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EIA Report Volume V: Executive Summary

Mai Po Nature Reserve Infrastructure Upgrade Project

Revision 7.3 – Final
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1 INTRODUCTION

1.1 Project Background

1.1.1 For decades, the Mai Po Nature Reserve ("MPNR") has served Hong Kong as one of the most valuable ecological assets in the city, and is managed by the World Wide Fund for Nature Hong Kong ("WWF"). Tens of thousands of visitors have shared collective memories of connecting with nature and understanding *gei wai* cultural heritage over the years. As an internationally recognized important wetland, it has also welcomed numerous local and overseas ecologists and trained wetland managers in the region.

1.1.2 Being a leading and responsible conservation and education Non-Government Organisation ("NGO"), WWF aspires to bring the outdoor nature's classroom that is MPNR to an even broader section of society, and to the Mai Po experience with the "21st Century Nature Classroom" – a first class learning environment. To realise this aspiration WWF (the Project Proponent) proposes an upgrade of key infrastructure – the Mai Po Nature Reserve Infrastructure Upgrade Project ("the Project") – that will cater for visitors, ensuring that facilities within the MPNR meet the expectations of visitors now and in the future.

1.1.3 The Project aims to highlight to all visitors the beauty and importance of nature in their own lives. Visitors can discover biodiversity year-round, have opportunities to observe the reserve's bird life, and connect to nature. For more than three decades, the biodiversity of over 2,050 species at MPNR has served to educate and enlighten Hong Kongers from all walks of life.

1.1.4 The Project Site and its environs are shown on ***Figure 1***.

1.2 The EIA Study

1.2.1 MPNR is located within an area zoned as a Site of Special Scientific Interest ("SSSI") on the Mai Po and Fairview Park Outline Zoning Plan ("OZP") No. S/YL-MP/6. Project Elements within MPNR are Designated Projects ("DPs") under Category under Item Q.1 of Part I, Schedule 2 of the Environmental Impact Assessment Ordinance ("EIAO") and require an Environmental Permit ("EP") prior to construction.

1.2.2 The Project Proponent, WWF, has prepared an Environmental Impact Assessment ("EIA") Report to assess the impacts of the proposed construction works on MPNR. The EIA Report comprises the following assessments, which have been carried out in accordance with the Technical Memorandum on the EIA Process ("EIAO-TM") following the requirements of the EIA Study Brief issued by the Authority:

- **Air Quality Impact.** Assesses the potential air quality impact on representative Air Sensitive Receivers ("ASRs") due to the construction of the Project and associated works.
- **Noise Impact.** Assesses potential noise impact on representative Noise Sensitive Receivers ("NSRs") due to the construction of the Project and associated works.
- **Water Quality Impact.** Assesses potential water quality impact on representative Water Sensitive Receivers ("WSRs") due to the construction and operation of the Project and associated works, including but not limited to construction site drainage, discharge of stormwater and surface runoff taking into account the cumulative impact from the existing, committed and planned projects in the vicinity of the Project.
- **Waste Management Implications.** Assesses potential waste management implications arising from the construction and operation of the Project and associated works.
- **Ecological Impact.** Assesses potential ecological impact due to the Project and associated works.
- **Fisheries Impact.** Assesses potential fisheries impact due to the Project and associated works.
- **Landscape and Visual Impacts.** Assessment of potential landscape and visual impacts due to the construction and operation of the Project and associated works.

2 PROJECT DESCRIPTION

2.1 Project Elements

2.1.1 Within the Project Site, the Mai Po Nature Reserve Infrastructure Upgrade Project will comprise the following elements, which are shown on ***Figure 2***:

1. **Construction of New Tower Hide 2 ("TH2").** TH2 is a new three-storey tower hide, modelled on the design of the existing TH1 at gei wai 8 and hence will be of the same height. TH2 is essentially a 7.9m three storey, metal-framed structure, clad in "Onduline" (a brand of lightweight roofing and cladding material) for water proofing. Some internal components such as window frames, and floors will be made of wood coated in fire retardant paint. The Onduline roof will further be overlaid with racks that support solar panels, which will take the height of TH2 to 8.4m. Batteries on the ground floor will store electricity that will be used to power minimal floor lighting, internal fans and WiFi. No toilets or washrooms will be provided. This area of the reserve is of particular value for the observation of raptors in MPNR and required a hide of several storeys. This area is generally off-limits to public and school visitors, and is primarily used for research purposes.
2. **Construction of New Tower Hide 3 ("TH3").** This is a new three-storey tower hide that follows the same design as the new TH2, discussed above. TH3 is planned to be built on the bund between gei wais 7 and 8, facing towards gei wai 8a. The area to the west of TH3 is ideal for viewing and learning about waterbirds that utilise rain-fed ponds, open-water gei wai, and reedbeds. The Project Proponent has designed the location of the hide to ensure that visitors are occluded on the reserve as much as possible when stopping to view waterbirds. As such, public and students will use bird hides wherever possible.
3. **Construction of New Boardwalks.** The concrete footpath running between the MPNR entrance and the Mai Po Education Centre ("MPEC") to the existing TH1 and the new TH3 is in a poor state of repair, cracked and in some places subsiding, making passage challenging for some visitors. The new path was designed to provide universal access, with six Education Areas ("EAs") utilising interactive materials. The plan also made provision for seven wheelchair passing bays. The design would be as a raised wooden boardwalk over the original concrete path to ensure no fragmentation of habitat.

2.2 With the Project in Place

2.2.1 The Project will facilitate universal access and provision of new educational components through the provision of two new Tower Hides and the replacement of the existing footpaths with boardwalks. The MPEC will also be refurbished internally for safe and flexible provision for public education programme. With enhancement of the hardware of the public education programme, the software/ programming can be further developed and diversified for the general public.

2.2.2 In other words, the Project will provide opportunities to empower people from different backgrounds and sectors of society with important knowledge about wetland and environmental protection and sustainable development in a unique natural setting. In doing so, the Project will also help government achieve some of the actions set out in the Biodiversity Strategy and Action Plan ("BSAP").

2.3 Without the Project in Place

2.3.1 If the Project does not go ahead, MPNR will be left with its existing aging infrastructure – some of it more than 30 years old – that cannot cope with the demands of the community; WWF will not be able to help government achieve BSAP Actions 21b and 21c; it will remain difficult to monitor the southern part of MPNR; and WWF will not be able to realise their aspirations to transform Mai Po into a first class learning institute.

2.3.2 Furthermore, organisations that use MPNR, such as the Hong Kong Bird Watching Society ("HKBWS"), will not be able to benefit from the provision of the new Tower Hides.

