Environmental Impact Assessment
Executive Summary

Comprehensive Development and Wetland Protection
Near Yau Mei San Tsuen

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ENVIRON

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1. INTRODUCTION

1.1 Background

1.1.1 The Project is proposed for comprehensive development and wetland protection near Yau Mei San Tsuen. The Project Site, with a total area of about 8.1 ha, near Fairview Park, Yuen Long. The site is sandwiched by several suburban residential communities such as Palm Springs to the north, Yau Mei San Tsuen and Royal Palms to the east, Fairview Park to the west (**Figure 1**).

1.1.2 Pursuant to the requirement of the Environmental Impact Assessment Ordinance (EIAO), an Environmental Impact Assessment (EIA) has been undertaken. It provides a detailed assessment of the nature and extent of potential environmental impacts associated with the construction and operation of the Project, including air quality, noise, water quality, waste management, ecology, fisheries, cultural heritage, landscape and visual resources, and recommendations for mitigation measures to comply with environmental legislations and standards. The impact assessments in the EIA have been conducted by qualified and experienced environmental consultants in association with consultants in various expert fields including ecology, fisheries, engineering, planning, architectural, traffic, cultural heritage, landscape and urban design in accordance with the Project EIA Study Brief requirements as well as the technical requirements in the EIAO-TM.

1.1.3 This Executive Summary provides a summary of the key findings of the EIA study. A non-technical summary providing a reader-friendly understanding of the key results of the environmental impact assessment that has been undertaken, is provided in **Appendix A** for reference.

1.2 Project Location

1.2.1 The Project Site covers Lot Nos. 3054 BRP and 3055 in DD 104 near Yau Mei San Tsuen, Mai Po, Yuen Long, with the total site area of about 8.1 ha. Under the Approved Mai Po and Fairview Park Outline Zoning Plan (OZP) No. S/YL-MP/6, the Project Site is zoned “Other Specified Uses” annotated “Comprehensive Development and Wetland Protection Area” (i.e. “OU(CDWPA)”). **The planning intention of the zone is to allow comprehensive low-density residential development/ redevelopment with the protection and conservation of the existing continuous and contiguous fishponds within the zone**. In brief, the site is designated by the Government for residential use and wetland protection purpose in line with the existing and planned uses on the adjacent sites.

1.2.2 Several existing residential developments including Palm Springs, Royal Palms and Yau Mei San Tsuen are located to the further north and east of Project Site. An existing Ngau Tam Mei Drainage Channel is located to the south of the Project Site. While Fairview Park and Yau Pok Road are located to the west and south, respectively. **Figure 1** shows the location and environs of the Project Site. Between the southern boundary of the Project Site and the Yau Pok Road, a cycle track linking the existing local cycle track networks of Yuen Long to Sheung Shui will be constructed by the Government.

1.3 EIAO and Designated Projects

1.3.1 Residential or recreational developments within Deep Bay Buffer Zones 1 or 2 are designated projects under the EIAO, of which environmental impact assessment (EIA) is required to be conducted. As the Project falls within Deep Bay Buffer Zone 2 (**Figure 1**) and comprises residential development, an EIA is required for the Project.

1.4 Project Description

1.4.1 The Project is to transform the Project Site into an area principally made up of wetland protection, which comprises a 3.8 ha wetland restoration area in the north-western portion of the Project Site, and supported by a sub-urban settlement at the south and south-eastern portion (**Figure 2**). The sub-urban settlement will include 3-storeys low density houses, clubhouse, swimming pool, site drainage system and ancillary facilities.

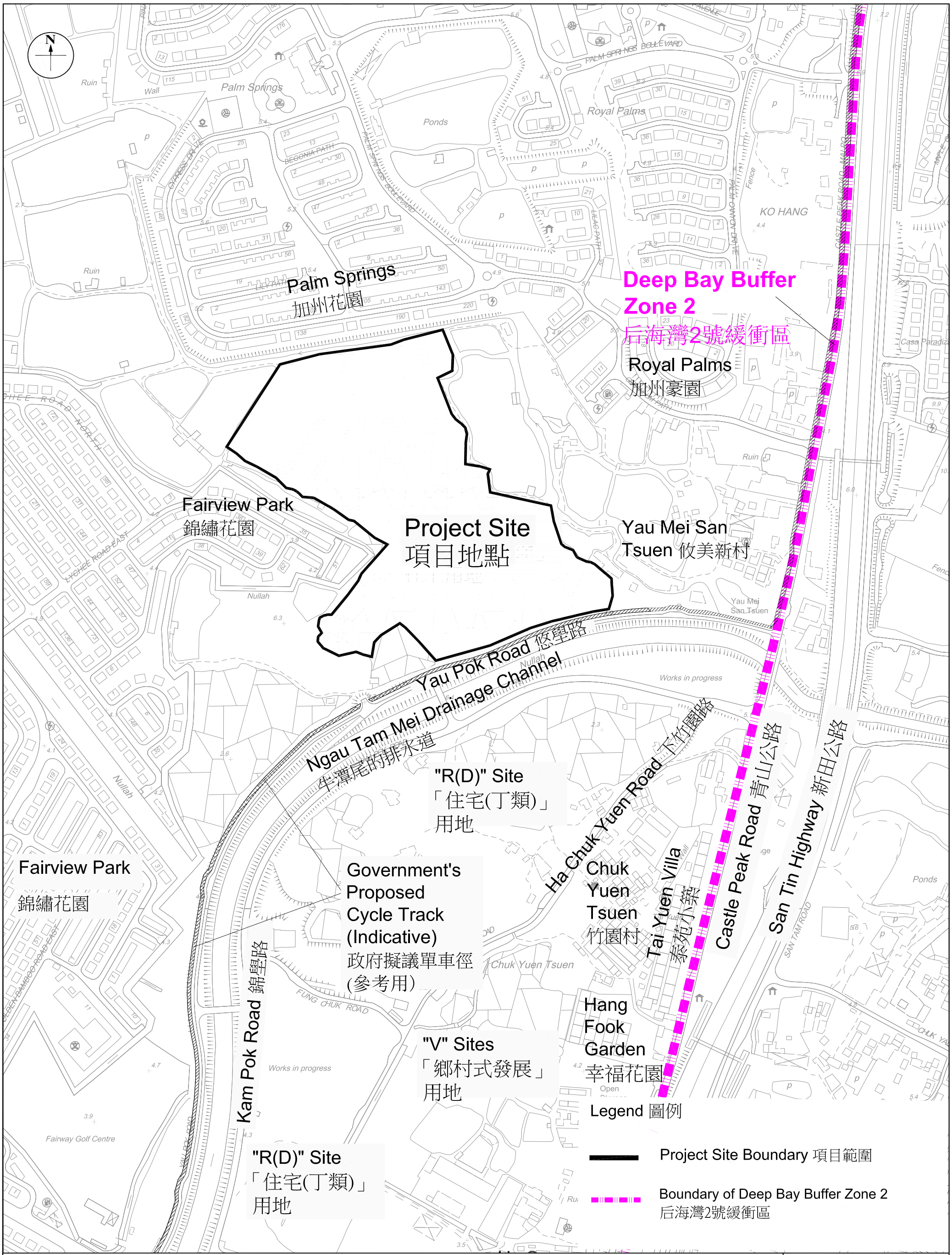

Figure 附圖: 1		ENVIRON
Title 名稱:	Location and Environ of the Project 項目位置及附近環境	Drawn by: HN Checked by: Tc
Project 項目:	Comprehensive Development and Wetland Protection near Yau Mei San Tsuen 毗鄰攸美新村綜合發展及濕地保護計劃	Rev.: 1.0 Date: Mar 2014

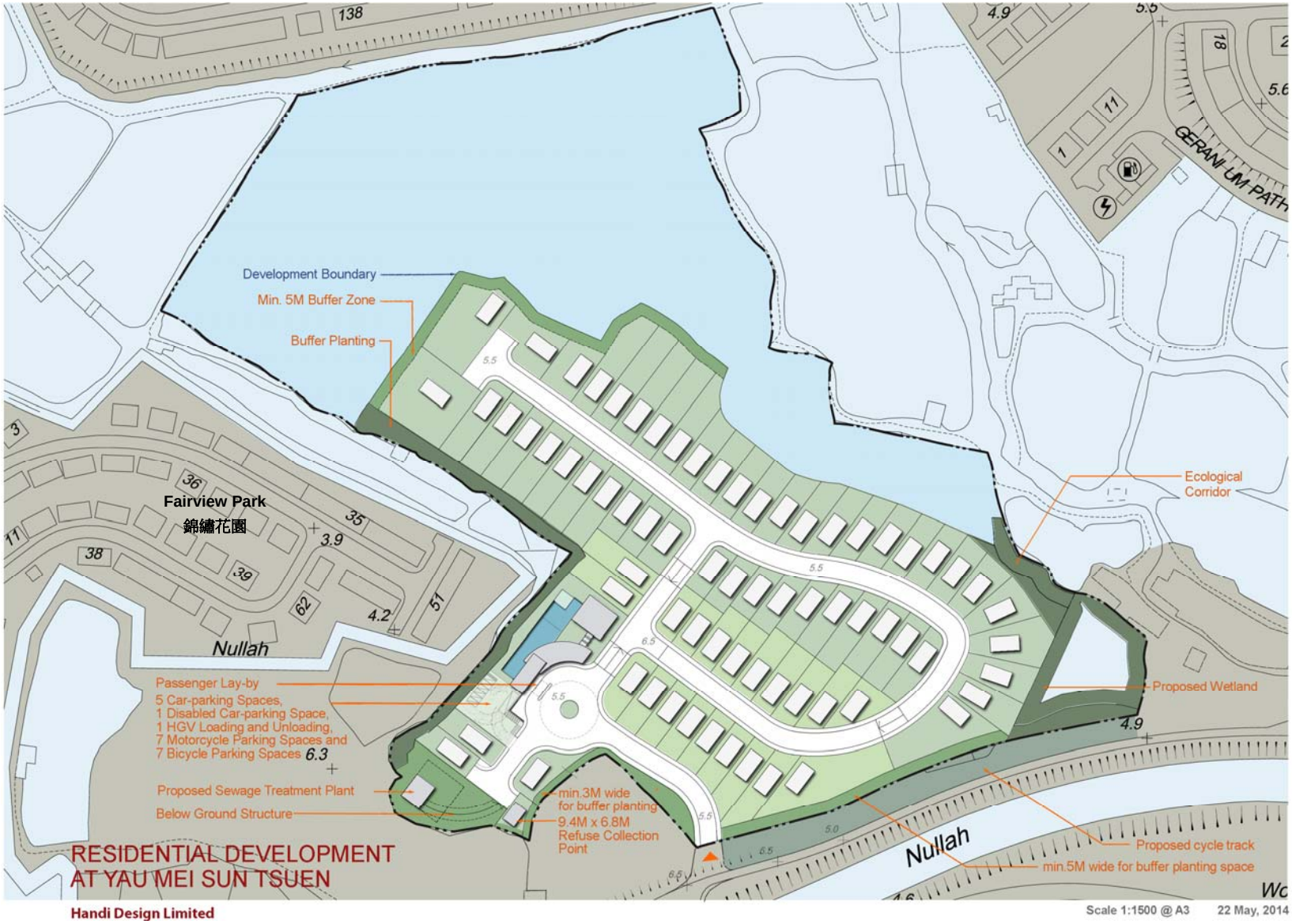

Figure 2
Conceptual Layout of the Project

2. KEY FINDINGS OF ENVIRONMENTAL IMPACT ASSESSMENT

2.1 General

2.1.1 An EIA has been undertaken for the proposed development in accordance with the requirements stipulated in the EIAO-TM as well as that in the Project EIA Study Brief issued by the Government in order to provide a detailed assessment of the nature and extent of potential environmental impacts associated with the construction and operation of the Project.

