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## 1 INTRODUCTION

### 1.1 Project Background

1.1.1 In the Policy Address 2015, the Government set out the intention to adopt the concept of revitalising water bodies in large-scale drainage improvement works and planning drainage networks for the new development areas. The concept of revitalising water bodies is aimed at promoting greening, biodiversity, beautification and water friendliness in addition to achieving efficient drainage, with a view to building sustainable drainage facilities and providing a better living environment.

1.1.2 Fo Tan Nullah (FTN) and Tai Wai Nullah (TWN) were identified as one of the waterbodies of high revitalisation potential and therefore were recommended for detailed investigation and proposing revitalisation schemes for implementation, taken into account its unique features and constraints in the feasibility study on “Study on Revitalisation of Water Bodies” (“the Study”) under Agreement No. CE 28/2015 (DS) commissioned by Drainage Services Department (DSD) in December 2015.

1.1.3 In April 2020, AECOM Asia Company Limited was commissioned by DSD to undertake Agreement No. CE54/2019 (DS) – “Revitalisation of Tai Wai Nullah and Fo Tan Nullah – Investigation” (hereafter referred to as “the Assignment”) to revitalise the existing TWN and FTN with an aim to enhance their ecological value, provide a greener environment, promote water friendliness and improve the community environment. The Assignment also includes provision of dry weather flow interceptors to improve the water quality. As part of the Assignment, an Environmental Impact Assessment (EIA) study under the Environmental Impact Assessment Ordinance (EIAO) is required for the proposed works to TWN and FTN, respectively.

1.1.4 This EIA Report covers the EIA study for Revitalisation of FTN (hereafter referred to as “the Project”).

1.1.5 The proposed revitalisation of FTN is classified as designated project (DP) by virtue of Item I.1(b)(ii), Part I, Schedule 2 of the EIAO – “a drainage channel or river training and diversion works which discharges or discharge into an area which is less than 300 m from the nearest boundary of an existing or planned site of cultural heritage”.

1.1.6 Project Profile for Revitalisation of FTN (No. PP-585/2019) was submitted to the Environmental Protection Department (EPD) on 31 July 2019 for application for an EIA Study Brief under section 5(1)(a) of the EIAO. The EIA Study Brief for the Revitalisation of FTN (No. ESB-319/2019) was issued on 11 September 2019 under the EIAO.

### 1.2 Purpose of this Executive Summary

1.2.1 This Executive Summary (ES) summarises the key findings, recommendations and conclusions of the EIA Report for the Project. The ES contains the following information:

- Section 2 presents purpose and nature of the Project, consideration of alternative options and construction methods for the Project;
- Section 3 presents the key findings of the environmental impact assessment;
- Section 4 describes the proposed environmental monitoring and audit programme for the Project; and
- Section 5 presents the conclusions.

## 2 PROJECT DESCRIPTION

### 2.1 Purpose and Scope of Project

2.1.1 The purposes and objectives of the Project are to revitalise the existing FTN with the aim of enhancing the ecological value of FTN, providing a greener environment, promoting water friendliness and improving the community environment. The Project also includes provision of dry weather flow interceptors to improve the water quality. Location plan and general layout of the Project are shown in [Figure 2.1](#) and [Figure 2.2](#) respectively.

2.1.2 The Project comprises the following key components:

- (a) beautification of the existing nullah (approximately 1.7 km long and 10 m to 35 m wide) by re-surfacing, greening and modification of channel bed;
- (b) provision of dry weather flow interceptor (DWFI) system;
- (c) provision of features for ecological enhancement and installation of underground water storage tank [approximately 10m (W) x 30m (L) x 2.5m (D)] under the existing Kwei Tei Street Garden equipped with two submersible water pumps installed under the nullah bed at mid-stream of FTN and underground water pipes for associated water retention and supplement;
- (d) construction of viewing decks and revamp of existing footbridges/bridges;
- (e) revamp/provision of footpaths, railings, amenity areas and pavilions along the nullah banks;
- (f) improvement/modification of existing planters; and
- (g) associated works including landscaping, utility works, etc.

2.1.1 Subsequent to the issue of the EIA Study Brief (No. ESB-319/2019), due to the pressing needs to alleviate flood risks near Kwei Tei Street, the improvement/modification of drainage channel connecting Kwei Tei Street, which does not constitute material change to an exempted DP under the EIAO, has been excluded from the Project scope for implementation under another public works contract so as to expedite its implementation programme. Furthermore, an underground water storage tank under existing Kwei Tei Street Garden equipped with submersible water pumps installed under the nullah bed at mid-stream of FTN and underground ground water pipes has been proposed to support the provision of ecological enhancement features in the nullah. In accordance with Clause 6.2 of the EIA Study Brief, confirmations have been sought from the Director of Environmental Protection in writing that these two changes would not fundamentally alter the key scope of the EIA Study Brief and it is still valid for the preparation of the EIA Report.

