Agreement No. CE 17/2019 (CE)
Technical Study on Partial Development of Fanling Golf Course Site – Feasibility Study

The 154th EIASC on 18 July 2022
"Technical Study on Partial Development of Fanling Golf Course Site – Feasibility Study"
Additional information on issues of concern
Responses to Comments

No.	Comments	Responses
	Fauna and Flora Diversity - provide justifications for the methodologies, coverage and frequency of the ecological surveys conducted, including flora and fauna.	Ecological survey was carried out in accordance with the requirements under EIA Study Brief (EIA SB), EIAO Technical Memorandum (TM), and Guidance Notes for EIA. The coverage of the ecological survey included representative areas of all the habitats within the PDA, 500m from the Potential Development Area (PDA), as well as egretries outside 500m assessment area i.e. Ho Sheung Heung Egretry, Man Kam To Road Egretry covered under the flightline survey. The survey frequency was made reference to EIAO Guidance Note 7/2010 Ecological Baseline Survey for Ecological Assessment, which covered the active period of the respective taxa group in a year. In accordance with EIA SB, the ecological field surveys shall be carried out for at least 12 months covering the wet and dry seasons. Additional survey was conducted to determine if the roosting and breeding ardeids at the new egretry reported near the end of survey period would fly towards the PDA. The main purposes of ecological survey are 1) to verify existing information collected from literature review, 2) to fill information gaps after a comprehensive literature review, and 3) to collect updated information, for establishment of ecological baseline with focus on occurrence of important habitats (e.g. breeding and roosting habitats) and species of conservation importance, and in particular the ecological conditions of the 4 Sub-Areas of the PDA for impact assessment. The Method Statement for the Terrestrial and Aquatic Ecological Impact Assessment was submitted and agreed with AFCD and EPD prior to the assessment. For plant survey, no direct counting is required in EIAO Guidance Notes, but all individuals (including seedlings) of the plant species of conservation importance (including Chinese Swamp Cypress) encountered within the PDA were tagged and counted to provide a quantitative number for impact assessment.

	- provide data or proof to demonstrate that the assessments on the diversity and rarity of the fauna species of conservation interest, such as birds, bats and moth were comprehensive and accurate given that the critical activity time for the species concerned, e.g. birds in early mornings, and bats and moths in late nights, were not covered;	The ecological baseline was established by both reviewing existing information and conducting necessary surveys to fill the information gaps (including ecological conditions in the PDA, habitat use by wildlife in the 4 Sub-Areas, any potential breeding and/or roosting sites within PDA, etc.) to facilitate evaluation of ecological value of each habitat type and Sub-Area, and also impact assessment. Hence, ecological surveys were conducted in the 4 Sub-Areas of PDA with the same methodology and frequency, in order to evaluate the ecological conditions of the 4 Sub-Areas, identify if any crucial ecological resources for species of high conservation importance will be impacted, and if there will be insurmountable ecological impact. According to Section 2.1 of the EIAO Guidance Note No. 10/2010 - *Methodologies for Terrestrial and Freshwater Ecological Baseline Surveys*, there are a wide range of surveys or sampling methods for investigating different types of habitats, flora and fauna groups. Each method has its own merits and limitations. In addition, each site to be studied has its specific condition, which may render certain survey methods more suitable. We have exercised professional judgements in choosing the most appropriate survey methodology (particularly for bird, bats and moths) according to the site conditions, ecological components to be studied and type of impacts expected for this EIA study. These judgements are further elaborated as follows. **<u>Birds</u>** Targets of the bird survey include identifying the diversity amongst the 4 Sub-areas and searching for the presence of colonial roost/nest within the 4 sub-areas, in order to establish the ecological baseline for assessment of the impact of the development to birds. The 12-month bird survey covered both resident and migratory birds. Transect method according to EIAO Guidance Note 10/2010 was conducted within and outside the PDA. Flight line survey was carried out during the active period of breeding egrets (both diurnal egrets and nocturnal egrets were covered). Bird survey near FGC was started from 8:00am. As there is no major water body within FGC and the assessment area as a whole, the majority of the birds within the assessment area, especially within FGC are land birds (referring birds inhabiting land habitats such as woodland, shrubland or grassland). Different from coastal waterbirds which often moving with tide and travel among different feeding grounds, land birds basically reside inside or stay close to their roosting habitats. Land birds can be recorded if the bird survey is carried out throughout the day. Based on the above, bird survey within FGC between 10:00am and 10:00pm and throughout the day, covering morning, afternoon, evening and night time is adequate for establishing the ecological baseline of birds within FGC, and has met the requirement under EIAO TM and the EIAO Guidance Note No. 10/2010. A total of 74 species of bird including 71 land bird species were recorded from the ecological survey. No colonial roosting/nesting sites of birds (i.e. egretry) was found within the various Sub-areas. The survey findings also showed that bird diversity and abundance as well as the species of conservation importance were relatively lower in Sub-Area 1 than Sub-Area 2-4. Potential impact of this