2.4 Project Programme

2.4.1 The EIA Report has assessed the impacts from the construction of the Project based on the programme for construction given in ***Figure 3***. It shows the works for the Project commencing in April 2022 after completion of the planned drain down of gei wai for 2022 under the *MPNR Management Plan 2019-2024*. Construction of the Project will not be concurrent with planned maintenance works. In mid-May 2022 the Project works will stop for the habitat management and planned gei wai refill under the *MPNR Management Plan* and will recommence in early-September 2022 for completion in mid-October 2022.

3 SUMMARY OF ASSESSMENTS AND ENVIRONMENTAL IMPACTS

3.1 Air Quality Impact

3.1.1 Within the 500m Assessment Area, thirteen representative ASRs have been identified, including domestic premises at Fairview Park and Palm Springs and a number of village houses in proximity to Tam Kon Chau Road. These are shown on ***Figure 4***.

3.1.2 Fugitive dust is the major impact during construction activities, such as excavation, stockpiling, earth moving, transferring or handling of dusty materials. Dust can also arise from bare ground that is cleared for construction of boardwalks. Fugitive dust emissions will be generated from the movement of vehicles along existing paved roads (the Boundary Road), the unpaved temporary access routes within the Project Site, and external paved roads.

3.1.3 A qualitative assessment of air quality impacts was carried out for the construction stage. The actual ambient concentrations of Respirable Suspended Particulates ("RSP") and Fine Suspended Particulates ("FSP") at the Yuen Long AQMS in year 2020 are well within the limits of the Air Quality Objectives ("AQO"). In addition, the baseline air quality monitoring results represent ambient air quality in the vicinity of MPNR and the averaged 1-hour TSP is less than 70μg/m^3, which is far less than the 500μg/m^3 limit under Annex 4 of TM-EIAO. It revealed that the vicinity of the Project Site has a very low ambient TSP concentrations. Given that most of the dust impacts typically associated with on-site construction have been avoided due to the off-site pre-fabrication of building elements and that the area of bare ground (for new boardwalk) is also relatively small, no significant increase in air quality impact at ASRs is anticipated during construction and no exceedance of AQO limits for RSP and FSP is expected

3.1.4 Given the small scale of construction works and its short duration, limited vehicle movement and well planned routing of vehicles within the Site, together with the use of off-site pre-fabrication as far as practicable, adverse construction dust impacts generated from construction activities and vehicle movement around the Site is not anticipated.

3.1.5 With the implementation of the recommended mitigation measures and good site practice, adverse air quality impacts during the construction stage are not anticipated.

3.2 Noise Impact

3.2.1 The Project Site is the MPNR, known for its wildlife and tranquillity. There are no major roads nearby and very little vehicular traffic. Inside MPNR there are no major noise sources and the prevailing noise environment is rural and low noise.

3.2.2 Within the 300m Assessment Area, ten representative NSRs have been identified, including domestic premises at Fairview Park and a number of village houses in proximity to Tam Kon Chau Road. These are shown on ***Figure 5***.

3.2.3 Noise impacts arising from construction of the Project are mainly due to the use of Powered Mechanical Equipment ("PME") for various construction activities. There will also be noise from

the movement of vehicles along existing paved roads (the Boundary Road), the unpaved temporary access routes within the Project Site, and external paved roads.

3.2.4 The construction programme has been arranged such that construction work during Restricted Hours will not be required. Also, percussive piling will not be required.

3.2.5 The noise impact arising from the construction of the Project at representative NSRs has been assessed and shows that noise levels at these NSRs will comply with relevant noise criteria. As such, further noise mitigation measures during construction are not necessary.

3.2.6 No adverse noise impact is anticipated from the construction of the Project.

3.3 Water Quality Impact

3.3.1 Deep Bay is ecologically important, with extensive intertidal mudflats backed by mangal, tidal gei wai and fishponds. Oyster culture is a feature of Deep Bay and it has the largest and most important mangrove habitat in Hong Kong. The mudflats of Inner Deep Bay also have high conservation value as an important feeding ground for a huge number of resident and migratory birds. The Mai Po and Inner Deep Bay Ramsar Site was recognised in 1995 as a "Wetland of International Importance".

3.3.2 Any water pollution generated by the Project will not only affect the gei wai within MPNR but also has the potential to affect Deep Bay through the regular water exchange and gei wai drain-down that are part of the normal operation of the gei wai.

3.3.3 A number of natural watercourses of varying sizes run through the Assessment Area, connecting different types of wetland habitats and providing drainage to the area. The most important watercourse is the Shan Pui River that which flows from Fairview Park, around the southeast boundary of MPNR and then between the Reserve and Lut Chau, before joining the Kam Tin River in the extreme southeast of the Assessment Area. In addition, two smaller watercourses discharge into the Shenzhen River to the north of Tam Kon Chau.

3.3.4 Surrounding the Project Site, there are also a number of commercial fishponds while the Site itself is located within the Mai Po Marshes SSSI and the Inner Deep Bay SSSI is located west of the Project Site. Within the 500m assessment area, eight representative WSRs have been identified, as shown in ***Figure 6***.

3.3.5 Potential water quality impacts for a typical construction site would arise from general construction activities, muddy site runoff, accidental spillage of liquids and sewage effluent from construction workforce. Traditionally, construction sites have collected muddy/contaminated water from perimeter drains and treated it in sedimentation tanks prior to discharge to municipal drains or to local water courses.

3.3.6 In less ecologically sensitive areas there is unlikely to be any lasting damage from this discharge, but this Project is located in a Ramsar Site, one of the most ecologically valuable and sensitive wetlands in Hong Kong. Any leakage or discharge of muddy/contaminated surface water from works areas could quickly enter a gei wai. Not only is there the possibility of direct impacts to the ecology of the gei wai themselves, but due to the normal water exchange process, pollutants could also enter Deep Bay and induce secondary impacts there. This risk is not acceptable to WWF.

3.3.7 Given that traditional approaches for control of water quality on construction sites are not sufficient for this Project, an alternative approach must be found. Particularly since the work sites are adjacent to water bodies, where any runoff would end up, and from there may ultimately flow into Deep Bay. WWF will adopt a "Zero Water Pollution" approach during construction, particularly for TH2 and TH3. This relies on two key elements; avoiding pollution of adjacent gei wai and Deep Bay; and avoiding generating polluted runoff from works areas in the first place.

3.3.8 To avoid pollution of adjacent gei wai and Deep Bay, the schedule of foundation works at TH2 and TH3 – the most potentially polluting period during construction in terms of runoff – will be aligned with the schedule of draining the adjacent gei wai in the latest *MPNR Management Plan*

2019-2024. The drained gei wei undergoing such maintenance are not hydraulically connected to any other gei wai nor to Deep Bay, i.e. they are fully isolated from surrounding water bodies. A perimeter bund will be constructed around the work sites for TH2 and TH3 to ensure that any runoff generated from these sites is discharged only into the adjacent drained gei wai and not into any other water-filled gei wai that are hydraulically connected to each other and to Deep Bay. Runoff is therefore prevented from entering other water-filled gei wai and Deep Bay and hence potential pollution of these water bodies is avoided.