2.1.2 During operational phase, similar to the existing practices, regular maintenance works for the drainage and sewerage systems along FTN, including desilting along the nullah and minor maintenance to the DWFI system, would be carried out by the DSD to remove excessive silts, debris and any obstructions to safeguard the hydraulic capacity of the nullah. The maintenance practices and frequency would be similar to the existing maintenance works undertaken by the DSD.

2.1.3 The operation of the two proposed submersible water pumps (one duty and one standby) installed under the nullah bed at mid-stream of FTN will be controlled by a level detector installed at the proposed underground water storage tank at the existing Kwei Tei Street Garden to pump water flowing from the low flow channel upstream to the underground water storage tank through pressurised underground pipes. The pumps will not operate during night-time (i.e. 2300 – 0700 hours). The stored water in the tank will be naturally discharged for recharging environmental flow in the nullah.

### 2.2 Need and Benefits of the Project

#### Water Quality Improvement and Water Friendliness

2.2.1 Due to ageing drainage systems and possible expedient connection made in the past, polluted discharges from the existing drainage outlets along FTN are observed at present. Complaints and concerns from the public, including Sha Tin District Council (STDC) and local stakeholders, on the long-standing water quality and odour nuisance of FTN were received. With the implementation of the proposed DWFI system of the Project, the dry weather flows from the drainage outlets along FTN will be intercepted and discharged to the existing sewerage system via gravity mains (i.e. no DWFI pumping station required) for

conveying to Shatin Sewage Treatment Works for treatment. With the interception of the polluted discharges, the water quality would be improved and odour nuisance to the resident nearby would be alleviated.

- 2.2.2 While FTN is not suitable to be opened up for public access due to safety reasons, the improvement of water quality and riverside environment of the nullah due to the Project would enhance user experience and hence promoting water friendliness culture. In view of the existing fragmented, inconsistent and underutilised public open spaces along FTN, installation of viewing decks along the nullah as well as improvement and landscaping works to existing walkways and public open spaces (e.g. installation of thematic pavilions, decked walkway and open spaces) are proposed to allow public to engage with and enjoy the revitalised waterscape.

#### Greening Enhancement

- 2.2.3 The existing concrete nullah bed from the section south to Kwei Tei Street down to the section with tidal influence near Fo Tan MTR Station and embankment down to the confluence with Shing Mun River will be resurfaced with layer of vegetation, which will enhance both the aesthetic and ecological values of FTN. Greening along the nullah bed and banksides, such as provision of emergent wetland planting (e.g. reed and other aquatic herbs), mangroves, climbing plants, tree and / or grasscrete etc, will be provided. The existing mature trees growing along the nullah banks will be retained, and additional tree planting will be provided. The existing planters will also be modified to beautify the footpath along FTN.

#### Ecological Enhancement

- 2.2.4 The existing FTN is of low ecological value in view of its concrete-lined channel bed and bank, as well as its limited baseflow, especially in dry season (i.e. from November to March). With the installation of the proposed underground water storage tank under the existing Kwei Tei Street Garden and submersible water pumps installed under the nullah bed at mid-stream of FTN for associated water retention and supplement, the following ecological features will be incorporated into the nullah to improve and create aquatic and terrestrial habitats, enhancing its ecological values:

- Reprofilng of the low flow channel (from the section south to Kwei Tei Street down to the section with tidal influence near Fo Tan MTR Station) and construction of in-stream weirs to create a meandering alignment along the nullah to mimic natural stream pattern where practicable, providing a series of microhabitats for wildlife in surrounding areas;
- Provision of DWFI system to improve water quality and to support ecological enhancement;
- Introduction of general constructed wetland systems (artificial wetland created to mimic processes in natural wetland ecosystems involving vegetation, soils, and their associated microbes through engineering design) to the channel bed, which can serve as greening and ecological enhancement measures whilst achieving some degree of pollution removal;
- Greening along the channel bed and banksides, such as provision of emergent wetland planting (e.g. reed and other aquatic herbs), mangroves, climbing plants, tree and / or grasscrete to the banksides;
- Incorporation of planting designed to attract wildlife species (e.g. birds and butterflies) during revamp of public open space along FTN;
- Provision of nest boxes / hunting perch for wildlife (e.g. birds) along FTN;
- Installation of oyster baskets along the bottom of channel bank at the small portion of Shing Mun Main Channel within the Project site to provide habitats for intertidal species and ardeids; and
- Modification of channel bank at downstream section of FTN to enhance foraging habitats for waterbirds.