		project to birds is considered as minor. In accordance with Appendix H Section 2(5)(c) and (e) of the EIA SB, attention should be paid on roosting, breeding and/or feeding sites of resident and migratory birds, and Eastern Cattle Egret. Based on our bird survey, the ratio of resident birds to migratory birds inside the PDA and outside the PDA conducted in different time of a day is about 7:3, which is tallied with the ratio to the list of species of conservation importance provided in the Hong Kong Golf Club (HKGC)'s Report submitted to the Task Force on Land Supply in 2018. Both data from HKGC's Report and our bird survey did not identify any important colonial roosting, breeding and/or feeding sites for resident and migratory birds. Eastern Cattle Egret was recorded both within and outside PDA, but more abundant outside PDA. With reference to information provided by AFCD (i.e. "List of Species Recorded at Fanling Golf Course Site EIA Study Boundary from AFCD" from 2002 to 2020), 39 species of birds including 11 species of conservation importance were recorded within/close to the present 500m assessment area, while a total of 74 species of birds including 16 species of conservation importance were recorded in the present EIA. In the present EIA, the total number of bird species from both literature and survey was 102 species (28 from literature and 74 from the present survey). The data from the present bird survey are indeed comparable with other EIA studies. For example, in the EIA study for North East New Territories New Development Areas (NENT NDA, AEIAR-175/2013), there were 65 species of birds recorded from the survey (cumulative from Appendices 13.3.2 to 13.3.8 of the EIA), while the bird inventory within the assessment area was 256 species which were mainly established from literature and survey (Appendix 13.3.1 of the EIA). As the assessment area of the EIA for NENT NDA was over 2000ha covering habitats that were not present in the present EIA, if the bird species from similar habitats as the present EIA are extracted, there were 118 species of birds (from both literature and survey) which are comparable to the number in the present EIA i.e. 102 species. As a summary, the baseline information of bird established from literature and this bird survey has followed the same approach as other approved EIAs. The data collected from this bird survey were similar to the pattern and/or comparable with the reviewed information, which are comprehensive and accurate for the purpose of impact assessment. **<u>Bats</u>** Bat survey has taken account of the information under the EIA SB and literature, including 8 bat species, their roosting habitats, emergence time and feeding locations Bat survey period has included active time of all listed bat species It is a common practice to conserve bat roost as direct impact on bat roost would affect the species population level. Conservation of bat roost is also an important issue in Taiwan and overseas (鄭錫奇等 1999; Sheffield et al. 1992[1]). Hence, attention was paid on bat roost

[1] 鄭錫奇，方引平，周政翰。臺灣蝙蝠圖鑑。 行政院農業委員會特有生物研究保育中心。

		location in local EIA studies (e.g. EIA for NENT NDA, Mai Po Nature Reserve Infrastructure Upgrade Project, etc.) Based on the literature review, including the EIA for NENT NDA and the 2018 HKGC's report, 8 species of bat were found in the study area and within FGC. However, the EIA for NENT NDA and the 2018 HKGC's Report do not include any information of the presence of bat roosting/breeding sites. As protection of their roosting sites is the major approach from bat conservation perspective, it is important to investigate whether there are any bat roosting/breeding sites within the assessment area, especially the PDA. An important target of the bat survey is to find out if any bat roosting/breeding sites are present within the PDA and their locations within the various sub-areas of the PDA, if any. Bat assessment focusing on searching for roosting/breeding sites is also adopted in other EIA studies, such as Mai Po Extension and NENT NDA EIAs. Bat roosting/breeding sites were searched actively during the day-time according to the preferred roosting habitats of each species (including the 3 species stated in EIA SB, i.e. Short-nosed Fruit Bat roosts in Chinese Fan-palm and Petticoat Palm; Lesser Bamboo Bat roosts in bamboo and tree; and Lesser Yellow Bat roosts in building and Petticoat Palm). Additionally, handheld bat detectors (Wildlife Acoustic EM3+) were used to detect bats emerging from potential habitats in evening according to their emerging time from roosts (all the bats listed in the literature with the active / emerging time from evening to a few hours after sunset e.g. Short-nosed Fruit Bat begins to forage about 30 minutes after sunset; Lesser Bamboo Bat emerges after dusk; Lesser Yellow Bat appears in the evening). Hand-held bat detector is commonly used in other EIAs (e.g. (i) Drainage Improvement Works at Ngong Ping; (ii) Yuen Long Barrage Scheme; (iii) Sai O Trunk Sewer Sewage Pumping Station; (iv) NENT NDA, (v) Hung Shui Kiu NDA, (vi) Pier Improvement at Tung Ping Chau, (vii) Pier Improvement at Lai Chi Wo, (viii) Upgrading of Remaining Sections of Kam Tin, (ix) Tuen Mun South Extension etc.) for bat survey. As all bat species reported in the area started their activities and were most active in the evening and after sunset, the surveys inside the PDA had already covered their most active duration of a day. Based on our survey, though bat roosting/breeding sites were identified within the assessment area (i.e. within the New/Eden Course), no bat roost was found inside the PDA. As no roosting/breeding site within the PDA was recorded, no significant impact to the population of bats due to the proposed development is expected. Besides, bat is highly mobile flying animal and may utilize a large area as foraging habitats, and its important feeding habitat types (i.e. agricultural, wetland areas and wooded area) will be either not directly affected, preserved or mitigated. Potential impact of this project to bat is considered as minor.

Sheffield, S. R., Shaw, J. H., Heidt, G. A., & McClenaghan, L. R. (1992). Guidelines for the Protection of Bat Roosts. Journal of Mammalogy, 73(3), 707 – 710.

		<u>Moths</u> As moth assessment has not been carried out under any previous EIAs involvement of Professor Wang Min (王敏) [2], who is a renowned moth expert of South China Agricultural University (華南農業大學), was invited provide professional advice on the methodology of moth survey, including moth trap types used, time and duration for setting up the moth traps, after a site visit in January 2020. The CV of Professor Wang was also submitted to AFCD for agreement. The main target of moth survey was to find out moth distribution in the 4 sub-Areas. Moth surveys were performed by moth traps and active search. Standardized number of moth traps (Robinson traps and LepiLED traps, adopted in other moth studies) were deployed in all the sub-areas of the PDA and the assessment area as a whole. The survey period covered dry, wet and transitional seasons. Active search for moths during day and night-time were also conducted. According to Professor Wang, setting up of moth traps for 2 hours after sunset at each survey location covering 4 sub-Areas was sufficient and appropriate to collect sufficient moth samples for the purpose of the present EIA. Setting up moth traps for longer period, however, might collect moth species further away from the survey location, such as habitats outside the PDA, and may affect the evaluation and impact assessment. The survey collected about 1,600 moth specimens and they were identified by Prof WANG. The survey findings indicated that diversity of moths in Sub Area 1 is similar with the other sub-areas. Moth generally roosts in woodlands in day time, forages at night. There would be no woodland loss in Sub Areas 2 to 4 and about 1ha mixed woodland in Sub Area 1 will be preserved. In addition, turfgrass is the largest habitat in Sub Area 1, but according to Kendrick 2002, moth diversity in grassland is low, ecological value of turfgrass is lower than grassland (due to management practice, pest control). Moreover, larval food plants of the 10 moth species of conservation importance with records within the PDA are all common or exotic to Hong Kong and are not unique in Sub Area 1, impact on food source for moth larvae is minor. Therefore the potential impact of this project to moths is considered as not significant.

