



Civil Engineering and  
Development Department



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# **Ground Investigation Works for Underground Quarrying at Sham Shui Kok, North Lantau Within Lantau North (Extension) Country Park**

## **Project Profile**

**JUNE 2025**

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## 1 BASIC INFORMATION

### 1.1 Project Title

- 1.1.1 This Project is known as “Ground Investigation Works for Underground Quarrying at Sham Shui Kok, North Lantau within Lantau North (Extension) Country Park” (hereafter named “the Project”).

### 1.2 Purpose and Nature of the Project

- 1.2.1 The proposed underground quarrying at Sham Shui Kok in North Lantau (SSKUQ) is to be constructed beneath the Lantau North (Extension) Country Park (LN(E)CP) in a form of caverns. Currently, there are limited Ground Investigation (GI) data available for SSKUQ within LN(E)CP. It is necessary to conduct GI works within the LN(E)CP to gather geological and geotechnical information for facilitating the engineering design of underground quarry at Sham Shui Kok.
- 1.2.2 This Project Profile (PP) is prepared to establish the environmental acceptability of the Project and to seek permission from the Director of Environmental Protection (DEP) to apply directly for an Environmental Permit (EP) for the Project under Section 5(11) of the Environmental Impact Assessment Ordinance (EIAO) (Cap. 499).
- 1.2.3 Consent for conducting the GI works within LN(E)CP from relevant authorities (e.g. Country and Marine Parks Authority) will also be obtained prior to undertaking the GI works within LN(E)CP.

### 1.3 Name of Project Proponent

- 1.3.1 The Project Proponent is Civil Engineering and Development Department (CEDD) of the Government of the Hong Kong Special Administrative Region.

### 1.4 Location and Scale of Project and History of Site

- 1.4.1 The Project is to carry out GI works within LN(E)CP. The location and extent of the GI works have been carefully planned and arranged to minimise impacts to the Country Park, shown in **Figure 1.1**. The proposed GI working areas are not covered by any existing Outline Zoning Plan (OZP). Locations of proposed GI works and alignment of temporary access would be slightly adjusted for accommodating possible site constraints. Based on the review of historical aerial photographs, there are no changes of the land use as natural hillside terrain since 1963. The Project Area has been designated as Lantau North (Extension) Country Park since 2008.



1.4.2 The scope of the proposed GI works within Country Park are as follows:

- 2 vertical drillholes (VBH02 and VBH04)
- 4 inclined drillholes (IBH01, IBH02, IBH06 and IBH07)
- 2 trial pits (TP03 and TP08)

1.4.3 Site visits will be carried out prior to the setting out of the proposed GI locations, to confirm the actual GI locations and the general alignment of access paths to these GI locations. Single-row steel access ladders of about 0.7m in width will be erected to reach to the drillholes / trial pits locations. A temporary working platform made of timber scaffolding will be erected for placing plant, equipment and materials at the GI locations. The working areas for trial pits locations will mainly be used for stockpiling of the excavated materials that stored in nylon bags. **Table 1.1** summarizes the approximate size of the working area(s). Minimal vegetation clearance will be carried out within the working areas to allow safe erection of working platform and access ladder. Approximately 16m<sup>3</sup> of excavated materials will be generated from inspection pits and trial pits and all the excavated materials will be backfilled upon the completion of the GI works.

**Table 1.1 Size of the Proposed Temporary Working Area(s)/Platform within LN(E)CP**

GI Stations	Approx. Size of Temporary Working Area/Platform	Helicopter Required for Transporting Materials (Yes/No)
VBH02	6m x 15m	Yes
IBH01	(shared working platform for two drillholes)	
VBH04	6m x 15m	Yes
IBH02	(shared working platform for two drillholes)	
IBH06	6m x 15m	Yes
IBH07	6m x 15m	Yes
TP03	3m x 6m	No
TP08	3m x 6m	No

#### Vertical/Inclined Drillholes

1.4.4 A drill rig, water tank, water pump and drilling equipment (e.g., casings, coring barrels and drill rods) will be placed on the working platform of drillhole. The materials/equipment/plant will be mobilised to the drillhole location by air lifting (helicopter), with some support by manual handling. At the drillhole locations, inspection pit (approximately 0.5m (L) x 0.5m (W) with maximum depth of 1.5m) will be excavated manually before the actual drilling works. The proposed drilling lengths of vertical/inclined drillholes range from 160m to 200m below ground level. During the GI works, drilling, soil and rock sampling and field testing (e.g., standard penetration tests) will be undertaken. Water will be used as the drilling fluid. Any water return will be pumped into water tank for recirculation.

- 1.4.5 Groundwater monitoring instruments (standpipes / piezometer) will be installed at the vertical drillhole for long-term groundwater monitoring. Remaining drillholes will be backfilled by cement-bentonite grout. All working areas (the temporary working areas/ platforms are at the same locations as the corresponding drillholes) and temporary access ladders will be reinstated properly upon the completion of GI works. The anticipated works duration, including setting up and drilling period, for each drillhole will be about six months.

#### Trial Pits

- 1.4.6 Trial pits will be excavated manually. Size of trial pits will be of about 1.5m (L) x 1.5m (W) with a maximum depth of 3m, giving an excavated volume of no more than 6.5m<sup>3</sup> from a trial pit. All excavated materials will be stored in nylon bags. Soil samples will be taken at depths and stored properly on site. It will then be transported away from site for storage or testing after the completion of works. It takes about three months to carry out the proposed GI works at each trial pit.
- 1.4.7 The trial pits will be backfilled by the excavated materials and compacted mechanically. Upon completion of backfilling, the ground surface will be restored to its original condition. The anticipated works duration, including setting up and excavation period, for each trial pit will be about three months.

### 1.5 Number and Types of Designated Projects to be Covered by the Project Profile

- 1.5.1 The Project involves earthworks within LN(E)CP. Therefore, the Project is classified as a Designated Project (DP) under Item Q.1 of Part I, Schedule 2 of the EIAO.
- *Item Q.1 – All projects involving earthworks, dredging works and other building works partly or wholly in an existing or gazetted proposed country park or special area, a conservation area, an existing or gazetted proposed marine park or marine reserve, a site of cultural heritage, and a site of special scientific interest .*

The environmental impact of the designated project is unlikely to be adverse and the mitigation measures described in the project profile meet the requirements of the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM). In view of that, this PP is prepared to seek permission from DEP to apply directly for EP for the Project under the EIAO, as mentioned in **Section 1.2.2**.

## 1.6 Name and Telephone Number of Contact Person(s)

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## **2 OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME**

### **2.1 Project Planning and Implementation**

- 2.1.1 CEDD has commissioned Consultancy Agreement No. CE 78/2023 (GE) to design GI works for the proposed underground quarry at Sham Shui Kok, and the Project will be carried out by CEDD Term Contractor.

### **2.2 Project Programme**

- 2.2.1 The GI works are tentatively targeted to commence in Q3 2025 for completion by Q2 2026.

### **2.3 Interactions with Other Projects**

- 2.3.1 The Project does not interact with any project within 500m from its boundary.

### 3 MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

#### 3.1 General Description of the Project

- 3.1.1 The major existing and planned sensitive receivers, as well as the sensitive parts of the natural environment that may be affected are discussed below.

#### 3.2 Air Quality

##### Air Sensitive Receivers

- 3.2.1 Representative Air Sensitive Receivers (ASRs) within 500m Assessment Area have been identified in accordance with Annex 1 and Annex 12 of the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM) and are listed in **Table 3.1**, with their locations presented in **Figure 3.1**.