3.3.9 To avoid generating polluted runoff from works areas in the first place, zero contaminated runoff will be achieved through implementation of a series of measures, including off-site pre-fabrication, off-site concrete mixing, off-site maintenance/repair of plant, taking extreme care when re-fuelling plant, covering open/exposed ground, provision of chemical toilets, bunded, covered construction waste material storage areas, and waterproof general waste receptacles.

3.3.10 In addition to this, the Works Contractor shall follow good site practice and be responsible for the design construction, operation and maintenance of applicable mitigation measures specified in *ProPECC PN 1/94*, a government guideline for construction site drainage.

3.3.11 With the above measures in place during the construction stage, it is unlikely that there will be any adverse water quality impact to the gei wai or to Deep Bay as a result of the works. Furthermore, no cumulative impact is identified.

3.3.12 During operation, no adverse water quality impact is anticipated as the two new tower hides will not be provided with toilets or washrooms, and so no wastewater will be generated. Runoff from the roof of the tower hides and from the boardwalks will not be contaminated.

3.3.13 No adverse water quality impact is anticipated during the construction or operation stages of the Project.

3.4 Waste Management Implications

3.4.1 During construction, different types of waste may be produced, including inert Construction and Demolition ("C&D") material, C&D waste and general refuse (there will be no chemical waste as there will be no maintenance of plant or equipment on site). To ensure that the majority of construction waste is acceptable at public filling areas or for recycling, all waste materials arising from the construction work shall be sorted on-site and be separated into different groups for disposal at landfills, Public Fill Reception Facilities ("PFRFs"), or recycling, as appropriate.

3.4.2 During the three months of construction it has been estimated that 280.3 tonnes of waste will be generated, of which up to 261.3 tonnes could potentially be treated/recycled/recovered, which is a 93% waste diversion rate from landfill. The breakdown into different types of construction waste is discussed below.

3.4.3 Inert C&D material does not decompose, such as debris, rubble, earth and concrete, and is suitable for land reclamation and site formation. An estimated 96.0 tonnes of inert C&D material will be generated, which equates to 32.0 tonnes per month on average. This waste will be sent to the PFRFs at Tuen Mun Area 38, around 16km from the Site.

3.4.4 C&D waste can decompose and generate odour, such as bamboo, timber, vegetation, packaging waste and other organic material, and is therefore unsuitable for land reclamation. An estimated 13.1 tonnes of C&D waste (non-inert) will be generated, which equates to 4.4 tonnes per month on average, which will be taken off-site for recycling. At least 3.8 tonnes should be able to be recycled and the remaining 9.3 tonnes or less will be disposed of at NENT Landfill as a last resort. An estimated 157.6 tonnes of C&D waste (vegetation) will be generated, which equates to 52.5 tonnes per month on average. All of this will be reduced in size to aid biodegradation and then composted within MPNR – none will require off-site disposal.

3.4.5 General refuse is Municipal Solid Waste ("MSW") and an estimated 13.6 tonnes will be generated by construction workers. This equates to 4.5 tonnes per month on average, and will be taken off-site for recycling. At least 3.9 tonnes should be able to be recycled and the remaining 9.7 tonnes or less will be disposed of at NWNT Transfer Station in Yuen Long as a last resort.

3.4.6 With proper waste segregation and recycling as well as provision of waste management training, the amount of general refuse required to be disposed of at landfills is minimised. Provided that the recommended mitigation measures are followed, there should be no adverse waste impact from the handling, transportation or disposal of inert C&D material, C&D waste or general waste during construction.

3.4.7 During operation, there will be no waste of any type generated within the Project Site. No waste receptacles are provided within MPNR and visitors will be encouraged to take their waste home with them.

3.5 Ecological Impact

3.5.1 MPNR contains habitats, such as dwarf mangroves, gei wai and rain-fed ponds, that provide important roosting and foraging sites for a large number of waterbirds, including internationally important species such as the globally-threatened Black-faced Spoonbill. The existing ecological baseline data available for the Project Site is extensive, due in part to WWF's long-term ecological monitoring programme, and covers:

- Habitat and Flora
- Non-flying Mammals
- Bats
- Avifauna, including Black-faced Spoonbill, Collared Crow, Anatidae and breeding Black-winged Stilts
- Reptiles
- Amphibians
- Butterflies
- Adult Odonates, including Four-spot Midget
- Fireflies (Mai Po Bent-winged Firefly)
- Aquatic fauna (fish and crustaceans)
- Benthic macroinvertebrates

3.5.2 In addition to the above, supplementary surveys for this Project were conducted between November 2016 and December 2017 to provide more Project-specific data and the ecological information concerning MPNR and the surrounding 500m Assessment Area, covering most of the above. The data collected were verified with further surveys from September 2019 to August 2020. A summary of the habitats in MPNR is provided on ***Figure 7*** .

3.5.3 To avoid disturbance on habitats and birds, there shall be no noisy outdoor construction work other than mobilisation and vehicle movement from 16 October to 15 April, which is the dry season. This recommended constraint on construction period arises as this is ecologically the most sensitive period when there are a large number of migratory water birds present.

3.5.4 For all project elements, the majority of construction components will be prefabricated off-site to minimise any impacts associated with construction on-site in ecologically sensitive areas. Furthermore, as a worst case, the ecological assessment assumes that all three Project elements will be constructed concurrently.

3.5.5 The area of direct habitat loss is small (approximately 0.07ha of bund), both in absolute terms and relative to the area of these habitats within MPNR. The number of individuals of flora and fauna that will be impacted is correspondingly small. Magnitude will be low as only a very small area (approximately 0.07ha of bund, 0.033% of these habitats) will be converted to developed areas. Impact would be of **Low to Moderate Severity** in both construction and operational phases of the project in view of the very small areas involved.

3.5.6 The area of direct temporary loss is small (approximately 0.31ha / 3,100m^2 of bund), both in absolute terms and relative to the area of these habitats within MPNR. The number of individuals of flora and fauna which will be impacted is correspondingly small. Magnitude will be low as only a very small area (approximately 0.31ha of bund, 0.15% of these habitats) will be temporarily lost and only 0.05ha will be affected at any one time. Impact would be of **Low Severity** in both construction and operational phases of the project in view of the very small areas involved.

3.5.7 Disturbance occurs when activities within a development site result in a reduction of the value of a habitat outside the site, usually as a consequence of fauna being deterred from using the habitat. Disturbance to brackish gei wai and rain-fed pond has been assessed as of **Low Severity** during the wet season construction period due to the low numbers of disturbance-sensitive species utilising these habitats at that time.

3.5.8 Bats are generally insensitive to disturbance while they are active (at night). However, they are potentially vulnerable at their roosts, especially at maternity/nursery roosts where females with dependent young are present. Whilst regular roosting sites would not be affected by the Project, mitigation measures will be implemented.