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	- provide data or proof to demonstrate that the assessments on the diversity, size and rarity of the flora species of conservation interest, such as seedlings of Chinese Swamp Cypress, as well as the overall ecological evaluation of four sub-areas, were comprehensive and accurate;	Habitat and vegetation surveys were conducted for the EcoIA. All habitat types were mapped and over 600 plant species were recorded. Within the PDA, the boundaries of various habitat types were delineated, and the extent of the swampy woodland was fully mapped. Based on the results from the ecological survey and also making reference to findings from tree survey team, no seedling of Chinese Swamp Cypress was recorded during the surveys for the EIA, which concurs with the observation in the site visit with ACE members on 12 July 2022 that no small-sized Chinese Swamp Cypress was identified on site. When evaluating the overall ecological values of the 4 sub-areas, the following factors were considered: For Sub-Area 1: • the size of woodland habitat with higher native plant species composition and ecological value is the smallest among the 4 sub-areas; • although the size of mixed woodland is the largest among the 4 sub-areas, its ecological value is relatively lower due to mixing with exotic plant species (i.e., about 43% in mixed woodland are exotic plant species and species numbers of mammal, bird, herpetofauna, butterfly and dragonfly are all lower than woodland); • the size of man-made habitats (i.e. developed area and turfgrass, 63%) with low ecological value including visitor carpark, staff quarters, golf course fairways and sports ground (tennis courts & a football pitch) is the largest; • lowest number of species of conservation importance among the 4 sub-areas; • the potential value of Sub-Area 1 is limited by the nearby developed area and high-rise buildings. For Sub-Area 2 & 3: • more species of conservation importance including non-flying mammals recorded in Sub-Area 2 & 3; • larger area of woodland habitat with more native species and higher ecological value; • not close to developed area and high-rise buildings as in Sub-Area 1. For Sub-Area 4: • more species of conservation importance including non-flying mammals recorded in Sub-Area 4; • presence of a marsh with species of conservation importance recorded; • presence of important swampy woodland and the age of the Chinese Swamp Cypresses is over 100 years; • the expansion of the swampy woodland is limited by the Fan Kam Road and the footpath within the Golf Course (even if the Chinese Swamp Cypress can be propagated naturally);

		• small size of the swampy woodland with limited ecological functions provided. The ecological value of Sub-Area 4 is considered the highest (i.e., ranked medium to high) among the 4 sub-areas, but it is not considered as high or very high ecological value when compared with habitats or areas with high/very high ecological value such as Long Valley, Gei Wai in Mai Po, etc.) due to its limitations (i.e. small size, expansion opportunity and ecological functions provided by the swampy woodland). While the ecological conditions of Sub-Area 2 & 3 are in-between Sub-Area 1 and 4, the overall ecological value is ranked as medium. As the ecological condition is relatively lower, the overall ecological value of Sub-Area 1 is ranked as low to medium.

	- provide results of additional ecological surveys as appropriate, if such could help illustrate or support the assessment results given in the EIA report;	Information/findings of all major literature, including the following, have been thoroughly considered in the ecological impact assessment: - • EIA for NENT NDA (as required in EIA SB) – Assessment area overlapped with this EIA; FGC was also described. • Letter from Kadoorie Farm and Botanic Garden (KFBG) in 2019, which includes comprehensive information/findings of the Chinese Swamp Cypress in Sub-Area 4; • HKGC's Technical Submission to the Task Force on Land Supply in 2018 - ecological survey in FGC since 2015 and cumulative species of conservation importance provided. Information gaps critical for the impact assessment after the literature review were identified as follows. • Habitat characteristics, vegetation composition of 4 sub-areas; • Habitat use of fauna, colonial roost/nest within the PDA; • Faunal distribution in various sub-areas of the PDA. According to EIAO Guidance Note 7/2020, the purpose of the ecological survey is to (a) provide first hand, specific, and updated information on the existing ecological characters of the proposed development site and its vicinity; (b) verify information obtained from the review of existing information & (c) fill existing information gaps. Information gaps for birds included occurrence of colonial roosting/nesting sites and their distribution. Information gaps for bats included existence of rooting sites and the distribution of these roosting sites within the different sub-areas of the PDA, if any. Information gaps for moths included moth distribution in the 4 sub-areas. Information gaps of the above were filled based on our bird, bat and moth surveys, which were carried out in accordance with the EIAO Technical Memorandum and the EIA SB for this project. In addition, the findings of our ecological survey are not in conflict with the additional information provided under the Ecological Report submitted by HKGC in 2022. Taking bat as an example, it is not mentioned under the 2022 HKGC's Report that bat roosting/breeding site was identified within the PDA, although more cumulative bat species were recorded based on HKGC's survey since 2015. The additional information does not change the assessment results based on our literature review and ecological survey conducted. Based on the above, we consider that the ecological surveys undertaken for this project have met the objectives of providing the baseline data for the ecological impact assessment. Additional ecological survey is considered not necessary.
	Hydrology and Hydrological Impact - Elaborate the hydrological impact on the Chinese Swamp Cypress and woodland habitats (sub-areas 3 and	The Chinese Swamp Cypresses are located within the swampy woodland in Sub-Area 4. The approximate level of the swampy woodland is +22mPD. Based on the existing topography, the existing hillock with maximum level of +90mPD approximately in the southeast side of Sub-Area 4 and the FGC to the west of Fan Kam Road with approximate level of +34mPD in the north-west side of Sub-Area 4 are much higher than the swampy woodland. The hillock and the FGC to the west of Fan Kam Road are the main water