Table 3.1 Representative Air Sensitive Receivers (ASRs)

ASR ID	Description	Nature/ Use	Approx. Distance from the Project
<b>Existing ASRs</b>			
ASR1	Siu Ho Wan Police Vehicle Pound (Office)	Office	500m
ASR2	O-Park1 (Office)	Office	450m
ASR3	Siu Ho Wan Water Treatment Work Administration Building	Office	455m
ASR4	KMB Siu Ho Wan Depot (Office)	Office	410m
ASR5	Citybus Siu Ho Wan Depot (Office)	Office	370m

##### Existing Ambient Air Quality Conditions

- 3.2.2 The proposed GI works are located within LN(E)CP. The existing ambient air quality could be referred to the nearest EPD's Tung Chung Air Quality Monitoring Station (AQMS).
- 3.2.3 The latest available 5-year (2019-2023) air quality monitoring data of various air pollutants monitored at Tung Chung AQMS is presented in **Table 3.2** and compared with the Air Quality Objectives (AQOs).

Table 3.2 Air Quality Monitoring Data (Year 2019 - 2023) at Tung Chung AQMS

Pollutant	Parameter	AQOs <sup>[1][2]</sup> , µg/m <sup>3</sup>	Pollutant Concentration (µg/m <sup>3</sup> ) <sup>[3]</sup>					
			2019	2020	2021	2022	2023	5-year Average
Respirable Suspended Particulates (RSP)	10 <sup>th</sup> highest 24-hour	75 (9)	75	66	63	57	51	62
	Annual	30	30	25	26	23	22	25
Fine Suspended Particulates (FSP)	19 <sup>th</sup> highest 24-hour	37.5 (18)	<b>43</b>	34	<b>38</b>	36	28	36
	Annual	15	<b>19</b>	14	<b>17</b>	14	14	<b>16</b>
Nitrogen Dioxide (NO <sub>2</sub> )	19 <sup>th</sup> highest 1-hour	200 (18)	149	113	115	94	118	118
	10 <sup>th</sup> highest 24-hour	120 (9)	80	64	61	51	58	63
	Annual	40	33	28	26	25	26	28
Sulphur Dioxide (SO <sub>2</sub> )	4 <sup>th</sup> highest 10-minute	500 (3)	57	24	19	26	22	30
	4 <sup>th</sup> highest 24-hour	40 (3)	18	8	9	11	11	11
Ozone (O <sub>3</sub> )	10 <sup>th</sup> highest 8-hour	160 (9)	<b>208</b>	<b>168</b>	158	<b>171</b>	156	<b>172</b>
	Peak Season	100	<b>104</b>	90	82	89	79	89
Carbon Monoxide (CO)	Max. 1-hour	30000 (0)	2260	1530	1240	1170	1280	1496
	Max. 8-hour	10000 (0)	1874	1388	1073	1151	1095	1316
	Max. 24-hour	4000 (0)	1644	1157	865	1011	1007	1137

[1] Values in ( ) mean the number of exceedances allowed per year.

[2] This set of AQO takes effect on 11 April 2025.

[3] Bold figures indicate exceedances of AQOs concentration value.

- 3.2.4 The annual and 19<sup>th</sup> highest 24-hour FSP concentrations recorded in 2019 and 2021 at the Tung Chung AQMS exceed the AQO concentrations. Improvements have been seen, as the annual FSP concentrations and 19<sup>th</sup> highest 24-hour concentration have dropped below the AQO concentration in the most recent two years. For other AQO pollutants (except O<sub>3</sub>), the recorded concentrations are also below the AQO concentrations.
- 3.2.5 Exceedance of AQO of O<sub>3</sub> was recorded in 2019, 2020 and 2022 at Tung Chung AQMS. An exceedance of the peak season O<sub>3</sub> concentration was recorded at 104 µg/m<sup>3</sup> in 2019, and no exceedances of the peak season have been recorded since 2020. The 10<sup>th</sup> highest 8-hour averaged O<sub>3</sub> concentration was recorded at 208 µg/m<sup>3</sup> in 2019 and dropped to 168 µg/m<sup>3</sup> in 2020 and slightly rose to 171 µg/m<sup>3</sup> in 2022. The 5-year-average is calculated as 172 µg/m<sup>3</sup> that exceeds the AQO of 160 µg/m<sup>3</sup>. It should be noted that O<sub>3</sub> is more a regional air pollution problem according to EPD's Air Quality in Hong Kong 2023 Report. As elaborated in the above-mentioned report, O<sub>3</sub> is mainly influenced by the regional photochemical smog problem formed by photochemical reactions between NO<sub>x</sub> and volatile organic compounds (VOCs) under sunlight, rather than a pollutant directly emitted from pollution sources.

- 3.2.6 As O<sub>3</sub> is a regional air pollution mainly, the GI works would be no direct impact on the concentration of O<sub>3</sub>. Potential air quality impact will be addressed in **Section 4.2**.

### 3.3 Noise

- 3.3.1 No Noise Sensitive Receivers (NSRs) have been identified within 300m from the GI works.

### 3.4 Water Quality

#### Water Sensitive Receivers

- 3.4.1 Representative Water Sensitive Receivers (WSRs) within 300m Assessment Area have been identified in accordance with Annex 1, Annex 6 and Annex 14 of the EIAO-TM. Representative WSRs include inland watercourses within the Assessment Area and are listed in **Table 3.3** and indicated in **Figure 3.2**. There are no planned WSRs within the Assessment Area.

Table 3.3 Representative Water Sensitive Receivers (WSRs)

WSR ID	Description	Approximate Nearest Distance from the GI Stations (m)
W1	Natural Watercourse	340m
W2	Natural Watercourse	90m
W3	Natural Watercourse	20m
W4	Natural Watercourse	60m
W5	Natural Watercourse	100m
W6	Natural Watercourse	15m
W7	Modified Watercourse	430m
W8	Natural Watercourse	345m
W9	Natural Watercourse	280m
W10	Natural Watercourse	295m

### 3.5 Waste Management

- 3.5.1 No waste handling or treatment facility is presented in the vicinity of the proposed GI works.

### 3.6 Terrestrial Ecology

- 3.6.1 The Assessment Area for terrestrial ecological impact has included all areas within 100m from the boundary of the proposed GI works. Detailed review of geographical maps and satellite images were conducted to identify and determine extent of major habitats, followed by field surveys to verify habitat baseline conditions. In view of the temporary and short-term nature of the GI works, terrestrial ecological field surveys were conducted to survey flora and key groups of fauna from August to October 2024 covering a 3-month period of wet season to provide representative



ecological baseline information of species and habitats to identify any species of conservation importance in the Assessment Area. In addition to daytime surveys, night-time surveys were also conducted to survey nocturnal species. The eastern part of the assessment area is located in the upland area which is inaccessible due to steep topography and/or blockage by overgrown vegetation. Hence field surveys were conducted in the vicinity of the assessment area as reference of ecological baseline conditions. The terrestrial ecological surveys were conducted along the survey transects as shown in **Figure 3.3**. The survey transects cover all accessible paths that are safe and unblocked.

### Site of Conservation Importance

Lantau North (Extension) Country Park

- 3.6.2 LN(E)CP was designated in 2008 and covers natural hillside habitats along north of Lantau from Tung Chung to Sunny Bay, including natural woodlands and watercourses, as well as hillslopes southeast of Siu Ho Wan (SHW) and Sham Shui Kok (SSK).

### Ecological Baseline Conditions

- 3.6.3 A total of four habitats, namely mixed woodland, plantation, shrubland and watercourse were identified in the 100m Assessment Area of the proposed GI works as shown in **Figure 3.4**. All the proposed trial pits and drillholes are located in shrubland or plantation. There will be sections of proposed temporary access ladders established within mixed woodland or over existing watercourses in the upland within LN(E)CP. Representative photographs of habitats in 100m Assessment Area and the surrounding areas are presented in **Appendix 1**. Plant species recorded along the survey transect are presented in **Appendix 2**. No plant species of conservation importance were identified in the 100m Assessment Area.

#### Mixed Woodland

- 3.6.4 Patches of mixed woodland were identified along the south of North Lantau Highway and along the foot of the hillslope southeast of SSK and part of which extending to the upland area. The mixed woodland comprises a mixture of native species such as *Sterculia lanceolata* and *Cinnamomum parthenoxylon* and exotic plantation species such as *Acacia auriculiformis*, *Acacia mangium* and *Acacia confusa*. Understorey was well-developed with native shrub and herb such as *Zanthoxylum nitidum* and *Alpinia hainanensis*.