## 2.3 Consideration of Design and Layout

- 2.3.1 Environmental implications of various options in regard to the extent of DWFI system, water retention and replenish methods, and ecological enhancement designs have been considered with a view to optimising the revitalisation design of FTN in order to enhance the ecological value of the nullah, provide a greener environment, promote water friendliness and improve the community environment whilst avoiding, minimising and mitigating any potential adverse environmental impacts of the Project.

### Extent of DWFI System

- 2.3.2 Drainage outlets with polluted discharges were identified between Sections 2 to 5 of FTN (see [Figure 2.2](#) on division of channel sections), i.e. from the section south to Kwei Tei Street down to the section near Fo Tan MTR Station, through pollution source identification survey. For the preferred extent of DWFI system, a full-scale DWFI system that intercepts the dry weather flows from all the drainage outlets identified with polluted discharges along the nullah within Sections 2 (part) to 5 of FTN is considered to be able to fully eliminate the existing polluted discharges to FTN and would improve the water quality and resolve the odour problem of FTN which favours the revitalisation, hence it is selected as the preferred option. Section 6 of is connected to natural catchments whilst Section 1 is surrounded by private housing estates / institutional uses which have well-established sewerage and stormwater drainage systems that expedient connection/misconnection from industrial area or significant polluted surface runoff due to the nature of the catchment area would be unlikely for these two sections. Likewise, Sections 1 and 2 (part) of the nullah are also subject to tidal influence with the outlets being submerged mostly in water that the discharges cannot be intercepted by the instream DWFI system. DWFI system is hence not considered necessary for Sections 1, 2 (part) and 6 of the nullah.

### Water Retention and Replenish Methods and Ecological Enhancement Designs

- 2.3.3 In view of the limited baseflow of FTN, water retention and replenish methods have also been considered to retain and supplement water to the nullah in order to provide sufficient water flow to support a healthy aquatic habitat in the channel.
- 2.3.4 In-stream fixed weirs, which would not be washed away in case of flood discharge, would be incorporated in the nullah bed to retain water depth for aquatic habitats. By impounding floodwater or environmental flows, weirs are particularly useful in the dry channels to retain water for a longer period, which could promote plant growth and aquatic species survival in such an otherwise dry environment.
- 2.3.5 Taking advantage of the proposed revamp of public open space along FTN to improve the community environment, land co-use concept would be adopted at the existing Kwei Tei Street Garden that an underground water storage tank would be constructed for water retention, supplement and flood control alongside with the revamp of the existing playground. In view of the limited and inconsistent baseflow, especially in dry season, submersible water pumps will also be constructed in mid-stream section of FTN (i.e. upstream of the tidal zone) to pump water to the underground water storage tank for replenishing. The stored water in the tank sourced from the overflow pipe and mid-stream submersible water pumps can be used for recharging environmental flow in the nullah, which can help maintain a healthy aquatic habitat and support the proposed emergent wetland planting for in-channel greening and ecological enhancement to mimicking the biodiversity of a natural stream environment and creating an aesthetically pleasing landscape.

## 2.4 Construction Methods and Sequences of Works

- 2.4.1 The Project site will be divided into six sections to be constructed in sequence starting from downstream FTN ([Figure 2.2](#) refers). The construction works along the nullah within each section would last for approximately 1 year and will not be undertaken at the entire section at the same time to avoid multiple construction activities overlapping / concentrating in a certain area over any period.
- 2.4.2 The proposed revitalisation works would be constructed by traditional open-cut and in-situ concreting method that mainly involve site clearance, soil excavation, sheet-piling, bore piling, formwork, concreting, backfilling, and reinstatement. Desilting works at downstream

tidal zone would be carried out at the commencement and prior to the completion of the construction works to remove the silt accumulated at the nullah, in addition to the routine maintenance desilting works undertaken by DSD along FTN and by CEDD along Shing Mun River under existing arrangement.

- 2.4.3 For each section, the construction works within the nullah, including nullah bed modification, construction of DWFI system along the nullah, mid-stream submersible water pumps and water pipes along the nullah and desilting works at downstream tidal zone will only be undertaken during dry season to reduce the potential water quality impacts due to surface run-off. To further reduce the water quality impacts, the excavation in the nullah will be carried out in an enclosed area surrounded by concrete blocks, sandbag barriers or other appropriate physical barriers.
- 2.4.4 The major parts of the DWFI system are u-channel and pipe system cast-in with the concrete block at nullah wall for stabilisation. Taking the inconsistent shapes and sizes of nullah wall / drainage outlets and limited accessibility to the nullah bank into consideration, the more flexible construction method of in-situ construction of DWFI system is considered more suitable and practical than the off-site pre-cast construction. Hence, it is adopted to avoid prolonged construction duration and repeated construction activities and to reduce potential disturbance/nuisance to the environment and local public from trial installations or on-site adjustment of pre-cast concrete mass.
- 2.4.5 The proposed underground water storage tank with an area of approximately 300 m<sup>2</sup> and 2.5m deep will be installed at shallow depth to match the downstream invert level of the nullah. Conventional bottom-up open-cut construction method is considered the most suitable and practical for such shallow excavation and small-scale substructure and hence and is adopted.