	4) with consideration of tree plantation as mitigation measures, and available water sources in both wet and dry seasons in these sensitive areas;	catchments of the swampy woodland. Runoff from these two catchments is discharged into the swampy woodland. The catchment area plan is shown in **Attachment 1**. As the 2 catchment areas are not within the PDA and Sub Area 4 is proposed to be preserved it is expected that the Swampy Woodland would not be affected. According to historical records, including the aerial photos taken since 1945, the existing woodlands within the Old Course, except the Chinese Swamp Cypresses within the swampy woodland, were rebuilt from 50's to 80's, as most of the woodlands were destroyed during World War II, whereas the Chinese Swamp Cypresses have been in existence for over a century. The record further demonstrates that as long as the plantings in Sub-Areas 2 to 4 are properly managed and monitoring program is implemented, impact on swampy woodland is unlikely. According to DEVB's Technical Circular (Works) No. 3/2012, public housing development should achieve an overall of 30% green coverage. Given that the proposed housing development in Sub-Area 1 is about 9ha, area to be reserved for greening would be about 2-3 ha. Development area within the existing Sub-Area 1 is 1.8ha. Hence, the impermeable area added due to the proposed housing development is 5.27ha. Average rainfall in Hong Kong is 2,000mm per year. Based on infiltration coefficient of 0.6 for porous surface, the potential groundwater lost due to the housing development is about 63,240m^3 year, or average of 173m^3/day. HKGC is using reclaimed water from Shek Wu Hui Sewage Treatment Works (SWHSTW) for irrigation. The daily consumption is 2,000 to 3,000 m^3/day. As Sub-Area 1 is about 5.8% of the whole FGC site, about 174 m^3/day of reclaimed water would be used in Sub-Area 1. If the compensation trees would be all planted in Sub-areas 2 and 3, the additional water demand would be at these sub-areas would be at maximum 174 m^3/day. Therefore total water demand is <u>347m^3</u>, assuming that the lost of groundwater of 173m^3 because of the housing development in Sub-Area 1 shall be compensated and the irrigation water of 174m^3 of the compensated trees in Sub-Areas 2 and 3 shall be fulfilled by other means. Reclaimed water produced by SWHSTW is over 73,000m^3/day, which is 210 times of the potential groundwater lost due to the housing development and compensated trees. Hence, SWHSTW's capacity is well sufficient to supplement the groundwater lost due to the housing development in Sub Area 1, if necessary.
	- evaluate the hydrological impact on trees of particular interest (TPI) and other retained trees in the sub-area 1, taking into account critical factors like sufficiency of water sources in both dry and wet season as well as the soil ceiling and soil compression impact;	The TPIs within Sub-Areas 1 to be retained will be given special attention during the subsequent investigation, design and construction phases. During the investigation phase, detailed tree survey will be undertaken for all existing trees within Sub-Area 1. The objective of the detailed tree survey is to provide information for reviewing the housing block layout and determining the site formation layout. Existing trees within Sub-Area 1, including TPIs and non-TPIs, will be retained as far as practical, taking account of the housing development needs and the conditions of the existing trees. All trees to be retained will be properly protected taking account of the measures to be implemented during the design and the construction phases as described as follows:

		During the design phase, measures necessary to retain the trees during the site formation works and the housing development works will be prepared for incorporation into the works contract of the site formation works and coordinating with Housing Department (HD) for incorporation into their housing development works contract respectively. DEVB has promulgated guidelines for preservation of existing trees. The existing condition of the preserved trees will be maintained within the tree protection zone of each tree, which is generally referred to the areas within the drip line of the preserved tree. For examples: - • The area within the tree protection zone will not be paved; • The ground level within the tree protection zone will not be changed; • Additional buffer area outside the tree protection zone will be provided if necessary for TPIs; • Manual or automatic irrigation system will be provided if necessary. During the construction phase, the contractors of CEDD for the site formation works and HD for the housing development works (under the supervision of resident site staff of CEDD's consultant & HD's consultant) will be required to implement the measures to protect and maintain the trees to be preserved. For examples: - • Condition of the existing trees including the existing soil condition within the tree protection zone will be assessed by certified arborists before commencement of the works and regularly during the construction phase; • Ground penetrating Radar (GPR) Laser or similar techniques will be adopted to identify extent of tree roots; • The tree protection zone will be fenced off before commencement of the works; • Excavation works will not be permitted within the tree protection zone and if required within the additional buffer area, excavation works will be undertaken with care. Works will be suspended for investigation of the impact to the preserved tree if major root is found during the excavation. • Manual or automatic irrigation system will be provided if necessary.
	- Provide hydrology impact assessment and mitigation measures to demonstrate the positioning and layout of the proposed number of blocks (consider to allow reasonable substructure / foundations as well) for the 12,000 residential units are feasible.	Hydrological impact to the trees retained within the housing development during the construction phase has been considered. The housing development for this project does not consist of basement. Deep excavation, which would require drawing down of water level, would not be required. Foundation of the housing development in Hong Kong is usually designed based on large-diameter bored piles. Drawing down of water table will not be required for construction of bored pile, as tremie concrete (i.e. casting of concrete under water) is used for construction of bored pile. According to DEVB's Technical Circular (Works) No. 3/2012, public housing development should achieve an overall of 30% green coverage. Given that the proposed housing development in Sub-Area 1 is about 9ha, area to be reserved for greening would be about 2-3

