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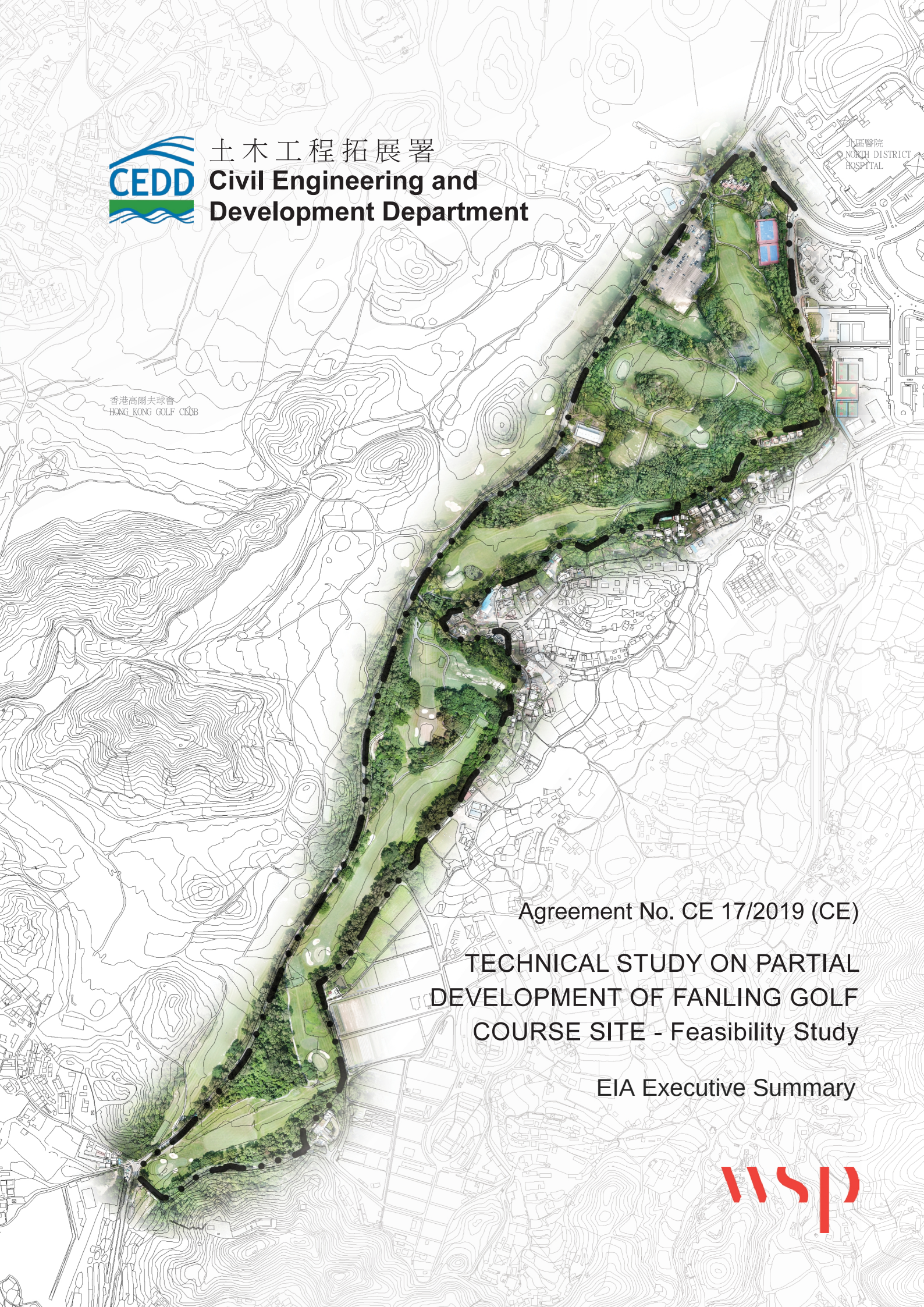
Civil Engineering and Development Department



Agreement No. CE 17/2019 (CE)

TECHNICAL STUDY ON PARTIAL DEVELOPMENT OF FANLING GOLF COURSE SITE - Feasibility Study

EIA Executive Summary

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EIA EXECUTIVE SUMMARY

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1. INTRODUCTION

1.1 Background

1.1.1 After public consultation on various land supply options in 2018, the Task Force on Land Supply (Task Force) (TFLS) recommended on 31 December 2018, among others, the Government to accord priority to studying and resuming the 32 ha of land of Fanling Golf Course to the east of Fan Kam Road for housing development. On 20 February 2019, the Government announced that the eight land supply options (including the partial development of the FGC site) recommended by the Task Force were fully endorsed.

1.1.2 The Government also announced that the Government will develop the 32 hectares (ha) of land east of Fan Kam Road of FGC for the purpose of housing development (with emphasis on public housing), and will accordingly commence a detailed, technical study in the second half of 2019 to ascertain the highest flat yield attainable in short to medium terms; assess the scope of infrastructural works required to support such development; identify environmental, ecological and other constraints, and formulate mitigation measures to contain any identified impacts to within acceptable limits; and come up with an implementation plan with timing and costs.

1.2 Purpose of this Executive Summary

1.2.1 The Executive Summary (ES) illustrates the key information and findings of the EIA study for the partial development of Fanling Golf Course Site, Fanling.

2. PROJECT DESCRIPTION

2.1 General Description of the Project

2.1.1 The Potential Development Area (PDA) covers approximately 32 ha, as shown in **Figure 2.1**, is bounded by Ping Kong Road to its northeast, Po Kin Road to its north, Fan Kam Road to its northwest and west, rural settlements of Ping Kong to its east, Tai Lung Experimental Farm and a green hillock to its southeastern and southern ends.

2.1.2 For the purpose of technical assessment, the PDA is divided into four areas as shown in **Figure 2.2**: Sub-Area 1 which is located at the northernmost part of PDA and extended up to the edge of woodland adjacent to the Fanling Raw Water Pumping Station; Sub-Area 2 which is bounded by the aforesaid woodland and the access road of On Po; Sub-Area 3 which is bounded by the existing access road of On Po in the north and the narrow edge adjacent to Tai Lung Experimental Farm; and Sub-Area 4 which is bounded by the southern edge of Sub-Area 3 and the site boundary of PDA.

2.1.3 Having assessed and evaluated various development options, housing development is only proposed at Sub-Area 1 with approximate population of 33,600. This will be further elaborated in the following sections.

2.2 Need of Project

2.2.1 The housing shortage in Hong Kong is one of the most pressing issues that Hong Kong is facing. Increasing the land supply for housing development has been one of the major focuses in the Policy Addresses in the last few years. As reported in the "Hong Kong 2030+: Towards a Planning Vision and Strategy Transcending 2030 study (Hong Kong 2030+) in October 2021, there is an estimated housing land shortfall of 510 – 680 hectares (ha) in the long run.