#### Plantation

- 3.6.5 Plantation were established interspersed with shrubland in the upland of LN(E)CP. The plantation trees were relatively younger compared to the those in the mixed woodland. The overstorey was dominated by plantation tree species (~8-10m tall) including the exotic trees *Lophostemon confertus*, *Acacia* spp. and *Eucalyptus robusta* and planted native trees of *Schima superba*, *Castanopsis fissa*. The understory of plantation was generally low in flora diversity and dominated by pioneer species such as the fern *Dicranopteris pedata* and typical shrubland



species including *Melastoma sanguineum*, *Rhodomyrtus tomentosa*, *Mallotus paniculatus*, *Melastoma malabathricum*, *Litsea rotundifolia* var. *oblongifolia*.

#### Shrubland

- 3.6.6 Shrubland were identified along the hill slopes of LN(E)CP. Native shrub species such as *Melastoma dodecandrum*, *Melastoma malabathricum*, *Melastoma sanguineum*, *Helicteres angustifolia* and *Melicope pteleifolia*, ground cover fern *Dicranopteris pedata* and small tree species such as *Mallotus paniculatus* and *Cratoxylum cochinchinense* were found in the shrubland habitat.

#### Watercourse

- 3.6.7 Natural watercourses were mostly located on hill slopes, flowing towards northwest or southeast, eventually joining the modified watercourses and discharging into marine habitats off SHW or Discovery Bay. The upland watercourses are located on steep, hilly terrain and surface flow is expected to be very narrow or dried down during dry seasons. The lower watercourses are approximately 2-3m wide with shallow water flow and natural substratum.

#### Fauna

- 3.6.8 Mammal, avifauna, amphibians, reptiles, butterflies, dragonflies, aquatic fauna species were recorded along the survey transect in various habitats as listed in **Appendix 3**.
- 3.6.9 Two common mammal species were recorded in 100m Assessment, one of which Eurasian Wild Pig *Sus scrofa* was recorded at the shrubland along the survey transect near TP03.
- 3.6.10 A total of 19 avifauna species were recorded, including one Black Kite (a species of Regional Concern (Fellowes *et al.* (2002) and protected by Cap. 586) recorded flying over the 100m Assessment Area. Black Kite is a common resident and winter visitor and is widely distributed throughout Hong Kong. No evidence suggests that the Assessment Area is a dependent habitat of the recorded Black Kite as no roosting or breeding behaviour was observed from the surveys.
- 3.6.11 All five amphibian species, including Asiatic Painted Frog, Paddy Frog, Günther's Frog, Brown Tree Frog and Greenhouse Frog recorded from the surveys, are widely distributed throughout Hong Kong.
- 3.6.12 All three reptile species, including Changeable Lizard, Chinese Gecko and Bowring's Gecko recorded are widely distributed throughout Hong Kong.
- 3.6.13 A total of 36 butterfly species were recorded in 100m Assessment Area, including one very rare butterfly species of local concern, Malayan *Megisba Malaya* (one individual) recorded in shrubland (**Figure 3.4**).
- 3.6.14 All 10 dragonfly species recorded are abundant and widely distributed in Hong Kong.

- 3.6.15 Four aquatic fauna species were recorded from the surveyed watercourses. These species include larva of Black-banded Gossamerwing, the freshwater shrimp *Caridina cantonensis*, an unidentified freshwater prawn *Macrobrachium* spp. and Apple Snail. All the identified species are common and widely distributed in Hong Kong.
- 3.6.16 Overall, two fauna species of conservation importance were recorded in 100m Assessment Area, including a single bird Black Kite (in flight) and a single butterfly Malayan, which are both highly mobile species and not considered to be of conservation concern for the proposed GI works. No other fauna species of conservation importance were identified in 100m Assessment Area from the surveys.
- 3.6.17 The ecological importance of habitats identified in 100m Assessment Area was evaluated in accordance with EIAO-TM Annex 8 and presented in **Table 3.4** below.

**Table 3.4 Ecological Evaluation of Habitats in 100m Assessment Area**

Criteria	Mixed Woodland	Plantation	Shrubland	Watercourse
Naturalness	Moderate	Low to Moderate	Moderate to High	Moderate to High
Size (ha)	1.96	7.50	23.50	~1,420m*
Diversity	Moderate floral diversity and low faunal diversity	Low floral and faunal diversity	Moderate floral diversity and low faunal diversity	Low floral and faunal diversity
Rarity	<p>Black Kite (a species of Regional Concern (Fellowes <i>et al.</i> (2002) and protected by Cap. 586) recorded flying over the 100m Assessment Area.</p> <p>Black Kite is highly mobile, and no roosting/ breeding sites were recorded in 100m Assessment Area</p>	<p>Black Kite (a species of Regional Concern (Fellowes <i>et al.</i> (2002) and protected by Cap. 586) recorded flying over the 100m Assessment Area.</p> <p>Black Kite is highly mobile, and no roosting/ breeding sites were recorded in 100m Assessment Area</p>	<p>Black Kite (a species of Regional Concern (Fellowes <i>et al.</i> (2002) and protected by Cap. 586) recorded flying over the 100m Assessment Area. Black Kite is highly mobile, and no roosting/ breeding sites were recorded in 100m Assessment Area.</p> <p>One very rare butterfly Malayan was recorded but it is highly mobile and not restricted to the recorded habitat.</p>	<p>Black Kite (a species of Regional Concern (Fellowes <i>et al.</i> (2002) and protected by Cap. 586) recorded flying over the 100m Assessment Area.</p> <p>Black Kite is highly mobile, and no roosting/ breeding sites were recorded in 100m Assessment Area</p>
Re-creatability	Low-to-Moderate – re-creatable if time is allowed for natural succession	High	Moderate	Low
Fragmentation	Moderate	High	Moderate	Low
Ecological Linkage	Good linkage with the upland habitats	Good linkage with the upland habitats	Good linkage with the upland habitats	Good linkage with the upland habitats

Criteria	Mixed Woodland	Plantation	Shrubland	Watercourse
Potential Value	Moderate	Low-to-Moderate	Low-to-Moderate	Low
Nursery/ Breeding Ground	No known nursery/ breeding grounds identified			
Age	Not known but relatively most mature in the 100m Assessment Area	Not known but relatively younger than mixed woodland in 100m Assessment Area	Not known but in earlier stage of natural succession and dominated by pioneer vegetation species	Not known but in a relatively stable condition
Abundance/ Richness of Wildlife	Moderate	Moderate	Moderate	Low
<b>Ecological Value</b>	Moderate	Low to Moderate	Low to Moderate	Low to Moderate

\* The upland watercourses (hill streams) are generally very narrow and riparian zones overgrown with vegetation thus only approximate length (m) is presented in **Table 3.3**.

## 3.7 Landscape and Visual

3.7.1 Based on desktop review and recent site visits, potential landscapes with distinctive characters in 100m Assessment Area of the proposed GI works have been identified as shown in **Figure 3.5** and described as follows:

### Landscape Resources (LRs)

- LR1 – Hillside Vegetation: The hillside vegetation comprises mainly mixed woodland at the lower hill slopes and a landscape mosaic formed by shrubland, grassland and young exotic plantation in the upland area. The mixed woodland is dominated by common native woodland tree species such as *Alangium chinense*, *Aporosa dioica*, *Cinnamomum camphora*, *Cratogeomys cochinchinense* and *Liquidambar formosana*, and common exotic plantation species including *Bombax ceiba*, *Casuarina equisetifolia*, *Eucalyptus robusta*, *Melaleuca cajuputi* subsp. *Cumingiana*, and invasive weed tree *Leucaena leucocephala* (thus mixed woodland). The upland areas are generally covered by young plantation or shrubby grassland. No registered or potential Old & Valuable Trees were identified from recent site surveys. LR1 is considered to have **High** sensitivity to change.
- LR2 – Watercourse: several natural watercourses are running from the upland of Tai Che Tung towards the lower slope on Cheung Tung Road. The upland watercourses are located on steep slopes and surface flow is expected to be very narrow or dried down during dry seasons. The lower watercourses are approximately 2-3m wide with shallow water flow and natural substratum. Natural watercourses are not uncommon in Hong Kong. In view of the generally high naturalness of LR2, it is considered to have **Medium** sensitivity to change.