3.5.9 A large number of bird species of conservation importance occur regularly in the Project Site and the Assessment Area in significant numbers. On and off-site impacts on these species will take place if they are displaced due to the direct habitat loss arising from the Project and/or are displaced due to disturbance arising from construction or operation of the project elements. No significant disturbance impact is predicted from construction of new footpaths as there will be no significant increase in disturbance in the area. Similarly, no significant increase in disturbance impacts are predicted from operation of the footpath as the number of visitor hours is predicted to decline, nor from the new TH3 and TH2 as these facilities will be designed with the explicit objective of permitting visitors to observe wildlife without causing disturbance.

3.5.10 The wet season timing of construction between mid-April and mid-October reduces greatly the potential for adverse impacts as the large number of birds that winter at Mai Po and Inner Deep Bay will not be present. This, in addition to the small scale of the facilities and the use of on-site assembly as much as possible, reduces the scope for disturbance impacts arising from construction of the two tower hides.

3.5.11 There are two species of concern, however, the Collared Crow and the Eurasian Otter. With regard to Collared Crow, low disturbance impacts are predicted from construction of TH2 if a minor change to the timing of construction and related activity is incorporated in order to prevent adverse impacts on birds gathering at pre-roost sites in the area. Thus, **Low Impact** on Collared Crow during both construction and operational phases of the Project. Potential construction phase impacts on Eurasian Otter, which is regionally threatened, have been assessed as **Moderate** in the absence of mitigation. Eurasian Otter is a nocturnal species in HK, and its activity will not coincide with construction or use of the project elements by visitors. However, pre-construction checks on the footprint and vicinity of the project elements is required to ensure that there are no daytime rest sites that could be disturbed, which would result in residual impacts of **Low** severity.

3.5.12 The current ecological conditions and potential ecological impacts of the Project have been assessed. Based on this review, measures to avoid and minimise ecological impacts have been recommended. With these measures in place it is considered that all significant ecological impacts from the Project will be addressed and there will be no unacceptable residual impacts.

3.5.13 A number of ecological mitigation measures were proposed:

- **Mitigation for Potential Construction Phase Disturbance to Mammals, in particular Eurasian Otter** – As a precautionary measure, adequate site checks in the works area and in the immediate vicinity of all Project elements should be conducted by a suitably qualified ecologist prior to commencement of works to search for substantive usage of the habitat by flora and/or fauna of conservation concern, e.g. the presence of an otter holt or similar site. If roosting or breeding species are found appropriate measures should be taken to avoid adverse impact,

including adjustments to the timing of the works. It is proposed that the potential for disturbance impacts on species using adjacent habitats be further reduced by screening works areas during the construction phase. In addition, planting of bamboo (using the native species *Bambusa tuldoides* (青稈竹, 花眉竹) a minimum of 2m high and of sufficient depth to provide an effective screen will be carried out along the access to the new Tower Hides to reduce disturbance during the operational phase. It may be necessary to install artificial screens in the early phase while the natural screen planting reaches acceptable height/depth.

- **Mitigation for Potential Construction Phase Disturbance to Collared Crow Roost and Pre-roost Sites –** To avoid impacts on nocturnal roost sites and associated pre-roost gatherings of Collared Crow in the vicinity of gei wai 20, all construction activity, including the passage of construction vehicles, will cease two hours before sunset. This means 4pm in the wet season construction period.
- **Precautionary Measures to Address Potential Impacts on Breeding Ardeids** – Ahead of construction, checks will be conducted during the breeding season at or near works areas to check for the presence of breeding ardeids within 500m of the footprint of project elements. These checks should be carried out two weeks prior to construction commencing and the day before. Should any egretry be discovered in the vicinity of works areas, the need for mitigation measures shall be assessed.
- **Precautionary Measures to Address Potential Mortality Impacts** – Adequate site checks along haul roads, in the works area and in the immediate vicinity should be conducted prior to the commencement of works at TH2 and TH3 to detect substantive use of adjacent habitat by species of conservation concern. If roosts or breeding species are found, appropriate measures should be taken to avoid adverse impact, including adjustments to the timing of works.

3.6 Fisheries Impact

3.6.1 A literature review, internet search and site visits were conducted to assess the baseline status of pond fish culture activity within the 500m Assessment Area. During site visits, local villagers, fish farmers and pond owners were interviewed. The ponds observed were categorised as active, inactive, abandoned or gei wai. Commercial fish ponds are present, mainly located around the northern perimeter of MPNR and to the south.

3.6.2 There are no fish ponds in the Project Area and so there will be no direct impact on fisheries within the Project Area during construction. Adjacent to the Project Site are commercial fisheries. However, with the mitigation measures proposed to control dust, water pollution and waste generation, indirect impacts on fisheries due to construction activities will be insignificant. Overall, therefore, no adverse fisheries impact is anticipated during the construction stage.

3.6.3 There are no capture fisheries known within the assessment area, and no assessment of impacts thereon has been carried out. Any polluted runoff from work areas will be isolated from Deep Bay and hence no adverse water quality impact to fisheries resources in Deep Bay are predicted.

3.6.4 The two new tower hides will not be provided with toilets or washrooms and so no wastewater will be generated during the operation stage. Runoff from the roof of the tower hides and from the footpaths will not be contaminated. As such, there will be no point or non-point pollution sources due to the operation of the Project and therefore no impact to the water systems – fish ponds, gei wai or Deep Bay – or associated sensitive receivers within the Project Site or within the Assessment Area for fisheries impact. Overall, therefore, no adverse fisheries impact is anticipated during the operation stage.

3.7 Landscape and Visual Impact

3.7.1 The assessment included a review of the planning and development control framework, and any approved and planned developments in the 500m Assessment Area. The assessment of landscape impact covered both Landscape Resources (“LR”) and Landscape Character Areas

("LCA"), while the assessment of visual impact identified and predicted the type and extent of impacts from visual obstruction, changes in visual amenity and compatibility of the Project within a defined Assessment Area.

3.7.2 Based on the assessment, the Project will result in loss of small areas of natural landscape resources due to the construction of new tower hides and new access connecting the new tower hides. There will be no net loss due to the proposed new boardwalk. The Project is considered to result in only **Small** changes in the affected LRs and LCA. The resulting construction and operational phase impacts range from **Slight** to **Moderate** without mitigation.

3.7.3 The Project is considered to have **Fair** compatibility with the surrounding environments given its small scale/ limited footprints of development and low level of blockage of existing view that may arise. Most of the Visually Sensitive Receivers ("VSRs") which are considered to have **Low** sensitivity will only notice **Negligible** changes and experience **Insubstantial** visual impacts from the construction and operation of the Project. However, there are some VSRs including the visitors in MPNR and workers along the pond bund near gei wai 20 who can view different portions the Project elements and will notice **Small to Medium** level of visual changes during construction and/or operation of the Project. The resulting visual impacts are expected to be **Moderate** without mitigation.