2.2.2 On 31 December 2018, the Task Force on Land Supply reported a shortage of 108 ha of housing land in short term. Having conducted extensive public engagement exercise, the Task Force recommended that it is worthwhile to accord priority to studying and resuming the 32 ha of land of FGC to the east of Fan Kam Road for housing development to relieve shortage in land in short-to-medium term while balancing the needs for sports development.

2.2.3 With the expiry of land lease for the 32 ha of land of FGC to the east of Fan Kam Road of FGC in August 2020 and a special three-year holding over arrangement up to August 2023, the land is expected to be reverted to the Government in September 2023. The development to the PDA could, in short-to-medium terms, alleviate the acute shortage of land.

2.3 Appreciation of Existing Environment

2.3.1 Taking into account of compatibility with existing transport and infrastructure and traffic connectivity, the rural setting and the elongated shape in the middle and southern part of the PDA, it is envisaged that the housing development potential in Sub-Area 2 to Sub-Area 4 would be limited.

2.3.2 Based on the selected Development Option , the associated environmental impacts have

been considered and assessed in this EIA report.

2.3.3 The ecological value of Sub-Area 1 is relatively lower compared to Sub-Area 2 to Sub-Area 4. In Sub-Areas 2 and 3, mammal species of conservation importance such as Leopard Cat and Small Indian Civet were recorded within the Sub-Areas. In Sub-Area 4, many plant/animal species of conservation importance were found. Sub-Area 4 is also encompassing protected species of Aquilaria sinensis and abundant endangered species under IUCN Red List of Glyptostrobus pensilis. Therefore, Sub-Area 4 is ranked as medium to high ecological value.

2.3.4 Apparently, the existing ecological habitats in the vicinity, including the ecological corridor at the northern end of Sub-Area 2, the woodland in the northern end of Sub-Area 3 near On Po, the marsh and swampy woodland in Sub-Area 4 create a precious ecological linkage in the Sub-Areas. Based on the selected Development Option, as only minor works in Sub-Areas 2 to 3 are recommended while no works is proposed in Sub-Area 4, the ecological sensitive areas could be largely preserved.

2.4 Designated Projects

2.4.1 The PDA has a study area of about 32 ha. It falls within Item 1 under Schedule 3 of the Environmental Impact Assessment Ordinance (EIAO), i.e. "Engineering feasibility study of urban development projects with a study area covering more than 20 ha or involving a total population of more than 100,000" and is therefore a Designated Project (DP) requiring an EIA report.

2.5 Project Benefits and Environmental Initiatives

Project Benefits

2.5.1 The Project intends to ease the urging demand for housing development. The proposed development would plan for a balanced community to optimize the use of the scarce land resources to serve the urgent housing need as well as to provide community facilities to the neighborhood.

- **Relieving Housing Demand** – The proposed housing development will provide approximate 12,000 housing units, subject to the ratio of public rental housing (PRH) and subsidized sale flats (SSF), which could accommodate approximately 33,600 population, alleviating scarcity of housing supply.
- **Creating Recreation cum Conservation Area** – With a concept to preserving the precious environment, Sub-Areas 2 to 4 will be converted to form a recreation cum conservation area for public enjoyment and relaxation. Only recreational and ancillary facilities with minimal new structure/change to existing site conditions would be provided in Sub-Areas 2 to 4.
- **Community Enhancement** – Commercial and retail facilities will be provided within the proposed development sites to serve the planned population as well as the nearby community. A Public Transport Interchange (PTI), pedestrian walkway and cycling track will be provided near Ping Kong Road which could also serves the nearby villagers and residents.
- **Government, Institution and Community (G/IC) Facilities** – Various educational facilities (e.g. kindergarten, etc.) a community hall as well as social welfare facilities comprising Neighbourhood Elderly Centre (NEC), Residential Care Home for the

Elderly (RCHE) cum Day Care Unit (DCU), Child Care Centre (CCC), Day Activity Centre (DAC), Hostel for Severely Mentally Handicapped Persons (HSMH), Hostel for Moderately Mentally Handicapped Persons (HMMH), Supported Hostel for Mentally Handicapped Persons (SHOS(MH)), Integrated Vocational Rehabilitation Services Centre (VRSC) and Hostel for Severely Physically Handicapped Persons (HSPH) have been planned in the proposed development.

Green and Environmental Initiatives

2.5.2 The vision of the Project is to create a sustainable, green and liveable community provided with supporting infrastructure to cater for future development needs. Environmental considerations are one of the key factors in the formulating of development of the PDA. Throughout the development formulation, appreciation has been made to the potential environmental initiatives both to conserve existing environmental resources and, where opportunities exist, to enhance and upgrade the environment on various aspects. The major green and environmental initiatives that this Project offers are summarized in below paragraphs.

2.5.3 Recently, there are increasing awareness in sustainable development. This Project has duly considered the sustainable strategy in respect of town planning, urban design, transportation and blue-green infrastructure for a creation of a sustainable local community. When formulating the development layout of the PDA, the adoption of green building design, energy-efficient features and renewable energy technologies within the PDA has been promoted.

2.5.4 In addition to green transport management, a comprehensive water management system including sewerage, drainage and water resources infrastructure has been recommended. Blue-green infrastructures and sustainable landscape design, such as zero-irrigation, swales and rain gardens have been considered. Besides, the use of reclaimed water for flushing has been explored to promote the sustainable use of water.

2.5.5 The various habitats with conservation importance in Sub-Areas 2 to 4 will be preserved under the Project as far as practicable to maintain the local character and fringe between urban and rural areas. Besides, podium and screen planting shall be considered to soften the built structures in Sub-Area 1.

2.5.6 For the aspect of solid waste management, the amount of municipal solid waste generated and disposed of can be minimised through on-site waste management plan including local recycling of organic waste, local recycling of glass for building blocks production and source separation of recyclables. Also, the adoption of automatic refuse collection system will be investigated to reduce fuel use, odour and noise of waste transport.

2.5.7 Green energy saving will also be adopted when appropriate. Measures include encouraging the use of energy-efficient building design and materials, promoting certification under BEAM Plus or other equivalent accreditations, exploration of community gardens in open space and amenity areas to promote green living, deploying energy-saving installations such as solar hot water system, etc.

2.6 Development Programme for the Project

2.6.1 The implementation programme is summarized in **Table 2.1** below. It is anticipated that the commencement and completion of the proposed development in Sub-Area 1 will be in Year 2024 and Year 2029.

