

Proposed Comprehensive Development with Wetland Enhancement (CDWE) at Nam Sang Wai and Lut Chau

Project Profile

Nam Sang Wai Development Co. Limited;
Kleener Investment Limited;
Community Wetland Park Foundation Limited; and
Lut Chau Nature Reserve Foundation Limited

March 2012

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1 BASIC INFORMATION

1.1 Project Title

- 1.1.1 Proposed Comprehensive Development with Wetland Enhancement (CDWE) at Nam Sang Wai and Lut Chau (hereinafter referred to as the “Project”).

1.2 Purpose and Nature of the Project

- 1.2.1 The Project Site partly falls within the Nam Sang Wai Outline Zoning Plan (OZP) No. S/YL-NSW/8 which is zoned “Other Specified Uses (Comprehensive Development and Wetland Enhancement Area 1)” and “Conservation Area (CA)”, partly within the Mai Po and Fairview Park OZP No. S/YL-MP/6 which is zoned as “Site of Special Scientific Interest (SSSI) (1)”, and partly within Yuen Long OZP No. S/YL/21 which is zoned as “Other Specified Uses (Industrial Estate)”. The proposed development, a Comprehensive Development with Wetland Enhancement (CDWE), will comprise two major components: residential development and wetland enhancement, as well as a proposed connecting road bridge from the CDWE to Wang Lok Street in Yuen Long. The proposed CDWE will embrace private land at Nam Sang Wai and Lut Chau at various Lots in DD 123 and the adjacent Government Land. Lut Chau will primarily be used for the establishment of a nature reserve.
- 1.2.2 The Project Site includes a small part of the “CA” contiguous with the aforesaid “SSSI (1)”, with an intention of promoting further ecological benefits and enhancing storm water drainage for Yuen Long Town and Kam Tin.
- 1.2.3 The measures proposed under the *New Nature Conservation Policy* will be the Public-Private Partnership (PPP) approach, under which development to an agreed extent may be permitted, provided this is on the portion of land with lower ecological value and the project proponent undertakes to enhance the ecological value of the remainder of the land.

1.3 Name of Project Proponents

- 1.3.1 The Project Proponents are (1) Nam Sang Wai Development Co. Limited; (2) Kleener Investment Limited; (3) Community Wetland Park Foundation Limited; and (4) Lut Chau Nature Reserve Foundation Limited.

1.4 Location of the Project

- 1.4.1 The Project Site, comprising the Nam Sang Wai Site (NSW Site), the Lut Chau Site (LC Site) and the connecting road bridge, is located at various lots in DD123 and the adjacent Government Land as shown in **Figure 1.1**.

Nam Sang Wai Site (NSW Site)

- 1.4.2 The NSW Site is currently zoned as “Other Specified Uses (Comprehensive Development and Wetland Enhancement Area 1)” under Nam Sang Wai OZP No. S/YL-NSW/8. It is bounded by the Kam Tin Main Drainage Channel (Kam Tin MDC) and Shan Pui River (widened section) to the east and west, respectively. Lying along the southern boundary of the site is the Kam Tin River.
- 1.4.3 The adjoining Tin Fook Wai (currently undeveloped) is located at the immediate south-east of the NSW Site, Yuen Long Sewage Treatment Works and the Yuen Long Industrial Estate (YLIE) is located at about 120m to the west of the NSW Site across Shan Pui River. Chung Hau Yu Man San Tsuen is the nearest residential development located at about 50m from the southern NSW Site boundary. To the north of the NSW Site across the Kam Tin MDC are fish ponds at Tai Sang Wai and Lut Chau.
- 1.4.4 The NSW Site has an “island-like” physical environment and is topographically flat. It currently comprises an area of fish ponds, including ponds which are managed for commercial fish farming activities as well as ponds which were inactive for a number of years and have

become overgrown with vegetation. The area surrounding the NSW Site is currently subject to uncoordinated recreational activities, including photography, cycling and model aircraft. These activities would be expected to increase after completion of the proposed cycle track along Nam Sang Wai Road.

Lut Chau Site (LC Site)

- 1.4.5 The LC Site, located within the Mai Po Inner Deep Bay Ramsar Site, is zoned as “SSSI (1)” and “CA” under Mai Po and Fairview Park OZP No. S/YL-MP/6 and Nam Sang Wai OZP No. S/YL-NSW/8 respectively. The CA zone aims to protect the ecological integrity of the Ramsar Site and is also partly grouped as Wise Use Zones (WUZs) 6 and 7 in the Second Stage of Ramsar Site Strategy and Management Plan (RSMPII). Some of these fish ponds in WUZs 6 and 7 are managed under the Accredited Fish Farm Scheme while some are under license for fish pond operations.
- 1.4.6 The LC Site is bounded by Kam Tin and Yuen Long Drainage Channel to the west and Mai Po Nature Reserve (MPNR) to the north. It currently comprises ponds which are actively managed for fish production. Fairview Park is located at about 300m to the east of the LC Site.
- 1.4.7 The LC Site forms an island surrounded by intertidal habitats. To the west is the intertidal estuary of Kam Tin/Shan Pui Rivers, while the rest of it is surrounded by intertidal and mangrove-lined creeks. An area of intertidal mangroves at the northwest of the LC Site is continuous with the extensive mangrove areas of Deep Bay.

Connecting Road Bridge (CRB)

- 1.4.8 The proposed CRB would span Shan Pui River and link the NSW Site to Wang Lok Street. The proposed CRB is located within the zones “Other Specified Uses (Comprehensive Development and Wetland Enhancement Area 1)” under Nam Sang Wai OZP No. S/YL-NSW/8 and “Other Specified Uses (Industrial Estate)” under Yuen Long OZP No. S/YL/21.

1.5 Scale of the Project

- 1.5.1 The Project comprises the NSW Site of about 121 ha in the “Other Specified Uses (Comprehensive Development and Wetland Enhancement Area 1)” zone, and the LC Site of about 56 ha in the “SSSI (1)” and “CA” zones, as well as a connecting road bridge between the NSW Site and Wang Lok Street in the “Other Specified Uses (Industrial Estate)” zone. Components of the Project are shown in **Table 1.1**.

Table 1.1 Components of the Project

Components of the Project	Approx. Area
Lut Chau Nature Reserve (land at “SSSI(1)” and “CA”)	56 ha
Nam Sang Wai Wetland Enhancement Area (NSW WEA) (including a visitor centre)	121 ha
Low Density Development at Nam Sang Wai (including residential development with maximum domestic and non-domestic GFA not exceeding 306,851m ² and 13,000m ² respectively, gardens, parks, recreation and leisure space)	
Connecting road bridge linking NSW Site to Wang Lok Street in Yuen Long	Not Applicable

1.6 Site History

- 1.6.1 The land use and landscape at Nam Sang Wai have undergone changes at various stages of economic growth in Hong Kong. Reclamation through the building of bunds and burning of mangroves took place in the earlier part of the twentieth century. The NSW Site was reclaimed from the 1930s and during post Second World War period for agricultural uses, including brackish water paddy, gei wai (intertidal shrimp ponds) and fish ponds. Mangrove and intertidal habitats were destroyed. During the 1960's, deep water fish ponds with higher

bunds and minimal vegetation became the predominant land use in the reclaimed areas. By the 1980s, all the gei wai had been converted to deep freshwater fishponds. Many of the fish ponds at Nam Sang Wai have been inactive since the mid-1990s, although some are still actively used for fish farming. All ponds at Lut Chau are active.

- 1.6.2 Drainage works in this area were commenced in 1993 and completed in 1999. The Kam Tin MDC was constructed from fish ponds and a section of the Kam Tin River section. Shan Pui River (widened section) was formed by the widening and channelisation of Shan Pui River lying to the west of the NSW Site. Water flows further northward through Shan Pui River for about 1 km before entering Deep Bay. As a result of the drainage works, the Kam Tin River section bounding the southern side of the site is cut-off at its eastern end by the embankment and service road of the Kam Tin MDC.