2.1.2 The potential environmental issues associated with the construction and operation of the Project, key findings, conclusions and recommendations are summarised in the following sections.

2.2 Air Quality

2.2.1 During the construction phase of the Project, fugitive dust emissions from the site formation works due to earth movement activities and transportation of excavated/ fill materials are the major sources of air pollution. According to the assessment results, the predicted unmitigated dust levels due to this Project would exceed the Air Quality Objectives/ Criteria and its stipulated No. of Exceedance Allowed.

2.2.2 However, no unacceptable air quality impacts are anticipated with the following mitigation measures in place: dust control measures required under the Air Pollution Control (Construction Dust) Regulation, e.g. imposing hard paving on the designated haul road; spraying water on areas with active site formation works during day-time; enclosing dump trucks when transporting dusty materials with impervious sheeting, etc.; good housekeeping practice by the works contractors; and the project specific measures recommended in the EIA report (e.g. minimizing the active working area so that each construction site will be divided into different sub-zones with only one sub-zone under construction in any one time, etc.). The mitigated dust level would comply with the relevant air quality objectives/ criteria. The predicted mitigated dust levels due to this Project are provided below:

	TSP (1-hr avg.)	**RSP (24 hours avg.) ***	**RSP (Annual avg.)**	**PM2.5 (24 hours avg.) ***	**PM2.5 (Annual avg.)**
Predicted Range, $\mu g/m^3$	164 - 295	122 - 125	43.3 – 44.3	91 - 92	30.7 – 31.0
No. of Exceedance	n/a	3	n/a	2	n/a
Compliance with Air Quality Criteria?	Yes	Yes	Yes	Yes	Yes
Air Quality Criteria, $\mu g/m^3$	500	100	50	75	35
No. of Exceedance Allowed	n/a	9	n/a	9	n/a

Remark: * The daily levels are based on the 1st highest 24-hour average concentrations at the receivers. Based on predicted results, the maximum predicted 24-hour average concentrations exceed the AQO limit, but no. of exceedances concerned is still within the AQO criteria. Thus, the dust level can comply with the relevant air quality criteria / AQOs.

2.2.3 Nevertheless, monitoring is still recommended during construction to ensure proper implementation of the mitigation measures, and to minimize the construction dust level as far as practicable.

2.2.4 During operational phase or when the residents live in these dwellings, there will be no planned dust generating activities from them. Given the scale of this Project (for small houses development), vehicular emissions due to traffic of this Project is unlikely to be significant, and the Project is unlikely contribute to any adverse air quality impact. Sewage generated by the proposed development will be discharged to the planned public sewerage system at Yau Pok Road. The interim sewage treatment plant will be enclosed and underground, and equipped with odour absorptive system, thus the Project Site itself will not contribute to any adverse air pollution or odour nuisance. There is also no air quality impact relating to industrial chimney emissions as no chimney is identified within the Assessment Area. Although the Project is adjacent to existing road network, sufficient setback distance has already been incorporated between the development and the roads, hence the impact from vehicular emission from the road is insignificant. Overall, no unacceptable air quality impact is expected to occur.

2.2.5 In brief, with the implementation of the mitigation measures as recommended in the EIA report, no adverse air quality impact due to the Project is anticipated.

2.3 Noise

Construction Phase

2.3.1 The use of Powered Mechanical Equipment for various construction activities will be the primary potential noise source during the construction phase of the Project. Without mitigation measures, the predicted unmitigated construction noise level at representative noise sensitive receivers (NSRs) would exceed the relevant construction noise criteria (i.e. 75dB(A) for residential uses; and 70dB(A) for educational institutions (65B(A) during school examination period)) at most of the NSRs. However, with the adoption of a combination of noise mitigation measures such as use of quiet type equipment, scheduling of construction programme to avoid concurrent works, and provision of movable and fixed temporary noise barriers, the predicted mitigated construction noise level would only range from 60dB(A) to 74dB(A), which comply with the relevant construction noise criteria. In addition, to ensure that the construction noise will not affect the nearby NSRs in the Fairview Park, Palm Springs and Yau Mei San Tsuen, short sections of temporary noise barriers (ranged from 3m to 6m high to shield the NSRs from potential construction noise) are proposed primarily along the Project site boundary. From the above, no adverse construction noise impact due to the Project or the nearby concurrent projects is anticipated.

Unmitigated Noise Level, dB(A)	**Mitigated Noise Level, dB(A)**	**Noise Criteria, dB(A)**	**Mitigation Measures**
>75 (>70 for educational institutions)	60 - 74	75dB(A) for residential uses; and 70dB(A) for educational institutions (65B(A) during school examination period)	Quiet type construction equipment; scheduling of construction programme to avoid concurrent works; and provision of movable and fixed temporary noise barriers.

2.3.2 Monitoring of the construction noise is recommended in the EIA report to ensure proper implementation of the mitigation measures, and to minimize the noise level as far as practicable.

Operational Phase

2.3.3 Regarding the traffic noise impact from the adjacent roads on future residents of the Site, the proposed development has setback from Yau Pok Road, thus the predicted road traffic noise level would range from 61dB(A) to 69dB(A) at the proposed development, which can comply with the relevant noise criteria of 70dB(A). Thus, there will be no unacceptable noise impacts from road traffic noise.

2.3.4 An evaluation conducted on potential industrial noise from activities within open storage site to the further east of the Project Site has found no adverse noise impacts on this Project and therefore no noise mitigation measure is necessary. The predicted noise level due to operation of the open storage site would be 44dB(A), which complies with the relevant noise criteria of 55dB(A) (day-time) and 45dB(A) (night-time), respectively.

	Calculated Noise Level, dB(A)	**Noise Criteria, dB(A)**
Road Traffic Noise	61 - 69	70
Industrial Noise	44	55 (day-time); and 45 (night-time)

2.3.5 From the above, it is concluded that with the adoption of the noise mitigation measures recommended in the EIA report, there will be no unacceptable noise impacts.

2.4 Water Quality

2.4.1 The Project will involve land-based works only, thus during construction of this Project, the major potential water quality impact will be from surface runoff and soil erosion of exposed surfaces. To alleviate the impacts, the EIA report recommends the adoption of good site practices and construction of a properly designed temporary drainage system within the site.

2.4.2 A peripheral site drainage system comprising precast concrete u-channels along site boundary together with sand/silt removal facilities and in accordance with the requirements stipulated in Professional Persons on Environmental Consultative Committee Practice Notes on the Site Drainage (ProPECC PN 1/94), will be constructed in order to divert surface runoff away from the Fairview Park Nullah and the existing drainage to the south of Palm Springs. Similar peripheral site drainage system will also be constructed along the edge of residential portion during its construction. The surface runoff will be properly treated prior to the discharge into Ngau Tam Mei Drainage Channel (NTMDC). Pursuant to the “Water Pollution Control Ordinance”, applications to the EPD for Discharge Licences are required prior to the commencement of the construction works and occupation of the development. In addition, regular environmental audits, as part of the proposed Environmental Monitoring and Audit (EM&A), including regular water quality monitoring and site inspections will be undertaken routinely in order to ensure there is no uncontrolled discharge of surface runoff and that the recommended mitigation measures are properly implemented.

2.4.3 Upon occupation of the Site, all domestic sewage generated will be discharged to the public sewerage system at Yau Pok Road. Before the concerned public sewerage system becomes available, an interim sewage treatment plant will be used for treatment of sewage generated from the proposed development. The discharge of treated effluent would comply with the relevant discharge limits/ criteria in order to ensure there will be no net increase in pollution loading to Deep Bay areas. The discharge from the STP is also subject to a discharge licence under the WPCO, and the discharge shall comply with the terms and conditions in the licence as well as the conditions specified in the Environmental Permit (EP) of this Project.

2.4.4 Surface runoff from the development site will be discharged to the NTMDC. Best Management Practices have been proposed in order to abate first flush pollution in stormwater runoff such as design measures to minimise soil erosion, proper site drainage design/control; provision of devices/ facilities to control pollution and to remove pollution source; and administrative measures for maintenance issues. Standard design of road gullies with silt traps and oil interceptors will be incorporated during the detailed design. Drainage outlet of covered car park will also be equipped with oil interceptor. In addition, manhole with sand trap will be incorporated before final discharge. With appropriate drainage system equipped within the proposed development, there will be no adverse water quality impact during the operation of the Project as the increase in surface runoff from this Project is insignificant when compared with the capacity of the trained downstream Ngau Tam Mei Drainage Channel, which are engineered drainage channels designed for collecting stormwater. The proposed wetland restoration area (WRA) in the north-western portion of the Project Site has been designed so that it will be self-contained and there is no outlet connecting to nearby channel/inland water. Surface runoff will be diverted away from the WRA by drainage channels.

	Recommended Mitigation Measures
Construction Phase	• A peripheral site drainage system comprising precast concrete u-channels along site boundary and works area; • Equipped with sand/silt removal facilities in accordance with the requirements stipulated in Professional Persons on Environmental Consultative Committee Practice Notes on the Site Drainage (ProPECC PN 1/94); • Surface runoff to be diverted away from the Fairview Park Nullah and the existing drainage channel to the south of Palm Springs; • Collected surface runoff will be properly treated prior to the discharge into Ngau Tam Mei Drainage Channel; • Regular environmental audits, as part of the proposed Environmental Monitoring and Audit (EM&A), including regular water quality monitoring and site inspections to ensure there is no uncontrolled discharge of surface runoff and that the recommended mitigation measures are properly implemented; and • Pursuant to the “Water Pollution Control Ordinance”, applications to the EPD for Discharge Licences prior to the commencement of the construction works and occupation of the development

	Recommended Mitigation Measures
Operational Phase	• Domestic sewage to be discharged into planned public sewers under the permanent disposal scheme; • A sewage treatment plant to treat generated sewage in interim; • Treated effluent is to comply with relevant discharge limits in the licence and the conditions in the EP, and there is no net increase in pollution loading to Deep Bay areas; • Best Management Practices have been proposed to abate first flush pollution in stormwater runoff, which covers design measures; provision of devices/ facilities to remove pollutants; and administrative measures. • Proper drainage system to collect surface runoff from the development with appropriate facilities and sand traps. Road gullies, car park and similar facilities installed with oil interceptors; • WRA is to be self-contained and surface runoff to be diverted away from WRA.

2.4.5 With the adoption and implementation of the mitigation measures recommended in the EIA report, no adverse water quality impact is anticipated during construction or operation of the Project.

2.5 Sewerage and Sewage Treatment

2.5.1 The proposed residential development area will be located to west of the Yau Mei San Tsuen Village. There is no existing public sewerage system in the vicinity to the Development. The Project Area with maximum 345 people (resident and staff) will generate a peak flow of 12 l/s additional sewage peak flow to the future public sewerage network under PWP Nos. 4215DS and 4235DS, as permanent measure. Hydraulic analysis shows that the future public sewerage and pumping stations have sufficient spare capacity for conveying the overall sewage generated at 2030 which includes the additional sewage from the Project Area. The hydraulic analysis also revealed that YLSTW after upgrade would have adequate capacity for the overall sewage generated at year 2030.

2.5.2 Considering that the current implementation programme of the Ngau Tam Mei Sewerage under PWP 4235DSD is still very tentative and uncertain due to public objection. It is necessary to consider the provision of the on-site sewage treatment facility as an interim measure to handle the sewage generated from the development. The interim on-site sewage treatment facility with the enhanced tertiary treatment process of MBR/RO system will treat the 148m^3/day sewage to achieve the Group C Inland and Costal Discharge Standard of Deep Bay WCZ. Also, it is understood there is no denitrification and effluent disinfection process at YLSTW currently; whilst nutrient and bacterial requirements are not specified under the current discharge license. The MBR/RO effluent will give better water quality than the discharge effluent at YLSTW.