Table 2.1 Summary of Tentative Implementation Programme

Stage	Works Components	Time Line
Stage 1	Public Housing Development in Sub-Area 1 • Site clearance and site formation works • Construction of internal Road • Pipe works and utilities works • Construction and building works of public housing site • Construction of public transport interchange (PTI) and bus terminus	2024 - 2029
Stage 2	School Site Development in Sub-Area 1 • Site clearance and site formation works • Construction of internal Road • Pipe works and utilities works • Construction of special school	2024 - 2028
Stage 3	Associated Road Works outside PDA • Junction improvement works at Po Kin Road / Ping Kong Road • Minor road improvement works at Ping Kong Road	2024 - 2029
Stage 4	Associated Infrastructure Works outside PDA • Pipe works and utilities works	2024 - 2029
Stage 5	• Recreational cum Conservation Area in Sub-Areas 2 to 4	To be further reviewed

3. SUMMART OF KEY FINDINGS IN ENVIRONMENTAL IMPACT ASSESSMENT (EIA) STUDY

3.1 Air Quality Impact

Key Assessment Scope and Key Criteria

3.1.1 The potential air quality impacts associated with the construction and operation of the Project are assessed. The air quality impact assessment is conducted in accordance with the requirements of Annex 4 and Annex 12 of the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM) as well as the technical requirements given in Appendix B of the EIA Study Brief (ESB-318/2019).

Construction Phase

3.1.2 Potential construction dust impact would be generated from site clearance, site formation, piling works, utility works and road improvement works. Quantitative construction dust assessment has been conducted. The major concurrent projects include Ching Hiu Road Development, Tai Tau Leng Development, North District Hospital Expansion, Drainage Improvements at North District, Fanling Highway Widening, Po Shek Wu Flyover, Lot 4076 in D.D. 91 Development, Reclaimed Water Supply to Sheung Shui and Fanling and So Kwun Po Interchange.

3.1.3 With the implementation of mitigation measures specified in the Air Pollution Control (Construction Dust) Regulation together with the recommended dust suppression measures including 3m hoarding and watering once per hour on exposed worksites and haul roads, the predicted Total Suspended Solid (TSP), Respiratory Suspended Solid (RSP) and Fine Suspended Solid (FSP) at representative air sensitive receivers (ASRs) would comply with the criteria stipulated in the Air Quality Objectives (AQOs) and EIAO-TM. The predicted concentrations for key representative pollutants after implementation of mitigation measures are summarised in Table 3.1.

Table 3.1 Summary of predicted cumulative construction dust impact (after implementation of mitigation measures)

	Pollutant Concentration (µg/m^3)					Compliance
	TSP	RSP		FSP		
	1-hr	24-hr (10th highest)	Annual	24-hr (19th highest)	Annual	
Existing ASRs	188 - 444	65 – 84	27 - 40	36 - 40	16 - 18	Yes
AQOs/ EIAO-TM Criteria	500	100	50	50 (35 exceedance)	25	--

Operation Phase

3.1.4 Key existing, planned and committed air pollution sources during operation phase are

the vehicular emission from open sections of existing roads, proposed roads and proposed junction improvement works within the assessment area. Cumulative air quality impact at the representative ASRs would also be expected due to the background pollutant concentrations, chimney emissions from North District Hospital, PTIs of the Project, Ching Ho Estate and Tai Ping Estate within the assessment area. Key representative air pollutants include Nitrogen Dioxide (NO_2), RSP and FSP.

3.1.5 Quantitative air quality assessment for operational phase has been conducted, taking into account the vehicular emission impact associated with the Project and existing road networks, industrial emission in the vicinity of the Project and the impacts from proposed and existing PTIs and proposed carparks. It is concluded that the predicted cumulative air quality impacts on all ASRs would comply with the AQOs during the operational phase of the Project. Results in Year 2029 is summarised in Table 3.2.

Table 3.2 Summary of predicted concentrations of representative air pollutants during Operation phase in Year 2029

	Pollutant Concentration (μg/m^3)						**Compliance**
	NO_2		**RSP (PM10)**		**FSP (PM2.5)**		
	1-hr (19th highest)	**Annual**	**24-hr (10th highest)**	**Annual**	**24-hr (19th highest)**	**Annual**	
Existing ASRs	99 - 144	13 –35	65 - 88	27 - 43	36 - 36	15 – 16	Yes
Planned ASRs	105 - 139	14 – 35	65 - 67	27 – 29	36 - 37	16 – 17	Yes
AQOs/ EIAO-TM Criteria	200	40	100	50	50	25	--

3.2 Noise Impact

Key Assessment Scope and Key Criteria

3.2.1 The potential noise impacts associated with the construction and operation of the Project are assessed. The noise impact assessment is conducted in accordance with the requirements of Annex 5 and Annex 13 of the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM) as well as the technical requirements given in Appendix C of the EIA Study Brief (ESB-318/2019).

Construction Phase

3.2.1.1 Construction noise associated with the use of Powered Mechanical Equipment (PME) for different phases of construction has been conducted. With the implementation of practical mitigation measures including good site management practices, adoption of quieter construction method, use of movable noise barrier and noise enclosure and use of quieter plant, construction noise impacts at all of the neighbouring residential noise sensitive uses would be controlled to acceptable levels. Minimum separation distance between schools and critical works area during school examination period have been

recommended to mitigate potential adverse construction noise impact during examination period.

3.2.1.2 With the recommended mitigation measures in place, construction noise impacts on all representative Noise Sensitive Receivers would comply with the relevant criteria.

Operation Phase

Road Traffic Noise

3.2.2 Operation road traffic noise impact on the representative existing and planned noise sensitive uses within and near the PDA have been evaluated. To mitigate the road traffic noise impact on the existing and planned NSRs exceeding their respective noise criteria, a combination of noise mitigation measures has been recommended as direct and additional mitigation measures, including i) application of low noise road surfacing material along some sections of Project roads and other roads, ii) provision of acoustic windows for the proposed public housing buildings and iii) adoption of class assessment approach at the proposed school. A summary of the predicted road traffic noise levels with mitigation measures in place is given in Table 3.3.

Table 3.3 Summary of Mitigated Road Traffic Noise Levels

Use	**Predicted Mitigated Overall Noise Levels, $L_{10(1hr)}$ dB(A)**	**Criteria, $L10_{(1hr)}$ dB(A)**	**Compliance**
Residential	55 - 70	70	Yes
Educational Institutions	-	65	Yes

3.2.3 With the implementation of mitigation measures, the predicted traffic noise levels of the planned NSRs would comply with the relevant noise criteria. No adverse residual impact is expected.

Fixed Noise Source

3.2.3.1 Fixed noise source impact assessment has been conducted for all existing and planned fixed noise sources. Noise impact from planned fixed noise source under this Project (i.e. ventilation fans for the proposed PTI) could be effectively mitigated by implementing noise mitigation measure at source. With the adoption of the proposed maximum allowable Sound Power Level (SWL), the predicted noise level at the representative NSRs would comply with the relevant noise criteria. No adverse fixed noise is anticipated.

3.2.3.2 The PTI will be enclosed and designed to avoid direct line-of-sight to the NSRs. The design of the PTI and the proposed maximum allowable SWLs of the ventilation fans shall be reviewed with the final design during the detailed design stage.