3.7.4 With full implementation of the mitigation measures including responsive design of the new Tower Hides and footpaths, and implementation of bamboo screen plantings at the new Tower Hides, the overall landscape and visual impacts resulting from the construction and operation of Project are all considered to be **Acceptable**, and some of the receivers may experience potentially **Beneficial** impacts from new boardwalk that is more aesthetically compatible with the surrounding natural landscapes.

3.7.5 In conclusion, any potential landscape and visual impacts arising from the construction and operation of the Project are all considered to be **Acceptable** when appropriate mitigation measures are implemented.

4 CONCLUSIONS AND RECOMMENDATIONS

4.1.1 A qualitative assessment of air quality impacts was carried out for the construction stage. No exceedance of AQO limits for RSP and FSP at representative ASRs is expected. No significant increase in air quality impact at ASRs is anticipated during the construction stage. With the implementation of the recommended mitigation measures and good site practice, adverse impacts during the construction stage are not anticipated.

4.1.2 The noise impact arising from the construction of the Project at the representative off-site NSRs has been assessed. The results of the assessment indicate that noise levels at these NSRs will comply with the relevant noise criteria. As such, further noise mitigation measures are not necessary. No adverse noise impact is anticipated during the construction stage of the Project.

4.1.3 A "Zero Water Pollution" approach will be adopted during construction, particularly for TH2 and TH3. In addition to this, the Works Contractor shall also follow good site practice and adopt mitigation measures specified in *ProPECC PN 1/94* for construction site drainage. With the above measures in place during the construction stage, it is unlikely that there will be any adverse water quality impact to the gei wai or to Deep Bay as a result of the works. Furthermore, no cumulative impact is identified. Nevertheless, as a precautionary measure and to demonstrate that the "Zero Water Pollution" approach is working, it is proposed to carry out water quality EM&A within Deep Bay before, during and after the foundation works at TH2 and TH3. During operation, no adverse water quality impact is anticipated as the two new tower hides will not be provided with toilets or washrooms, and so no wastewater will be generated. Overall, therefore, no adverse water quality impact is anticipated during the construction or operation stages of the Project.

4.1.4 During construction, it is estimated that a total of 280.3 tonnes of waste will be generated, of which up to 261.3 tonnes could potentially be treated /recycled/recovered, which is a 93% waste diversion rate from landfill. This waste comprises inert C&D material, C&D waste and general refuse. Chemical waste will not be generated as WWF will mandate in all contract documents that there shall be no maintenance or repair of vehicles, plant or equipment on site. Provided that the recommended mitigation measures are followed, there should be no adverse waste impact from the handling, transportation or disposal of inert C&D material, C&D waste or general waste during construction. During the operation, there will be no waste of any type generated within the Project Site. No waste receptacles are provided within MPNR and visitors will be encouraged to take their waste home with them. Overall, therefore, no adverse waste management implications are anticipated during the construction or operational stages of the Project.

4.1.5 The current ecological conditions and potential ecological impacts of the Project have been assessed. Based on this review, measures to avoid and minimise ecological impacts have been recommended. With these measures in place and having considered the relevant assessment criteria listed in the EIAO-TM (i.e. effects on health of biota, the magnitude, geographic extent, duration and frequency of adverse impacts, the likely community size affected, the degree to which the adverse impacts are irreversible, the ecological context, the international or regional importance of the species or habitats and both the likelihood and degree of uncertainty of adverse environmental impacts), it is considered that all significant ecological impacts from the Project will be addressed and there will be no unacceptable residual impacts.

4.1.6 There are no commercial fishponds in the Project Area and so there will be no direct impact on fisheries within the Project Area during construction. Adjacent to the Project Site are commercial fisheries. However, with the mitigation measures proposed in this report to control dust, water pollution and waste generation, indirect impacts on fisheries due to construction activities will be insignificant. The two new tower hides will not be provided with toilets or washrooms and so no wastewater will be generated during the operation stage. Runoff from the roof of the tower hides and from the footpaths will not be contaminated. As such, there will be no point or non-point pollution sources due to the operation of the Project and therefore no impact to the water systems – fish ponds, gei wai or Deep Bay – or associated sensitive receivers within the Project Site or within the Assessment Area for fisheries impact. Overall, therefore, no adverse fisheries impacts are anticipated during the construction or operational stages of the Project.

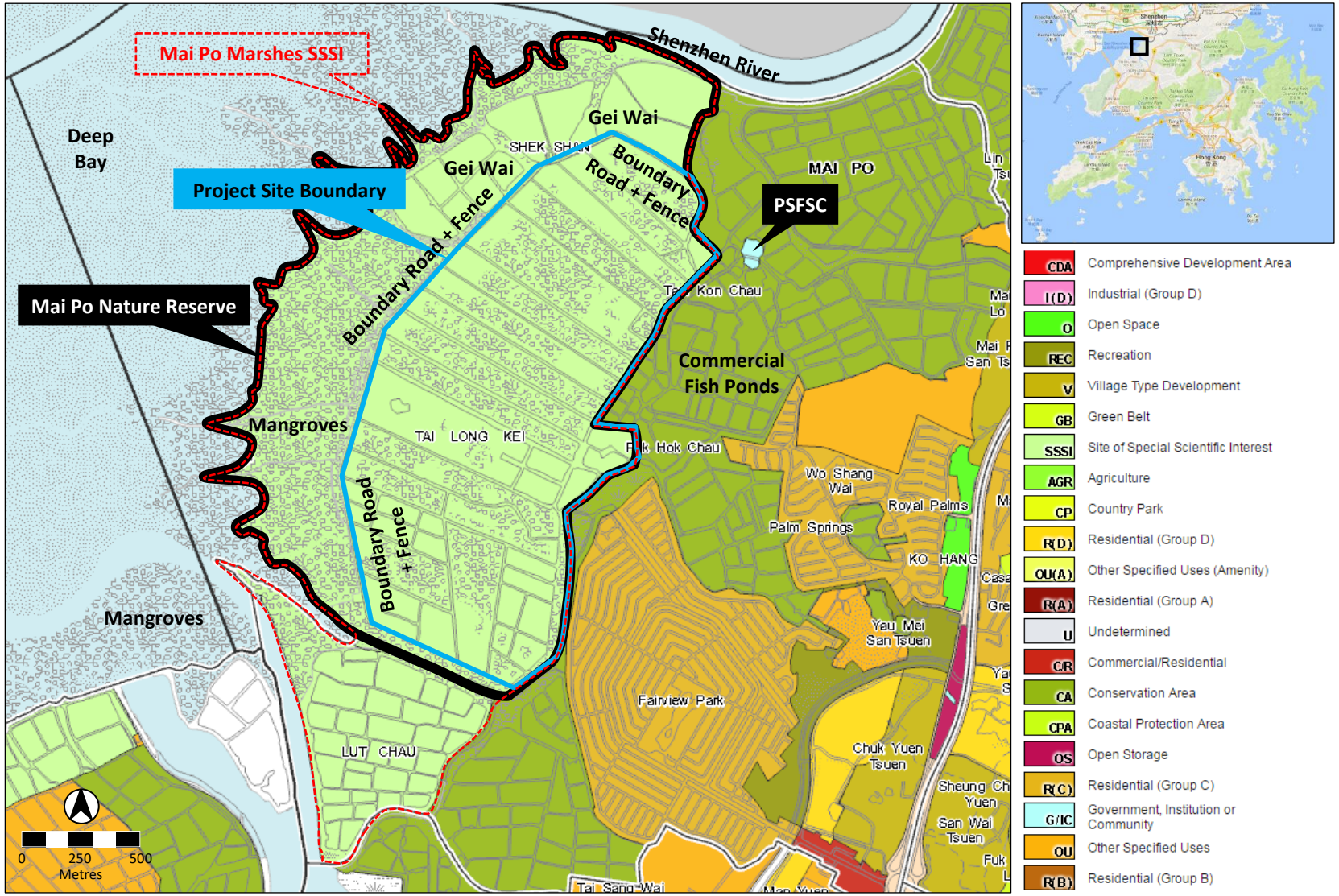
4.1.7 With full implementation of the recommended mitigation measures, the overall landscape and visual impacts resulting from the construction and operation of Project are all considered to be acceptable. Some of the receivers may experience potentially beneficial impacts from the upgrading of the existing paved footpath to the new wooden boardwalks, which are more aesthetically compatible with the surrounding natural landscapes.