## 2.5 Construction Programme

- 2.5.1 The construction works are tentatively scheduled to commence in Q1 2024 for completion in Q4 2029.

## 2.6 Concurrent Projects

- 2.6.1 The potential cumulative environmental impacts during construction and / or operational phase from the below interfacing projects within 500 m from the Project or ones that involve construction works within or in close proximity to Shing Mun River and its tributaries have been reviewed.
- Proposed floodwall along Shing Mun River under Drainage Improvement Works in Sha Tin and Sai Kung;
  - Rising main for connecting Sha Tin Main Sewage Pumping Station to the planned Intermediate Sewage Pumping Station along Shing Mun River proposed under the Relocation of Sha Tin Sewage Treatment Works to Caverns – Upstream Sewerage and Pumping Stations;
  - Sewerage Works near Kwei Tei Street;
  - Widening of Tai Po Road (Sha Tin Section);
  - Revitalisation of Tai Wai Nullah;
  - Revised Trunk Road T4 in Sha Tin;
  - Redevelopment of Housing Authority's (HA) Sui Fai Factory Estate for Residential Use; and
  - New Facilities Building of the Hong Kong Sports Institute (HKSI)
- 2.6.2 No adverse cumulative environmental impacts from the above potentially interfacing projects were predicted during the construction and operational phases of the Project. Nonetheless, it is recommended that during the detailed design stage, the contractor of this Project should be requested to closely liaise with the contractors of these potential concurrent projects in planning the interfacing works properly to avoid / minimise repeated and concurrent construction works as far as practicable to further minimise any potential cumulative impacts and to enhance overall environmental performance of the Project.

## 2.7 Public Consultation

### 2.7.1 Consultation exercise carried out include:

- Meeting with Sha Tin District Council in June and July 2018, March 2021
- Meeting with Sha Tin District Council Health and Environmental Committee in March 2019
- Meeting with Green Groups in July 2020
- A series of public engagement exercises (e.g. interviews, workshops and surveys) through the use of Design Thinking Approach between December 2020 to August 2021.

### 2.7.2 During the public inspection period of the Project Profile submitted for the Application of EIA Study Brief (No. PP-585/2019) in 2019, comments received were largely in favour of the Project, in particular, the proposed DWFI system and ecological enhancement are considered to be beneficial to the community. Members of the Sha Tin District Council, general public and green groups are supportive of the Project. Their key concerns and comments on avoidance and minimisation of impacts on existing natural watercourses / habitats and associated wildlife, water quality issues and odour nuisance, promotion of water friendliness, insufficient baseflow to support proposed ecological enhancement and improvement on walkability along the nullah and enhancement of public open spaces have been incorporated into the design of the Project.

### **3 KEY FINDINGS OF THE ENVIRONMENTAL IMPACT ASSESSMENT**

#### **3.1 Air Quality Impact**

- 3.1.1 Potential air quality impacts associated with the construction and operational phases of the Project have been assessed in accordance with the criteria and guidelines as stated in the requirements given in Section 3.4.4 and Appendix B of the EIA Study Brief, as well as Annexes 4 and 12 of EIAO-TM. The assessment area for air quality impact assessment is within 500m from the boundary of the Project area.
- 3.1.2 The potential air quality impacts arising from the construction of the Project would be related to fugitive dust emissions from construction works and gaseous emissions from the use of powered mechanical equipment (PME), and odour nuisance from the desilted/excavated materials generated during desilting works at downstream tidal zone / excavation works in the nullah. Since the construction works of the Project would be divided into sections which are in small scale, the air quality impacts would be localised and minor, and would be well controlled through the implementation of good site practices and dust suppression measures stipulated in the Air Pollution Control (Construction Dust) Regulation as well as the proposed good site practices to minimise the exhaust emissions from non-road mobile machinery (NRMMS) and odour nuisance from handling of desilting/excavated materials. No adverse air quality impact due to the construction of the Project would therefore be anticipated.
- 3.1.3 With the implementation of DWFI system under the Project to intercept and divert the polluted discharges from drainage outlets along the nullah to the existing sewerage system for treatment, the odour nuisance of FTN would be alleviated as a result of the operation of the Project. Any odour emission generated from exposed desilted materials during the routine maintenance works would be temporary and confined to the areas of maintenance works that it would be well-controlled through good site practices. No adverse air quality impact due to the operation of the Project would be anticipated.