2.5.3 Furthermore, it is aware that the interim treatment plant needs to fulfil the requirement of no net increase of pollution loads to the Deep Bay under the Town Planning Board (TPB) Guidelines, i.e. TPB PG-No.12C. Considering all the existing village houses and associated septic tanks within the site area will be vacated and demolished for the purpose of the proposed development, the residual pollution loads of the on-site sewage treatment plant will be reduced by offsetting the current pollution loads from the existing village houses after the completion of the proposed development. It is

hence evident that the proposed development will not cause net increase of pollution load to the Deep Bay WCZ in adhere with the pollution loads requirement under the TPB guidelines. At the same time the provision of the interim onsite sewage treatment facilities will have positive impact on the pollution load to Deep Bay WCZ comparing to the existing condition and do nothing scenario.

2.5.4 Furthermore, the sewerage system within the development area will be designed to facilitate the future connection to the government sewerage system at Castle Peak Road. The proposed sewerage system for the Development will be connected to Ngau Tam Mei sewerage system once it becomes available. Adverse short-term and long-term environmental impacts in respect of water quality, ecological, public health and safety arising from both the long term and interim sewerage scheme are not anticipated. No adverse sewerage impact will be incurred as a result of the development.

	Recommended Measures
Domestic Sewage	• A peak flow of 12 l/s sewage to be generated; • Sewage to be discharged into planned public sewer under permanent disposal scheme; • An interim sewage treatment plant (STP) comprising enhanced tertiary treatment process of MBR / RO system before planned public sewer is available; • STP to be designed to facilitate future connection to the planned public sewer; • Maintenance and emergency measures recommended to ensure effective operation of the STP; • Discharge from STP will not result in net increase in pollution loading to Deep Bay by offsetting existing pollution loads; • The discharge of treated effluent from the STP is to comply with the terms and conditions in the discharge licence under the WPCO as well as the conditions specified in the EP of this Project.

2.6 Waste Management

2.6.1 The types and categories of waste that would be generated during the construction phase of the Project include site clearance, excavated soil, construction and demolition materials, chemical waste from the maintenance of construction plant and equipment, and general refuse from the workforce. Opportunities for reduction in waste generation through recovery, reuse or recycling have been identified in the assessment. Excavated materials and C&D materials can be reused as filling materials where possible.

2.6.2 The appropriate disposal method for each type of waste generated from the construction method was identified. Opportunities for reducing construction waste generation and maximizing re-use on-site were evaluated. Environmental mitigation measures and good practices have been recommended in the EIA report in order to mitigate the environmental impacts.

	Recommendations
Construction Waste	• A waste management plan to be prepared and implemented by contractor(s) through-out construction; • Implementation of proper trip ticket system; • Proper training on waste management to workers; • Avoidance and minimization to reduce the potential quantity of C&D materials generated; • Reuse of materials as practical as possible; • Recovery and Recycling as practical as possible; • Proper treatment and disposal in respect to relevant laws, guidelines and good practice; • Landfill disposal as the last resort; and • Regular environmental audit and monitoring to ensure effective implementation.

2.6.3 With the recommended practices are strictly followed, no adverse impacts to the environment associated with waste generated by the construction phase of the Project are anticipated.

2.6.4 As the Project is not a high-density development, the development even when fully occupied will generate limited amount of domestic waste. Standard approach that is widely adopted in other parts of Hong Kong shall be adopted for the handling and disposal of this small quantity of waste during the operational phase. Waste generated will be collected and disposed of properly by a licensed contractor using refuse collection vehicle. Thus, no adverse waste management issues are expected to arise during operation of the Project.

2.7 Ecology

2.7.1 Six habitats (pond, marsh, reedbed, seasonally wet grassland, dry agricultural land and grassland/shrubland) were identified within the Project Area. A 12-month ecological survey programme was conducted to assess the habitat characteristics and wildlife utilization within the Project Area and adjoining areas. All habitats of the Project Area support a low diversity of plant species, all of which are common to very common in the territory. The overall faunal diversity was also low. These habitats were evaluated as having "Low" to "Low to Moderate" ecological value. Further site visits were undertaken in December 2014 to verify the habitat condition, and it was confirmed that the conditions of these areas are unchanged. The major impact of the proposed development is the residual loss of agricultural land but the wetland habitats in the north of the project Area will be retained and enhanced. A key element of the project will be in the establishment of a 3.8ha Wetland Restoration Area (WRA), including 0.2ha of Wetland and Visual Buffer; thus there will be a net increase in the area functioned as wetland of 0.8ha (a 27% increase). Habitats to be restored/ enhanced in the WRA will include pond with deep and shallow water zones, marsh, reed, bamboo, gravel (non-vegetated area), grassy bund and wooded bund. All these habitats have been carefully chosen to provide suitable conditions for the wetland fauna (waterbirds, amphibians and dragonflies) which currently use the Project Area; hence none of these wetland fauna will be adversely affected. Indeed, during operational stage because the WRA will be carefully designed and actively managed for their needs, these species are expected to benefit from the project's successful implementation.

2.7.2 The WRA will be completed before the construction works of the residential portion commences so as to mitigate for direct and disturbance impacts to birds during the construction phase of the Project. In addition, an area of temporary wetland enhancement is proposed prior to the construction period of the WRA to further reduce the potential impact of short-term habitat loss for wildlife caused by this mitigation measure.

	Recommendations
Operational Phase	• 3.8 ha of Wetland Restoration Area to be established, including 0.2ha of Wetland and Visual Buffer; • A net increase in area functioned as wetland ; • WRA comprising pond with deep and shallow water zones, marsh, reed, bamboo, gravel (non-vegetated area), grassy bund and wooded bund; • Habitats for wetland fauna (waterbirds, amphibians and dragonflies) enhanced; • Carefully designed and actively managed under the scheme agreed with relevant government authorities.
Construction Phase	• WRA to be constructed prior to construction of residential portion to mitigate disturbance to birds; • A temporary wetland enhancement area to be provided during the construction and establishment periods of WRA.

2.7.3 Overall, with the above mitigation measures in place, there would not be significant adverse residual ecological impact from the proposed development. Furthermore, as a net ecological gain, the project will contribute to maintaining the integrity of the wider Deep Bay wetland ecosystem by securing the permanent long term conservation management of wetland habitats which will link the ponds to the north and the Ngau Tam Mei Drainage Channel to the south. This will ensure that flight-lines for waterbirds flying between these areas will not be impeded and will be permanently protected.

Project Site – currently the developable area consists of dry agricultural fields and grassland/shrubland

Project Site – wetlands within the site are currently unmanaged, limiting their ecological function

2.8 Fisheries

2.8.1 There are no ponds for edible fish aquaculture within the Project Site. The existing ponds within Project Site will be retained and converted into wetland habitat (ponds) and managed as part of the WRA. The loss of the potential for redevelopment for editable fish culture is insignificant as comparing to the overall fish pond area (<1%). When other concurrent projects are taken into consideration, the cumulative fisheries impact remains insignificant and acceptable. Hence, no significant adverse fisheries impact is predicted. Further, with the implementation of good site practices and water quality and construction and operational sewerage and drainage measures, indirect impacts during construction and operational phases would also be insignificant. .

2.9 Cultural Heritage

2.9.1 A Cultural Heritage Impact Assessment has been carried out for the Project. The assessment area has been determined to contain no site of archaeological interest/

potential. Thus, no direct and indirect impacts to any terrestrial archaeology are anticipated. In addition, no land use features or declared monuments that may carry specific cultural meanings were identified within the Project Site, thus there is no cultural element concerned.

2.9.2 The only potential cultural resource identified is an ancestral hall at existing Wo Shang Wai village 450m north of the Project Site beyond existing major residential developments such as Palm Springs and Royal Palms. The ancestral hall is not a graded historic building and has already been modified with modern structures, which is also located beyond the Project Area. It is concluded that no cultural heritage resources will be affected by the Project and no specific mitigation measures would be required during construction and operation phases of the Project.

2.10 Landscape and Visual

2.10.1 The major source of landscape and visual impacts arising from the proposed development will be due to the removal of existing vegetation, the presence of the construction sites/new structures, and the enhancement works to be implemented to the existing pond / wetland within the WCA portion.

2.10.2 These impacts will be mitigated during construction by various measures. These will include the proper preservation of existing healthy unaffected trees, advance tree planting, the appropriate screening of construction works, and, the control of night-time lighting. The temporary noise barriers (approximately respectively 3m, 4.5m and 6m high) are proposed along the southern part of the development. The temporary noise barrier design will incorporate finishes, such as opaque and non-reflective material utilising colours that are sympathetic to the surrounding environment. The form of treatment will be sensitively selected to reduce visual impact and to avoid bird strikes (**Figures 4 & 5**).

2.10.3 When the development comes into operation, impacts will be mitigated by new, healthy planting throughout the development, within the landscape buffer along the boundary (**Figure 3**), and the restored wetland/ pond. These features (especially the wetland pond by enhancing the existing pond / wetland area) will uplift the overall landscape amenity.

2.10.4 The visual impact of the 1.8m high perimeter wall and 1.8m high wire mesh will be mitigated by very careful landscape treatment (**Figure 3**).

2.10.5 The assessment concluded that the residual landscape and visual impacts of the proposed development will be acceptable with mitigation measures during construction and operation phases.

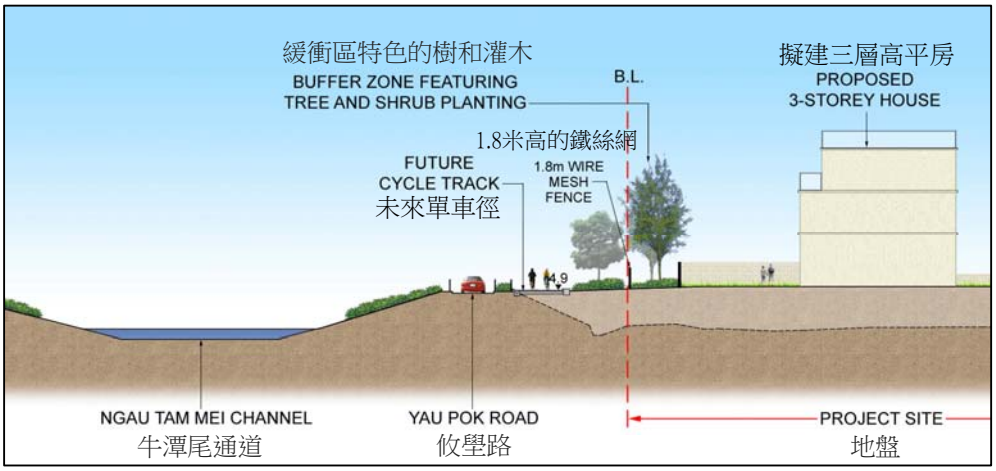

Figure 3 - Proposed Landscape Buffer along the Boundary of the Project Site

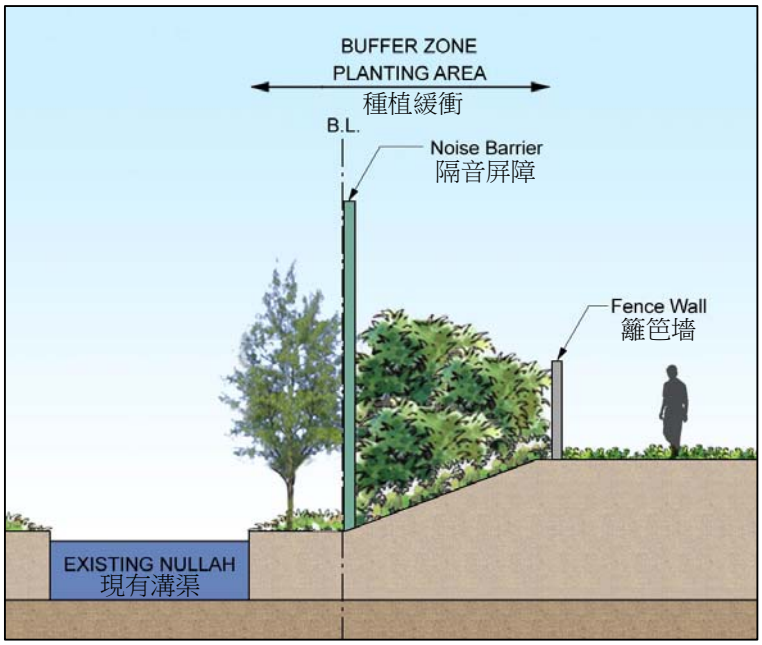

Figure 4 - Illustrative Section of Noise Barrier Buffered & Visually Enhanced by Peripheral Planting

Figure 5 - Conceptual View of a Section of Noise Barrier with Proper Peripheral Landscape Treatment

3. ENVIRONMENTAL MONITORING AND AUDIT

3.1.1 An environmental monitoring and audit (EM&A) programme will be implemented for the Project during the construction and operational phases, to check sufficiency and effectiveness of the recommended mitigation measures to ensure compliance with relevant statutory criteria and requirements.