Aircraft Noise

3.2.3.3 Aircraft noise impact on planned sensitive uses within Sub-Area 1 of PDA has been reviewed. All departure flight paths to be in use under the Three-runway System (3RS) operations and near to the development sites have been assessed. The PDA is located at over 15km from the NEF 25 Contour of the Hong Kong International Airport under the 3RS operation. Adverse aircraft noise impact due to 3RS operation is not anticipated.

3.2.3.4 The aircraft noise impact from the operation of Shek Kong Airfield has been reviewed. The separation between the PDA and the Shek Kong Airfield is approximately 5.3 km. In view of the large separation between PDA and Shek Kong Airfield, adverse aircraft noise impact due to operation of Shek Kong Airfield is not anticipated. According to the latest information, the approach and departure operation of aircrafts would maintain sufficient separation distance from the PDA. Therefore, no adverse aircraft noise impact is anticipated in the PDA.

Helicopter Noise

3.2.3.5 Helicopter noise impact on planned sensitive uses within Sub-Area 1 of the PDA has been reviewed. According to the latest information, the flight path of helicopters would maintain sufficient separation distance from NSRs in Sub-Area 1 of the PDA. Therefore, no adverse helicopter noise impact is anticipated in PDA.

3.3 Water Quality Impact

Key Assessment Scope and Key Criteria

3.3.1 The potential water quality impacts associated with the construction and operation phase of the Project are assessed. The water quality impact assessment is conducted in accordance with the requirements of Annex 6 and Annex 14 of the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM) as well as the requirements set out under Clause 3.4 of the EIA Study Brief (ESB-318/2019). Appropriate mitigation measures were proposed to minimize the potential water quality impacts.

Construction Phase

3.3.2 Water quality impacts during construction phase include site run-off from general construction activities, accidental spillage, groundwater from contaminated area, effects on groundwater table / hydrology / flow regime and sewage effluent from construction workforce. The site practices as outlined in the ProPECCPN 1/94 “Construction Site Drainage” and the ETWB TC (W) No. 5/2005 “Protection of natural streams/rivers from adverse impacts arising from construction works” are recommended to minimise the potential water quality impacts from the construction activities. Proper site management and good site practices are also recommended to ensure that construction wastes and other construction-related materials would not enter the nearby streams. Temporary sanitary facilities would be provided on construction sites to properly collect the on-site sewage generated from the construction workers. Regular site inspection will be conducted during construction stage to ensure that the recommended mitigation measures are properly implemented.

3.3.3 With the implementation of the recommended mitigation measures, the construction works for the Project would not result in unacceptable impacts on water quality.

Operation Phase

3.3.4 During the operation phase, all the sewage and wastewater generated from the Project will be properly collected and discharged to the public sewerage system and conveyed to the Shek Wu Hui Sewage Treatment Works (SWHSTW) for treatment. Discharge from the Shek Wu Hui Sewage Treatment Works after treatment would not cause adverse water quality impact in Deep Bay Water Control Zone.

3.3.5 A management plan stating the details of application of agrochemicals including the type, dosage, frequency, application instructions shall be prepared. The use and application of fertilizers and pesticides shall follow normal practices in Leisure and Cultural Services Department (LCSD)'s prevailing code of practice and the Pesticides Ordinance (Cap. 133). Adverse water quality impact associated with usage of fertilizers and pesticides is therefore minimized.

3.3.6 With proper implementation of the recommended mitigation measures, no unacceptable water quality impact would be expected during the operation phase of the Project.

3.4 Sewerage and Sewage Treatment Implications

Key Assessment Scope and Key Criteria

3.4.1 The capacity of existing and planned sewerage infrastructure has been reviewed based on the latest available information. The latest development parameters of the proposed development have been utilized for calculation.

3.4.2 New sewers were proposed to connect with the existing trunk alongside San Wan Road. Only manageable impact to the downstream sewerage networks is anticipated.

Construction Phase

3.4.3 The sewage generated during the construction stage from the on-site workers will be collected in chemical toilets and disposed of off-site. Therefore, no adverse sewerage impacts are expected from the Project during the construction phase. As such, environmental monitoring and audit of the sewerage system is considered not required.

Operation Phase

3.4.4 The following general mitigation measures are to be considered in order to meet 'no net increase in pollution loading' in Deep Bay:

- sewage collected from the site will be conveyed to Shek Wu Hui Sewage Treatment Works (SWHSTW) and treated to a standard suitable for recycle for non-potable use including flushing and irrigation;
- Upgrading the sewerage system for discharge into SWHSTW or providing other sewage treatment/disposal facilities to ensure that there is sufficient capacity to cater for increased sewage effluent flows from the developments; and
- Provision of suitable measures to minimize the risk of emergency discharges of untreated sewage effluent and to ensure timely repair.

3.5 Waste Management Implications

Key Assessment Scope and Key Criteria

3.5.1 The types of waste that would be generated during the construction and operation phases of the Project have been identified. The potential environmental impacts that may result from these waste materials have been assessed in accordance with the criteria and guidelines outlined in Annex 7 and Annex 15 of the EIAO-TM, and Section 3.4.7 and Appendix F of the EIA Study Brief.

Construction Phase

3.5.2 The main waste types to be generated during the construction phase of the Project would include construction and demolition (C&D) materials, chemical waste, general refuse and asbestos-containing materials (ACMs). An estimated total of 950,000 m^3 of C&D materials are expected to be generated, of which 620,000 m^3 are inert C&D materials and 330,000 m^3 are non-inert C&D materials, a several hundred litres per month of chemical waste, around 182 kg per day of general refuse and some ACMs to be generated during the construction phase of the Project. Reduction measures have been recommended to minimise the amount of materials generated by the Project by reusing C&D materials as far as practicable before off-site disposal.

3.5.3 The inert C&D materials generated from the Project will be reused within the Project or other concurrent projects as far as practical. For instance, during site clearance, site formation and infrastructure works, it is estimated that 50,000m^3 of the inert C&D materials will be suitable for reuse on-site as backfilling materials under this Project and 570,000 m^3 of inert C&D materials will be transported to other concurrent projects and/or to Public Fill Reception Facility (Tuen Mun Area 38 Fill Bank) for reuse. 56,000 m^3 of non-inert C&D materials (clean soil) is expected to reuse on-site. 66,000 m^3 of non-inert C&D materials shall be recycled prior to off-site disposal and 208,000 m^3 of non-inert C&D materials shall be disposed of at designated landfill (NENT). Temporary stockpiling areas are also identified to store the C&D materials for reuse under this Project. Provided that the waste is handled, transported and disposed of using approved methods, adverse environmental impacts would not be expected.