1.7 Number and Type of Designated Project

- 1.7.1 The Project covers designated project (DP) elements as specified under Schedule 2 Part 1 and Schedule 3 of the *Environmental Impact Assessment Ordinance* (EIAO) (Cap. 499). The DP or potential DP elements identified as being possible for this Project are tabulated in **Tables 1.2 and 1.3** below.

Table 1.2 List of Designated Project Elements Identified

Work Item	EIAO Identified	Reason for DP Designation
Proposed Comprehensive Development within Deep Bay Buffer Zone	EIAO Schedule 2 Part 1 Category P.1	A residential or recreational development, other than New Territories exempted houses, within Deep Bay Buffer Zone 1 or 2
Proposed enhancement works at the LC Site	EIAO Schedule 2 Part 1 Category Q.1	All projects including new access roads, railways, sewers, sewage treatment facilities, earthworks, dredging works and other building works partly or wholly in an existing or gazetted proposed country park or special area, a conservation area, an existing or gazetted proposed marine park or marine reserve, a site of cultural heritage, and a site of special scientific interest.
Proposed Comprehensive Development with a study area covering more than 20 ha	EIAO Schedule 3 Item 1	Engineering feasibility study of urban development projects with a study area covering more than 20 ha or involving a total population of more than 100,000.

Table 1.3 List of Potential Designated Project Elements under Review

Work Item	EIAO Identified	Reason for DP Designation
The reuse of treated sewage effluent	EIAO Schedule 2 Part 1 Category F.4	Subject to the engineering design, reuse of treated sewage effluent from an internal treatment plant may be considered for irrigation.
Proposed Connecting Road Bridge between south-western part of NSW Site and Wang Lok Street	EIAO Schedule 2 Part 1 Category A.1 EIAO Schedule 2 Part 1 Category A.8	Subject to the road type of the proposed connecting road bridge and its engineering design.
A sewage pumping station with an installed capacity of more than 2,000 m ³ per day and a boundary of which is less than	EIAO Schedule 2 Part 1 Category F.3(b)(i)&(v)	Subject to the engineering design, a new sewerage network might be considered across Shan Pui River to the YLIE and then to Yuen Long

150 m from an existing or planned residential area/site of special scientific interest		<p>Sewage Treatment Work for ultimate treatment.</p> <p>Similarly, off-site treatment facilities, in the form of screening and pumping during Dry Weather Flow condition is being reviewed as an additional Environmental Benefit Initiative.</p>
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1.8 Alternatives

- 1.8.1 Alternatives to be considered during the EIA will include layouts of the development, vehicular access arrangements, development options and construction methodologies. Any alternatives for long term operational issues will also be considered. Alternatives for the design, implementation and management of the wetland areas will also be considered.

1.9 Name and Telephone Number of Contact Person(s)

- 1.9.1 The following person may be contacted for enquiries concerning this Project:
- Miss K. L. Tong , Tel: 3922 9000

2 OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

2.1 Planning

- 2.1.1 A feasibility study and the development of the design for residential development with wetland enhancement are currently underway. Design parameters for the development have been reviewed and have been used as a broad basis for the preliminary information contained within the project profile. The proposed comprehensive development with wetland enhancement at Nam Sang Wai in Yuen Long is being planned and designed by Consultants appointed by the Project Proponents. The construction works are anticipated to commence in 2013 and to be completed in 2018/2019.

2.2 Site Selection

- 2.2.1 Although the site is located in proximity to the Mai Po Marshes and Inner Deep Bay Ramsar Site, the Project offers an opportunity for a holistic design to be developed to allow wetland enhancement to be realized as a “gain” in ecological value with the limited scale of residential development stipulated in the Statutory Outline Zoning Plan. Such an approach would reverse the progressive deterioration of the wetland value of the site which is occurring through vegetation succession to non-wetland habitats and provide an overall benefit given the context of the Project Site.

2.3 Rationale for Formulating a Development Plan

- 2.3.1 Relevant statutory and non-statutory planning policies provide appropriate planning guidance in terms of the development context for the Project Site. Such policies also form part of the fundamental factors in designing a development plan for the Project Site.

Statutory Planning Policies

- 2.3.2 The Zoning of the NSW Site of the Project Site is “Other Specified Uses (Comprehensive Development and Wetland Enhancement Area 1)” under the Approved Nam Sang Wai OZP No. S/YL-NSW/8. Under Remark (d) of the zone it specifies that:

“Any development or redevelopment within the “OU(CDWEA1)” zone is required to be developed together with the “Site of Special Scientific Interest (1)” zone on the Mai Po and Fairview Park Outline Zoning Plan in a comprehensive and integrated manner”.

The Project includes the LC Site which is part of “SSSI(1)” and “CA” zones in the Approved Mai Po and Fairview Park OZP No. S/YL-MP/6 and the Nam Sang Wai OZP No. S/YL-NSW/8 respectively.

- 2.3.3 The Planning Intention of the “OU(CDWEA1)” zone on the Nam Sang Wai OZP is to allow the consideration of comprehensive low-density residential or passive recreational development in exchange for long-term conservation, enhancement and management of the ecological value and functions of the existing fish ponds or wetland under the ‘private-public partnership approach’. It also specifies that any new development should be located as far away from Deep Bay as possible.
- 2.3.4 The Planning Intention of the “SSSI(1)” zone on the Mai Po and Fairview Park OZP *“is to conserve the ecological value and function of the existing fish ponds within this zone and to deter development”* except development which is beneficial to the ecology or for educational or research purposes.
- 2.3.5 The Planning Intention of the “CA” zone on the Nam Sang Wai OZP *“is to conserve the ecological value of the wetland and fish ponds which form an integral part of the wetland ecosystem in the Deep Bay Area and function as a substantial source of food supply for birds and as an important habitat for roosting and foraging waterbirds”*. The “no-net-loss in wetland” principle is adopted for any change in use within this zone.

Non-Statutory Planning Policies

2.3.6 The Town Planning Board (TPB) Guidelines for Application for Developments within Deep Bay Area under Section 16 of the Town Planning Ordinance TPB PG-No. 12B set out the land use guidelines for the Deep Bay Area where the Project Site is situated. The relevant sections applicable to the Project Site are described below.

- The “precautionary approach” to environmental impact principle is to be applied in formulation the development proposal.
- The “no-net-loss in wetland” principle provides for the conservation of continuous and adjoining fish ponds. This can refer to both loss in “area” and “function”.
- Wetland Conservation Area (WCA): *“New development within the WCA would not be allowed unless it is required to support the conservation of the ecological value of the area or the development is an essential infrastructure project with overriding public interest.”* Wetland compensation is required for any redevelopment which requires pond filling. The ‘Private-Public Partnership Approach’ enables there to be low density residential development at the landward fringe of the WCA under certain conditions.

2.3.7 Apart from the aforementioned TPB Guidelines, some relevant planning and management strategies as discussed below will also be considered in the Project.

- Mai Po Inner Deep Bay Ramsar Site Management Plan (AFCD, 2011): The updated definition of ‘Wise Use’ as defined in the Ramsar Handbook 1 – Wise Use of Wetlands is: *“Wise Use of wetlands is the maintenance of their ecological character, achieved through the implementation of ecosystem approaches, within the context of sustainable development.”* An elaboration of the Wise Use concept is also provided in the Handbook which stated that *“Within the context of ecosystem approaches, planning processes for promoting the delivery of wetland ecosystem benefits/services should be formulated and implemented in the context of the maintenance or enhancement, as appropriate, of wetland ecological character at appropriate spatial and temporal scales.”* Fish pond operation and water channels are regarded as wise use of wetland. It is therefore important that in consideration of the change of land use within the Wise Use Zones, the ecological functions of these fish ponds and water channels should be maintained so that they will continue to provide feeding and roosting sites for wintering waterbirds in the Ramsar Site.
- First Sustainable Development Strategy: *“Sustainable Development in Hong Kong balances social, economic, environmental and resource needs, both for present and future generations, simultaneously achieving a vibrant economy, social progress and a high quality environment, locally, nationally and internationally, through the efforts of the community and the Government.”* Therefore, for it to be successful, sustainable development should strike a balance among social, economic, environmental and resource needs. And it should at the same time achieve a vibrant economy, social progress and a high quality environment.