3.1.2 Details of the EM&A programme, mitigation measures required during construction and operational phases, and requirements are provided in the EM&A Manual of the EIA report. An Environmental Team (ET) comprises suitably qualified staff and specialists shall be appointed to carry out the recommended EM&A works for the project. The Independent Checker (Environment) (IEC) shall advise the Engineer or Engineer's representative on environmental issues related to the project and audit ET's EM&A works. A summary of key EM&A monitoring schedule is provided below:

EM&A Monitoring Schedule

Environmental Aspects	**EM&A Requirement**
General	Construction Phase: • Site Surveillance – once per week during construction phase by ET; • Environmental complaints investigation – upon receipt of complaints by ET and IEC; • Reporting – baseline monitoring report; monthly EM&A reports; quarterly EM&A summary reports; and final EM&A reports by ET.
Noise	Construction Phase: Monitoring noise level at nearby sensitive receivers. • Baseline Monitoring: Monitoring for 14 days prior to commissioning of construction works by ET. • Impact Monitoring: Weekly monitoring throughout the construction phase by ET. Operational Phase: Nil
Air Quality	Construction Phase: Monitoring dust level at nearby sensitive receivers. • Baseline monitoring by ET: Monitoring for 14 days prior to commissioning of construction works by ET. • Impact monitoring: Monitoring every six days and throughout the construction phase by ET. Operational Phase: Nil
Water Quality	Construction Phase: Monitoring water quality at nearby nullah and Ngau Tam Mei Drainage Channel by ET. • Baseline Monitoring:

Environmental Aspects	**EM&A Requirement**
	3 days a week and for 4 weeks prior to commissioning of construction works by ET. • Impact Monitoring: 3 days a week throughout the construction phase by ET. Operational Phase: Nil
Sewerage	Construction Phase: Nil. Operational Phase: Regular sampling and testing of treated effluent in accordance with discharge licence requirements as well as conditions specified in the EP during operation of the interim sewage treatment plant.
Waste Management	Construction Phase: Monitoring on waste generation, disposal and minimisation by ET and Engineer. Auditing on contractor(s) waste management performance. Operational Phase: Nil
Landscape and Visual	Detailed Design: Monitoring design works against recommendations of landscape and visual in the EIA during detailed design stage by a Registered Landscape Architect. Construction Phase: • Baseline Monitoring: Prior to construction works. • Impact Monitoring: Monitoring and auditing on the implementation of landscape construction works and subsequent maintenance operations by a Registered Landscape Architect. Operational Phase: To be audited by a Registered Landscape Architect during the last 12 month establishment period. Managed and maintained during operation.
Ecology	Construction Phase (Monitored by qualified ecologists): • Baseline Monitoring: 12 months prior to the commencement of any site clearance for wetland and/or residential construction to establish the baseline condition of the site; this includes bird, dragonfly/butterfly and herpetofauna. • Impact Monitoring: Monitoring of the items during the baseline monitoring is required and weekly site visit. • Advance Provision of the WRA: The WRA should be constructed prior to the commencement of the residential portion. • Temporary Ecological Enhancement Area: An area at the western portion of the site is to be managed and maintained as a temporary ecological enhancement area.

Environmental Aspects	**EM&A Requirement**
	• Site Hoarding: To be provided at the boundary of the Project Area. • Movable noise barrier: To be provided around machinery. • Control Access: No unauthorized access to the WRA; no dogs allowed at the construction site. <u>Operational Phase</u> (Monitored by qualified ecologists): • Ecological Monitoring: Ongoing of ecological monitoring to evaluate the success of the WRA; • Control Access: Implementation of a 1.8 m tall dog-proof chain link fence. No unauthorized access to the WRA; no dogs allowed at the WRA.
Fisheries	<u>Construction Phase</u>: Nil <u>Operational Phase</u>: Nil

4. OVERALL CONCLUSION

4.1.1 The findings of this EIA have provided information on the nature and extent of environmental impacts arising from the construction and operation of the Project Site.

4.1.2 Based on the results of the Assessment, the EIA study concludes that the Project would be environmentally acceptable and would comply with all environmental legislations and standards. The EIA Study has also predicted that after the adoption of appropriate mitigation measures, there would be no adverse residue impacts. An environmental monitoring and audit programme has been recommended to monitor the implementation of the mitigation measures and to ensure compliance with environmental standards.

APPENDIX A

Environmental Impact Assessment
Non-Technical Summary

毗鄰攸美新村的**綜合發展及濕地保護計劃**

Comprehensive Development and Wetland Protection Near Yau Mei San Tsuen

環境影響評估**非技術摘要**

Environmental Impact Assessment **Non-Technical Summary**

二零一四年十二月
December 2014

聯同
in association with

雅邦 Urbis Limited

ENVIRON

AECOM

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ecology arboriculture landscape aec

Handi Architects Limited

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1.0 PURPOSE OF NON-TECHNICAL SUMMARY AND CONTENT

Purpose

This non-technical summary (NTS) aims to provide a concise reader-friendly understanding of the results of the environmental impact assessment (EIA) that has been undertaken for a proposed wetland conservation and residential development project located near Yau Mei San Tsuen. Comprehensive technical details of the assessment can be found in the full EIA Report should readers require further detail. The NTS describes the following:

2.0 PROACTIVE PHILOSOPHY

Figure 2.1 Proposed Development Blending in the Natural Environment

The Planning intention of this zone is to allow all consideration of comprehensive low-density residential development or redevelopment provided that all the existing continuous and contiguous fish ponds within the zone are protected and conserved.

Source: Mai Po & Fairview Park OZP S/YL-MP/6

Proactive Philosophy

It is a common misunderstanding that wetland conservation can only take place if no development is permitted. In reality, a do-nothing approach may lead to further decline in ecological value. This can be caused by commercial farming activity located on dry agricultural land abutting wetland areas. In the instance of the subject project site either the intensification or abandonment of farming activity will have adverse impacts on the adjoining Deep Bay Wetland System. To avoid this, a holistic approach has been adopted in the current statutory town plan to achieve specific conservation and protection objectives through incentive mechanisms. Passive planning intentions on control cannot, however, ensure sustainable use of wetlands by waterbirds, and may result in a lack of management of abandoned ponds. To materialise the planned objectives, a comprehensive development proposal has been 'implanted'.

This adopts 3 basic principles:

- ***Wetland Conservation:*** The proposal enshrines and emphasises the conservation, enhancement and management of the wetland within the site;
- ***Sustainable Land Use Planning:*** Philosophy of permitting low impact residential / recreation development in exchange for long term commitment.
- ***Long Term Capability:*** The comprehensive development proposal adheres to the Government statutory town plan to make use of the existing dry agriculture land of low to moderate ecological value for low-density residential development to support the future management.

3.0 THE SITE LOCATION AT THE LANDWARD FRINGE OF DEEP BAY

The Project Area is located in the North West New Territories (NWNT) at the landward fringe of the Deep Bay wetland approximately 1,000m from the Mai Po Nature Reserve (see **Figure 3.1**). Fairview Park and Palm Springs, and rural houses are also located close to the Mai Po Nature Reserve. The site also lies adjacent to the Ngau Tam Mei Drainage Channel and the San Tin Highway.

Disused fish ponds are currently located in the northern portion of the site and abandoned dry farm land in the southern portion. The present degraded and neglected conditions previously on site will be reconciled by the proposed development, ecological, and other enhancement initiatives described in this summary. These will transform the site into an area principally made up of wetland protection supported by a suburban settlement (see **Figure 3.2**).

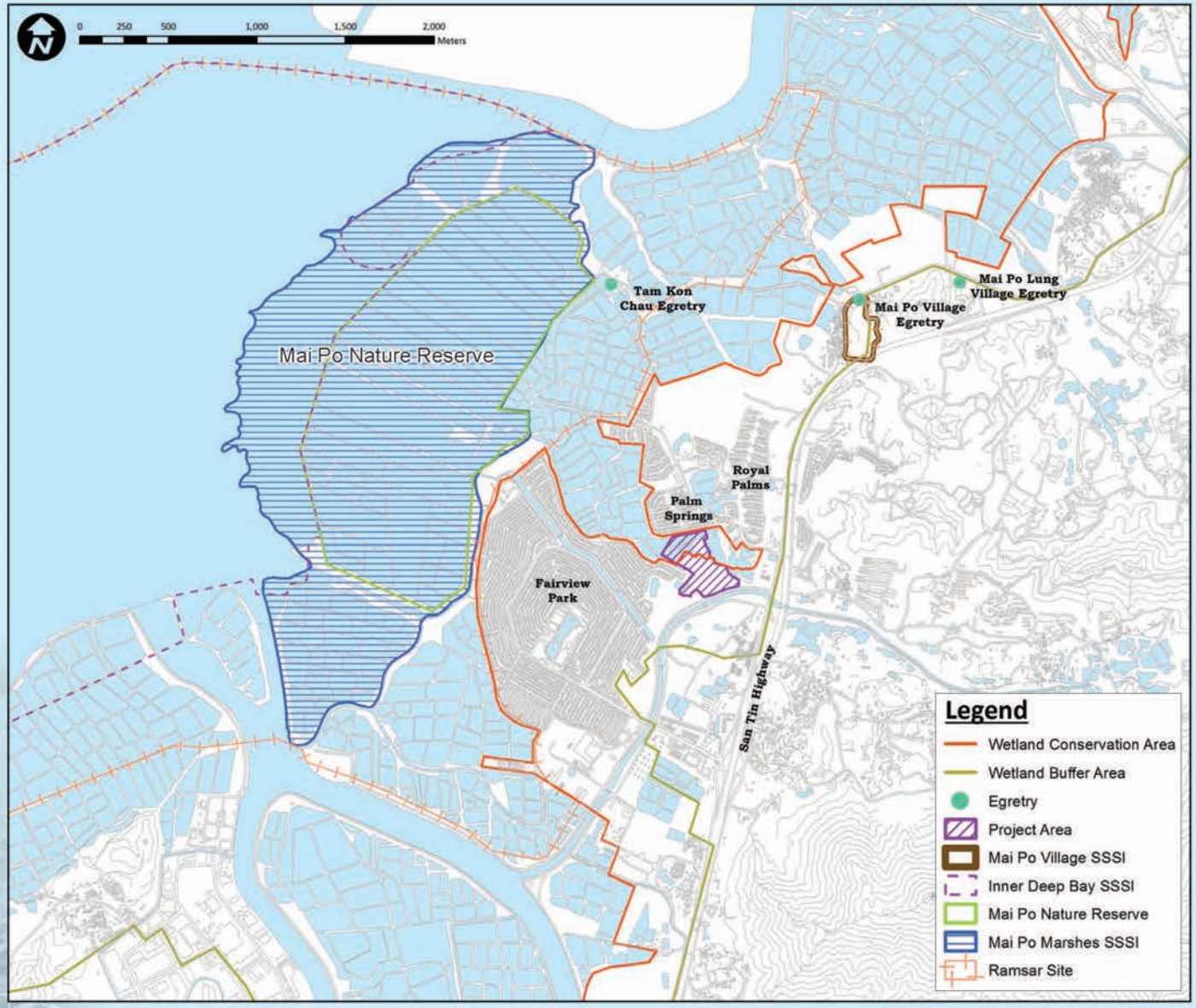

Figure 3.1 Site Location and its Land Use Context

3.0 THE SITE LOCATION AT THE LANDWARD FRINGE OF DEEP BAY

Legend

1. Proposed Residential cum Passive Recreational Development within "Recreation" Zone and "Residential (Group C)" Zone.
2. Approved Planning Application No. A/YL-MP/205
3. Approved Planning Application No. A/YL-MP/202