Operation Phase

3.5.4 The main types of waste to be generated during the operation phase of the Project would consist of general refuse, clinical waste and chemical waste. It is expected that the Project would generate around 34 tonnes of general refuse per day in total, about 0.002 kg of clinical waste per person per day, and approximately 5 litres per month of chemical waste, mainly from maintenance activities on the road networks within the PDA, and maintenance of equipment such as cooling, electricity and paints. The general refuse generated would be conveyed to refuse collection points before being transported to the existing North East New Territories (NENT) Landfill outside the PDA. Initiatives such as promoting recycling and providing recycling bins would be employed in order to minimise the amount of general refuse to be disposed of at landfill. Provided that the waste generated in the operation phase is handled, transported and disposed of properly, no adverse environmental impacts are anticipated.

3.6 Land Contamination Impact

Key Assessment Scope and Key Criteria

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

3.6.2 The land contamination assessment examined the potential contaminative land uses within the PDA and their potential impacts to future land use. The assessment on the potential land contamination was conducted based on the findings from site appraisal, comprising of the site walkover and review of historical aerial photographs and maps, historical spillage and leakage records and previous site investigations (SI) undertaken at the PDA.

3.6.3 Based on the available information and size of the PDA, 149 no. of sampling locations have been proposed. Based on desktop review and visual site inspection, the majority of the PDA has been used as a golf course, with a small section being used as a parking lot, tennis courts, staff quarters and private residential lots. The source of potential land contaminating activities at the identified sites mainly relates to the historical use and current application of fertilisers, pesticides and herbicides on the golf course. As such, it is considered that the potential land contamination at these sites would be localised on the turf grass areas throughout the PDA.

3.6.4 The chemicals of concern (COCs) identified with the potential to be present at the potentially contaminated sites include the 54 COCs identified in EPD's Guidance Manual, in addition to the recommended list of pesticides and herbicides. These COCs are readily treatable with proven remediation techniques in local remediation experience. By implementing the recommended remediation works, any contaminated site(s) identified within the PDA could be cleaned up prior to construction/development.

3.6.5 The recommended remediation works would not only minimise the health risk to the future occupants arising from the exposure of the contaminated soil and/or groundwater, it would also provide the opportunity to reuse the treated contaminated materials into useful materials for backfilling, which results in minimising the amount of waste disposing into the depleting landfill in Hong Kong and achieving a more sustainable development.

3.6.6 However, given the PDA is still in operation, SI is unlikely to be carried out at this stage and shall only begin after the land has been reverted to Government. Upon the land has been reverted to Government and site clearance, a re-appraisal and a supplementary Contamination Assessment Plan (CAP) covering the entire assessment area shall be prepared and submitted to EPD for approval. SI and laboratory analyses shall commence after the approval of the supplementary CAP by EPD.

3.6.7 Contamination Assessment Report (CAR) will be prepared to present the findings of the SI works. If contaminated soil and/or groundwater were identified, remediation should be carried out according to EPD's approved Remediation Action Plan(s) (RAP(s)) and Remediation Report(s) (RR(s)) should be submitted to EPD for endorsement after completion of the remediation works. No construction works or development of site should be carried out prior to the endorsement of RR.

3.6.8 Land contamination assessment and remediation shall be completed prior to the development of the Project. If deemed necessary, the contaminated sites shall be remediated before commencement of any construction works which may disturb the ground. In all cases, contaminated soil remediation, treatment or disposal must be managed in an environmentally sound manner, including compliance with all relevant legislation and Government requirements.

3.6.9 The establishment and implementation of the supplementary CAP, CAR and/or RAP will minimise potential adverse impacts to the environment arise from land contamination and site remediation activities. No adverse residual impacts are anticipated from the construction and operation of Project activities.

3.7 Ecological Impact

3.7.1 The ecological impact assessment was conducted in accordance with the requirements set out under Annexes 8 and 16 of the TM-EIAO, Section 3.4.9 and Appendix H of the EIA Study Brief, EIAO Guidance Notes (6/2010, 7/2010 and 10/2010) and other relevant legislations and guidelines. The assessment area for ecological impact assessment includes the area within 500m from the boundary of the Project Site.

3.7.2 Based on the selected Development Option, the associated ecological impacts have been considered and assessed. The proposed development will avoid areas of higher ecological values i.e. Sub-Areas 2 to 4 (medium or medium to high ecological values), only Sub-Area 1 with relatively lower ecological value (low to medium) will be developed. Direct impacts to most of the important habitats (e.g. swampy woodland with very rare *Glyptostrobus pensilis*) and species of conservation importance are not expected. Besides, the hydrological disruption due to the proposed development is not expected, potential impacts to the hydrology of the swampy woodland are thus not likely. With the implementation of the proposed management with the aims to protect the important habitats and species of conservation importance in Sub-Areas 2 to 4, the ecological conditions will be conserved and probably be enhanced.

3.7.3 As woodland and mixed woodland are identified within Sub-Area 1, in order to minimize the potential impacts due to habitat loss (i.e. 4.11ha of woodland and mixed woodland) and site formation, a number of mitigation measures will be implemented. Compensation woodland planting will be provided (~5.1 ha, larger than the loss of 4.11ha woodland and mixed woodland) and opportunities of in advance planting will be explored. Plant species of conservation importance recorded within Sub-Area 1 will be retained as far as possible or transplanted. As Sub-Areas 2 to 3 will only provide recreational facilities and ancillary facilities, and no works is proposed in Sub-Area 4, no adverse ecological impacts are anticipated.

3.7.4 Sub-Areas 2 to 4 are intended to be zoned as “Other Specified Uses” annotated “Recreational cum Conservation” under Outline Zoning Plan. Hence, Sub-Areas 2 to 4 should be conserved and a management plan will be formulated with the aims to manage the human activities conducted in Sub-Areas 2 to 4 and conserve the ecologically sensitive habitats and species of conservation importance from disturbance. With the future management plan, the potential indirect impacts from disturbance (e.g. noise, traffic and human disturbance) to the important habitats in Sub-Areas 2 to 4 and the habitats in the vicinity as well as the species of conservation importance can be further reduced. A monitoring programme will be included in the

management plan to evaluate the effectiveness of the management strategies.

3.7.5 With the implementation of mitigation measures, the residual ecological impact from the proposed development is considered acceptable.

3.8 Fisheries Impact

3.8.1 A study based on existing information on pond culture fisheries resources and activities within the 500m assessment area has been undertaken, following the criteria and guidelines for evaluating and assessing fisheries impact as stated in Annexes 9 and 17 of the TM-EIAO.

3.8.2 The proposed development will be conducted within the Project Site. No loss of active or inactive fish ponds are anticipated. With the implementation of mitigation measures recommended in the Water Quality Chapter for controlling water quality impact, the Project would not cause any unacceptable water quality impact to fish ponds or watercourses that provide water supply for fish ponds during construction and operation phases.