2.4 Project Implementation Programme

2.4.1 Construction of the Project is expected to commence in 2013 for occupation in around 2018/2019.

2.5 Potential Interfacing Projects Identified

2.5.1 Based on the best available information, there would be provision of sewerage system (Package 2A-1T Yuen Long Sewage Treatment Works Effluent Pipeline and its alternative scheme) within 300m from Project boundary, according to the approved EIA study of “Yuen Long and Kam Tin Sewerage and Sewage Disposal Stage 2” (Register No.: AEIAR-078/2004). The final alignment and implementation programme of such sewerage works is however yet to be confirmed during the preparation of this Project Profile. Given that the proposed sewer would be constructed in small segments for minimising the impact, the potential cumulative impact from this planned project is not anticipated.

2.6 Construction Methodology

- 2.6.1 The construction works to be involved in the Project would be site formation, building construction, wetland enhancement works and construction of connecting road bridge. The construction programme and sequences of each project component would be carefully considered according to site and ecological conditions to minimise the environmental impacts. It is anticipated that the wetland enhancement works would be conducted prior to the commencement of civil construction works wherever possible.
- 2.6.2 The extent of the excavation for the Project to be selected for residential developments will be subject to further engineering appraisals. Pre-cast structures would be preferably employed for the construction of the Project to minimise the on-site construction activities and thus the potential impacts from the construction activities could be reduced. Practical mitigation measures including but not limited to minimisation of on-site construction plants, erection of site hoardings, use of quiet plant and scheduling of works would be adopted as appropriate.

3 MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

3.1 Air

Existing Environment

- 3.1.1 The traffic emissions from Castle Peak Road, San Tin Highway, Tsing Long Highway and other local roads, as well as the chimney emissions from the YLIE are considered to be the dominant sources affecting the ambient air quality within the study area.

Sensitive Receivers

- 3.1.2 Representative Air Sensitive Receivers (ASRs) within 500m of the Project Site have been identified according to the criteria set out in the *Technical Memorandum on Environmental Impact Assessment Process* (EIAO-TM) through site inspections and a review of land use plans. The existing and planned air sensitive receivers are summarised in **Table 3.1** below and shown in **Figure 3.1**.

Table 3.1 Representative Environmental Sensitive Receivers in the Vicinity of the Project

ID	Description	Nature	Type*
SR1	Wing Kei Tsuen	Residential	ASR
SR2	Sha Po Tseun	Residential	ASR
SR3	Cheung Chun San Tsuen	Residential	ASR
SR4	Yeun Long Industrial Estate	Industrial	ASR
SR5	Nam Sang Wai (TS1)	Residential	NSR and ASR
SR6	Nam Sang Wai (TS2)	Residential	NSR and ASR
SR7	Nam Sang Wai (TS3)	Residential	NSR and ASR
SR8	Chung Hau Yu Man San Tsuen	Residential	NSR and ASR
SR9	Shan Pui Tsuen	Residential	NSR and ASR
SR10	Fairview Park	Residential	ASR
SR11	Lut Chau (TS1)	Residential	NSR and ASR

Note:

* ASR - Air Sensitive Receiver, NSR- Noise Sensitive Receiver.

3.2 Noise

Existing Environment

- 3.2.1 The traffic noise from Castle Peak Road, San Tin Highway, Tsing Long Highway and other local roads are considered to be the major noise sources within the study area.

Sensitive Receivers

- 3.2.2 Representative Noise Sensitive Receivers (NSRs) within 300m of the Project Site have been identified according to the criteria set out in the TM-EIA through site inspections and a review of land use plans. The existing and planned noise sensitive receivers are summarised in **Table 3.1** and shown in **Figure 3.1**.

3.3 Water

Existing Environment and Sensitive Receivers

- 3.3.1 There are various types of inland water system in the Deep Bay including rivers and fish ponds. The baseline conditions for water bodies that would be potentially affected by the Project, including Shan Pui River, Kam Tin River, fish ponds as well as the planned water bodies are discussed below.

Shan Pui River

- 3.3.2 Shan Pui River is located to the west of the NSW Site. It is the downstream section of Yuen Long Creek which runs into Inner Deep Bay.

- 3.3.3 Yuen Long Creek has a length of 60 km and a catchment area of about 26.7 km². The limited water circulation in Inner Deep Bay has enhanced sedimentation and retention of pollutants in the creek (EPD, 1999). To reduce the tidal effects and odour problems in the lower creek, an inflatable fabric dam and a dry weather flow channel were installed at Yuen Long Nullah to prevent back flushing from Deep Bay.
- 3.3.4 Flooding has been a major problem in the North West New Territories. As part of the Main Drainage Channel project for Ngau Tam Mei, Yuen Long and Kam Tin, Shan Pui River was widened and channelized to form a 3.3km long trapezoidal-shaped drainage channel. The new channel is mainly unlined except for an upstream section of 0.46km in length at the confluence with the existing Kam Tin River. The confluence of Shan Pui River and Kam Tin River is approximately 290m in width. The drainage works at Shan Pui River commenced in October 1993 and were completed in mid 1999.

Kam Tin Main Drainage Channel (Kam Tin MDC), Kam Tin River and Kam Tin Meander

- 3.3.5 Along the eastern boundary of the NSW Site is the new Kam Tin MDC. The new channel was formed by straightening a section of Kam Tin River lying to the north of Castle Peak Road and by removing existing fish ponds located further downstream. The Kam Tin MDC merges with the widened Shan Pui River near the northern tip of the NSW Site. The Kam Tin MDC is mainly unlined except for a 150m section located to the immediate north of Castle Peak Road. The channel has a general trapezoidal section. The downstream section has a rubble protected embankment. Mangroves are planted along the margin of the channel at the downstream section. The Kam Tin MDC and the widened Shan Pui River merge at the northern tip of the NSW site. The combined water flow runs through an additional length of about 1km at Shan Pui River before entering the estuary draining into Inner Deep Bay.
- 3.3.6 Kam Tin River has a total length of 50km and a catchment area of about 44.3 km². It runs through Kam Tin and Yuen Long before discharging into Inner Deep Bay via the Shan Pui River. As a result of the implementation of the Kam Tin MDC, the “old” Kam Tin River section bounding the southern boundary of the NSW Site is bypassed at its eastern end by the new Kam Tin MDC. The “cut-off” section of Kam Tin River as a result only receives local runoff and is affected by water inflows from Shan Pui River.
- 3.3.7 The Kam Tin Meander refers to the remnant of the original Kam Tin River left on the eastern side of the Kam Tin MDC. The river section is now bounded by the Kam Tin MDC at both ends. Water diverted into the Kam Tin Meander from the Kam Tin MDC would return to the MDC with local runoff at the lower end.

Fish Ponds

- 3.3.8 The existing ponds at the NSW Site were formed by destruction of mangrove and intertidal habitats and reclamation works in around 1960s – 70s. The ponds are surrounded by the Shan Pui River, Kam Tin River, and Kam Tin MDC to the west, south and east, respectively. Flooding has been a significant problem in this area and overflows from the nearby rivers and surface runoff occur during heavy storm events. Some ponds are also directly connected to the river system and hence have become tidal ponds.
- 3.3.9 The ponds at the NSW Site are either privately owned or government-owned. The privately owned ponds have been inactive following former active use in fish farming. Due to the lack of active management of these ponds, some of the ponds dry out completely during winter when precipitation is rare.