		ha. The green coverage to be provided will be well sufficient for maintaining the existing trees to be preserved. Since development area within the existing Sub-Area 1 is 1.8ha, the impermeable area added due to the proposed housing development is about 5.27ha. Average rainfall in Hong Kong is 2,000mm per year. Based on infiltration coefficient of 0.6 for porous surface, the potential groundwater lost due to the housing development is 63,240m^3 year, or average of 173m^3/day. HKGC is using 2,000 to 3,000 m^3 of reclaimed water for irrigation per day. Reclaimed water produced by SWHSTW is over 73,000m^3/day and is well sufficient to supplement the irrigation need due to the housing development in Sub Area 1. Detailed design of the fresh water and reclaimed water system will take into account the water demand based on the greening requirement. Preservation of trees, especially TPIs, is common in various housing development projects in Hong Kong. Taking the Queen's Hill as an example, some of the existing trees are preserved successfully within the housing development. Please refer to **Attachment 2** for photos of the preserved trees within the housing development. This shows that, with the various mitigation as described above, tree preservation within housing development would be practical.
	Landscape Impact - provide information on the proposed compensatory tree planting with reference to the hydrology impact as mentioned above;	As explained above, since the main water sources of the swampy woodland in Sub-Area 4 where the Chinese Swamp Cypresses are located are not from Sub-Areas 2-3, plantation of compensatory trees within Sub-Areas 2-3 will not affect the swampy woodland. Yet, any compensatory tree planting within Sub-Areas 2-3 will be handled with care and on the condition that the swampy woodland will not be affected based on detailed hydrological impact assessment. For tree species selection, we will consider planting of native deciduous species such as *Liquidambar formosana*, *Celtis sinensis*. These species take up less water, hence preserving more water in soil during the winter/dry season. Besides, we will also consider enhancing the existing woodland by planting a forest with different layers – canopy, understory and forest floor. Integrating the planted forest with the existing woodland will enhance the ecosystem that benefit not only the Chinese Swamp Cypresses but species.

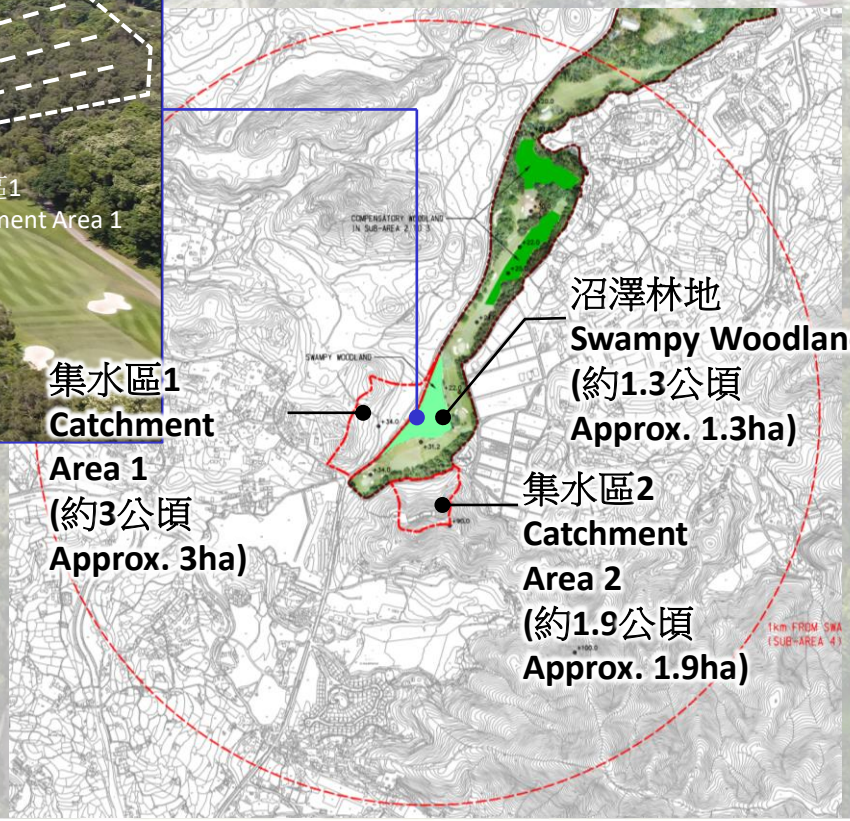
	- provide a preliminary layout plan of the proposed housing in the sub-area 1 with relevant information to illustrate the feasibility of maintaining sufficient space and appropriate landscape conditions for the retained / translocated trees to survive while accommodating the proposed development of 12,000 housing units in the site during the construction and operational phases; - provide information to demonstrate the site-specific design approach adopted or to be adopted in determining the layout of the proposed individual housing blocks, associated amenities and infrastructure in the sub-area 1, so as to ensure the majority of the existing trees, other than TPI, are to be retained;	Our original notional layout (**Attachment 3**) has adopted site-specific design approach. As shown in preliminary layout in the EIA report, an approximate 1ha mixed woodland in southeast of the side and a tree cluster in the middle of the site (i.e. small knoll located between block 6 and 12) has been preserved. Total 267 nos. of tree could be preserved in Sub-Area 1 under the proposal. To further enhance the condition of preserved tree, it is recommended to extent additional 3m buffer zone from typic tree protection zone (i.e. dripline for the trees) to further ensure that roots would not be damaged and less disturbance to the tree in operation. The illustration is shown in **Attachment 4.** Further refinement on block layout to enhance tree protection will be proposed in the detailed design stage of the project with input from HD.
	Ecological Impact - provide information to illustrate that the proposed development in sub-area 1 would not pose adverse ecological impact on the other sub-areas;	From the ecological impact point of view, the ecological value of Sub-Area 1 is assessed to be low to moderate based on our literature review and our ecological survey carried out. The fauna species found in Sub-Area 1 is less than that found in Sub-Areas 2-4. The mixed woodland located in the south-eastern side of Sub-Area 1 adjoining Sub-Area 2 will be preserved. The preserved mixed woodland would serve as a buffer to avoid affecting the ecology of Sub-Area 2. From the hydrological impact point of view, as explained above, the housing development will not involve drawing down of water table of Sub-Areas 2 to 4, both during construction and operation. Based on the existing topography and rock had level, Sub-Area 1 falls towards the north side, whereas Sub-Areas 2 to 3 falls towards the south side to Sub-Area 4. Hence, development of Sub-Area 1 will not affect the hydrology of Sub-Areas 2-4. From the lighting glare point of view, as explained below, the housing block layout has been well engineered to minimize any potential lighting glare impact to Sub-Area 2, including (a) providing the community facilities with more light sources in the centre of the housing development, and providing a carpark building and residential blocks to shield the residual light beam originated from the community facilities, (b) well engineering the block layout of the housing bocks facing Sub-Area 2 and using architectural fins to block