4.1.8 Overall, the EIA Study has concluded that with the implementation of recommended mitigation measures, no adverse environmental (air quality, noise, water quality, waste), ecological, fisheries or landscape and visual impacts are anticipated during the construction or operation stages of the Project.

4.1.9 The demolition and rebuild of Peter Scott Field Study Centre (PSFSC) near MPNR will have been completed by March 2022 whereas the construction of this Project will commence at end-April 2022. As such, the demolition and rebuild of PSFSC will not be carried out concurrently with this Project. There are also no other concurrent projects near MPNR. Thus, cumulative environmental impacts for this Project is not anticipated. As shown in the Project Programme in ***Figure 3***, there are also no concurrent works related to the *MPNR Management Plan 2019-2024* and so no cumulative environmental impacts.

4.1.10 A comprehensive EM&A programme has been recommended, covering baseline, impact and post-construction monitoring of various parameters, to ensure that there are no unacceptable impacts and to demonstrate compliance with the findings of the EIA Study.

Figure 1 Statutory Plan Showing Location of Project and its Environs



Source: Extract from the approved Mai Po and Fairview Park OZP No. S/YL-MP/6, from PlanD Statutory Planning Portal 2.

Figure 2 Components of the Project – the Preferred Development Option

Source: Google Earth Pro

Figure 3 Project Programme

Project Activity	2022											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
New TH2 (including Boardwalk Access)												
Foundation Works (Phase 1)												
Superstructure Works (Phase 2)												
Roof, Cladding and Interior Works upto Handover												
New TH3 (including Boardwalk Access)												
Foundation Works (Phase 1)												
Superstructure Works (Phase 2)												
Roof, Cladding and Interior Works upto Handover												
New Boardwalk (including EAs)												
Construction (Part 1 - North)												
Construction (Part 2 - Centre)												
Construction (Part 3 - South)												
Vehicular Movement (Site-wide)												
Construction Vehicles												

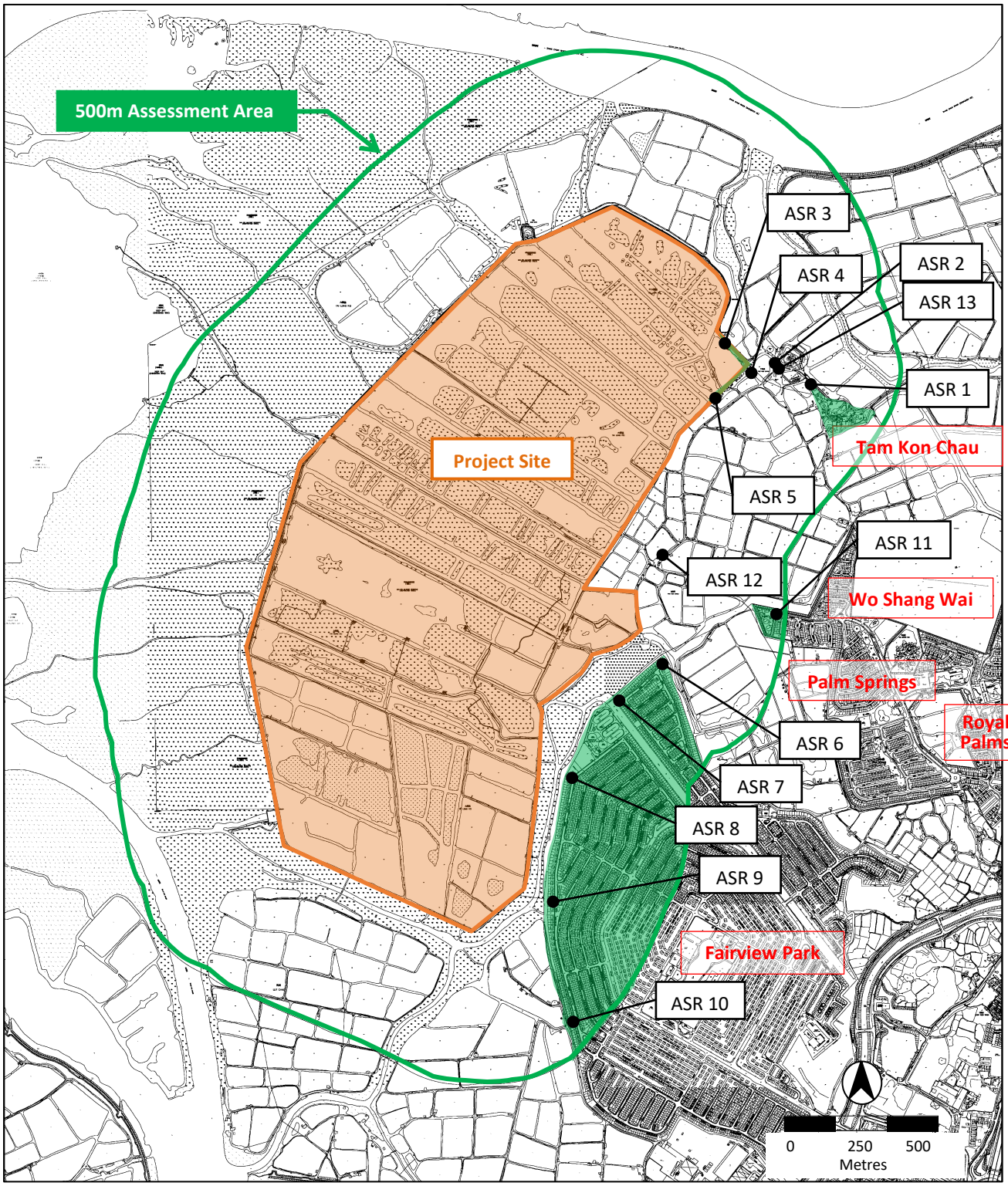
Other Projects	2022											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Planned MPNR Management Plan Maintenance Activities in 2022 - NOT Concurrent												
Drain Down of gei wai												
Habitat management												
Gei Wai Refill												