Deep Bay

- 3.3.10 Deep Bay is located on the east bank of the Pearl Estuary. It is a shallow bay and has a surface area of about 112 km². During mean sea level, it contains approximately 330 Mm³ of water. The rivers of interest that drain into Deep Bay include Shenzhen River on the PRC side (Guangdong – Shenzhen side) and River Indus, River Beas, River Ganges, Yuen Long Creek, and Kam Tam River on the Hong Kong side. Shenzhen River provides a significant contribution runoff and loading into Deep Bay.

- 3.3.11 The Deep Bay WCZ was gazetted on 1 December 1990. The WCZ covers the Mai Po Marshes which, together with the Inner Deep Bay area, were declared as a Ramsar Site for wetland protection in 1995. It contains 4 Sites of Special Scientific Interest (SSSIs), including Mai Po Marshes, Mai Po Egret, Tsim Bei Tsui and Tsim Bei Tsui Egret. Oyster beds were found near Lau Fau Shan, Sheung Pak Nai and Ha Pak Nai. The estuarine mud flats of Inner Deep Bay are of international importance for migrating and wintering birds.

3.4 Ecology

Mai Po Marshes and Inner Deep Bay Ramsar Site

- 3.4.1 In 1995, Mai Po and Inner Deep Bay area was designated as an area of "Wetland of International Importance" under the Ramsar Convention. This Ramsar Site includes extensive natural inter-tidal mudflats, *gei wai*, mangroves and fishponds, covering an area of about 1,500 ha in the northwest New Territories.
- 3.4.2 The Ramsar Site is located at the mid-point of the East Asian-Australasian Flyway and serves as an important staging site for migratory birds as well as supporting approximately 90,000 waterbirds in recent winters. The NSW Site of the Project is approximately 200 m from the closest part of the Ramsar Site, while the LC Site of the Project is included within the Ramsar Site.
- 3.4.3 Management of the Mai Po Inner Deep Bay Ramsar site is determined by a management plan maintained by AFCD (details are provided at http://www.afcd.gov.hk/english/conservation/con_wet/con_wet_look/con_wet_look_man/files/RSMPII.pdf). Under the management plan, the Ramsar Site is divided into a number of zones, determining the management actions for the area. Most fish ponds at Lut Chau are located within the "Wise Use Zone", where the intention is "To allow ecologically sustainable use of wetland and other natural resources to be carried out in a way compatible with the Ramsar Site's management goals". Part of Lut Chau is included in the "Private Land Zone", where the intention is to conduct "management in an ecologically sustainable manner consistent with the surrounding or adjacent management zones" (in this case the "Wise Use Zone" described above). Mangroves at the north of Lut Chau are included in the "Core Zone" where the intention is "to provide an undisturbed reference area where the biological interest of the Ramsar Site is concentrated".
- 3.4.4 The Town Planning Board Guideline 12B was published to guide the application for developments within the Deep Bay Area for protection of the ecological integrity of wetlands within the Ramsar Site. This includes the designation of Wetland Conservation Area (WCA) surrounding the Ramsar Site, further surrounded by Wetland Buffer Area (WBA). The NSW Site of the Project falls within the WCA. Under the Guideline 12B, any development within the WCA would be expected to demonstrate conformity to the "No-Net-Loss of Wetland" principle. Under this principle, the wetland area or ecological function served by the existing fish ponds should be retained, especially in relation to the provision of abundant and accessible food and roosting grounds to ardeids and other species. Alternative land uses would only be considered if they are able to demonstrate that there would not be a loss in the ecological function of the existing ponds.

New Nature Conservation Policy

- 3.4.5 The New Nature Conservation Policy of the HKSAR Government lists 12 priority sites for enhanced conservation, two of which are pertinent to the current submission, the Ramsar Site (which contains the LC Site of the Project) and the Deep Bay wetlands outside Ramsar Site (which contains the NSW Site of the Project).

Sites of Special Scientific Interest

- 3.4.6 The Mai Po Marshes SSSI was designated in 1976. It holds an important area of mangrove as well as the largest reedbeds and (semi-) tidal open water habitats derived from *gei wai* shrimp ponds. The productive seral community and man-made key *gei wai* provide important foraging sites for both resident and migratory birds as well as supporting an important and diverse fauna and flora. The LC Site of the site is located within the SSSI.

- 3.4.7 The Inner Deep Bay SSSI was designated in 1986. Inner Deep Bay contains the largest and most important mangrove communities in Hong Kong and extensive natural inter-tidal mudflats. Both the mangroves and mudflats provide an important feeding and resting ground for waterbirds. The SSSI is located entirely within the Ramsar Site and the LC Site and is in close proximity to the NSW Site.

Habitats and Vegetation

- 3.4.8 Many of the inactive fish ponds in the NSW Site of the site have become overgrown with reeds *Phragmites australis* by succession. Although *Phragmites* reeds are common and widespread, extensive reedbeds are relatively uncommon in Hong Kong and in southern China. The reedbeds at the NSW Site are one of the largest areas of this habitat present in Hong Kong. Reedbed habitats are important for a number of faunal species, including birds and invertebrates.
- 3.4.9 Fishponds form an integral part of the Deep Bay wetlands, and are important for several wetland-dependent species, especially birds. Active fish ponds are present at both the NSW Site and the LC Site.
- 3.4.10 Many of the trees present at the NSW Site are exotic species and are not of intrinsic ecological value. These trees are an important roosting site of the Great Cormorant *Phalacrocorax carbo*.
- 3.4.11 The LC Site of the site is surrounded by mangroves continuous with the extensive mangroves system of Deep Bay. This habitat provides an important resource for a diverse wildlife. Mangroves in this area are also used by roosting waterbirds and terrestrial birds, e.g. Collared Crow *Corvus torquatus* and may support the mangrove-dependent firefly *Pteroptyx maipo* a newly-described species first observed in Hong Kong Wetland Park in 2009.

Mammals

- 3.4.12 Eurasian Otter *Lutra lutra* was recorded once in an inactive fish pond in the NSW Site of the Project. This species has a restricted distribution in Hong Kong, having been recorded only from the Deep Bay area. It is also listed as globally near-threatened by IUCN. Other mammals recorded at the NSW Site include Small Indian Civet *Viverricula indica* Small Asian Mongoose *Herpestes javanicus* and Leopard Cat *Prionailurus bengalensis*.

Birds

- 3.4.13 Reedbed habitats, as found at the NSW Site, are utilised by some reedbed associated bird species as stopover sites during migration periods and supported roosts of passerine birds.
- 3.4.14 Both the NSW and the LC Sites include areas of active fish ponds. In the Deep Bay area, active fish ponds are recognised to be important for foraging waterbirds, especially during periods of pond drain-down, when ponds can provide an important resource for foraging ardeids and globally-endangered Black-faced Spoonbills *Platalea minor*.
- 3.4.15 Open water among the inactive ponds at the NSW Site also provides habitat for certain bird species, including ducks, ardeids, spoonbills and Black-winged Stilts *Himantopus himantopus*.
- 3.4.16 Large numbers of Great Cormorant *Phalacrocorax carbo* roost within the NSW Site (up to 7204 being counted during winter 2011/12), including approximately 50% of the total Deep Bay wintering population of this species. The cormorants roost in trees and bamboo, with most individuals in the northern part of the NSW Site.
- 3.4.17 The Tung Shing Lei egretty is located approximately 1.5 km to the south-east of the NSW Site. In 2011 the egretty supported 40 nests of Little Egret and 21 nests of Chinese Pond Heron, making this the fifth largest egretty in Hong Kong. Studies have previously found that egrets in Hong Kong will forage up to approximately 4 km from the egretty.
- 3.4.18 The Kam Tin MDC is intertidal and is connected directly to the internationally-important intertidal mudflats of Inner Deep Bay. The Kam Tin MDC is used by large numbers of foraging waterbirds, especially during winter and migratory seasons. The Kam Tin MDC is also apparently used for foraging by egrets breeding in Tung Shing Lei egretty.