3.9 Landscape and Visual Impact

Landscape Impact

3.9.1 The Development will inevitably result in some landscape and certain visual impacts. The works will be conducted within Golf Course Landscape. Golf Club Building and Carpark in Golf Course are expected to receive the most impact due to the large percentage of area to be affected. Natural Woodland in Golf Course, Secondary Woodland in Golf Course and Grassland will also be affected due to the large total area size. It is not possible to fully mitigate all landscape impacts in relation to the loss of trees and other vegetation during construction and operation phase. However, the impacts have been reduced through minimization of construction and temporary works area with construction control, incorporation of aesthetic landscape and architectural design and providing more greening around the Development and associated infrastructure works. Residual impacts to Landscape Resources and Landscape Character Areas will provide slight beneficial to moderate landscape impact by Year 10 when the proposed mitigation measures are in full effect.

Tree Treatment

3.9.2 A total of 4411 nos. of trees were recorded in the PDA and the adjacent area likely to be affected by the proposed works. 1255 nos. of trees were identified in Sub-Area 1 and 3090 nos. were in Sub-Areas 2 to 4 of the PDA. Regarding Sub-area 1, amongst the 1255 nos. of trees recorded (including 70 nos. Trees of Particular Interest (TPIs[1])), 267 nos. are proposed to be retained, 954 nos. of trees are proposed to be felled and 34 nos. are proposed to be transplanted. No rare and protected species are proposed to be felled in Sub-area 1.

3.9.3 Regarding Sub-Areas 2 to 4, there are approx. 3090 nos. of existing trees found by a broad-brush tree survey, all of the existing trees are proposed to be retained as proposed

[1] "Trees of particular interest" are defined in DEVB, GLTMS – Guidelines for Tree Risk Assessment and Management Arrangement, (9th edition Rev. 1 1st April 2020.)

development has no direct impact on the concerned trees. For the adjacent areas outside the PDA, amongst 66 nos. of existing trees recorded, 24 trees are proposed to be retained. 42 nos. of trees, including 7 nos. of *Leucaena leucocephala* (undesirable species), i.e. 35 nos. of trees are proposed to be removed due to direct conflict with the proposed works. No rare and protected species are proposed to be felled in adjacent areas outside PDA. To compensate the loss of 996 nos. of trees, 996 nos. of compensatory trees are proposed to be planted in Sub-Area 2, Sub-Area 3 or other suitable locations.

Visual Impact

3.9.4 Visually Sensitive Receivers (VSRs) identified in this assessment are representatives among that individuals or groups that have a similar sensitivity to changes in the visual and landscape environment. Viewing Points (VPs) are the key public viewing points that will be affected by the Project during construction or operation phase and they are selected as representative viewpoints for photomontage.

3.9.5 Residual visual impact is expected to be reduced and range from insubstantial to substantial adverse, of which less VSRs receive substantial adverse impacts by operation phase Year 10. With the implementation of mitigation measures such as proposed staggered built forms and sensitive treatment and design of external finish of the built elements, together with landscape treatment around and within the perimeter of the site, podium gardens, retention of mature trees and trees of high amenity value, can alleviate the visual impacts on certain VSRs and enhance the visual quality for residents of the proposed public housing development. To further enhance of the visual quality, Sub-Areas 2 to 3 of the PDA will receive landscape treatment and additional planting.

3.9.6 In conclusion, the landscape and visual impacts can be eliminated and reduced to a certain extent with the implementation of mitigation measures, the overall landscape and visual impacts are considered acceptable.

3.10 Cultural Heritage Impact

3.10.1 Three Graded historic buildings, Grade 1 Fanling Lodge, Grade 2 Clubhouse of the Hong Kong Golf Club (HKGC) and Grade 3 Half-way House of HKGC, and six clan graves may be indirectly affected by the proposed development option. One clan grave (G-01) will require relocation. Mitigation recommendations for built heritage include possible green screening for the two graded historic buildings depending on the final location, design and height of the development and further measures, such as condition survey, monitoring, implementing buffer zones and ensuring safe public access may be required during the construction phase for the clan graves. The mitigation measures are to be determined in a detailed built heritage impact assessment during the detailed design stage. For all the graded, not-graded historic buildings and clan graves, the overall impact is ranging from Acceptable to Acceptable with mitigation.

3.10.2 Desk-based review indicates that existing impacts associated with the construction and maintenance of the golf course would have affected archaeological potential of large parts of Sub-Area 1. Three small areas within a wooded area are identified as original landforms and are tentative proposed for archaeological field investigation. Minor

development within Sub-Areas 2 to 4 may equally affect pockets of original landform, but extent of development within both Sub-Area 1 and Sub-Areas 2 to 4 is yet unknown.

3.10.3 In addition, some archaeological potential exist around the proposed drainage and minor road upgrade works to the east of Sub-Area 1 or as yet decided works associated with minor works in Sub-Areas 2 to 4. Depending on the details of the proposed associated and/or drainage and minor road upgrading works to be reviewed in detailed archaeological impact assessment at later stage (and prior to detailed design stage), an archaeological field survey (prior to construction phase) is required if areas outside the existing roads and drainage channels are affected, or archaeological watching brief (during construction phase) is required if works are within existing impact areas such as existing roads and drainage channels. Review should be undertaken for Sub-Area 1 and Sub-Areas 2 to 4 (associated) works prior to other investigations including ground investigation, investigation for land contamination and so on in order not to disturb the site.

3.10.4 A detailed archaeological impact assessment including archaeological field survey, including field scan, auger tests and test pit excavation will be required within Sub-Area 1 and select areas within Sub-Areas 2 to 4 if development is confirmed. The archaeological survey and archaeological impact assessment should be conducted prior to other investigations including ground investigation, investigation for land contamination and so on in order not to disturb the site and the archaeological field survey.to guide the development and record archaeological information, if any.

3.10.5 "Fanling Golf Course, The Hong Kong Golf Club" is a New Item (N340) pending grading assessment by the Antiquities Advisory Board (AAB). Further assessment pending to the grading of the New Item conducted by AAB and mitigation measures, where necessary, will be proposed to Antiquities and Monuments Office (AMO) for agreement.

3.11 Environmental Monitoring and Audit Requirements

An Environmental Monitoring and Audit (EM&A) programme will be implemented during the construction and operation phases to regularly monitor the environmental impacts on the neighbouring sensitive receivers. Any action required during the construction and/or operation phases are also recommended for implementation. EM&A requirements for air quality, noise, water quality, sewerage and sewage treatment, waste implications, land contamination, ecology, fisheries, landscape and visual and cultural heritage have been recommended. Regular site inspection and audits will be conducted during construction phase to ensure that the recommended mitigation measures are properly implemented. The EM&A requirements are specified and detailed in the EM&A Manual.

4. SUMMARY OF ENVIRONMENTAL OUTCOMES

4.1 General

4.1.1 Overall environmental outcomes due to the Project, which covers 32 hectares of land of the Fanling Golf Course located to the east of Fan Kam Road are summarized below. Environmental considerations have been taken into account throughout the planning of the proposed land uses.