### 3.7.2 Landscape Character Areas (LCAs)

- LCA1 – Hillside Landscape: LCA1 is the only LCA identified in the 100m Assessment Area of the proposed GI works. The foothill of this LCA is dominated by woodland trees and tall shrubs. The quality of LCA1 is good and majority of LCA1 in the Assessment Area falls within LN(E)CP, the sensitivity of LCA1 is considered to be **High**.

### 3.7.3 Visual Conditions

- In accordance with Section 7 and Appendix B of EIAO-TM Annex 18, visual impact assessment shall focus on permanent impacts generated from the Project. Considering that the proposed GI works do not involve any permanent structures aboveground, no permanent visual impacts are anticipated, thus no visual impact assessment is required.

## 3.8 Cultural Heritage

- 3.8.1 There are no declared monuments, proposed monuments, graded historic buildings and Government historic sites identified and recorded by Antiquities and Monuments Office (AMO) within the vicinity by GI working areas. No Site of Archaeological Interest (SAI) was identified within the 100m Assessment Area from the GI working area.

## 4 POSSIBLE IMPACT ON THE ENVIRONMENT

### 4.1 General

- 4.1.1 All the prevailing statutory requirements (e.g., EIAO, Air Pollution Control Ordinance, Noise Control Ordinance, Water Pollution Control Ordinance, Waste Disposal Ordinance, Forests and Countryside Ordinance, Wild Animals Protection Ordinance and Country Parks Ordinance) would be considered to assess the potential environmental impacts associated with the GI works during the construction phase. There will be no operation phase for the proposed GI works, thus no operational phase environmental impact will be anticipated.
- 4.1.2 As discussed in **Section 1.4**, the proposed GI works would include the following:
- Set up of temporary access ladders and temporary working platforms;
  - Digging of inspection pits and trial pits manually;
  - Mobilization of drill rigs by helicopter;
  - Drilling works at drillholes; and
  - Site reinstatement works.

### 4.2 Air Quality

- 4.2.1 Dust may arise from trial pit excavation/drilling activities and the exposed surface of trial pits/drilled holes. However, it is anticipated that the proposed GI works will not cause a significant dust impact due to the small drillhole size (i.e., approximately 100mm in diameter, with a 0.5m x 0.5m inspection pit) and the limited excavation volume from inspection pits and trial pits within the LN(E)CP, which totals approximately 16m<sup>3</sup> (2 trial pits each 6.75m<sup>3</sup> and 6 inspection pits each 0.375m<sup>3</sup>).
- 4.2.2 As mentioned in **Table 3.1**, the nearest ASR (i.e., Citybus Siu Ho Wan Depot (Office) (ASR5)) is located more than 370m from the GI works. The air quality impact from the project is minimal. Although drilling activities will be conducted concurrently, their locations are separated with a distance of more than 200m. Given the limited scale of the project, limited excavation volume, the large distance between the GI works, and the implementation of good site practices and control measures as discussed in **Section 5.1**, the potential dust impact arising from the project on the ASRs is expected to be minimal.
- 4.2.3 Gaseous emission and dust would also be generated from helicopters and construction equipment. However, the GI working platforms are scattered on hillside. At each GI working platform, only one generator and one drilling rig would be deployed to carry out the work for each working area. At most, GI works at two working platforms will be operated concurrently. Therefore, the exhaust emissions are anticipated to be very limited. Only regulated machines and non-road vehicles under the Air Pollution Control (NRMMS) (Emission) Regulation shall be used. Fuel with sulphur content not exceeding 0.001% by weight should be used to minimize

SO<sub>2</sub> emission in accordance with the Air Pollution Control (Fuel Restriction) Regulation. There will only be a small number of diesel-powered construction equipment will be operating, and that the use of helicopters for material delivery will be infrequent and of short duration (operating only during the daytime for mobilization and demobilization of the drill rigs, with a tentative frequency of one trip per month, each lasting about two hours). Construction trucks will not be deployed on site for this project due to the constraints of site conditions. The associated air emissions from the project are expected to be minimal.

### 4.3 Noise

- 4.3.1 As detailed in **Section 1.4** on the proposed construction method and equipment, potential source of construction noise impact arising from the Project (including trial pits, vertical boreholes and inclined boreholes) would be the use of Powered Mechanical Equipment (PME) for GI works, types of PME involved including generator and drilling rig.
- 4.3.2 Considering there are no NSRs identified within the 300m area from the GI works, and with implementation of good site practice, no adverse construction noise impacts are expected to occur.
- 4.3.3 Helicopter flights, as mentioned in **Table 1.1**, will be required only for material transportation to a few distinct vertical/inclined drillhole locations (mobilization and demobilization of the drill rigs). The frequency of helicopter flights is limited and helicopters will be only operated during the daytime period. Since the helicopter is only used with very short duration and infrequent (a tentative frequency of one trip per month, each lasting about two hours), adverse impacts associated with operating helicopter is not expected.
- 4.3.4 The GI works involve drilling boreholes and manually excavating trial pits only. There are no extensive construction works, therefore construction noise impact is anticipated to be minimal.

### 4.4 Water Quality

- 4.4.1 The Project involves land-based GI works only, all drillholes are small in scale (approximately 100mm diameter). There will be no encroachment to any watercourses and no watercourses will be diverted or altered during construction and post-construction phases. It is anticipated that the water quality impacts from GI works on near watercourses are negligible. The proposed temporary access ladders to connect to temporary working platforms for drillholes VBH02/IBH01 and VBH04/IBH02 would be installed away from watercourses as far as possible, and thus all watercourses will remain untouched. All working areas and temporary access ladders will be reinstated upon completion of GI works. Therefore, it is expected that there would be no disturbance on watercourses and adverse water quality impact is not anticipated.
- 4.4.2 During drilling, the drilling fluid will be stored in the water tank and it will be recirculated between the drillhole and water tank. Upon completion of the drillhole,



the water tank will be transported off site by helicopter or removed manually. There will be no water discharge resulting from the drilling works thus adverse water quality impact is not anticipated.

- 4.4.3 To avoid site runoff and pollutants from entering to the watercourses, the good site practices as recommended in Professional Persons Environmental Consultative Committee Practice Note (ProPECC PN) PN 2/24 “Construction Site Drainage” should be followed to prevent runoff with high concentration of suspended solid entering the surrounding water bodies. Best Management Practices (BMPs) in controlling construction site discharges are also recommended for the proposed GI works. With the implementation of good site practices to control potential site runoff, disturbance of water bodies would be avoided, and potential adverse water quality impact caused by the construction surface runoff would be limited.
- 4.4.4 Portable toilets will be provided outside the Country Park for the workforce. A licensed waste collector should be employed to clean and maintain the chemical toilets on a regular basis. The sewage generated from the construction workforce will be contained and tanked away. Potential adverse water quality impact caused by sewage effluent from workforce is not anticipated.

## 4.5 Waste Management

- 4.5.1 Inert construction and demolition (C&D) material including excavated soil from trial pits and drillholes will be anticipated. The excavated soil will be placed within the temporary working platform and stored in nylon bags. The excavated soil from trial pits will be backfilled at their original locations upon the completion of GI works. Soil and rock samples (i.e., inert C&D materials) taken from drillholes will be stored in coreboxes and delivered to storage site upon the completion of GI works.
- 4.5.2 As the materials of working areas/platforms and chemical waste would be reused at all possible opportunities, no non-inert C&D materials or chemical waste would be generated from the GI works. Limited general refuse comprising food scraps, wastepaper, empty containers, etc. would be generated from workers. The general refuse generally would be stored at rubbish bins on site. The waste should be disposed of at designated landfill site (i.e., West New Territories Landfill (WENT)). Based on experience from similar projects and consultation with the GI contractor, it is assumed that no more than 5kg would be generated per day. With the implementation of mitigation measures, adverse impacts arising from waste management implications associated with the GI works are not expected.