- 3.4.19 Collared Crow *Corvus torquatus* is considered to be Near-threatened globally, and Deep Bay apparently supports internationally important numbers of this species. Flocks of the species are regularly recorded at the LC Site.

Herpetofauna

- 3.4.20 Amphibian communities at both the NSW Site and the LC Site are relatively poor, in terms of both abundance and diversity. Chinese Bullfrog *Hoplobatrachus chinensis* has been recorded in the past at the NSW Site but during surveys conducted in 2011 only five species of amphibian, none of which were of conservation concern, were recorded.
- 3.4.21 Surveys have recorded relatively few reptile species at the NSW Site and the LC Site, but these include three species of conservation concern recorded recently at the NSW site: Reeves' Terrapin *Cinemys reevesii* (Endangered in IUCN Red List), Burmese Python *Python bivittatus* (Near-threatened on the IUCN Red List) and Common Rat Snake *Ptyas mucosus* of Potential Regional Concern.

Dragonflies/butterflies

- 3.4.22 Dragonfly surveys have revealed a high abundance of individuals and relatively high diversity of species at the NSW Site. Most species are relatively common in lowland Hong Kong, but species of conservation importance recorded within the site include Scarlet Basker *Urothemis signata* and Ruby Darter *Rhodothermis rufa*. The dragonfly community of the LC Site is both less abundant and less diverse.
- 3.4.23 Butterfly communities at both the NSW Site and the LC Site are relatively impoverished, both in terms of species diversity and abundance. Only one species recorded (Pale Palm Dart *Telicota colon*) is considered to be of conservation concern.

Fireflies

- 3.4.24 In 2009 a firefly species new to science was discovered at Hong Kong Wetland Park and has subsequently been described as *Pteroptyx maipo*. Species of the genus *Pteroptyx* are mangrove-dependant and it is very possible that *Pteroptyx maipo* is present at the NSW or, perhaps more likely, the LC Site; fieldwork at an appropriate season is required in order to investigate whether this species is present.

Existing Environment

- 3.4.25 The NSW Site is located in the Deep Bay wetland ecosystem. Diverse wetland habitats are present in the surrounding environment, including intertidal mudflats, mangroves, fish ponds and watercourses. These support a high abundance and diversity of species. The Deep Bay area is recognised to support internationally important numbers of several bird species, including globally-threatened species, and also provides habitat for a diversity of other fauna.

Sensitive Receivers

- 3.4.26 Recognised sites of ecological importance in the area include Mai Po Marshes Nature Reserve, Mai Po Inner Deep Bay Ramsar Site, Mai Po Marshes SSSI and Inner Deep Bay SSSI. Tung Shing Lei egrettry is also located nearby.
- 3.4.27 Ecological sensitive receivers in the surrounding environment include the various habitats of the Deep Bay wetlands, including intertidal mudflats, mangroves, fishponds and various streams or channels. These wetlands are recognised to be of international importance and support a number of species which are threatened regionally or globally.

3.5 Fisheries

Existing Environment

- 3.5.1 Much of the surrounding environment comprises fish ponds. These include ponds currently used for the cultivation of fish as well as ponds which are currently inactive or have been inactive for long period. Ponds within the NSW Site are either active or inactive, and nearby

ponds are mostly inactive. Most of the existing fish ponds in and around the LC Site are actively managed for fisheries production.

3.6 Landscape and Visual

Existing Environment

- 3.6.1 The Project Site is bounded by Kam Tin MDC to the north and east, Shan Pui River to the west and to the south are Kam Tin River and village houses. The majority of the existing landscape character is currently a wide open level field of inactive fish ponds inter-filled with tall grasses growing mostly everywhere where no water exists. The Project Site is generally flat and an amalgamation of inactive fish ponds. Rows of matured sized *Eucalyptus tereticornis* are situated predominantly along the fish pond bunds or dikes. The site is bounded by industrial estate to the west, Fairview Park to the northeast and comprehensive development with wetland restoration area to the east.

Sensitive Receivers

- 3.6.2 Visually sensitive receivers (VSRs) within 500m of the Project Site have been identified according to the criteria set out in the EIAO-TM. The existing and planned SRs are summarised in **Table 3.2**.

Table 3.2 Visually Sensitive Receivers in the Vicinity of the Site

Description	Nature of Sensitive Receiver
Yuen Long Sewage Treatment Plants	Industrial
Yuen Long Industrial Estate	Industrial
Shan Pui Chung Hau Tsuen	Residential
Chung Hau Yu Man San Tsuen	Residential
Fairview Park	Residential
Tin Fook Wai	Residential (currently undeveloped)
Nam Sang Wai Road	Cyclists/ Strollers/ Vehicle Travellers
Yau Pok Road	Cyclists/ Strollers/ Vehicle Travellers
Pok Wai South Road	Cyclists/ Strollers/ Vehicle Travellers
Mai Po Nature Reserve	Cyclists/ Strollers

4 POSSIBLE IMPACTS ON THE ENVIRONMENT

4.1 Environmental Scoping

- 4.1.1 In respect to the nature and scope of the Project as discussed in **Section 1**, potential impacts arising from the construction and operation of the Project have been identified and are summarised in **Table 4.1**.

Table 4.1 Potential Impacts associated with the Construction and Operation of the Project

Potential Impact	Construction Phase	Operation Phase
Air Quality	√	√
Noise	√	√
Water Quality	√	√
Waste Management Implication	√	√
Ecology	√	√
Fisheries	√	√
Landscape and visual	√	√
Cultural Heritage	√	√
Hazard	x	x

Note:

√ - Possible impact

x – Impact not expected

4.2 Air Quality

Potential Sources of Impact

- 4.2.1 Potential air quality impact in the surrounding ASRs during the construction phase of the Project will be dust emission includes:

- (i) Loading and unloading fill materials;
- (ii) Wind erosion on dusty stockpiled material;
- (iii) Earthworks resulting in exposed ground vulnerable to air erosion;
- (iv) Handling of excavated material and construction debris; and
- (v) Vehicle movements on unpaved haul roads.

- 4.2.2 During operational phase, the potential sources of impact are traffic emissions from existing and proposed road networks, as well as chimney emissions from the nearby industrial premises. Odour from the potential sewage pumping station and/or treatment plant is other potential source of impact.

Evaluation of Impacts

- 4.2.3 Construction activities have the potential to generate significant dust impacts on the nearby Air Sensitive Receivers, if unmitigated. Mitigation measures in the form of phase implementation, and provision of various dust suppression techniques recommended in the *Air Pollution Control Ordinance* (APCO) (Construction Dust Regulation) should be implemented to alleviate dust emission level arising from activities associated with the construction works to acceptable levels.
- 4.2.4 The potential operational air quality impacts arising from the pollution sources will be assessed in related to the development and proposed road layout.

4.3 Noise

Potential Sources of Impact

- 4.3.1 The potential source of noise impact during the construction phase would mainly be the use of powered mechanical equipment (PME) for various construction activities.

4.3.2 Potential impact to the NSRs during operational phase would be due to the following noise sources:

- (i) Traffic noise induced from existing road networks and proposed road improvements;
- (ii) Fixed source noise from the YLIE; and
- (iii) Fixed source noise from E&M facilities in the proposed development.

Evaluation of Impacts

4.3.3 Practical mitigation measures including but not limited to minimisation of on-site construction plants, erection of site hoardings, use of quiet plant and scheduling of works would be adopted to minimise the construction noise impact to acceptable level.

4.3.4 A combination of acoustic considerations will be review exhaustively in the building design and access road alignment such that road traffic noise impact can be mitigated.

4.3.5 A combination of acoustic considerations will be review exhaustively in the building design such that off-site fixed noise impact can be mitigated.

4.3.6 Subject to the engineering design, standard acoustic treatments, such as quiet plant, repositioning, standard noise enclosure, will also be provided for the proposed E&M facilities. With the provision of measures, it is anticipated that on-site fixed noise source would not be a concern.