		the indoor light of the residential flats to Sub-Area 2; (c) adopting various measures to control lighting beam directions and intensity of the public and security lighting during the construction and the operation phases. The above mitigation measures will be able to avoid adverse impact to Sub-Areas 2-4 due to the housing development in Sub-Area 1.
	Light Impact - elaborate with the support of data on the potential impact of light pollution on the woodland habitat and associated fauna in both the construction and operational phases; and suggest practical mitigation measures for minimizing light pollution during the operation of the project (i.e., light pollution from the buildings). - suggest light abatement measures to demonstrate the positioning and layout of the proposed number of blocks to support the proposed 12,000 residential units (the carpark at sub-area 1 is acting as a buffer between the high-rise residential buildings and sub-area 2; if sub-area 1 is built up to the density similar to the high-rise residential building across the road, the effect on sub-area 2 may not be acceptable.	Assessment of the lighting impact of the housing development shows that the glare is mainly come from the security lighting during the construction phase and road lighting during the operation phase. Indoor light of the community facilities, retail facilities, restaurants, etc. and lower levels of the housing blocks is also a glare source. Lighting glare impact has been considered in formulating the block layout of the housing development for the EIA. According to "inverse square law" ($I=P/4\pi r^2$), lighting intensity will be decreased with the distance between the light source and the light receiver. Taking street lamp as an example, a street lamp is normally installed at 10 m (i.e. 3-storey) above ground. The distance from the nearest woodland within Sub-Area 1 and Sub-Area 2 to the building is about 20 – 40m away. This would mean that the light intensity of the nearest building / street lamp to the woodland, as compared with a standard street lamp right above it, will be decreased by 4 – 16 times. For building / street lamp of 50m from the woodland, the light intensity will be reduced by 25 times. For Sub-Area 3, as it is > 300 – 400m away from Sub-Area 1, the light intensity will be decreased by about 1000 times. Hence, even if there is a direct light path, the light intensity is negligible. In determining the housing block layout, consideration has also been given to minimize the lighting glare due to the community facilities such as the public transport interchange, the retails facilities and the restaurants to the preserved woodlands in Sub-Area 2. Hence, the community facilities are located the centre, rather than near the southern side of the housing development based on the principle of "inverse square law". There will be a carpark building and residential blocks between the community facilities and the preserved woodlands in Sub-Area 2. Residual lighting impact will be blocked by this carpark building and the residential blocks. During the operation phase, the potential residual lighting glare impact would mainly be come from the public lighting of the housing development and the indoor lighting of the residential flats. Potential lighting glare impact due to public lighting can be controlled via adjustment of the lighting intensity, installation of lighting shield to block the light towards the sensitive receivers, and using warn white light etc. Potential lighting glare impact due to the indoor light of the residential flats can be mitigated by well designing layouts of the housing blocks facing the ecological sensitive receivers, or using architectural fins to block the light path of the indoor light to the sensitive receivers. CEDD has consulted HD and agreed that the above-mentioned measure would be appropriately adopted in the housing estate design. Photos of special layout design and architectural fins are shown in **Attachment 5**. During the construction phase, no works will be carried out after 7:00pm according to Noise Control Ordinance. The remaining potential lighting impact would be due to the security light. Similar

		to the public lighting during the operation phase, potential lighting glare impact due to security lighting can be controlled via adjustment of the lighting intensity, installation of lighting shield to block the light towards the sensitive receivers, and using warn white light etc.