## 4.6 Terrestrial Ecology

### Direct Ecological Impacts

- 4.6.1 All the proposed GI works within LN(E)CP are located in plantation or shrubland (a total excavation area of approximately 6m<sup>2</sup>). There will be several working platforms (with dimensions 3m x 6m for trial pits and 6m x 15m for drillholes respectively) connected by temporary access ladders (about 0.7m width) which will be laid within plantation and shrubland. The exact location of proposed GI works

and temporary access ladders are readily adjustable on site to avoid trees, natural streambed and species of conservation importance.

- 4.6.2 Only minimal vegetation clearance/ temporary disturbance to ground vegetation will be resulted from minor excavation of inspection pits/ trial pits, and the erection of temporary access ladders and working platforms. The excavated areas will be reinstated properly upon completion of GI works. It is expected that vegetation temporarily disturbed by the GI works will recover over time from natural succession. No tree felling and permanent loss of habitats are anticipated from the proposed GI works. Direct impact from potential habitat loss/ disturbance from GI works is **Minor**.

### **Indirect Ecological Impacts**

- 4.6.3 There will be helicopter flights to transport materials and equipment for proposed GI works. The unloading point(s) will be within the temporary access ladders or working platforms and shared by the trial pits/ drillholes to minimize number of flights. Temporary access ladders between the nearest access road and the temporary working platforms will be erected for labour workers to access the inspection pits/ drillhole area(s). Potential disturbance impact due to helicopter flights (and noise generated from helicopter flights) are limited and temporary. Indirect disturbance impacts to wildlife in LN(E)CP and adjacent areas would be **Minor**. As reviewed from the ecological surveys, all fauna species recorded are low in numbers and highly transient. Potential noise and vibration impact from drilling activities to fauna species which are highly mobile and transient are expected to be **insignificant**.
- 4.6.4 As detailed in **Section 4.2**, small amount of dust may arise from drilling activities during the GI works. Dust generated may be deposited on the nearby vegetation communities and cause damage to existing plants. This may further result in secondary impacts from habitat degradation and adverse impacts to the inhabited fauna. Given the limited scale of the GI works, the huge distances between each concurrently operating drilling activity, and the implementation of environmental protection measures and good site practices as described in **Section 5** and **Section 6**, indirect ecological impacts arising from dust generated from the GI works is expected to be **minimal**.
- 4.6.5 As reviewed in **Section 4.4**, water quality impact from proposed GI works is expected to be negligible given all proposed works are land-based and will not encroach onto any existing watercourses. With the implementation of precautionary measures to avoid site runoff and pollutants from entering watercourses and other good site practice to control water quality impacts, indirect ecological impacts from induced water-quality impact due to the proposed GI works are negligible.
- 4.6.6 No night-time works are anticipated for the proposed GI works. As such, indirect disturbance impacts from construction light to fauna species is not anticipated.
- 4.6.7 One avifauna (i.e. Black Kite (in flight)) and one butterfly (i.e. Malayan (one individual)) species of conservation importance were recorded within the 100m Assessment Area but outside the proposed working areas. No roosting or breeding



behaviour was exhibited by the recorded species. Both the Black Kite and Malayan are also highly mobile species and their habitats are not confined to the Assessment Area. Therefore, potential indirect impact to these species of conservation importance is **Minor**.

### Evaluation of Significance of Ecological Impacts on Habitats and Important Area(s)

**Table 4.1** below presents the evaluation of significance of ecological impacts arising from the proposed GI works in accordance with EIAO-TM Annex 8 and Annex 16. (\*The estimated habitat area(s) to be disturbed/ affected are calculated based on the dimensions of proposed working platforms and excavated area(s) as described in **Table 1.1** and **Section 1.4.3** respectively.)

Table 4.1 Evaluation of Significance of Ecological Impacts

Criteria	Mixed Woodland	Plantation	Shrubland	Watercourse	Site of Conservation Importance (LN(E)CP)
Habitat Quality	Moderate	Low-to-Moderate	Low-to-Moderate	Low-to-Moderate	Moderate-to-High
Species	Moderate floral diversity and low faunal diversity	Low floral and faunal diversity	Moderate floral diversity and low faunal diversity	Low floral and faunal diversity	Moderate species diversity
*Size/ Abundance within LN(E)CP which will be temporarily disturbed due to GI works	No mixed woodland will be disturbed	Temporary access ladders: ~230m long (Approx. Area = 230m (L) x 0.7m (W) = 161m <sup>2</sup> )  Area of Working Platforms (IBH01, VBH02, IBH02, VBH04): 6m x 15m x 2 = 180m <sup>2</sup>  Possible excavated area (within the extent of working platform):  Area = 0.5m (L) x 0.5m (W) x 4 = 1m <sup>2</sup>	Temporary access ladders: ~820m long (Approx. Area = 820m (L) x 0.7m (W) = 574m <sup>2</sup> )  Area of Working Platforms (IBH06, IBH07, TP03, TP08): (6m x 15m x 2) + (3m x 6m x 2) = 216m <sup>2</sup>  Possible excavated area (within the extent of working platform):  Area = (0.5m (L) x 0.5m (W) x 2) + (1.5m (L) x 1.5m (W) x 2)	No streambed will be disturbed	Temporary access ladders: ~1,050m long (Approx. Area = 161m <sup>2</sup> + 574m <sup>2</sup> = 735m <sup>2</sup> )  Working Platforms: 180m <sup>2</sup> + 216m <sup>2</sup> = 396m <sup>2</sup> (total)  Possible excavated area (trial pits and drillholes) within the working platform(s):  1m <sup>2</sup> + 5m <sup>2</sup> = 6m <sup>2</sup>

Criteria	Mixed Woodland	Plantation	Shrubland	Watercourse	Site of Conservation Importance (LN(E)CP)
		(IBH01, VBH02, IBH02, VBH04)	=5m <sup>2</sup> (IBH06, IBH07, TP03, TP08)		
Duration	Short and temporary (<12 months)				
Reversibility	Reversible				
Magnitude	Very low				
Regional Significance	Low – all are common habitats in the territory				
<b>Overall Impact Significance</b>	Minor	Minor	Minor	Minor	Minor

## 4.7 Landscape and Visual

- 4.7.1 The proposed GI works including establishment of temporary access ladders (about 0.7m wide), trial pits and drillholes are all temporary works in a short duration. All the proposed trial pits and drillholes are located in shrubland or plantation areas. No registered or potential Old and Valuable Trees (OVTs) have been identified in the 100m Assessment Area.
- 4.7.2 The proposed alignment of temporary access ladders and exact locations of trial pits and drillholes will be carefully selected and readily adjustable on site based on actual site topography to avoid or work around trees. Only minimal clearance of ground vegetation will be resulted from minor excavation of trial pits and establishment of temporary access ladders.
- 4.7.3 Helicopters will be used for transportation of materials and equipment for GI works and the transported materials will be unloaded onto the proposed temporary access ladders/ platform to minimize the footprint of unloading areas.
- 4.7.4 As tree felling would be avoided and no valuable trees/ plant species of particular interest were identified in the assessment area, the magnitude of change to the existing landscape is considered to be negligible given the limited footprint of GI works which is temporary in nature and short term. Potential landscape impacts arising from the GI works on both landscape resources and landscape character area of the Assessment Area would be insubstantial.
- 4.7.5 The proposed GI works do not involve any permanent structures aboveground, no permanent visual impacts are anticipated.

## 4.8 Cultural Heritage

- 4.8.1 No declared monument, proposed monument, graded historic building, government historic sites and SAI is identified within the 100m assessment area and the GI works are not located at any area of archaeological potential area. Thus, no impacts to cultural heritage resources are expected.