4.4 Water Quality

Potential Sources of Impact

Construction Site Runoff

4.4.1 Generation of general construction site runoff is expected during construction. The site runoff is expect to contain high level of suspended sediment, and may carry lubricant and other chemical spilled onsite. Water quality impact may arise if the construction site runoff is not properly handled.

Construction in Close Proximity to Water Sensitive Receivers

4.4.2 Subject to the engineering design of the proposed connecting road bridge, supporting structures may be required to be constructed in close proximity to the existing water sensitive receivers. Water quality impact may arise if no mitigation measures in place.

Chemical Spillage

4.4.3 Variety of chemicals would be used for carrying out construction activities. These chemicals may include petroleum products, spent lubrication oil, grease, mineral oil, solvent and other chemicals. Accidental spillages of chemicals in the works area may contaminate the surface soils. The contaminated soil particles may be washed away by construction site runoff causing water pollution.

Sewage from Works Construction Workforce

4.4.4 Domestic sewage would be generated from the workforce during the construction phase. However, this sewage can be adequately treated by interim sewage treatment facilities, such as portable chemical toilets, which can be installed within the construction site.

Domestic Sewage from the Project

4.4.5 Domestic sewage would be generated from households and human activities from the proposed development. It is expected that the domestic sewage would carry heavy dose of organic and inorganic pollutants from the daily activities of the residents.

Evaluation of Impacts

- 4.4.6 Potential water quality impact during construction phase could be mitigated with proper implementation of good site practices and water quality mitigation measures.
- 4.4.7 All domestic sewage generated from the development would be connected to the government sewers to avoid water quality impact to the nearby environment. The feasibility of such arrangement will be further studied during the establishment of Development Plan.

4.5 Waste Management

Potential Sources of Impact

- 4.5.1 Wastes generated during the construction phase of the Project would likely comprise the following categories:
- (i) Construction and Demolition Materials (C&DM);
 - (ii) Chemical waste;
 - (iii) General refuse; and
 - (iv) Sediment.

- 4.5.2 The potential environmental impact arising from the handling, storage, transport and disposal of wastes are described below.

Construction and Demolition Material (C&DM)

- 4.5.3 Construction waste that could be directly generated from construction activities may include excavated materials and non-inert C&D materials (e.g. wood, green wastes).

Chemical Waste

- 4.5.4 The amount of chemical waste that will be generated from the construction works will depend on the contractor's on-site maintenance intention, age and number of plant and vehicles used. Nevertheless, chemical wastes such as lubricating oil or solvent generated by workers are not expected to be in large quantity. The likely chemical waste types are readily accepted at the chemical waste treatment centre at Tsing Yi or other licensed waste oil recycling facilities in Hong Kong.
- 4.5.5 Fossil fuel and used lubricants for trucks and machinery are classified as chemical wastes. The Contractor shall register with EPD as a chemical waste producer and observe all the requirements under the storage, labelling, transportation and disposal of chemical waste.

General Refuse

- 4.5.6 Throughout the construction phase, the workforce on the construction site will generate a variety of general refuse requiring disposal. These refuse will mainly consist on food wastes, aluminium cans, and waste paper, etc.

Sediment

- 4.5.7 Subject to the engineering design of the proposed connecting road bridge structure, minor dredging of sediment may be required for the construction of the bridge supporting structure.

Evaluation of Impacts

- 4.5.8 Provided that standard waste management practices are to be strictly followed, no waste related regulatory non-compliance and unacceptable environmental impacts are expected to arise from the handling, storage, transport and disposal of construction waste arising from the proposed development.

4.6 Ecology

Potential Sources of Impact

- 4.6.1 Direct ecological impacts could potentially arise from loss of habitat to construction, including construction of the proposed residential development and the connecting road into the site. Changes to habitat characteristics during site management (including management of ponds for ecological enhancement) may also result in ecological impacts.
- 4.6.2 Potential indirect impacts may arise from a number of sources including:
- (i) Disturbance from vehicles accessing site (including construction and operation phase vehicular access);
 - (ii) Noise disturbance from within the site (during construction and operation);
 - (iii) Increased levels of human activity in surrounding areas;
 - (iv) Disturbance from light pollution and night-time glare;
 - (v) Changes to hydrological conditions in surrounding areas, including changes to water quality in Deep Bay wetlands from pollution or sedimentation;
 - (vi) Fragmentation of wetland habitats from construction of the development and associated access road in existing wetland area;
 - (vii) Loss of foraging habitat for ardeids breeding at Tung Shing Lei and/or impedance of flight-lines between the egretty and foraging sites elsewhere; and
 - (viii) Loss of wintering roosting site of Great Cormorants.

Evaluation of Impacts

- 4.6.3 Ecological impacts are anticipated as a result of the direct impacts of habitat loss, including the loss of a moderately large area of reedbed and fish ponds. Mitigation for these impacts will be required through appropriate habitat management to ensure that the site as a whole accords with the "No Net Loss in Wetland" principle described in TPB Guideline 12B.
- 4.6.4 Eurasian Otter can be very secretive and may be overlooked at the NSW Site. This wetland-dependent species forages in open water and often favours reedbed fringes. Given that this is a rare species in Hong Kong and is globally Near-threatened, the loss of habitat at the NSW Site is potentially important.
- 4.6.5 The potential impact to the important roost of Great Cormorant as a result of habitat loss and/or disturbance is considered to be one of the key issues at the NSW Site. Mitigation measures will be required to avoid or minimise the potential impacts to this roost.
- 4.6.6 The Tung Shing Lei egretty is located 1.5 km from the NSW Site and will not be directly impacted. Indirect impacts to the egretty may arise from loss of foraging habitat for birds breeding in the egretty, either directly through habitat loss or as a result of a decrease in habitat quality due to increased disturbance. Breeding success at the egretty may also be impacted if flight-lines between the egretty and foraging grounds are impeded such that birds are required to take longer routes to reach suitable foraging locations.
- 4.6.7 The adjacent Kam Tin MDC is an important foraging site for a large number of waterbirds. Loss of habitat would be a potential issue for these birds, as would the potential for increased disturbance from human activity or noise in or around the site.
- 4.6.8 Impacts to herpetofauna and butterflies are not expected to be significant due to the low species diversity and low abundance of these groups. Impacts to dragonflies may be significant due to the relatively high diversity of species.
- 4.6.9 Water runoff from the site may enter directly into Deep Bay through Kam Tin MDC or Shan Pui River. Runoff containing pollutants or increased sediment load would potentially impact the important ecology of the intertidal areas of the bay.
- 4.6.10 Lighting and night-time glare from the development or connecting roads potentially affects nocturnal species present in the area, or roosts of diurnal species, leading to reduced suitability of the habitat for these species. The NSW Site is known to support important roosts of birds, most notably Great Cormorants.

4.7 Fisheries

Potential Sources of Impact

- 4.7.1 The whole of the LC Site comprises active fish ponds, and some active ponds are also located at the NSW Site. The proposed development may turn these active as well as other inactive fishponds with future pond fish culture potential into residential or ecological enhancement area.
- 4.7.2 Indirect impacts (such as dust, runoff, sewage, etc.) will also be generated during the construction and/ or operational phases and these may affect fish ponds in the close vicinity.

Evaluation of Impacts

- 4.7.3 Given the area of fish ponds present at the site, there is a possibility for impacts arising to pond fish production in Hong Kong. Potential impacts to surrounding pond fish culture activity will also require assessment.

4.8 Landscape and Visual

Potential Sources of Impact

- 4.8.1 The Project may cause temporary landscape and visual impacts. Permanent landscape and visual impacts are less likely due to the poor visual amenity and degraded landscape character of the site at present.
- 4.8.2 Temporary landscape and visual impacts will arise from disturbance to the existing landscape of the site, from construction works and plant and from the presence of temporary structures, such as false work for structural elements.
- 4.8.3 Sources of permanent adverse landscape and visual impact might include residential units and associated roads, clubhouse, etc. The creation of wetland is likely to represent a source of positive landscape/visual impact in the longer term.
- 4.8.4 Light pollution/glare from lighting facilities might also cause concern to the nearby VSRs.