#### **3.2 Noise Impact**

- 3.2.1 Potential noise impacts associated with the construction and operational phases of the project have been assessed in accordance with the criteria and guidelines as stated in the requirements given in Section 3.4.5 and Appendix C of the EIA Study Brief, as well as Annexes 5 and 13 of the EIAO-TM. The assessment area for noise impact assessment is defined by a distance of 300m from the site boundary of the Project.
- 3.2.2 Construction noise is expected from the use of powered mechanical equipment (PME) during various construction activities. No marine transportation of construction materials and waste is required. Noise impact arising from construction activities of the Project has been assessed. With proper implementation of the proposed mitigation measures, including adoption of good site practices, use of quality PME / quieter construction method including silent piling by press-in method, adoption of movable noise barriers, and proper scheduling of noisy construction activities, the mitigated cumulative construction noise levels from the Project and nearby concurrent project at all representative noise sensitive receivers (NSRs) in the vicinity of the Project work site would range from 59 to 75 dB(A), complying with the noise criteria set out in the EIAO-TM. Potential cumulative construction noise on representative NSR NAP2 (Yuk Wo Court), NAP3 (51 Fo Tan Village), NAP4 (57 Fo Tan Village) and NAP6 (Jockey Club TI-I College) is also anticipated to be insignificant. Subject to the detailed design and construction programme, as an enhancement measure to further improve the environmental performance of the construction of the Project, other quieter construction methods, such as use of road ripper instead of breaker for concrete breaking during excavation works, would also be considered where viable. Noise monitoring is recommended as part of the environmental monitoring and audit (EM&A) programme for the construction phase of the Project to check compliance with the daytime construction noise criteria. Weekly site audit is also recommended to audit the proper implementation of the recommended mitigation measures for daytime construction activities as part of the EM&A programme.
- 3.2.3 During operational phase, fixed plant noise from the operation of the proposed submersible water pumps installed under the nullah bed at mid-stream of FTN for ecological



enhancement associated water supplement would be the major source of noise impacts based on the current design. The noise impact associated with the operation of the Project has been assessed based on the plant inventory provided by the Project Engineer at the time of the assessment. The assessment result indicated that the predicted fixed plant noise levels at all representative NSRs would comply with the noise criteria. No adverse noise impact is anticipated during operational phase of the Project. Commissioning test should be conducted prior to operation of the Project to ensure that the fixed plant noise impact would comply with the relevant noise standards.

### **3.3 Water Quality Impact**

3.3.1 The water quality impact assessment was conducted in accordance with the requirements in Annexes 6 and 14 of the EIAO-TM and the requirements in Section 3.4.6 and Appendix D of the EIA Study Brief. The study area for this water quality impact assessment includes areas within 500 m from the boundary of the Project and covers Shing Mun River, Tolo Harbour and Channel Water Control Zone (WCZ) as designated under the Water Pollution Control Ordinance (WPCO).

3.3.2 The key issues of the land-based construction works include construction works at and in close proximity to FTN / inland water, wastewater generated from general construction activities, construction site runoff, sewage from construction workforce and accidental spillage of chemicals. The potential water quality impacts could be avoided and minimised by implementing the recommended pollution control measures. No adverse water quality impact during construction phase would be anticipated. Regular site audit should be undertaken routinely to inspect the construction activities and works area to ensure the recommended measures are properly implemented.

3.3.3 The potential sources of water quality impacts during operation phase would be related to non-point source surface / irrigation runoff, routine maintenance works (maintenance desilting and minor maintenance to DWFI system) and potential changes in hydrodynamics properties and hydrology. Adequate drainage system with silt traps and oil interceptors should be incorporated into the proposed works to collect the surface / irrigation runoff. With proper design of drainage system and implementation of the recommended pollution control measures, no adverse water quality impact from non-point source surface / irrigation run-off would be expected. No adverse water quality impacts would be expected to occur at any identified WSRs due to the small-scale and infrequent routine maintenance works to remove excessive silts, debris and any obstructions for safeguarding the hydraulic capacity of the nullah, which practices and frequencies would be similar to the ones undertaken by DSD along FTN under existing arrangement. Despite the reduced environmental baseflow at the nullah due to the interception of the flow with polluted discharges by the DWFI system, owing to the natural sloping gradient along FTN and the water retention and replenish designs and ecological enhancement features (e.g. wetland habitats created) within the nullah, average flow rate will remain similar to baseline condition and no unacceptable impacts on hydrodynamics properties and hydrology are anticipated. No adverse water quality impact during operation phase would therefore be anticipated.