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

### **5.1 Air Quality**

5.1.1 Good site practices and control measures stipulated in the Air Pollution Control (Construction Dust) Regulations, Air Pollution Control (Non-road Mobile Machinery (NRMM)) (Emission) Regulation and Air Pollution Control (Fuel Restriction) Regulation will be implemented to suppress the air emissions. Following mitigation measures will be considered during the GI works to minimize air quality impacts.

- Cover the excavated trial pits and any dusty material storage piles with impervious sheeting, if applicable, to reduce emissions;
- Open stockpiles should be avoided or covered with tarpaulin sheets. Where possible, prevent placing dusty material storage piles near ASRs;
- Optimize flight paths to enhance fuel efficiency during the planning of flight paths and avoid unnecessary idling during the operation of helicopter;
- Backfill the drillholes/ trial pits upon the completion of GI works as soon as possible;
- Deploy drill rigs of approved NRMMs as far as practicable; and
- Spray the working area with water for minimization of dust.

### **5.2 Noise**

5.2.1 Noise impacts due to the GI works are not expected. Nevertheless, good site practice and noise management will be considered for the GI works to minimize the noise impacts as appropriate including the following:

- Use of well-maintained construction plant;
- Provide regular maintenance to all plant and equipment;
- Shut down machineries that are in intermittent use between works periods;
- Use of quieter construction methods/ equipment as far as is practicable with reference to GN 9/2023 "Preparation of Construction Noise Impact Assessment Under the Environmental Impact Assessment Ordinance".

5.2.2 The Contractor shall ensure compliance with the construction noise standards as stated in EIAO-TM.

### 5.3 Water Quality

- 5.3.1 The Contractor should adhere to the drillhole backfilling guidelines outlined in the GEO/CEDD Geoguide 2 (2017 Version) to mitigate the risk of aquifer contamination. The best procedure is to refill the borehole with a cement-based grout introduced at the lowest point by means of a tremie pipe and it is often preferable to use a cement-bentonite grout.
- 5.3.2 Contractor shall also follow the Best Management Practices (BMPs) of mitigation measures in controlling water pollution and good site management, as specified in the Professional Persons Environmental Consultative Committee Practice Notes (ProPECC PN) PN 2/24 “Construction Site Drainage” issued by the Director of Environmental Protection and Works Bureau Technical Circular (Works) No. 5/2005” (ETWB TC(W) 5/2005) “Protection of Natural Streams/ Rivers from Adverse Impact Arising from Construction Works” to minimise surface runoff and water quality impacts upon any natural streams or surface water systems. The recommended key mitigation measures for minimizing potential water quality impact listed below should be followed:

#### Surface run-off

- Exposed soil surface should be covered with tarpaulin or similar fabric as necessary during rainstorms.
  - Excavated and filled surfaces that are susceptible to erosion should be consistently protected to prevent any erosion; and
  - Good site practices should be adopted to remove rubbish and litter from works site so as to prevent the rubbish and litter from spreading from the working area. It is recommended to clean the construction sites on a regular basis.
- 5.3.3 Any portable toilets will be located outside the Country Park and shall be well maintained to avoid watercourse pollution. A licensed waste collector should be employed to clean and maintain the chemical toilets on a regular basis. The sewage generated from the construction workforce will be contained and tanked away. All sludge, wastewater, and cleanup water from the toilets should not be discharged into the surrounding environment. In addition, notices should be posted at conspicuous locations to remind the workers not to discharge any sewage or wastewater into the nearby environment.

### 5.4 Waste Management Implications

- 5.4.1 The inert C&D materials are mainly the excavated soil generated by trial pits and inspection pits and shall be placed within temporary working areas. Temporary stockpiling of excavated Inert C&D materials will be stored in nylon bags. The excavated trial pits shall be backfilled with inert C&D materials upon the completion of GI works. Refuse bins covered with lids shall be provided on-site. The general refuse such as wastepaper, empty cans, etc. will also be recycled where practicable prior to disposal. Non-recyclable wastes should be disposed of at designated landfill site (i.e., West New Territories Landfill (WENT)).

## 5.5 Terrestrial Ecology

- 5.5.1 The proposed GI works have taken the following approaches to avoid, minimize or mitigate potential ecological impacts from temporary disturbance caused by the GI works:
- 5.5.2 Avoidance – The locations of proposed trial pits/ drillholes and temporary access ladders will be adjusted on site to avoid encroachment onto trees or watercourses.
- 5.5.3 Minimization – The locations of proposed trial pits/ drillholes have been carefully reviewed and the numbers of pits/ drillholes in LN(E)CP have been further minimized. Temporary access ladders and working platforms would be elevated to minimize the amount of vegetation required to be cleared. Some drillholes will have shared working platform to minimize the footprint of temporary works. Unloading points for transportation of materials and equipment will be restricted to the area within the temporary access ladders/ working platforms and shared by the trial pits and drillholes where possible to minimise the number of flights required, further reducing potential disturbance impacts from helicopter operation.
- 5.5.4 Reinstatement – All potential ecological impacts arising from the proposed GI works are temporary and reversible. The disturbed grounds will be reinstated properly. No permanent habitat loss or deterioration of habitats are anticipated.
- 5.5.5 Given that some areas of the assessment area were inaccessible for ecological surveys, a pre-construction survey shall be conducted by a qualified ecologist during the erection of temporary access ladders and temporary working platforms, such that suitable locations for building the access ladders/ working platforms could be identified to avoid or minimize disturbance to vegetation/ habitats. Appropriate protection measures for the species of conservation importance, in particular for flora and amphibian species shall be implemented (e.g. establishment of protective barriers, and providing a formal briefing/ induction to the workforce to reinforce the message that the works are being conducted within (LN(E)CP) which is an ecologically sensitive area and precautionary measures such as to remind the construction worker not to enter areas secured by protective barriers to avoid impacts to wildlife shall be taken), in case any species of conservation importance at/near the proposed works is identified.

## 5.6 Landscape and Visual

- 5.6.1 The following good site practice and tree preservation measures shall be implemented as far as practicable to further minimise any possible landscape impacts or any temporary visual impacts from GI works:
- Minimization of extent of works activities to minimize unnecessary disturbance to existing vegetation.
  - Provide tree protection measures to preserve existing trees in accordance with Guidelines on Tree Preservation during Development issued by DEVB, GLTMS in April 2015 and DEVB TC(W) No. 4/2020 on Tree Preservation.

- Reinstatement of all disturbed areas properly upon completion of ground investigation.
- Proper storage of materials and equipment and management of construction waste to avoid or minimize disturbance to the existing landscape.

## 5.7 Cultural Heritage

- 5.7.1 Impact to cultural heritage resources is not anticipated. As a precautionary measure, pursuant to the Antiquities and Monuments Ordinance, Cap. 53, the project proponent is required to inform the Antiquities and Monuments Office (AMO) immediately in case of discovery of antiquities or supposed antiquities in the course of works, so that appropriate mitigation measures, if needed, can be timely formulated and implemented in agreement with and to the satisfaction of AMO.

## 5.8 Severity, Distribution, Duration of Environmental Effects and Further Environmental Implications

- 5.8.1 In view of the nature of the Project, the associated environmental impact would be small scale, localized and short term. No adverse residual environmental impacts are anticipated with the implementation of the recommended mitigation measures and good site practices, and thus no further implications.



## 6 SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

6.1.1 The potential environmental impacts and proposed mitigation measures to be incorporated Project are summarized in **Table 6.1**, which would be included in the GI works contract document. The Project Proponent or his representatives would supervise and monitor the implementation of these measures by the contractor.