Key: Dry season during which there will be no outdoor Works for the Project within MPNR

Outdoor Works for the Project within MPNR

Works for Other Projects (including the planned drain-down and re-fill of gei wai #7, 8a, 19, 20e)

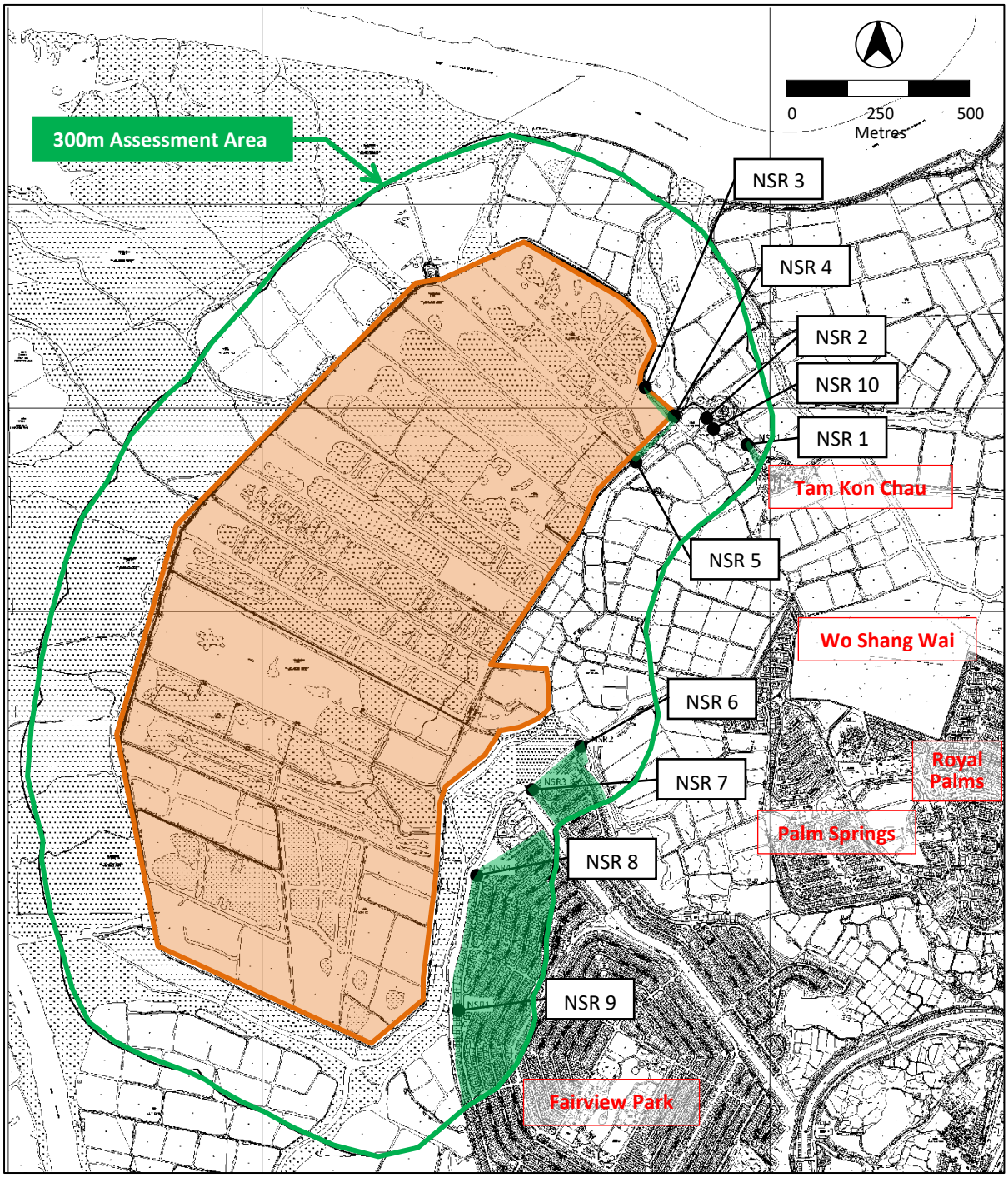
Figure 4 Locations of Representative ASRs



Legend:

- Project Site
- Residential Areas
- ASRs within 500m of the Project Site Boundary
- Representative ASRs