### **3.4 Waste Management Implications**

3.4.1 The waste impact assessment was conducted in accordance with the criteria and guidelines as stated in the requirements given in Section 3.4.7 and Appendix E of the EIA Study Brief, as well as Annexes 7 and 15 of the EIAO-TM.

3.4.2 Construction and Demolition (C&D) materials will be generated from channel bed modification, improvement of existing walkways, landscaping and miscellaneous works, construction of DWFI system and underground water storage tank construction. Based on the latest layout, it is estimated that approximately 41,400 m<sup>3</sup> of inert C&D material and 3,000 m<sup>3</sup> of non-inert C&D materials would be generated.

3.4.3 Inert C&D materials from the above construction works will be sorted and reused as filling material as much as possible. It is estimated that that approximately 36,600 m<sup>3</sup> of inert C&D materials (mainly soil) could be reused on-site as backfill materials whilst approximately 4,800 m<sup>3</sup> of surplus inert C&D materials would be delivered to public fill reception facility (PFRF) for beneficial reuse in other project. Non-inert waste will be recycled as far as possible before disposed to landfill. Opportunities in minimisation of

generation and maximisation of reuse of C&D waste would be continually investigated during the detailed design and construction phases. With the implementation of the recommended good site practices and mitigation measures for the handling, transportation and disposal of the identified waste arising, no adverse environmental impacts would be anticipated.

3.4.4 Small quantities of other waste materials, including desilted materials from desilting works at the downstream tidal zone (approximately 2,000 m<sup>3</sup> from each desilting works), general refuse (approximately 19.5 kg per day), chemical waste from maintenance and servicing of construction plants and vehicles (highly dependent on the contractor's on-site maintenance activities and the quantity of plant and equipment utilised but in the order of a few cubic meters per month) and potentially asbestos (from an asbestos cement pipe along FTN which extent and location are still under investigation) will also be generated throughout construction. Provided that these identified wastes will be handled, transported and disposed of using the recommended methods and that good site practices would be strictly followed, adverse environmental impacts are not expected.

3.4.5 The main waste types generated from the operation of the Project would be silt, debris, screening and limit amount of chemical waste from the routine maintenance of the DWFI system and underground water storage tank, as well as desilted materials from maintenance desilting works. With implementation of the relevant legislative requirements and the recommended best waste management practices, adverse environmental impacts (including potential hazard, air and odour emissions, noise and wastewater discharges) and public transport impact would not be anticipated during operational phase. Provided that sufficient number of trash bins and recycling bins would be provided / retained for the collection of general refuse generated by pedestrians / users along the revitalized FTN, no unacceptable environmental impact and public transport impact would be anticipated.

### **3.5 Land Contamination**

3.5.1 The land contamination assessment is conducted in accordance with the criteria and guidelines as stated in the requirements given in Section 3.4.8 and Appendix F of the EIA Study Brief, as well as Sections 3.1 and 3.2 of Annex 19 of the EIAO-TM.

3.5.2 Based on the site appraisal, the Project area has been occupied by non-contaminating land uses and no potentially contaminating activities were observed. No adverse land contamination impact arising from the Project is therefore anticipated and mitigation measures are considered not necessary. No further site investigation works at the Project area is required.

### **3.6 Sewerage and Sewage Treatment Implications**

3.6.1 The assessment on potential sewerage and sewage treatment impacts on the downstream public sewerage, sewage treatment and disposal facilities arising from the Project has been conducted in accordance with the criteria and guidelines as stated in the requirements given in Section 3.4.9 and Appendix G of the EIA Study Brief, as well as Section 6.5 of Annex 14 of the EIAO-TM.

3.6.2 A DWFI system is proposed to improve the water quality in the Fo Tan Nullah with intercepted dry weather flow estimated to be at 2,700 m<sup>3</sup>/day. The sewerage impact assessment indicated that existing sewerage system has sufficient capacity to take up the additional dry weather flow intercepted by the DWFI system. Thus, no mitigation measures are required.

### **3.7 Ecological Impact (Terrestrial and Marine)**

3.7.1 The ecological impact assessment is conducted in accordance with the relevant requirements as specified in Section 3.4.10 and Appendix H of the EIA Study Brief, as well as Annexes 8 and 16 of the EIAO-TM.

3.7.2 A literature review and ecological field surveys covering both dry and wet seasons between May 2020 and November 2020 have been conducted. A total of seven habitat types were recorded within the 500m assessment area from recent surveys, including developed area / wasteland, village / orchard, plantation, shrubland, woodland, natural watercourse and modified watercourse. Dominant habitat types recorded within the Project area were

developed area / wasteland and modified watercourse, which are of low ecological value. Short section of natural watercourse directly upstream of the concrete nullah of FTN, which is of low to moderate ecological value, was also located within the Project area and has been avoided under the revitalisation design that no works would be conducted within the natural watercourse.