Table 6.1 Summary of Potential Environmental Impacts and Mitigation Measures/Good Site Practices

Potential Environmental Impact	Mitigation Measures	Implementation Agent	Text Ref.
Air Quality	<ul style="list-style-type: none"> <li>Cover the excavated trial pits and any dusty material storage piles with impervious sheeting, if applicable, to reduce emissions.</li> <li>Open stockpiles should be avoided or covered with tarpaulin sheets. Where possible, prevent placing dusty material storage piles near ASRs.</li> <li>Optimize flight paths to enhance fuel efficiency during the planning of flight paths and avoid unnecessary idling during the operation of helicopter.</li> <li>Backfill the drillholes/ trial pits upon the completion of GI works as soon as possible.</li> <li>Deploy drill rigs of approved NRMMS as far as practicable.</li> <li>Spray the working area with water for minimization of dust.</li> </ul>	Contractor	5.1
Noise	<ul style="list-style-type: none"> <li>Use of well-maintained construction plant.</li> <li>Provide regular maintenance to all plant and equipment.</li> <li>Shut down machineries that are in intermittent use between works periods.</li> <li>Use of quieter construction methods/ equipment as far as is practicable with reference to GN 9/2023 "Preparation of Construction Noise Impact Assessment Under the Environmental Impact Assessment Ordinance".</li> </ul>	Contractor	5.2
Water Quality	<ul style="list-style-type: none"> <li>Adhere to drillhole backfilling guidelines outlined in the GEO/CEDD Geoguide 2 (2017 Version).</li> <li>Follow the BMPs outlined in EPD's ProPECC PN 2/24, and ETWB TC(W) 5/2005 as far as practicable.</li> <li>Cover exposed soil surface with tarpaulin or similar fabric as necessary during rainstorms;</li> <li>Excavated and filled surfaces that are susceptible to erosion should be consistently protected to prevent any erosion.</li> </ul>	Contractor	5.3

Potential Environmental Impact	Mitigation Measures	Implementation Agent	Text Ref.
	<ul style="list-style-type: none"> <li>Good site practices should be adopted to remove rubbish and litter from works site so as to prevent the rubbish and litter from spreading from the working area. It is recommended to clean the construction sites on a regular basis.</li> <li>Portable toilets will be located outside the Country Park to handle sewage from the workers. Those facilities should be well-maintained to avoid watercourse pollution. A licensed waste collector should be employed to clean and maintain the chemical toilets on a regular basis. The sewage generated from the construction workforce will be contained and tanked away. All sludge, wastewater, and cleanup water from the toilets should not be discharged into the surrounding environment.</li> <li>Notices should be posted at conspicuous locations to remind the workers not to discharge any sewage or wastewater into the nearby environment.</li> </ul>		
Waste Management	<ul style="list-style-type: none"> <li>Inert C&amp;D materials generated by trial pits and inspection pits shall be placed within temporary working areas. Temporary stockpiling of excavated materials will be stored in nylon bags.</li> <li>The excavated trial pits shall be backfilled with inert C&amp;D materials upon completion of GI works.</li> <li>Refuse bins covered with lids shall be provided on-site.</li> <li>General refuse such as wastepaper, empty cans, etc. will also be recycled where practicable prior to disposal.</li> <li>General refuse and non-recyclable wastes should be disposed of at designated landfill site (i.e., West New Territories Landfill (WENT)).</li> </ul>	Contractor	5.4
Terrestrial Ecology	<ul style="list-style-type: none"> <li>The proposed trial pits/ drillholes and temporary access ladders/ working platforms shall avoid encroachment onto existing trees and natural watercourses.</li> <li>The footprint of vegetation disturbance shall be kept minimal.</li> <li>All disturbed areas shall be reinstated properly.</li> <li>A pre-construction survey shall be conducted by a qualified ecologist during the erection of temporary access ladders and temporary working platforms, such that suitable locations for building the access ladders/ working platforms could be identified to avoid</li> </ul>	Contractor	5.5



Potential Environmental Impact	Mitigation Measures	Implementation Agent	Text Ref.
	or minimize disturbance to vegetation/habitats. Appropriate protection measures for the species of conservation importance, in particular for flora and amphibian species, shall be implemented (e.g. establishment of protective barriers, and providing a formal briefing/ induction to the workforce to reinforce the message that the works are being conducted within (LN(E)CP) which is an ecologically sensitive area and precautionary measures such as to remind the construction worker not to enter areas secured by protective barriers to avoid impacts to wildlife shall be taken), in case any species of conservation importance at/near the proposed works is identified.		
Landscape & Visual	<ul style="list-style-type: none"> <li>Minimize extent of works activities to minimize unnecessary disturbance to existing vegetation.</li> <li>Provide tree protection measures to preserve existing trees in accordance with Guidelines on Tree Preservation during Development issued by DEVB, GLTMS in April 2015 and DEVB TC(W) No. 4/2020 on Tree Preservation.</li> <li>Reinstate all disturbed areas properly upon completion of ground investigation.</li> <li>Proper storage of materials and equipment and management of construction waste to avoid or minimize disturbance to the existing landscape.</li> </ul>	Contractor	5.6
Cultural Heritage	<ul style="list-style-type: none"> <li>As a precautionary measure, pursuant to the Antiquities and Monuments Ordinance, Cap. 53, the project proponent is required to inform the Antiquities and Monuments Office (AMO) immediately in case of discovery of antiquities or supposed antiquities in the course of works, so that appropriate mitigation measures, if needed, can be timely formulated and implemented in agreement with and to the satisfaction of AMO.</li> </ul>	Contractor/ CEDD	5.7

## **7 USE OF PREVIOUSLY APPROVED EIA REPORTS**

7.1.1 There are no previously approved EIA Reports with similar nature as the Project.

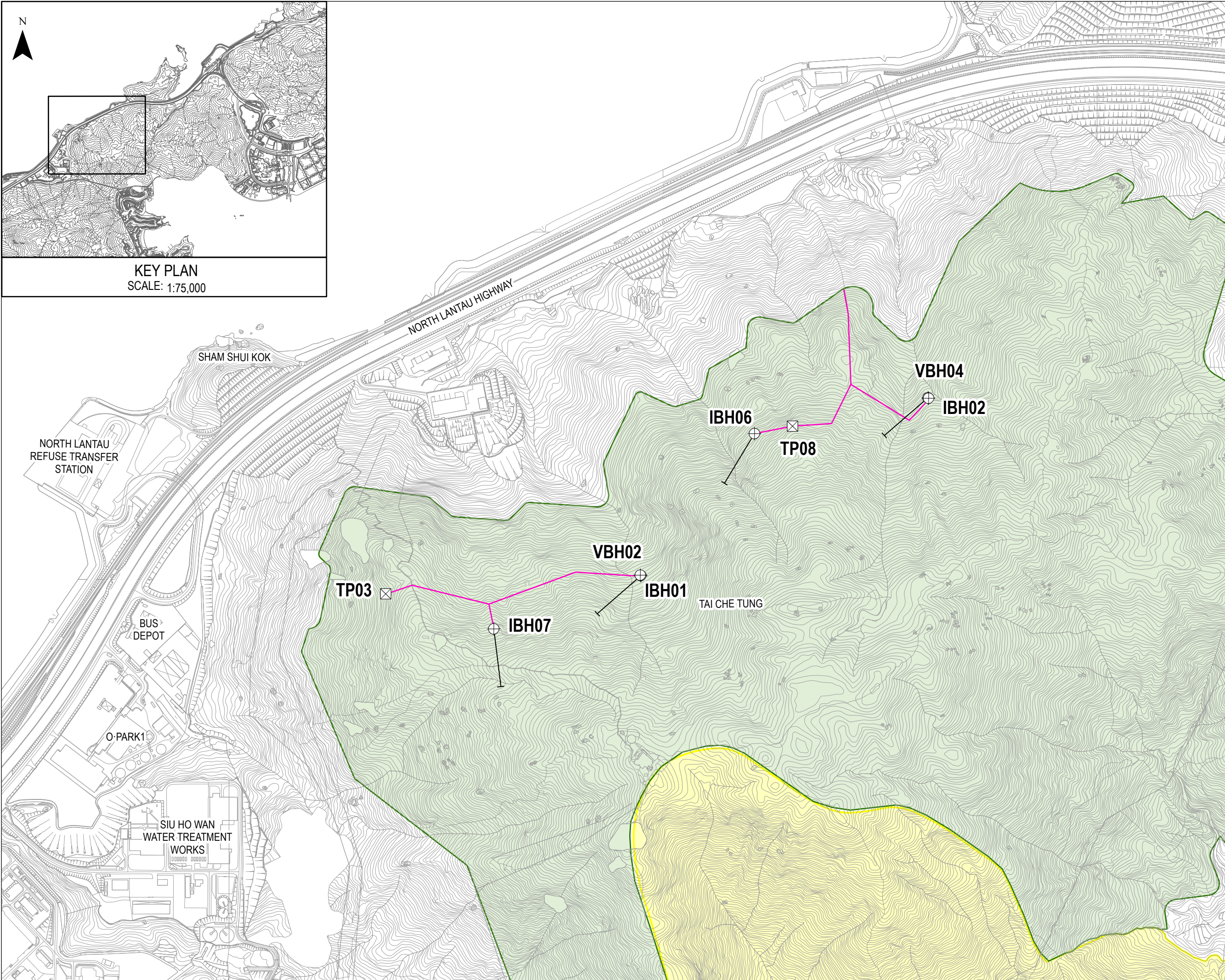
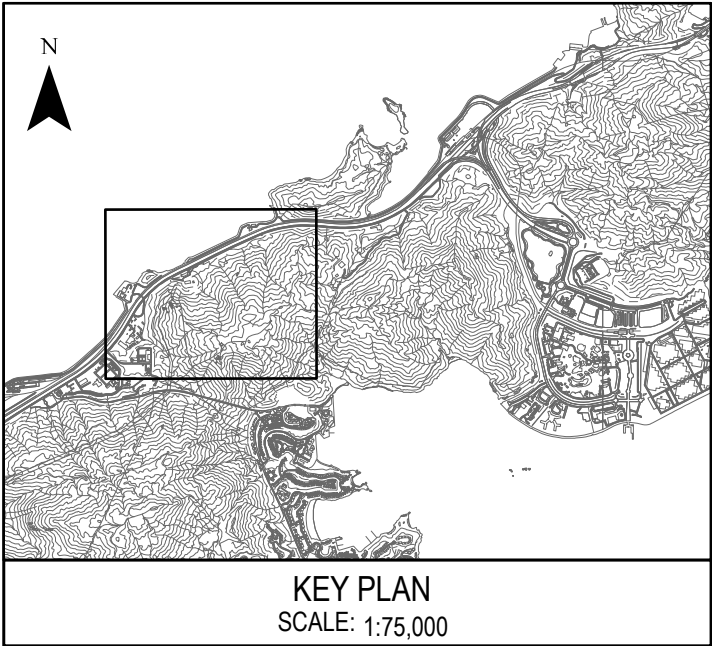
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## Figures