Figure 3.2 Site Location

4.0 ALTERNATIVE PLANNING PROPOSALS AND THEIR RATIONALE

Several approaches with and without development have been investigated and discussed in connection with the site during under the EIA and Continuous Public Involvement process. In a 'do-nothing' situation, it was determined that the ecological value of the Site would continue to decline. The present dry agriculture areas are low to moderate ecological value and have little capability to generate wetland fauna. As-of-right agricultural use may involve draining, dredging, uncontrolled drainage diversion and biological/chemical impacts which would eventually jeopardise the wetland eco-system. The abandoned ponds would silt up, and be colonized by vegetation (including invasive weed species) and would also gradually dry out if there were no proper management. Accordingly, there are all kinds of uncertainties and potential ecological risks associated with this approach. Intervention to ensure that this situation would not occur would require public sector intervention. It is most unlikely that government would intervene in this regard. As such there needs to be a solution whereby the private sector is incentivised to implement measures that will promote ecological conservation and enhancement. It was consequently advocated that this sort of approach be pursued.

The recommended approach and layout therefore incorporates further protection of the fish ponds at Wetland Conservation Area by providing additional habitats. It is also proposed that ecological linkages are enhanced. This approach incorporates the enhancement of wetland habitats and the provision of low-density residential development. The latter provides a means through which enhancement works can be financed and the long-term conservation and management of the restored wetland areas in conformity with TPB Planning Guideline No.12C can be secured. The proposed scheme will involve the provision of wetland habitats between the wetland areas in the east and the provision of buffer planting in the west. A Wetland and a Visual Buffer will be provided to the south of the Wetland Restoration Area (within the Wetland Buffer Area) to further protect the Wetland Conservation Area in compliance with TPB Planning Guideline No.12C and the planning intentions advocated under the prevailing statutory planning framework (see Section 5.0 following). The project proponent has therefore utilised this option for the purposes of the environmental impact assessment.

5.0 LAND USE PLANNING AND WETLAND PROTECTION REQUIREMENTS

5.1 Meeting Planned Objectives of Town Planning Board

As noted above the future of the Wetland Conservation Area (WCA) relies on the success of proactive approach as promulgated in the statutory town plan (Mai Po & Fairview Park Outline Zoning Plan No. S/YL-MP/6, the OZP). The planning intention advocated under the prevailing statutory plan is to provide incentives to land owners to commit in long-term conservation and management of fish ponds by permitting compatible low-density residential development adjacent to the ponds subject to planning conditions under the control zoning "Other Specified Uses (Comprehensive Development and Wetland Protection Area)", OU (CDWPA) in **(Figure 5.1)**. The key planned objectives outlined in the Notes accompanying the OZP state that there should be:

> *'no-net-loss in wetland', 'no pond filling' and 'no decline in wetland function of the fish ponds within or near the development site'.*
>
> *and*
>
> *'to allow consideration of comprehensive low-density residential development or redevelopment provided that all the existing continuous and contiguous fish ponds are protected and conserved.'*

The scheme described and depicted in this NTS fully conforms to this planning intention and provides a means through which conservation measures can be implemented managed and maintained.

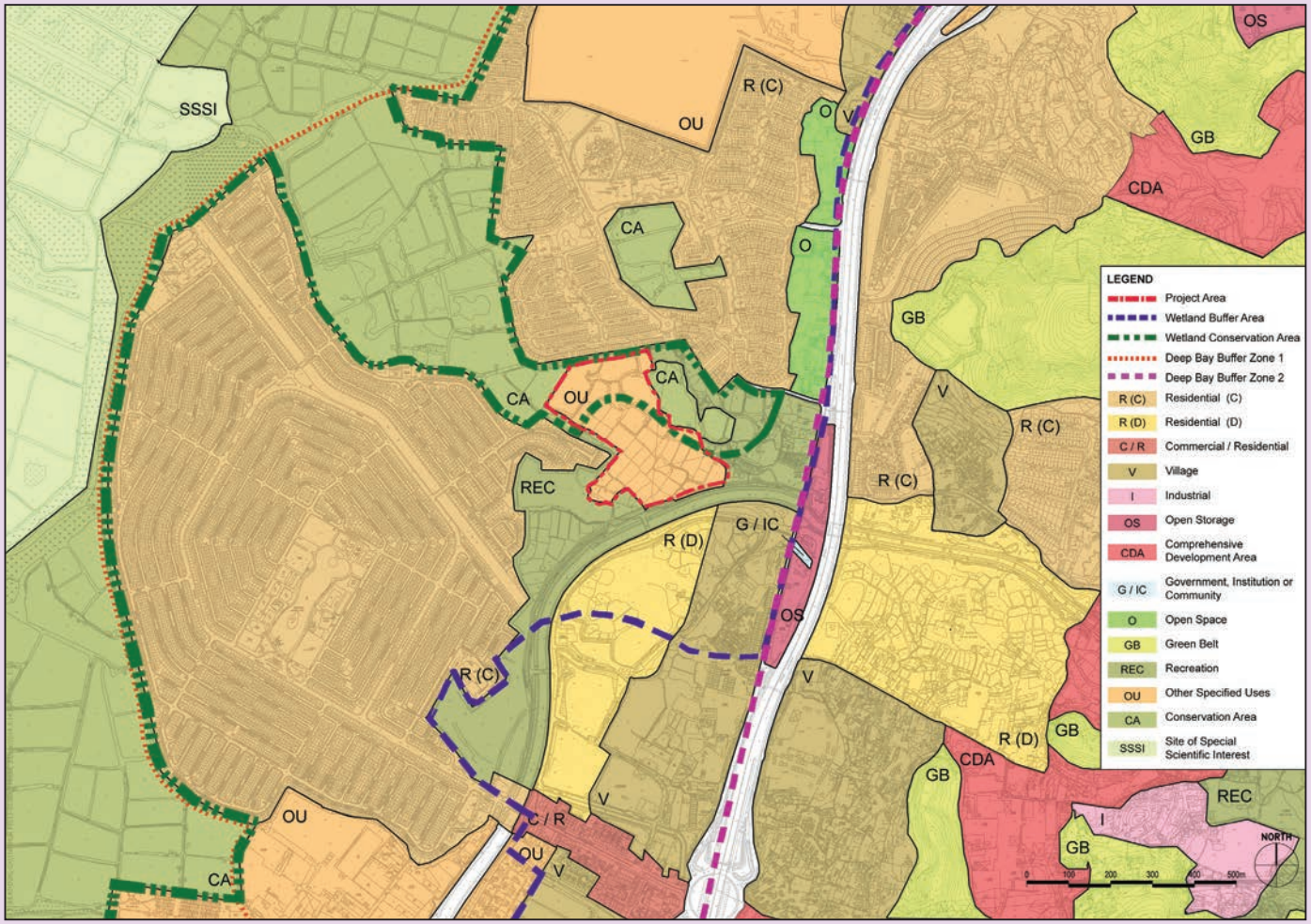

Figure 5.1 Approved Mai Po & Fairview Park OZP No. S/YL-MP/6 Gazetted on 18/02/2005

5.2 Problems with Existing Wetland

The current fish pond habitat in the subject site was originally a man-made habitat created for fish farming. The ponds were subsequently abandoned due to the decline in the fishing industry. As noted under Section 4.0 without active management of the water level and vegetation control, the fish ponds will progressively dry and become subject to invasion by exotic and weedy, herbaceous vegetation through natural successions. Possible **transition into non-wetland habitats** such as grassland and scrubland of low ecological value are likely to result over time. The transition is likely to be unavoidable if not irreversible. From a conservation perspective this would be **undesirable**.

6.0 THE DEVELOPMENT PROPOSAL AND THE MANAGEMENT PLAN

6.1 Development vs Conservation

There is no conflict between development and wetland. The low-density development is designed as a low impact community that incorporates a buffer zone to separate regional transport infrastructure and proposed and existing suburban developments. The wetland buffer proposed in the development reinforces the separation of human activities from the natural environment. Many proactive design measures have been adopted to design out adverse impacts that could have risen from the scheme **(Figure 6.1)**. These include the provision of private backyards to set back development from proposed conservation areas. This will ameliorate disturbance to the Wetland Restoration Area (WRA). Site level differences have also been utilised to strengthen separation and to restrict access to the WRA. An eco-linkage between the wetland and the new eco-habitat in the drainage channel has also been introduced to promote continuity of areas committed to ecological conservation and enhancement **(Figure 6.2)**.

Figure 6.2 Eco-linkage

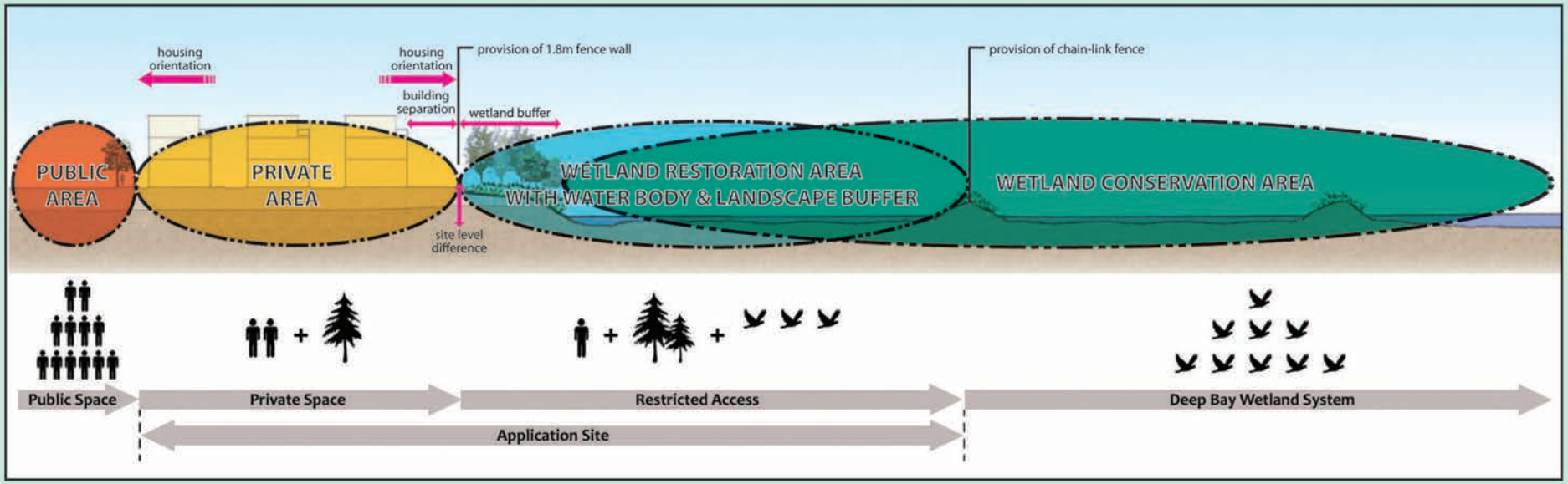

Figure 6.1 Proactive Design to Reduce the Human Disturbance

6.2 Proposal Overview

It is intended that development on site will be limited to a low-density residential development with a plot ratio of 0.2 (3-storey houses). These will only be developed on the dry land. The volume of development will provide sufficient incentive to provide for the financing of the long-term conservation and management for the WRA. This could not be facilitated by any lesser magnitude of development.