Attachment 1

沼澤林地的主要水源分析
Main Water Sources of Swampy Woodland

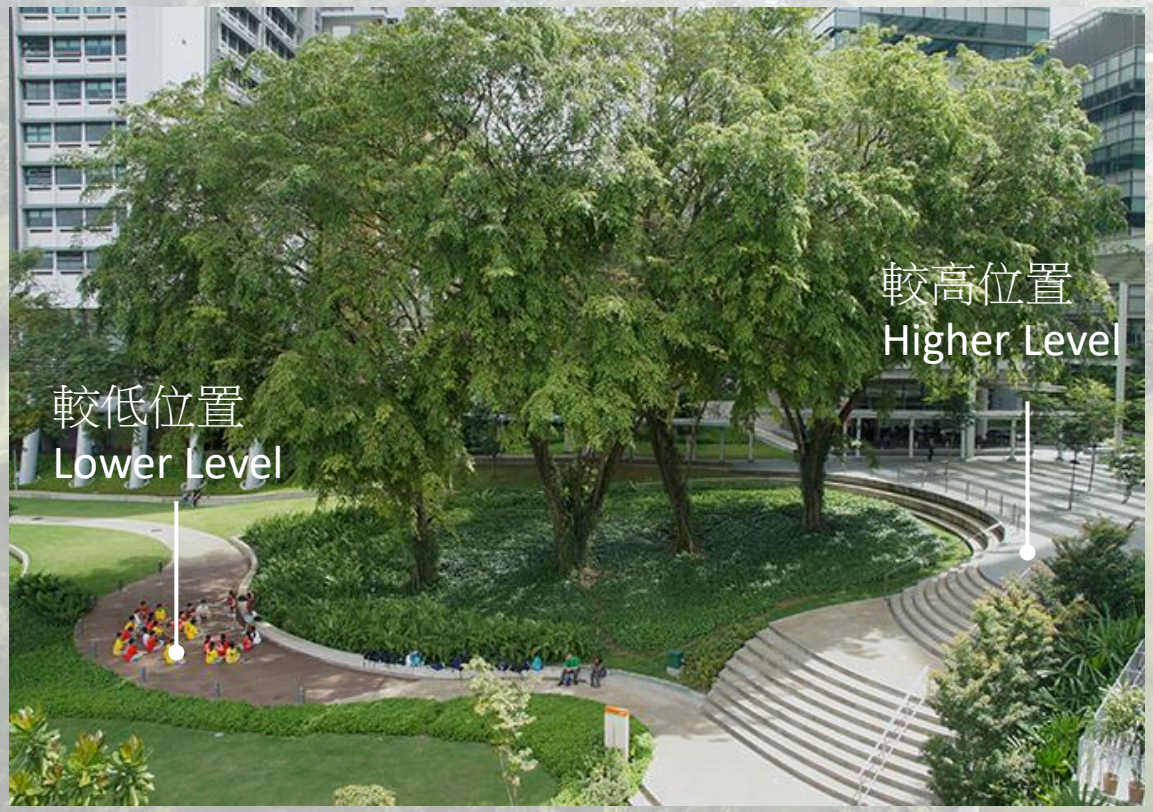


樹木保護方法
Tree Protection Methodology

Attachment 2

建立樹島/樹井 Establish Tree Island / Tree Well

例子 Example:
皇后山邨Queen's Hill Estate



樹島 Tree Island

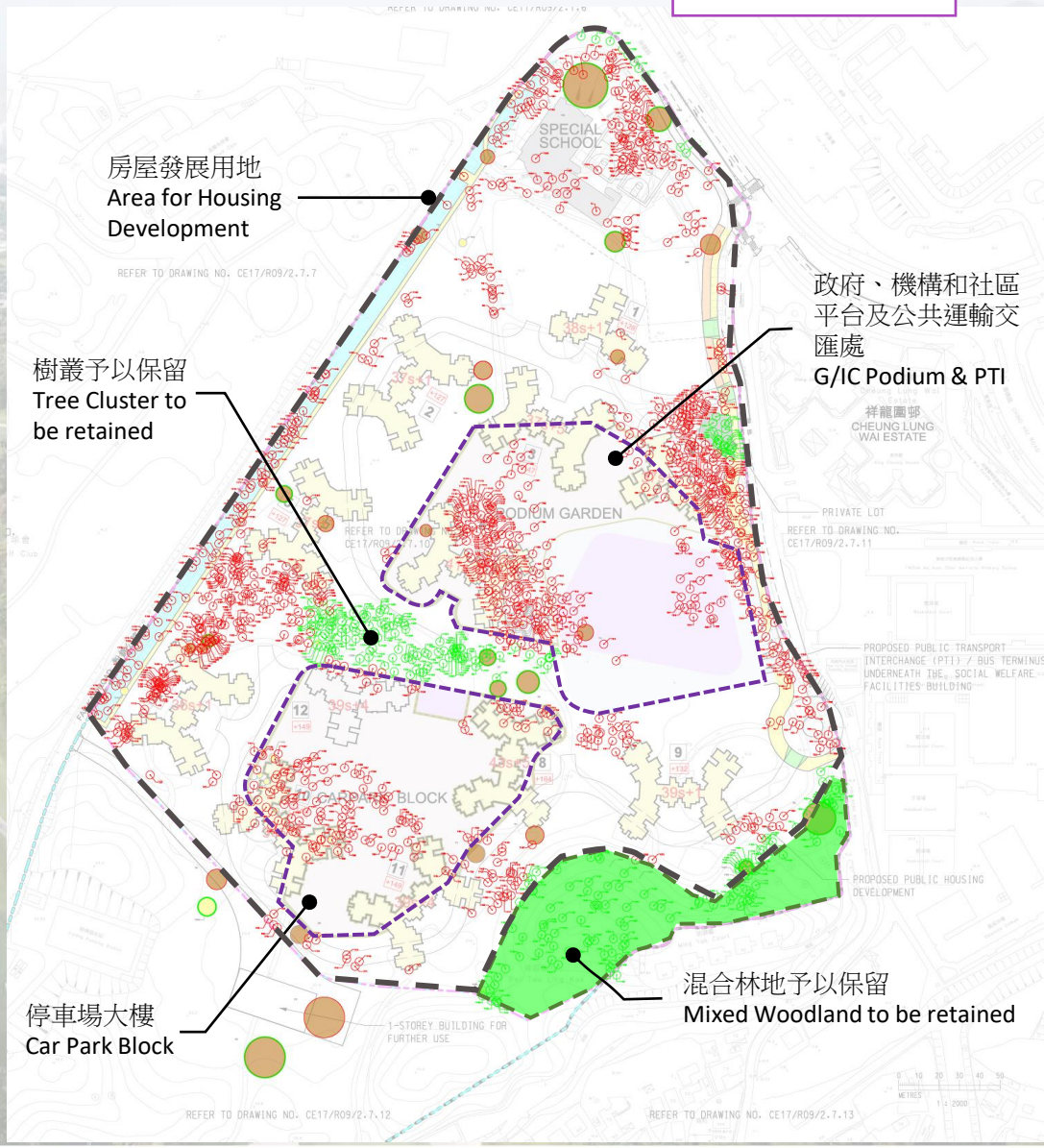
樹井 Tree Well

Attachment 3

保留現有樹木
Preserving Existing Trees

分區1 (約11公頃):
Area for Housing Development in Sub-Area 1 (11ha):