- 3.7.3 For habitats outside the Project area, woodland is considered of moderate to high ecological value, shrubland and natural watercourse of low to moderate ecological value, while remaining habitats (developed area / wasteland, village / orchard, plantation and modified watercourse) are of low and very low ecological value. Species of conservation importance recorded within the assessment area included 11 flora, 16 avifauna, one odonate, five herpetofauna, 14 mammal and three freshwater species. Among these species, only four avifauna, one mammal and two freshwater species of conservation importance were recorded within the Project area.
- 3.7.4 Marine habitats within the assessment area included subtidal hard substrata, soft bottom, and intertidal habitats, which are all of low ecological value. As the Project area is located far from marine habitats (>2.6 km), no direct impacts to marine habitats are anticipated, and indirect impacts are considered negligible.
- 3.7.5 No direct impacts to natural habitats within the assessment area are anticipated for the Project. Although natural watercourse was identified within the Project area, direct impact on the natural habitat has been avoided through confinement of construction works within boundary of the highly disturbed habitats of developed area and modified watercourse only. Direct impacts arising from the proposed works would be limited to the temporary loss (about 7.17 ha) of some modified watercourse and developed area. Given the relatively low to moderate ecological values of affected habitats, the small area affected, and the temporary nature of the impact, direct impacts are expected to be *Minor*. All affected areas will be reinstated and enhanced in terms of ecological value as part of the project. Avoidance measures (e.g. protection of mature trees along the nullah and avoidance of encroachment onto natural watercourse) would be implemented to preserve the day roosting habitats for bats and ardeids.
- 3.7.6 Indirect impacts during the construction phase would comprise of human disturbance, construction noise, dust, lighting/glare and site run-off. With proper implementation of the recommended mitigation measures and good site practices, no significant adverse ecological impact is anticipated. With ecological enhancement measures incorporated into revitalisation design of FTN, nature of disturbance during operation phase would be minimal compared to existing baseline condition. Net positive ecological outcome would be resulted from the created and enhanced wetland habitats. No unacceptable adverse residual impacts would therefore be expected during both construction and operation phase.
- 3.7.7 Monthly site audit should be carried out throughout the construction phase to ensure recommended measures are properly implemented. No EM&A programme is required during operational phase.
- 3.7.8 Ecological enhancement designs have been incorporated into the revitalisation plan to promote ecological value of the Project, as well as enhancement measures and good site practices to further minimise any potential environmental impacts. The proposed revitalisation plan for FTN should seek to find a balance between design for local communities' requirements (e.g. aesthetics, recreation/leisure and access) and ecological enhancement. Ecological enhancement could be achieved by incorporating habitat creation within and along the FTN to improve the overall ecological value of the Project area. The design should not result in disturbance impacts to surrounding habitats and fauna utilising the nullah. Upon completion of revitalisation for FTN, ecological value of the Project area should be improved by ecological enhancement measures incorporated into the design. A post-enhancement ecological monitoring programme will be developed and implemented by the DSD to review effectiveness of these enhancement measures (e.g. creation of wetland habitats, vegetation planting and specific enhancement measures for identified species). The programme should aim to record the overall ecological condition of the Project area, including but not limited to the followings: quality of the created habitats and enhancement elements, usage by targeted fauna species and vegetation conditions.

Maintenance and management requirements for FTN should be adjusted accordingly based on the monitoring results.

### **3.8 Fisheries Impact**

3.8.1 Potential impacts on fisheries have been assessed in accordance with Section 3.4.11 and Appendix I of the EIA Study Brief as well as Annexes 9 and 17 of the EIAO-TM.

3.8.2 The Project would only involve construction works within the Project area (existing FTN and developed area alongside). No loss of fishing grounds and mariculture areas are anticipated within the assessment area. With the implementation of the recommended water pollution control measures, the Project would not cause any unacceptable indirect impacts to fishing grounds and mariculture areas within the assessment area during both construction and operational phases. Thus, no further mitigation measures and environmental monitoring and audit programme specific to fisheries impact are required.

### **3.9 Cultural Heritage Impact**

3.9.1 Cultural heritage impact assessment (CHIA) has been conducted in accordance with the relevant requirements as specified in Section 3.4.13 and Appendix K of the EIA Study Brief, as well as Annexes 10 and 19 of the EIAO-TM.