4.1.2 This EIA Study has provided an assessment of the potential environmental impacts associated with the construction and operation of the Project, based on the engineering design information available at this stage. This has also included specific assessments for a Schedule 3 DP under the EIAO.

4.1.3 The technical assessments conducted have demonstrated that all the statutory requirements in EIA Study Brief (No. ESB-318/2019) and Technical Memorandum on Environmental Impact Assessment (EIAO-TM) have been complied with.

- Air Quality Impact;
- Noise Impact;
- Water Quality Impact;
- Sewerage and Sewage Treatment Implications;
- Waste Management Implications;
- Land Contamination Impact;
- Ecological Impact;
- Fisheries Impact
- Landscape and Visual Impacts; and
- Cultural Heritage Impact.

4.1.4 The findings of this EIA Study have predicted the likely nature and extent of environmental impacts arisen from the construction and operation of the Project. During the EIA process, environmental mitigation measures have been identified for incorporation into the planning and design of the Project, to achieve full compliance with environmental legislation and standards during the construction and operation phases.

4.1.5 Based on the selected Development Option, the associated environmental impacts have been considered and assessed in this EIA report. In particular, the Development Option has the following environmental benefits:

<u>Avoidance of Direct Impact on Plant Species of Conservation Interest</u>

4.1.6 Consideration of avoiding the impacts of rare/protected plant species has been taken into account during the initial stage of the study. In order to minimize the impacts of construction towards the existing rare and protected plant species, the proposed public housing development will be located at Sub-Area 1. As a result, amongst the 70 nos. of Trees of Particular Interest (TPIs) found in Sub-Area 1 including 24 nos. mature trees

with DBHs equal to or over 1000mm and 46 nos. rare/protected plant species, 11 nos. mature trees are feasible to be preserved in-situ, 2 nos. of mature trees are to be transplanted to nearby receptor site within the PDA and 11 nos. mature trees are to be removed due to proximity with the proposed building layout. Amongst 32 nos. rare/protected plant species, all of them are proposed to be transplanted to nearby suitable receptor site.

4.1.7 In addition, there are 395 nos. of TPIs found in Sub-Areas 2 to 4 including 41 nos. mature trees with DBHs equal to or over 1000mm and 80 nos. rare/protected species including *Aquilaria sinensis* (43 nos.) and *Glyptostrobus pensilis* (30 nos.), *Lagerstroemia indica* (2 nos.) and *L. speciosa* (5 nos.)[2].

Avoidance of encroachment onto Recognised Sites of Conservation Importance

4.1.8 All the recognized sites of conservation importance, including Sites of Special Scientific Interest (SSSI), Country Park, Conservation Areas, and Long Valley Nature Park have been avoided and will not be encroached by any developments under the Project.

Avoidance of Important Habitats

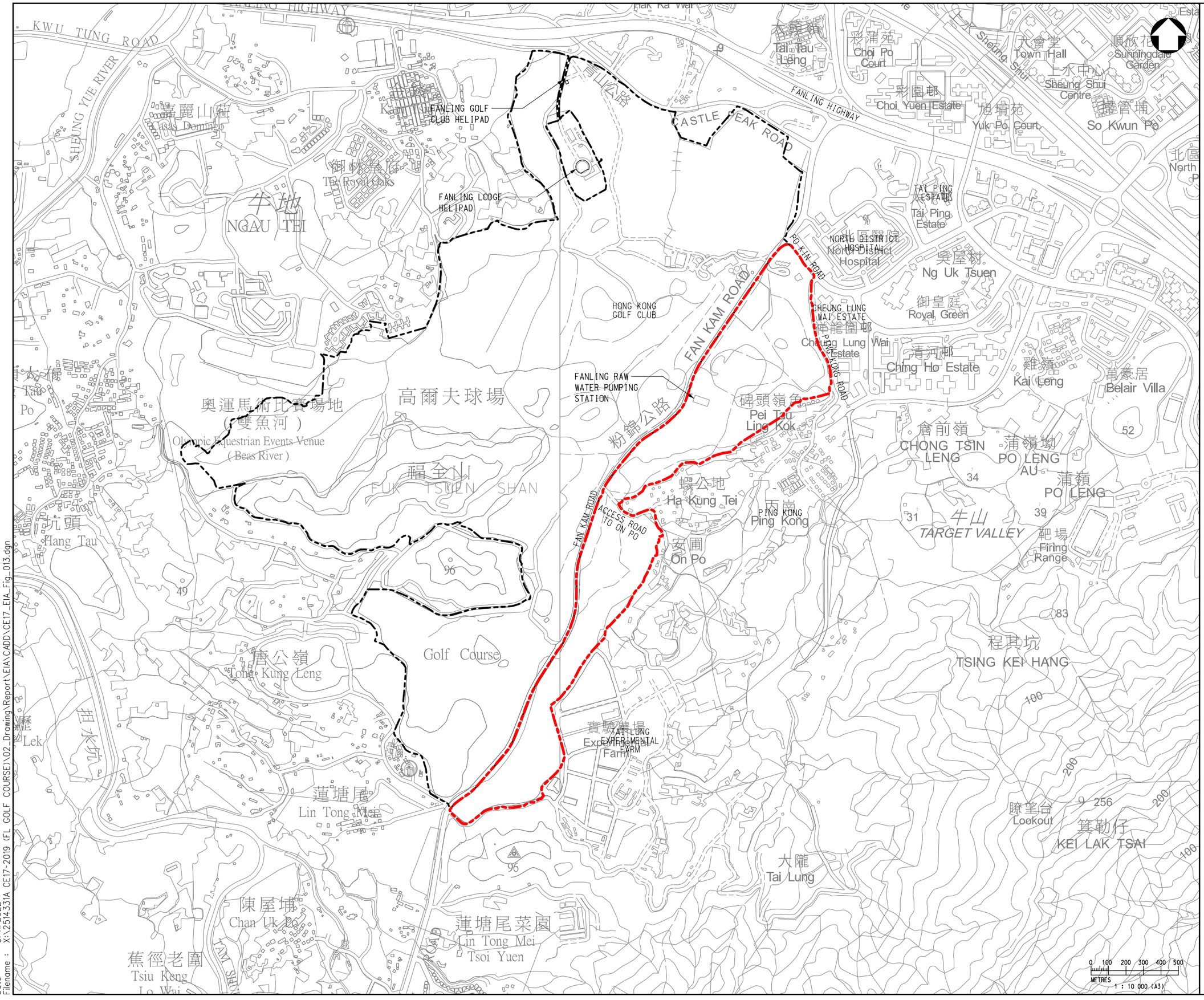
4.1.9 Important habitats including Fung Shui Wood and the egretries outside the PDA would not be impacted. Within the PDA, the habitat types with medium or above ecological values (e.g. swampy woodland and marsh) have been avoided.