A proposed WRA of 3.8ha in extent will protect and conserve all fish ponds on the site **(Figure 6.3)**. The proposal for the WRA includes wetland & buffer planting to increase the wetland area and its conservation functions. The total area available for conservation will be increased from an existing area of some 3.0ha to a future to some 3.8ha (i.e. 27% increase in area). The new area, as noted, earlier will be subject to active and ongoing future management. The proposed ecological connection between wetland habitat ponds in the WCA and the Ngau Tam Mei Drainage Channel will include a 0.2ha area of reed buffer planting.

6.3 Sustainable Management Plan

To ensure the wetland protection is effective, a long term management mechanism must be put in place. Different approaches of funding and managing the wetland have been explored, and agreement will be reached with Government. Until such time of agreement, the Project Proponent will provide an undertaking to assume the responsibilities of the funding, implementation, management and maintenance of the WRA as part of the development.

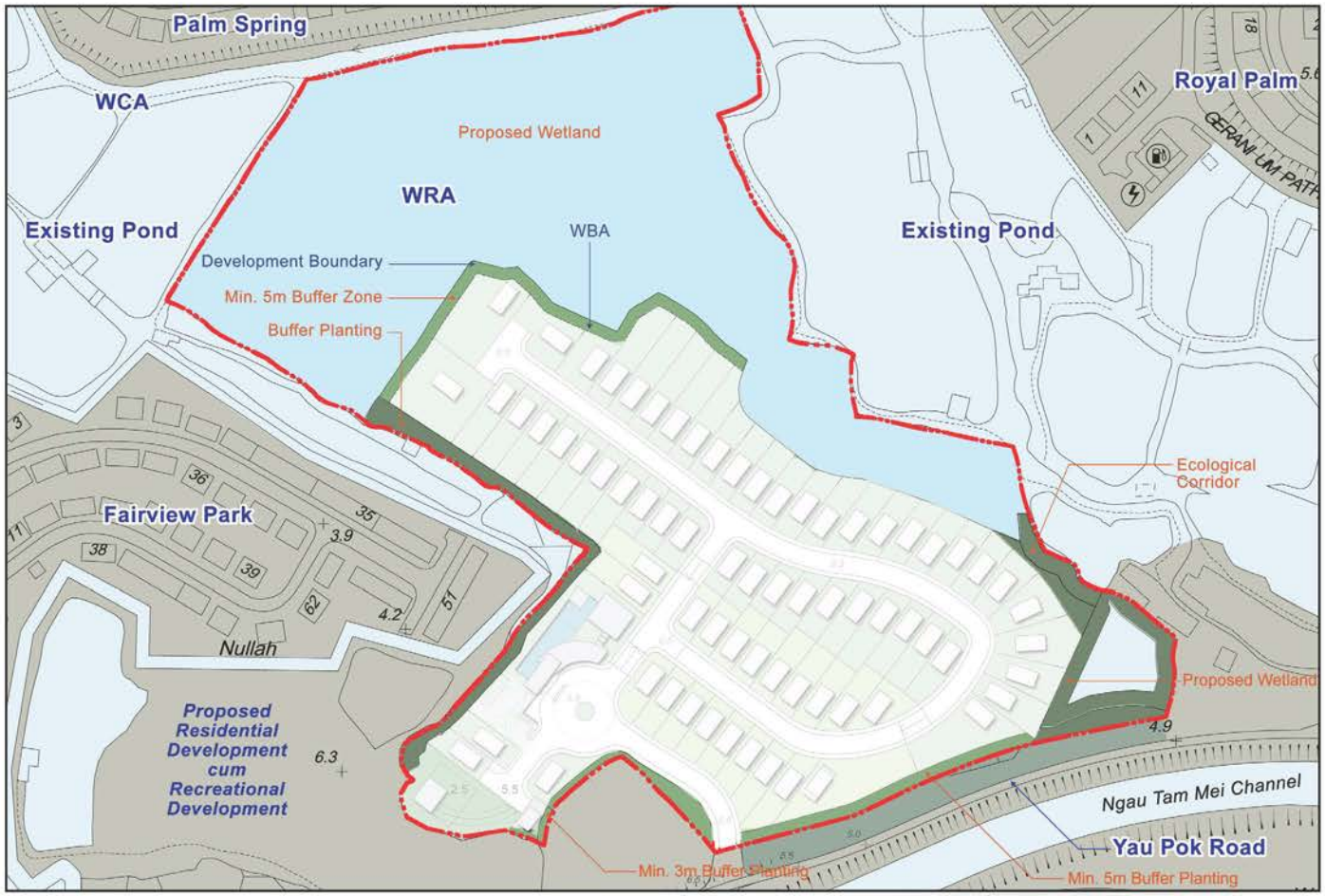

Figure 6.3 Comprehensive Development Proposal

7.0 CONTINUOUS PUBLIC INVOLVEMENT (CPI)

7.1 Engagement of Key Stakeholders

Consultations with local Non-Governmental Organisations (NGO's) concerned with the environment and local residents on the development were undertaken at an early stage in 2008. These will be continued after the implementation of the Project. This initiative is to ensure concerns have been addressed in the early stage of planning. Meetings with concerned NGO's were held as early as mid-2008 to obtain their views and identify their key concerns on the proposed development. The nearby local residents such as those at Fairview Park, Palm Springs, Royal Palms and the Yau Mei San Tsuen have been consulted. Some of the respondents provided positive responses. Others were more cautious in their comments. On-going stakeholders' views are to be solicited at the subsequent development stages including submission, construction and operation of the project.

8.0 KEY FINDINGS OF THE ENVIRONMENTAL IMPACT ASSESSMENT

8.1 Designated Project under the EIAO

The Environmental Impact Assessment Ordinance (EIAO) requires residential or recreational developments within Deep Bay Buffer Zones 1 or 2 to carry out environmental impact assessment (EIA). The project consists of a comprehensive development and is subject to the provisions of the EIAO (An EIA report has been prepared). The potential environmental issues associated with the construction and operation of the Project have been assessed and addressed. Key findings are summarised in the following sections.

8.2 Air Quality

The nearby community will be concerned about air quality mainly during construction phase of the Project. Fugitive dust emissions are envisaged from site formation works and various mitigation measures will be implemented to mitigate dust levels to meet the latest air quality objectives (AQOs)/ EIAO-TM criteria. Their effectiveness has been verified through the use of quantitative air quality models (**Figure 8.1**) and the Environmental Protection Department (EPD) has been consulted.

8.3 Noise

It is expected that if uncontrolled construction activities may generate adverse noise impacts. A combination of noise mitigation measures will be applied to ensure compliance with the relevant construction noise criteria (**Figure 8.2**). No adverse construction noise impacts are anticipated to arise from the Project including the nearby projects being implemented concurrently. The noise generated due to an increase in traffic will be reduced through layout design measures such as set backs and separation distances. The on-site sewage treatment plant (STP) will be treated with acoustic louvers and silencers. It is estimated that there will be no adverse noise impact with the implementation of the recommended noise mitigation measures.

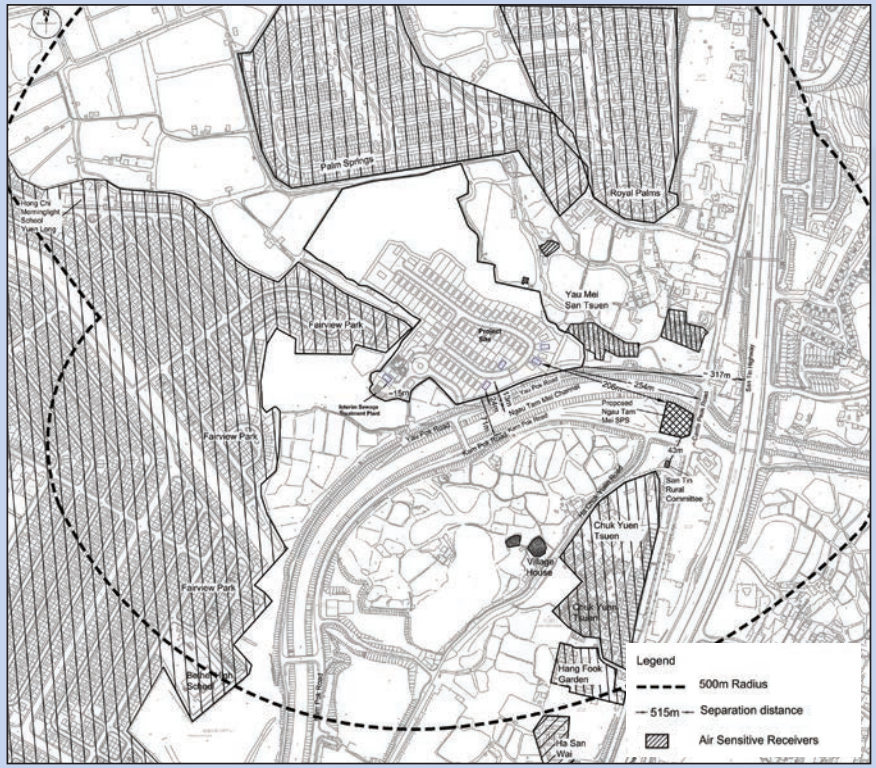

Figure 8.1 Location of Air Sensitive Receivers taken into Consideration during EIA Process and the Environmental Protection Department (EPD) has been consulted

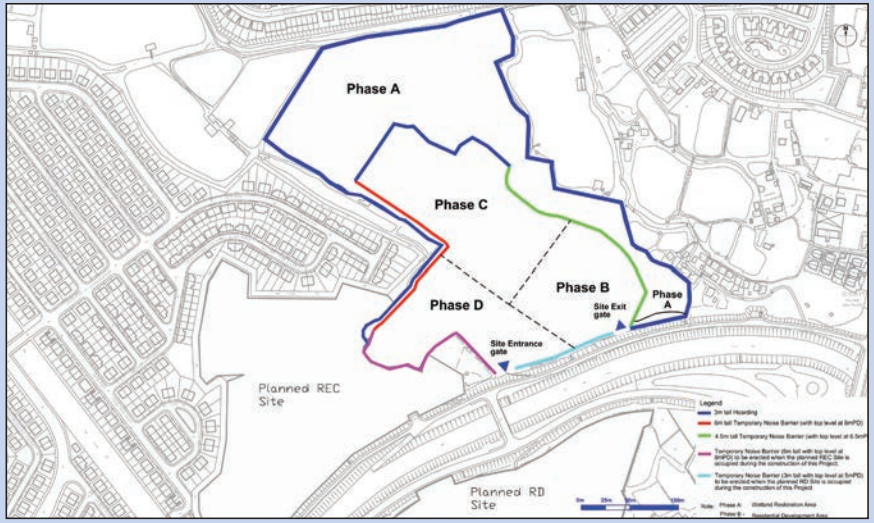

Figure 8.2 Mitigation Measures for Temporary Construction Noise

8.4 Water Quality

The Project will involve land-based construction works only. There will be a need to address surface runoff and soil erosion of exposed surfaces (**Figure 8.3**). A basic peripheral drainage system will be installed before the commencement of construction. Basic peripheral site drainage channel with sand/ silt removal facilities will be installed before the commencement of the construction. In addition, further peripheral site drainage channel with sand/ silt removal facilities will also be provided along the edge of residential portion during its construction to ensure no off-site spillage of runoff.