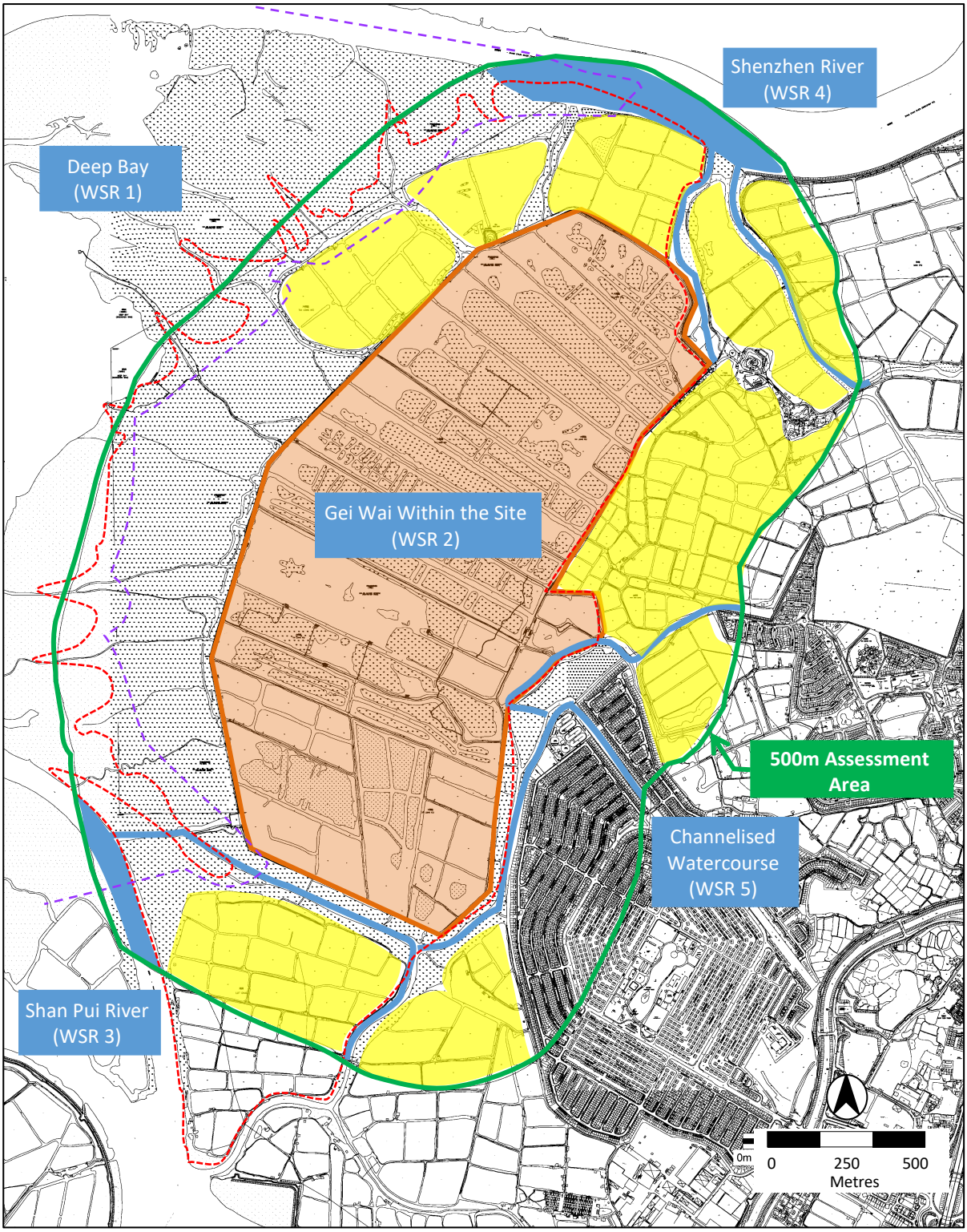
Figure 5 Locations of Representative NSRs



Legend:

- Project Site
- Residential Areas
- NSRs within 300m of the Project Site Boundary
- Representative NSRs for Assessment

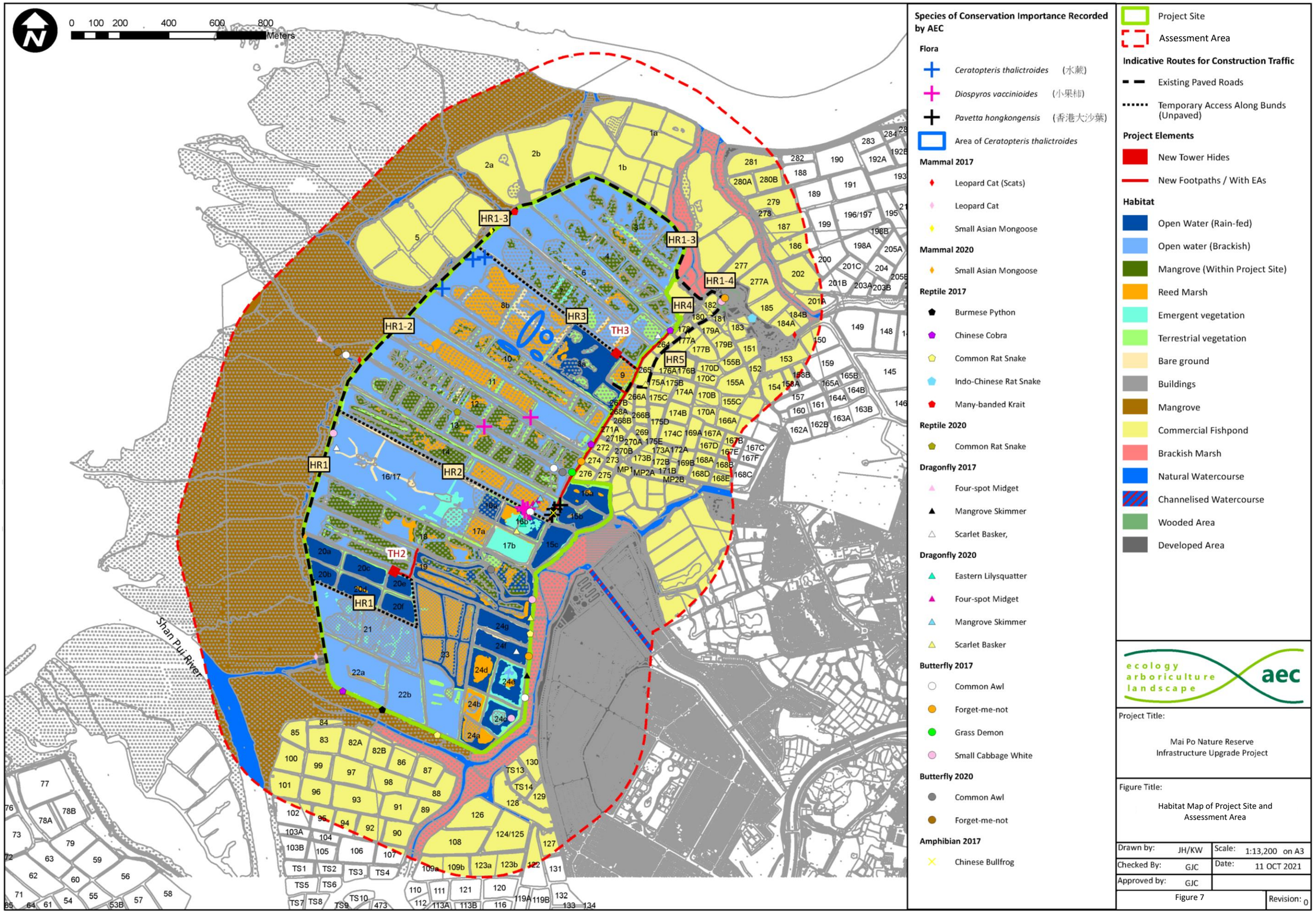
Figure 6 Location of Representative WSRs



Legend:

- Project Site
- Water Sensitive Receiver (WSR)
- Commercial Fishpond (WSR 6)
- Mai Po Marshes SSSI (WSR 7)
- Inner Deep Bay SSSI (WSR 8)

Figure 7 Habitat Map of Project Site and Assessment Area



ecology arboriculture landscape aec

Project Title:

Mai Po Nature Reserve
Infrastructure Upgrade Project

Figure Title:

Habitat Map of Project Site and Assessment Area

Drawn by:	JH/KW	Scale:	1:13,200 on A3
Checked By:	GJC	Date:	11 OCT 2021
Approved by:	GJC		
Figure 7		Revision:	0

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