Avoidance of Direct Impacts on Clan Graves

4.1.10 With the exception of a single grave, development and direct impact on clan graves has been avoided within the PDA boundary.

END OF TEXT

[2] Remarks: In Sub-area 2, a 1-storey building and the associated vehicle road may possibly be provided nearby the existing pumping station for the future use of Sub-Areas 2 to 4, 2 nos. of TPIs (T33 and T61) would be affected by the proposed layout. However, this layout is indicative for demonstrating possible form of recreational facilities for preliminary assessment at this stage only. The exact layout of the proposed 1-storey building and the associated vehicle road shall be subjected to further review in detail design stage, conflict to the existing trees in Sub-Areas 2 to 4 shall be avoided.



NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
2. ALL LEVELS ARE IN METRES (M) AND RELATIVE TO HONG KONG PRINCIPAL DATUM (mPD).

LEGEND :

PROJECT BOUNDARY

FANLING GOLF COURSE (FGC)

Rev	Description	By	Date

Consultant

wsp

Project title

AGREEMENT NO. CE17/2019 (CE)
TECHNICAL STUDY ON PARTIAL DEVELOPMENT OF FANLING GOLF COURSE SITE
– FEASIBILITY STUDY

Drawing title

LOCATION OF THE PROJECT

Drawing no.		Rev.
Figure 2.1		–
Drawn: CAD	Date: 12/2020	Checked: cck / Approved: EW
Scale: AS SHOWN (A3)		Status: –

CEDD 土木工程拓展署
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT
北拓展處
NORTH DEVELOPMENT OFFICE

Date : 5/11/2022
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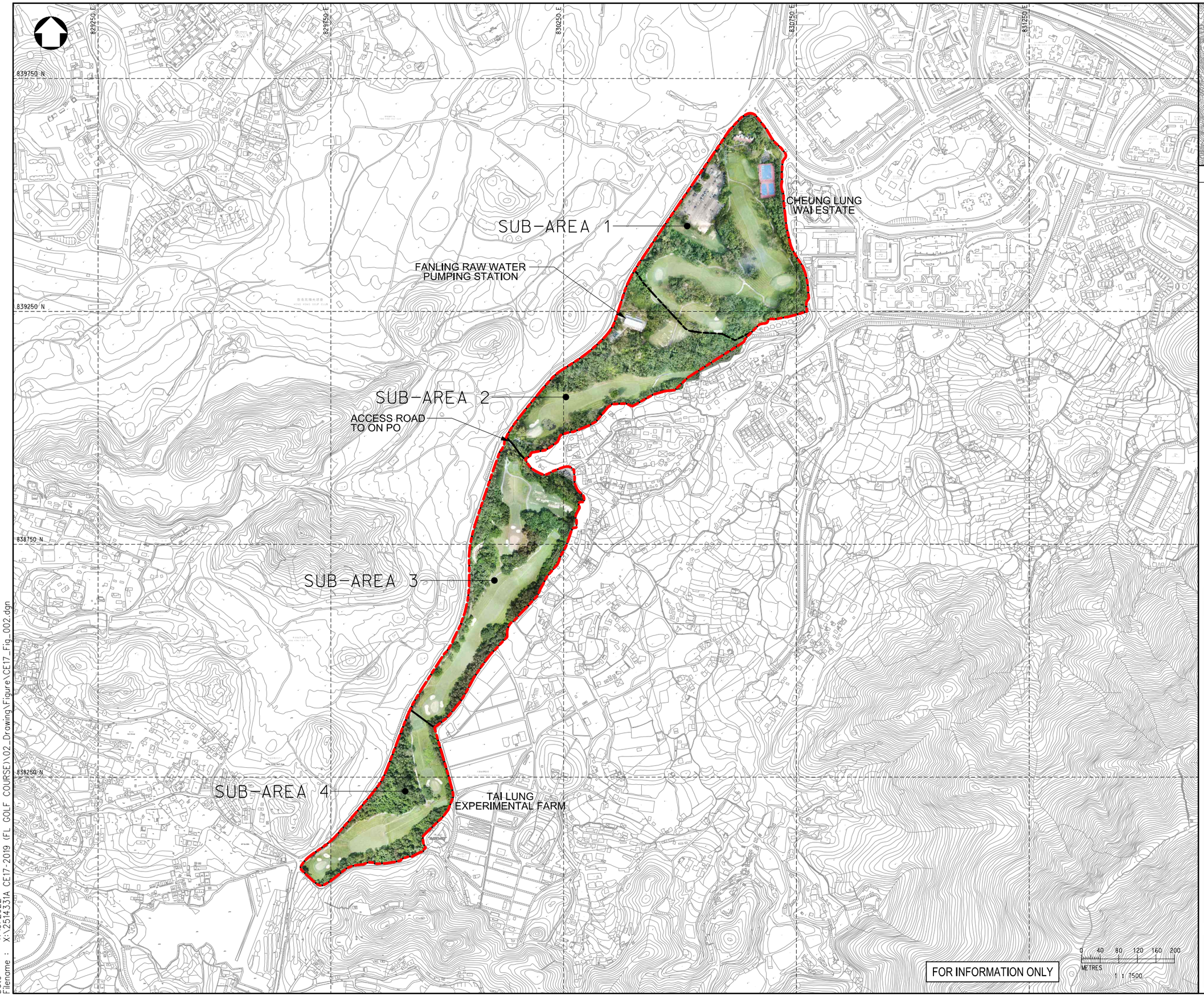

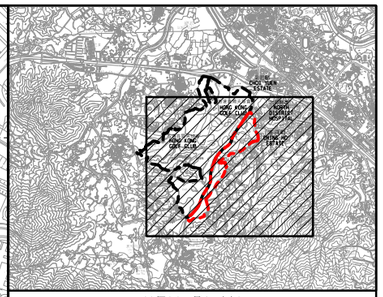

KEY PLAN

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
2. ALL LEVELS ARE IN METRES (M) AND RELATIVE TO HONG KONG PRINCIPAL DATUM (mPD).

LEGEND :

HONG KONG (FANLING) GOLF CLUB

POTENTIAL DEVELOPMENT AREA (PDA)

Rev	Description	By	Date

Consultant

wsp

Project title

AGREEMENT NO. CE17/2019 (CE)
TECHNICAL STUDY ON PARTIAL DEVELOPMENT OF FANLING GOLF COURSE SITE
– FEASIBILITY STUDY

Drawing title

DELINEATION OF SUB-AREA 1 TO SUB-AREA 4

Drawing no.			Rev.
FIGURE 2.2			–
Drawn	Date	Checked	Approved
CAD	10/12/19	SF	EW
Scale		Status	
1:7500 (A3)		–	

土木工程拓展署
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT
北拓展處
NORTH DEVELOPMENT OFFICE

Date : 4/19/2022
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