3.9.2 A Declared Monument, Old House, Wong Uk Village, is located within 300m of the discharge area from the revitalised FTN, and located at about 900m from the nearest site boundary. As the proposed works are mostly situated within the FTN and there is substantial separation distance between the Old House and the proposed works, no direct and indirect impacts on the Old House would be anticipated during the construction and operation phases of the Project.

3.9.3 No built heritage resource or Site of Archaeological Interest (SAI) were identified within 300 m from the Project area and no archaeological potential was identified within the Project area, no impact to built heritage or archaeology would be anticipated.

### **3.10 Landscape and Visual Impacts**

3.10.1 A landscape and visual impacts assessment has been carried out in accordance with Section 3.4.12 and Appendix J of the EIA Study Brief, Annexes 10 and 18 of the EIAO-TM, and EIAO Guidance Note No.8/2010.

3.10.2 During construction phase, the proposed channel modification and construction of DWFI system and mid-stream water pumps for ecological enhancement associated water supplement will be constructed inside the existing Fo Tan Nullah, while certain proposed architectural structures will be constructed at the roadside which may impose visual impact to adjacent VSRs. Amongst the 173 nos. of surveyed trees, 133 nos. are proposed to be retained, including all existing mature trees growing along the nullah banks. A total of 25 nos. of trees are proposed to be removed, all of which are common species including *Acacia confusa*, *Bauhinia variegata*, *Bischofia javanica*, *Ficus virens*, *Melia azedarach* and *Morus alba*, and including 15 nos. of undesirable species, *Leucaena leucocephala*; and a total of 15 nos. of *Magnolia grandiflora* are proposed to be transplanted. As stipulated in DEVB TC(W) No. 4/2020, "...the number of compensatory trees onsite and offsite shall not be lower than that of number of trees removed including dead trees, but excluding trees of undesirable species...", therefore, To compensate the loss of existing trees, approximately 10 nos. of heavy standard compensatory trees are proposed in available planting area to enhance the amenity value to vicinity of site. With the implementation of mitigation measures including preservation of trees, compensatory tree planting, tree transplantation, control of night-time lighting glare, erection of decorative screening hoarding, careful management of construction activities and facilities, as well as reinstatement of temporarily disturbed landscape areas and watercourses, no unacceptable residual landscape and visual impacts from the construction of the Project would be anticipated.

3.10.3 Fo Tan Nullah will be revitalised with architectural and landscape features aimed at promoting water friendliness and providing an enhanced green and ecological environment. The proposed architectural and landscape features, and modified channel bed would be the key sources of visual / landscape changes during operation. With the proposed greening enhancement along channel bed and embankment, provision of recreational

opportunity along nullah, sensitive and aesthetically pleasing design, re-provision of affected open space, the overall impacts are considered as acceptable in accordance to Annexes 10 and 18 of the EIAO-TM and the Project would be beneficial to the landscape and visual aspects.

## **4 ENVIRONMENTAL MONITORING AND AUDIT**

4.1.1 Environmental Monitoring and Audit (EM&A) requirements and regular site inspection and audits for air quality, noise, water quality, waste management implication, ecological (terrestrial and marine), and landscape and visual impacts have been recommended during the construction phase to ensure that the recommended mitigation measures are properly implemented. Commissioning tests for fixed noise sources, i.e. the proposed water pumps, have been recommended prior to operation of the Project to ensure the fixed plant noise impact would comply with the relevant noise standards. The EM&A requirements are specified and detailed in the EM&A Manual.

## **5 CONCLUSION**

5.1.1 With the implementation of the Project, over 20,000 m<sup>2</sup> of concrete-lined channel space of FTN would be transformed into green spaces to promote greening of the local environment and the ecological value of existing FTN would be enhanced with the incorporation of the proposed ecological features. Furthermore, the introduction of the DWFI system under the Project would eliminate the water quality and odour issues associated with the current polluted discharges to the nullah. While the revitalised FTN will not be opened up for public access due to safety reasons, the proposed revamp/provision of pavilion, viewing decks and amenity areas, and beautification of existing walkway and public open space along the nullah would improve the riverside environment for public enjoyment of the enhanced waterscape. No environmental disbenefits would be envisaged from the proposed revitalisation of FTN.

5.1.2 The findings of the EIA provided information on the nature and extent of the environmental impacts likely to arise from the construction and operation of revitalised Fo Tan Nullah. The EIA has, where appropriate, identified mitigation measures to ensure compliance with the relevant environmental legislation and standards.

5.1.3 Overall, the EIA concluded that the Project would comply with the requirements of the EIA Study Brief and EIAO-TM with the implementation of the proposed measures during the construction and operational phases of revitalisation of Fo Tan Nullah. The schedule of implementation of the proposed measures has been provided in the EIA Report. An EM&A programme has also been recommended to ensure the effectiveness of the proposed measures.