ground in eastern waters of Hong Kong including Po Toi O, and spawning and nursery grounds for commercial fisheries resources in eastern waters of Hong Kong. In terms of capture fisheries, adult fish production (in weight) in the Study Area was “relatively low – medium”, while the overall fish (i.e. both adult fish and fish fry) production (in value) was “relatively medium – high” among Hong Kong waters.

14.7.2 Although no direct encroachment on Fish Culture Zone and Artificial Reefs in the Study Area is anticipated, about 1,920 m² of fishing ground and 500 m² of benthic spawning ground will be affected. Except the 5 m² benthic spawning ground will be lost permanently, other impacted area will only be affected in construction phase temporarily (reversible impact). Indirect impact on fisheries resources by the water quality deterioration will be insignificant. No cumulative fisheries impact is expected as no project will be carried out concurrently of this Project.

14.7.3 No substantial change in water quality in Po Toi O bay is predicted during normal operation of the PTOSTW. No discharge of raw sewage in case of emergency plant failure is anticipated as mentioned in Section 14.4.3.

14.7.4 With proper implementation of mitigation measures on water quality, residual impact is expected to be acceptable. No specific monitoring and audit programme is required for fisheries.

14.7.5 The overall impact on fisheries is considered as acceptable.

14.8 Waste Management

14.8.1 During construction phase, major C&D materials will be composed of rock and soil from slope cutting for STP construction. Other waste includes chemical waste from maintenance of plant equipment, used bentonite from drilling works, marine sediment from dredging works and general refuse from workforce.

14.8.2 Sediment Sampling and Testing Plan (SSTP) has been submitted to EPD as required under the Study Brief. Sedimentary Quality Tests of sediment at dredging point showed that the materials were classified as Category L. According to ETWB TC(W) No. 34/2002 Management of Dredged/Excavated Sediment, Category L materials shall be disposed at open sea disposal site assigned by the Marine Fill Committee (MFC).
14.8.3 Operation of sewage treatment plant will generate sludge, debris from screening, worn filter in deodouring unit and general refuse from staff.

14.8.4 The waste shall be handled and disposed of properly to prevent causing damage to the environment, e.g., water pollution, odour nuisance and hygiene issue. With implementation of the recommended measures and site practices, impact due to waste management is expected to be acceptable.

14.8.5 Based on historical aerial photos, land use history, site inspection and information from EPD and FSD, it is concluded that land contamination within the work boundary demarcated in Figure 1-1 is highly unlikely.

14.9 Landscape and Visual

14.9.1 This Project will have temporary and permanent landscape and visual impacts on the environment, which are identified and addressed in this EIA with the aim of avoiding (where practicable) and at the very least, minimising such impacts to within acceptable levels. There are opportunities, at the Project’s design, construction and operation stages, for incorporating environmental mitigation measures into the Project. These include reducing the scale of the sewage treatment plant and providing sensitive treatments of its external appearance and associated planting works.

14.9.2 Due to the relatively small scale of the proposed Project, none of the LRs, LCAs or VSRs will experience substantial residual impacts. The highest residual impact for Landscape Resources and Landscape Character Areas is only assessed as Slight on Day 1 and Insubstantial at Year 10 (all the other LR’s and LCA’s experiencing Insubstantial or No residual impact at Year 10). The highest residual impact for Visually Sensitive Receivers is Moderate at Day 1 and Slight at Year 10, (all the other VSRs experiencing only Slight or Insubstantial residual visual impacts at Day 1 and Insubstantial or No residual visual impacts at Year 10).

14.9.3 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 TM- EIAO, the overall residual landscape and visual impacts of the proposed Project are acceptable with mitigation during the construction and operation phases.

14.10 Built Heritage

14.10.1 Po Toi O was a small fishing village and developed into a seafood and tourism destination. One Grade 3 historic building, Hung Shing Temple, was identified in the Study Area (50m from work boundary). It has over 350 years history and it is still commonly worshipped today. Besides Hung Shing Temple, two built heritages and six landscape features were identified. They are not exceptionally historic but could be culturally connected with the local villagers.
14.10.2 For the proposed project to provide village sewerage to the unsewered areas of Po Toi O, the alignment of sewers and rising mains proposed is inevitably closed to the existing structures; however, efforts have been made to adjust the alignment so that no identified built heritage resources will fall within the works boundary. From the built heritage impact assessment, it is found that there is no direct damage to the built heritage resources. With the proposed mitigation measures including condition survey, vibration and settlement monitoring, provision of protective covering or protective screen, provision of buffer zone and maintenance of public access, the potential impacts to the identified built heritage resources should be minimised and considered acceptable.

14.11 EM&A Requirement

14.11.1 Specific mitigation measures are proposed to avoid and minimize the potential environmental impacts. Also, a number of monitoring works will be conducted to ensure compliance of environmental criteria. The information has been presented in the EM&A Manual.

14.12 Overall Conclusion

14.12.1 The existing environmental conditions have been identified through onsite survey, literature review. The environmental impacts on air quality (dust & odour), noise, water quality, terrestrial and marine ecology, fisheries, waste, landscape and visual and built heritage induced during construction and operational phases of this Project were identified, assessed and evaluated in this EIA Report. Major construction impact will be elevation in suspended solids during dredging works and noise from pipe laying work along the narrow alley between residences. However, dredging works will be confined within cofferdam. Noise impacts are usually short term and no noise exceedance is expected with proper implementation of mitigation measures. A number of measures are proposed to avoid emergency discharge of raw sewage in case the sewage treatment plant fails to operate.

14.12.2 In order to alleviate any identified environmental impacts, detailed EM&A requirements have been formulated based on the assessment results. Monitoring works during construction and operational phases are proposed if the assessment results conclude that significant impact is anticipated or the receivers should be protected.

14.12.3 Given the scale project scale and beneficial nature of this Project, the overall environmental impact is considered acceptable.