After population in-take, surface runoff will be discharged into Ngau Tam Mei Drainage Channel with no adverse water quality impact and the capacity of the Ngau Tam Mei Drainage Channel can handle. The discharge of treated effluent from the interim STP will meet the discharge criteria and there will be no net increase in pollution loading to the Ngau Tam Mei Drainage Channel and the Deep Bay.

8.5 Sewerage and Sewage Treatment

An on-site sewage treatment facility will be installed to handle the sewage until a connection to a public sewer is available. Taking account of the no-net increase in pollution loading to Deep Bay principle, the proposed interim sewage treatment facility will comprise of a MBR/ RO system which can produce effluent that can meet the Group C Inland and Coastal Discharge Standard and exceed the requirements of the drinking water standards stipulated in WHO guideline. Once the few existing villagers and farmers have abandoned the project area, the existing situation will be improved as upon implementation, untreated sewerage will not be discharged into the WCA (**Figure 8.4**).

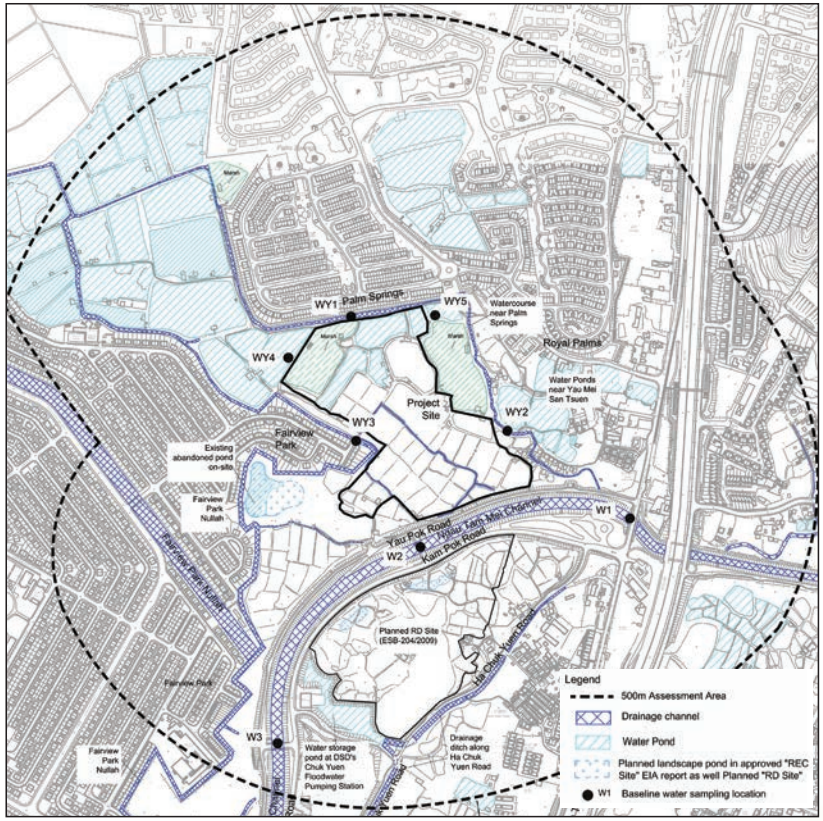

Figure 8.3 Location of Water Quality Surveys taken into Consideration during EIA process

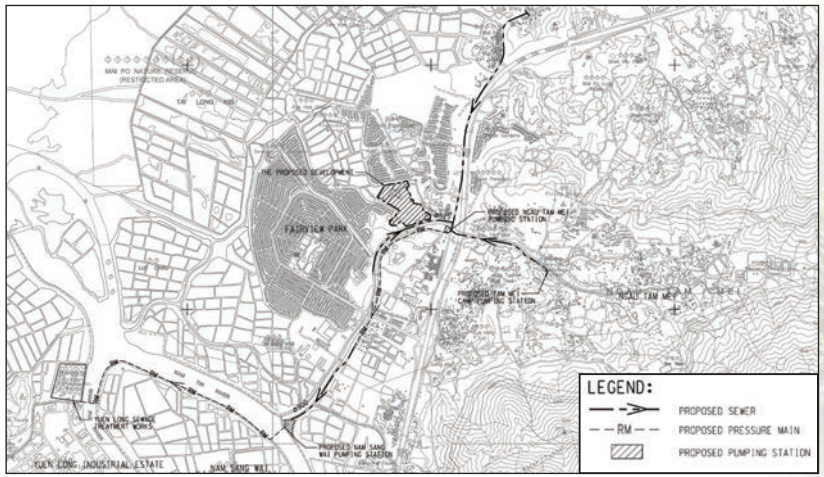

Figure 8.4 Government Proposed Sewerage Connection

8.6 Waste Management

The waste will be reduced through recovery, reuse or recycling. Environmental mitigation measures and good site practice have been recommended in the EIA report to mitigate environmental impacts.

8.7 Ecology

There are 3 key proactive actions to be implemented.

(1) Establishment of a 3.8ha Wetland Restoration Area (WRA), including 0.2ha of Wetland and Visual Buffer; thus there will be a net increase in the area of wetland of 0.8ha (a 27% increase). Habitats to be restored and enhanced in the WRA will include ponds with deep and shallow water zones, marsh, reed, bamboo, gravel (non-vegetated area), grassy bund and buffer planting. All habitats have been carefully chosen to provide suitable conditions for the wetland fauna (waterbirds, amphibians and dragonflies) which currently use the Project Area (**Figure 8.5**).

(2) A linkage between ponds to the north and the Ngau Tam Mei Drainage Channel to the south has been provided. This will ensure that flight-lines for waterbirds flying between these areas will not be impeded and that they will be permanently protected.

(3) An area of temporary wetland enhancement is also provided during the construction and establishment periods of the WRA to further minimize the possible impact of direct habitat loss for wildlife. The construction of WRA will be completed before the construction works within the residential portion commences to mitigate direct disturbance to birds during the construction phase.