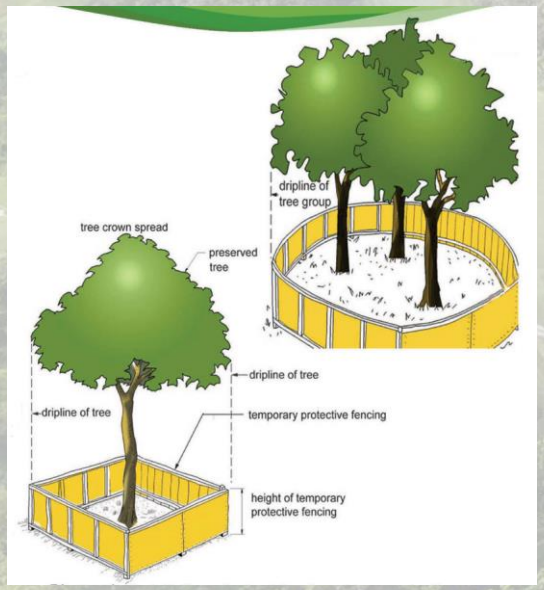
- 保留分區1內的部份林地
  Some of the existing woodland within Sub-Area 1 will also be preserved.
- 約267棵樹予以保留
  Approx. 267 Nos. of Trees to be retained.
- 約34棵樹建議移植
  Approx. 34 Nos. of Tree to be transplanted
- 約954棵樹建議移除
  Approx. 954 Nos. of Tree to be felled



Attachment 4

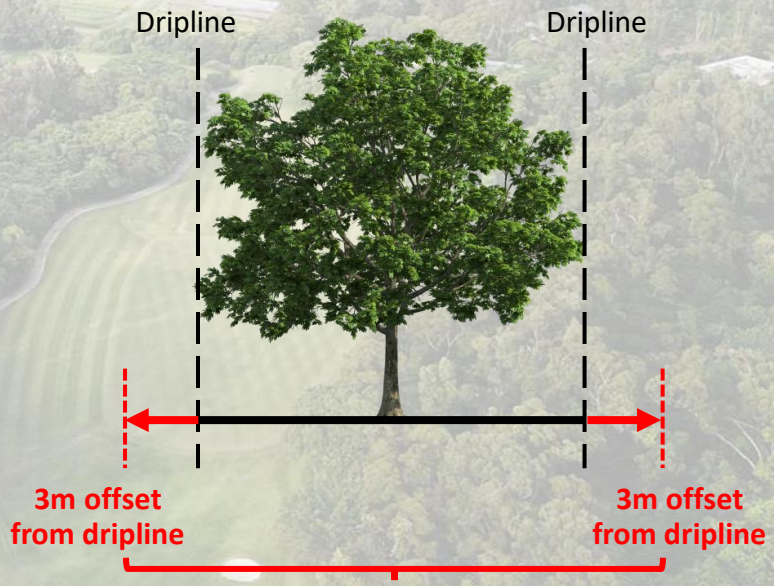
樹木保護方法
Tree Protection Methodology

建立有額外緩衝區(外加3米)的優化樹木保護區
Establish Optimized Tree protection zone, with additional buffer zone (e.g. 3m extra space)



典型樹木保護區
Typical Tree Protection Zone

Optimized

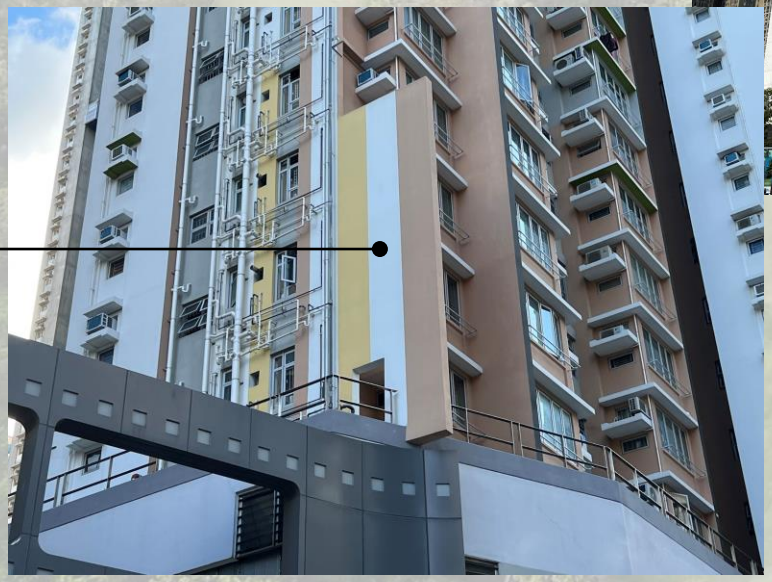


Attachment 5

照明眩光評估 Lighting Glare Assessment

緩解措施包括: -
Mitigation measures include: -

- 住宅樓宇的平面佈局及建築裝飾阻擋燈光直接照射到生態敏感受體。
  Block layout & architectural fins of the housing blocks to block the light to the ecological sensitive receivers;



建築裝飾
Architectural fins

住宅樓宇的平面佈局
Housing block layout