Evaluation of Impacts

- 4.8.5 Impacts on VSRs notably residents of surrounding villages / developments may be significant during the construction phase due to the removal of part of the existing vegetation, the presence of construction works, activity and partly completed structures in the landscape. During the operational phase, design of mitigation measures including screen planting, building colour scheme, finishes and texture of materials will be fully considered to ensure that the development will be compatible with the landscape setting and it is considered that adverse visual impacts are unlikely.
- 4.8.6 Impacts on landscape resources are unlikely to be very significant during the construction or operational phases, due to the limited sensitivity of resources currently on site. Impacts may ultimately be positive in the longer term, after creation of the wetland. Tree felling will be avoided wherever possible by good planning of the development. If tree removal cannot be avoided, transplanting affected trees to an appropriate location will be considered. Compensatory planting will also be provided to compensate for the loss of any vegetation.
- 4.8.7 Impacts on landscape character may be significant during the construction phase resulting from the presence of construction plant, activity and partly completed structures. Permanent long term impacts are less likely during the operational phase.
- 4.8.8 Subject to the design considerations, the distribution of the lighting equipment, the illumination power, the orientation of the equipment and the height of the lamp posts can be carefully reviewed such that glare impact shall be practically reduced to an acceptable level.

4.9 Cultural Heritage

Potential Sources of Impact

- 4.9.1 The Project Site has been adopted as fishponds for a long time which indicate cultural heritage resources are not expected to be located at this site.

Evaluation of Impacts

- 4.9.2 It is anticipated that there would be no direct impact on any cultural heritage resources as there are and were no historical structures or dwellings previously on this site.

5 ENVIRONMENTAL PROTECTION MEASURES TO BE INCORPORATED IN THE DESIGN AND FURTHER ENVIRONMENTAL IMPLICATIONS

5.1 Construction Phase

Air Quality

- 5.1.1 Dust generation during construction is expected to be insignificant with the implementation of dust suppression measures, as stipulated in the APCO. These measures should be incorporated into the specifications for the works contracts.

Noise

- 5.1.2 Construction noise would be minimised by following *Noise Control Ordinance* (Chapter 400) (for Construction Industry) published by EPD, which includes:

- Only well-maintained plant should be operated on-site and the plant should be serviced regularly during the construction phase;
- Silencers or mufflers on construction equipment, if applicable, should be utilised and should be properly maintained;
- PME that may be in intermittent use should be shut down between work periods or throttled down to a minimum;
- Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs; and
- Material stockpiles and other structures should be effectively utilised, wherever practicable, in screening noise from on-site construction activities.

Water Quality

- 5.1.3 To avoid potential water quality impact during the construction phase, guidelines stipulated in ProPECC PN 1/94 *Construction Site Drainage* should be properly followed to minimise site runoff, control erosion, and retain and reduce any suspended solids prior to discharge. Silt removal facilities should be provided and soil excavation work should be minimised on rainy days as far as practicable. Apart from these, earthworks final surfaces should be well compacted and the subsequent permanent work or surface protection should be carried out immediately after the final surfaces are formed to prevent erosion caused by rainstorms. The above measures would be incorporated into the specifications of the works contracts.

Waste Management

- 5.1.4 Waste management practices including the following control/mitigation measures are recommended during the construction phase. These measures should be incorporated into the specifications for the works contracts.

- Provision of sufficient waste disposal points and regular collection for disposal;
- Different types of waste should be sorted and stored in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal;
- Provision of appropriate measures to minimise wind-blown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers;
- Separation of chemical wastes for special handling and appropriate treatment at the Chemical Waste Treatment Centre;
- Any unused chemicals or those with remaining functional capacity shall be recycled; and
- Maximising the use of reusable steel formwork to reduce the amount of C&D materials. The excavated fill material shall be used on-site as backfill material as far as possible.

Ecology

- 5.1.5 One of the most significant ecological issues arising from the development would be the impacts on wetland habitats at the NSW Site. Consideration will be given throughout the design stage to ways in which the impacts on wetland habitats can be avoided or minimised. This will include consideration of the location and layout of the developed portion of the site in order to minimise direct loss of habitat as well as to avoid or minimise indirect impacts to

wetland habitats remaining within the site and in surrounding areas. It is expected that the remaining wetlands within the site (both at the NSW Site and the LC Site) would be managed to increase the ecological value of these sites as compensation for residual impacts arising from the developed portion of the site.

- 5.1.6 In order to avoid any temporary impacts of wetland loss as a result of construction, the enhancement of habitats within the remaining wetland area would be required prior to the commencement of construction works.
- 5.1.7 Direct impacts to species during the construction phase as a result of mortality risk would be considered and measures proposed to avoid or minimise the potential mortality from construction works.
- 5.1.8 Construction phase impacts to off-site habitats will be addressed and mitigation measures will be proposed for any impacts identified. These will follow the principles set out under the EIAO of (in order of preference) avoidance, minimisation and compensation of impacts. Issues which are anticipated to be particularly significant during the construction phase include the disturbance of waterbirds using adjacent wetlands (especially Kam Tin MDC and Shan Pui River), disturbance of roosting Great Cormorants and surface runoff of sediment or pollutants into Deep Bay.
- 5.1.9 Potential mitigation measures to avoid or minimise indirect construction phase impacts to surrounding areas include:
- Phasing of construction work such that not all of the site is under construction at a given time;
 - Timing of certain activities to avoid seasons when sensitive species are present (for example, avoiding certain activities during the migration periods of important birds);
 - Selection of construction machinery to minimise noise impacts to surrounding areas;
 - Provision of suitable site screening to avoid direct visual impacts to surrounding areas of human activity or construction machinery; and
 - Implementation of appropriate measures to avoid runoff of sediments or pollutants into nearby water bodies.
- 5.1.10 Impacts arising from fragmentation of habitats as a result of the construction of the Project or associated access will be evaluated. Appropriate mitigation measures will be proposed as required, for example through modification of the design to minimise fragmentation or through provision of wildlife underpasses or similar measures to permit movement of animals between wetland areas.

Fisheries

- 5.1.11 Appropriate mitigation measures to be implemented to avoid or minimise impacts to fisheries may include measures to avoid runoff of sediments or pollutants into surrounding water bodies and to ensure there are no impacts to water supplies for surrounding fish ponds.

Landscape and Visual

- 5.1.12 To reduce and minimize the potential landscape and visual impacts during the construction phase, the following control/ mitigation measures are recommended:
- Tree felling would be avoided wherever possible by good planning of the development. If tree removal cannot be avoided, transplanting affected trees to an appropriate location will be considered. Compensatory planting would also be provided to compensate for the loss of any vegetation.
 - Valuable landscape resources found on site (including topsoil, pond bund material etc) will be retained where possible for reuse in the works.
 - Trees to be retained within or adjacent to the works area will be carefully protected to avoid damage by machinery or any construction activities as well as to prevent contractors compacting soil around tree roots or dumping materials.

- Preservation of existing trees and advance screen planting along the boundary will be considered to minimize both landscape and visual impact during the construction phase. Landscape and visual impacts will be minimized by regulation of working hours, reduction of construction period to practical minimum, minimising export of material off-site; and control night-time light and glare, etc.
- Any trees identified as affected by the Project will be first considered for transplanting. In order to minimize the disturbance on tree during transplanting, the proposed transplanted trees will be relocated to the final recipient location within the site.