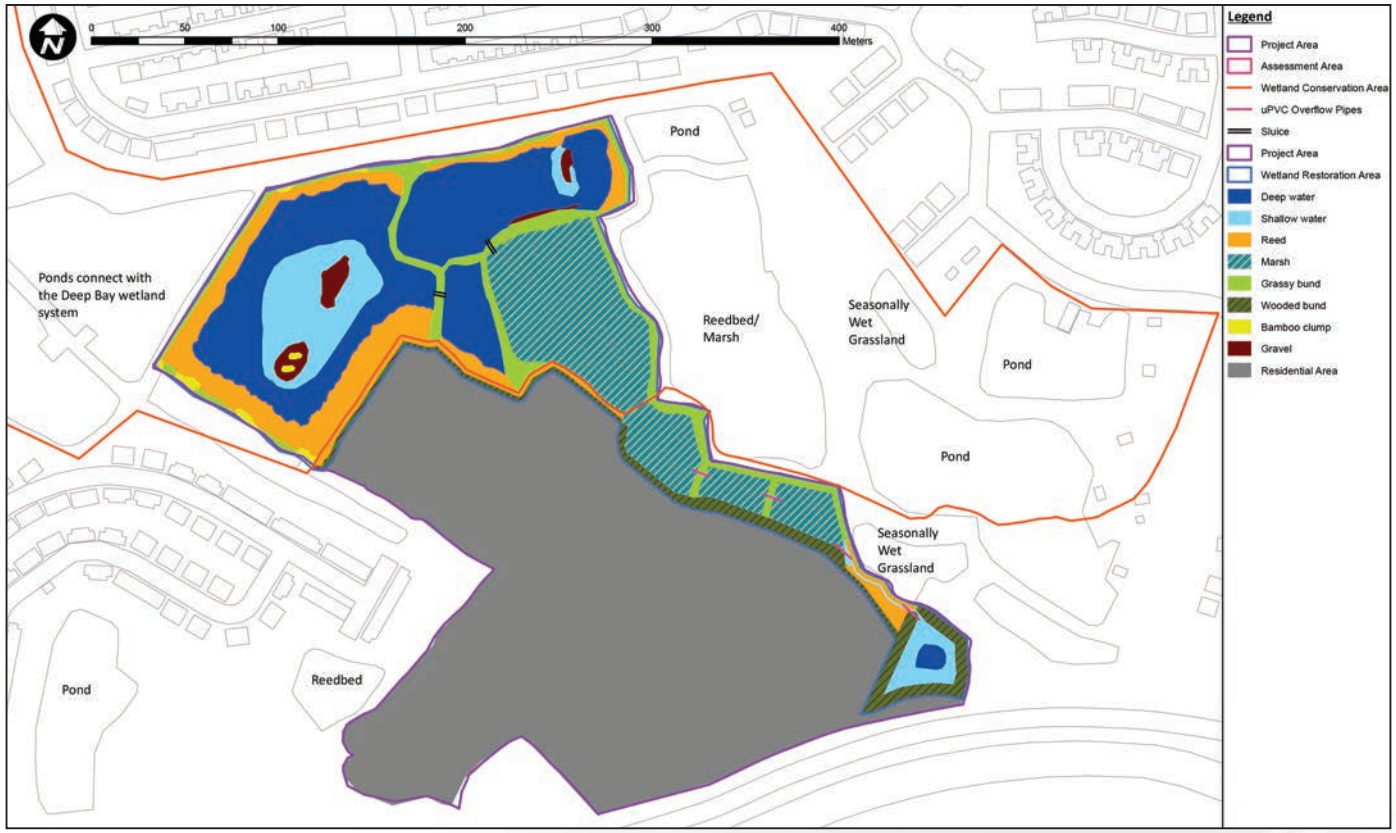

Figure 8.5 Proposed WRA and Eco-link

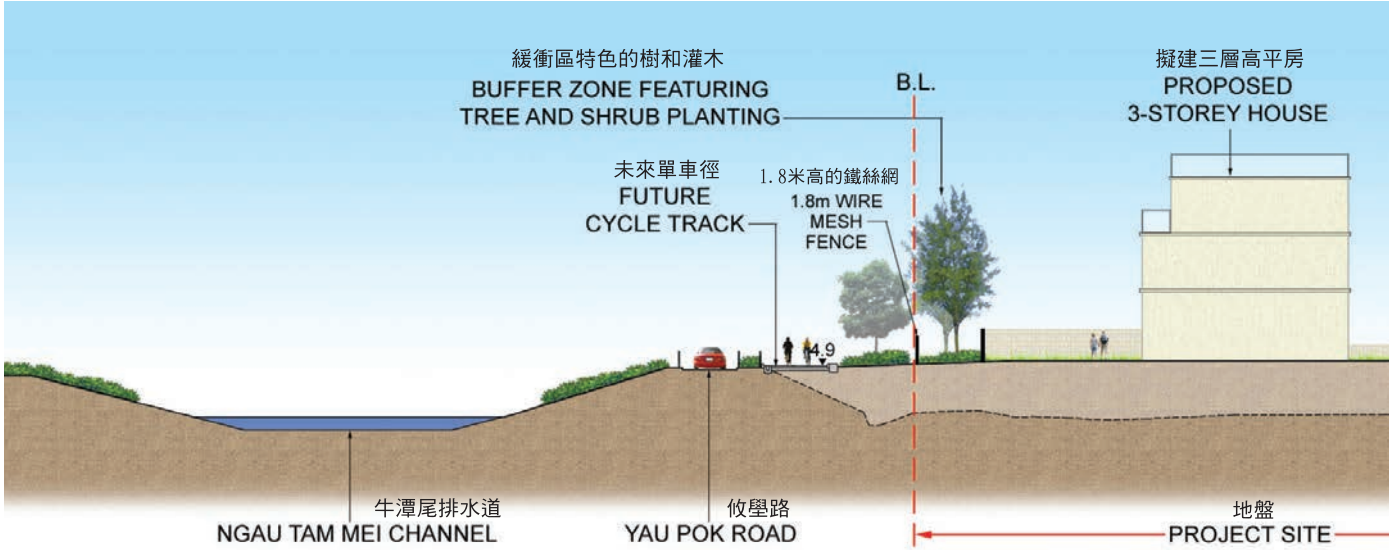

Figure 8.6 Proposed Landscape Buffer along the Boundary of the Project Site

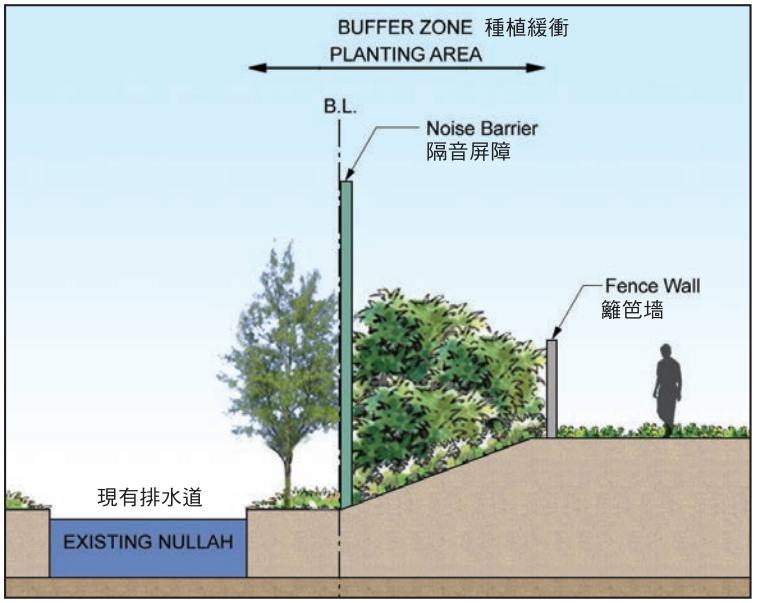

Figure 8.7 Illustrative Section of Noise Barrier Buffered & Visually Enhanced by Peripheral Planting

8.8 Fisheries

No active fish ponds will be affected by the Project.

8.9 Cultural Heritage

The assessment area has determined that no sites of archaeological interest or areas of archaeological potential are located within the project site. The only potential cultural resource identified is an ancestral hall at existing Wo Shang Wai village 450m north of the Project Site beyond existing major residential developments such as Palm Springs and Royal Palms. The ancestral hall is not a graded historic building, and has already been modified with modern structures, which is also located beyond the Project Area.

8.10 Landscape and Visual

The change in the landscape and visual character of the Site needs a detailed action plan to minimise the impacts. The actions include preservation of existing healthy unaffected trees, advance tree planting, the appropriate screening of construction works, and, the control of night-time lighting. The temporary noise barriers (approximately respectively 3m, 4.5m and 6m high; **Figures 8.7**) are proposed along the southern part of the development. The temporary noise barrier design will incorporate finishes, such as opaque and non-reflective material utilising colors that are sympathetic to the surrounding environment. The form of treatment will be sensitively selected to reduce visual impact and to avoid bird strikes.

After the population in-take, impacts will be mitigated by new, healthy planting and buffer planting along the boundary (**Figures 8.6**). The restored wetland/ pond will uplift the overall landscape amenity. The visual impact of the 1.8m high perimeter wall and 1.8m high wire mesh will be mitigated by considered landscape treatments (**Figures 8.8**).

8.0 KEY FINDINGS OF THE ENVIRONMENTAL IMPACT ASSESSMENT

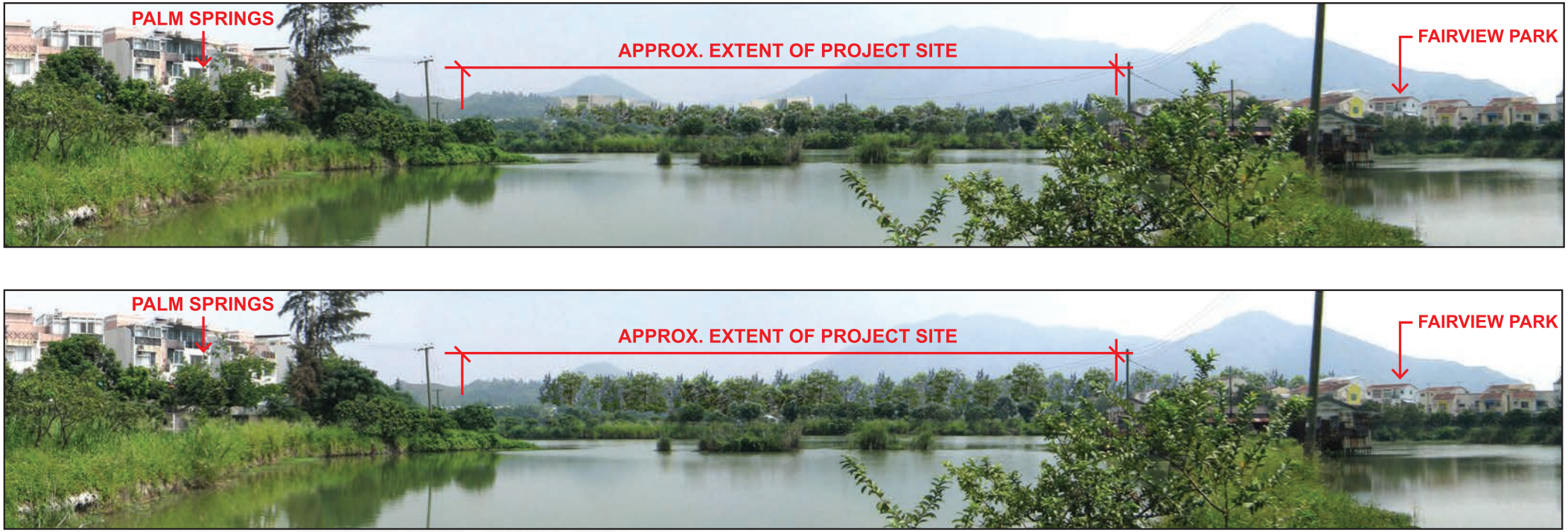

Figure 8.8 Landscape and Visual Mitigation Measure - Photomontage

9.0 THE IMPORTANCE OF ENVIRONMENTAL MONITORING AND AUDIT

The success of the proposed comprehensive development also depends on the effectiveness of the environmental monitoring and audit (EM&A) programme. An EM&A mechanism is to ensure compliance and effectiveness of the recommended mitigation measures. An Environmental Team (ET) comprising suitably qualified staff and specialists will be appointed to carry out the recommended mitigation works while an Independent Environmental Checker (IEC) will monitor the performance (see **Figure 9.1**).

Details of the EM&A programme, mitigation measures required during construction and operational phases, and requirements have been provided in the EM&A Manual of the EIA report.

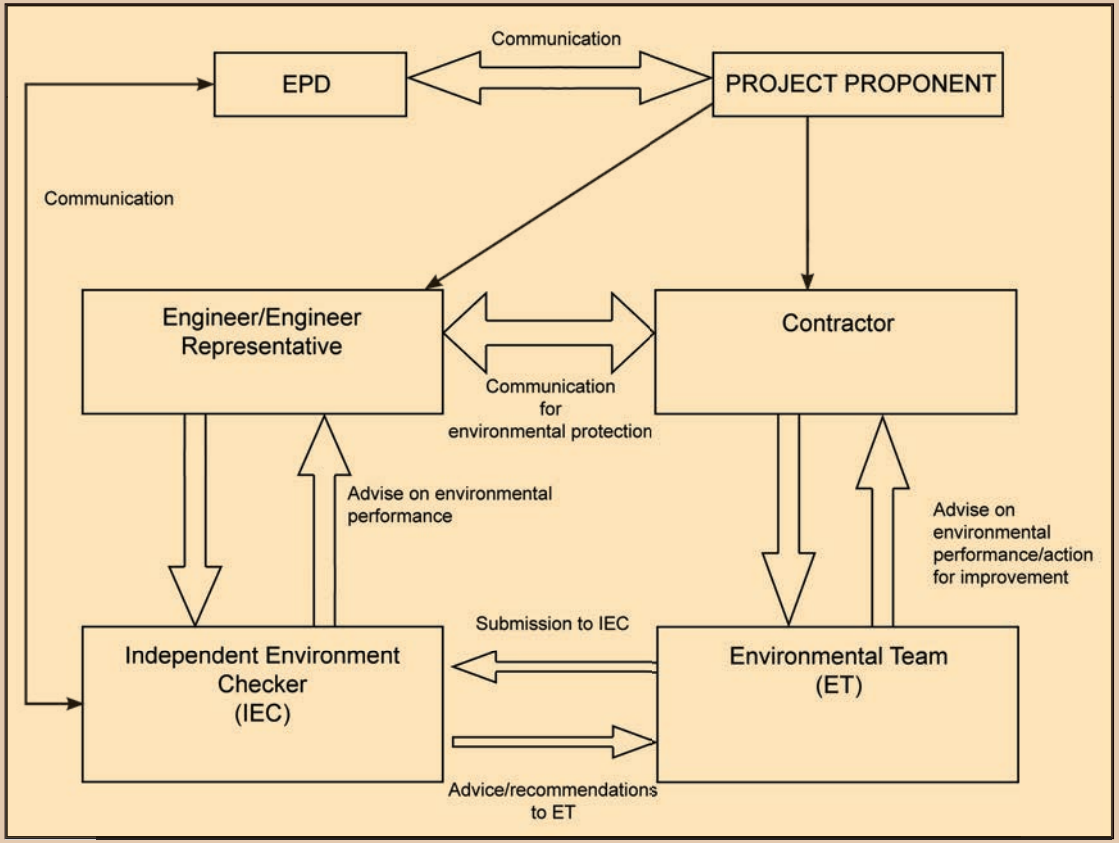

Figure 9.1 EM&A Monitoring Diagram

10.0 OVERVIEW

The Project Proponent has placed significant emphasis on the realisation of 3 basic principles applicable wetland conservation, sustainable land use planning, and long term capability. The EIA Study has predicted that after the adoption of appropriate mitigation measures, there would be no adverse residual impacts. The Project will realize the following benefits:

- As well as demonstrating that there will be no adverse environment impacts, the Project will realise planned objectives and environmental gains in terms of increase in wetland areas and its function, and enhanced ecological connectivity with the hinterland;
- There is no-net-loss in wetland, no pond filling, no decline in wetland functions, no-net increase in pollution loading to Deep Bay and the existing continuous and contiguous fish ponds are protected and conserved; and
- The proposals will also safeguard wetland protection and ensure long term maintenance, management and funding;

In terms of planning control of the mitigation measures, the proposed development is further subject to the planning approval process under the Town Planning Ordinance. The Project Proponent will continue with the CPI process and will consider any room for improvements. This will ensure a comprehensively transparent planning and development process which will contribute to the success of the wetland protection in accordance with the planning intention of TPB PG No. 12C.