5.2 Operation Phase

Ecology

- 5.2.1 Ecological impacts of wetland loss will be minimised by the enhancement and management of wetlands at the NSW Site and the LC Site. As required under Town Planning Board Guideline 12B, there will be an intention that habitats provided should ensure no net loss of wetland function as a result of the development. Wetland design would take into account the habitats present on site and species potentially impacted as well as considering the possibility of enhancing the overall ecological value of the Deep Bay wetlands.
- 5.2.2 Habitats to be formed or enhanced would complement those found in the Deep Bay ecosystem and, if possible, enhance the value of the ecosystem as a whole. Creation or enhancement of habitats would provide a long-term commitment to protect, manage and maintain wetland habitats in Deep Bay. The planning and design of mitigation wetlands would also take into account public access into the managed areas and the provision of facilities for public observation of wildlife.
- 5.2.3 Off-site impacts arising from the development will be considered and measures will be proposed to avoid, minimise or compensate for the impacts identified. This will include consideration of the potential disturbance to fauna using surrounding areas (especially waterbirds in adjacent rivers) and roosting Great Cormorants. This would include measures to minimise the impact of disturbance by noise, glare, human activity and/or any other sources identified.
- 5.2.4 Measures which would be considered in order to mitigate off-site impacts may include:
- Design of development layout to minimise visual intrusion onto adjacent habitats;
 - Screening of development to minimise disturbance to surrounding habitats;
 - Lighting to be directed internally to prevent intrusion of glare into surrounding habitats; and
 - Treatment of water to ensure no net discharge of pollutants into Deep Bay.
- 5.2.5 The potential impacts to Tung Shing Lei egret as a result of impacts to flight-lines or habitat loss will be taken into account as part of the design of the development and wetland areas.

Fisheries

- 5.2.6 Design and layout of the development component will consider the potential impacts to fisheries both within the site itself and in surrounding areas. Potential impacts to fisheries will be considered as part of the site design and management, with a view to avoiding or minimising these impacts.

Landscape and Visual and Glare

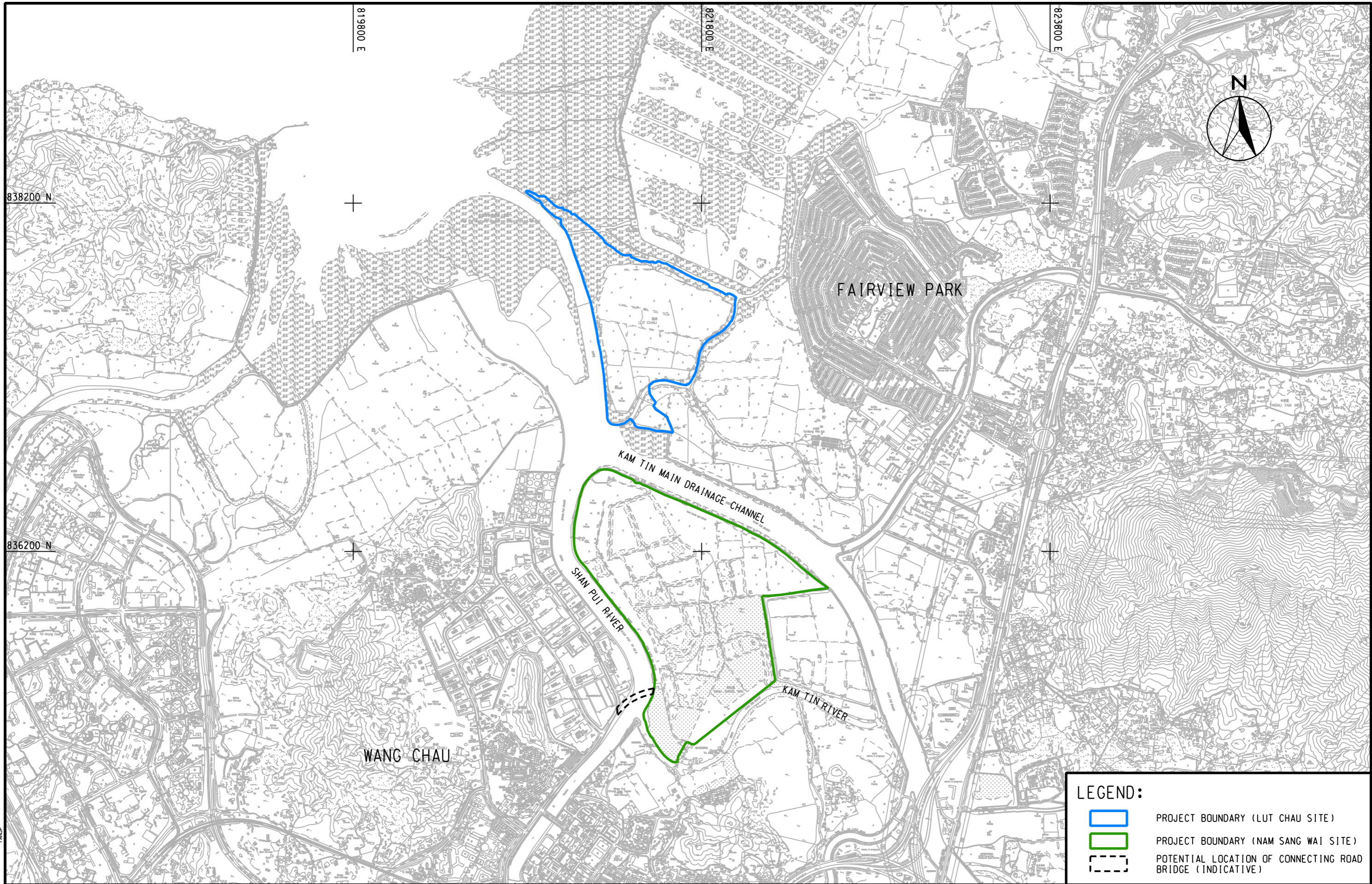
- 5.2.7 To reduce and minimize the potential landscape and visual impacts during the operation phase, the following mitigation measures are recommended:
- Maximise soft landscape and water bodies in residential areas in residential areas of the site. Where space available, street trees will be provided to minimize the visual impact.

- Building colour scheme, finishes and texture of materials would be fully considered to ensure that the development will be compatible with the landscape setting. Sensitive chromatic treatment of residential buildings will assist in reducing their visual impact.
 - The creation of water bodies as well as the planting of amenity and habitat landscapes will act as mitigation for any loss of vegetation currently on site.
 - Provision of a continuous belt of screen planting by the preservation of existing trees and introduction of fast growing tree species and shrubs along boundary.
 - Provision of an attractive soft landscape in residential area in order to provide a visual softening and greening effect to the Project by the creation of an attractive soft landscape in residential areas.
 - Streetscape elements (e.g. paving, signage, street furniture etc.) shall be sensibly designed in a manner that responds to the rural context.
- 5.2.8 To minimize the impact of lighting to visual sensitive receiver, lighting units along internal access roads should be directional and minimise unnecessary light spill. The glare will be further mitigated by screening planting within the residential area and along boundary.

6 USE OF PREVIOUSLY APPROVED EIA REPORTS

- Yuen Long and Kam Tin Sewerage and Sewage Disposal Stage 2 (Register No.: AEIAR-078/2004)
- Yuen Long and Kam Tin Sewerage and Sewage Disposal Stage 1 Packages 1A-1T and 1B-1T - Kam Tin Trunk Sewerage Phase I and II (Register No.: AEIAR-063/2002);
- Proposed Development at Fung Lok Wai, Yuen long at Lot 1457 R.P. in D.D.123 (Register No.: AEIAR-148/2009); and
- Comprehensive Development at Wo Shang Wai, Yuen Long (Register No.: AEIAR-120/2008).

FIGURES






PROPOSED COMPREHENSIVE DEVELOPMENT WITH WETLAND ENHANCEMENT (CDWE)
AT NAM SANG WAI AND LUT CHAU ENVIRONMENTAL IMPACT ASSESSMENT

LOCATION PLAN

AECOM

LEGEND:

-  PROJECT BOUNDARY (LUT CHAU SITE)
-  PROJECT BOUNDARY (NAM SANG WAI SITE)
-  POTENTIAL LOCATION OF CONNECTING ROAD BRIDGE (INDICATIVE)

SCALE	A3 1 : 20000	DATE	MAR. 2012
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