**LEGEND:**



- LANTAU NORTH (EXTENSION) COUNTRY PARK
- CONSERVATION AREA
- PROPOSED ACCESS LADDER FOR GROUND INVESTIGATION (ABOUT 0.7m WIDE)

**PROPOSED GI WORKS**

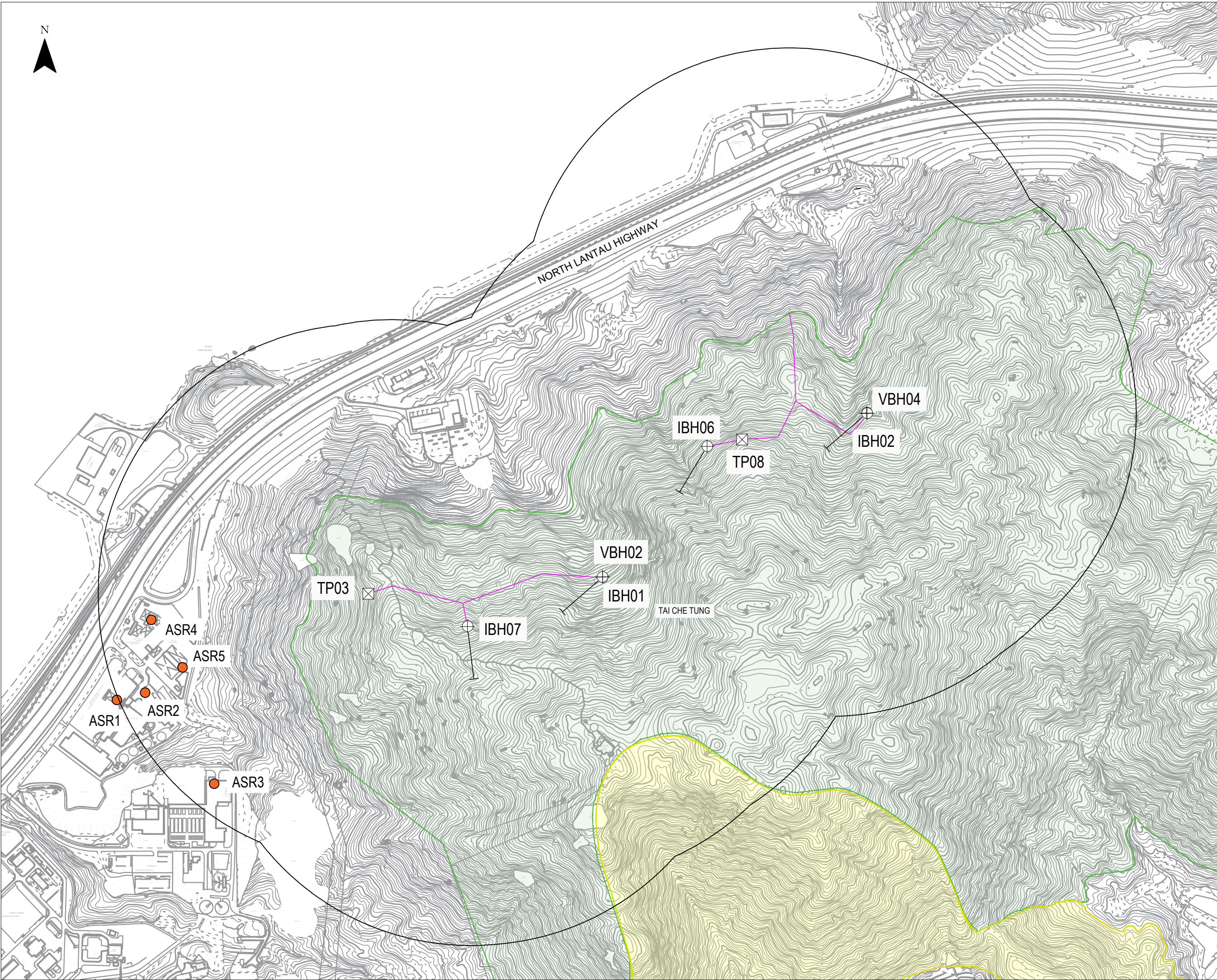
- VBH02 PROPOSED VERTICAL DRILLHOLE
- TP03 PROPOSED TRIAL PIT
- IBH01 PROPOSED INCLINED DRILLHOLE

**REMARKS:**

LOCATIONS OF PROPOSED GI WORKS AND ALIGNMENT OF TEMPORARY ACCESS LADDER WOULD BE SLIGHTLY ADJUSTED FOR ACCOMMODATING POSSIBLE SITE CONSTRAINTS

Rev.	Date	Drawn	Description	Checked	Approved
Employer					
 土木工程拓展署 <b>CEDD Civil Engineering and Development Department</b>					
Project					
GROUND INVESTIGATION WORKS FOR UNDERGROUND QUARRYING AT SHAM SHUI KOK, NORTH LANTAU WITHIN LANTAU NORTH (EXTENSION) COUNTRY PARK					
Title					
LOCATION OF THE PROJECT					
Consultant					
					
Designed		Checked			
Drawn		Approved			
Scale	A3	Status	Rev		
1:6,000					
Drawing No.					
FIGURE 1.1					
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**LEGEND:**



- 500m ASSESSMENT AREA
- LANTAU NORTH (EXTENSION) COUNTRY PARK
- CONSERVATION AREA
- PROPOSED ACCESS LADDER FOR GROUND INVESTIGATION (ABOUT 0.7M WIDE)

**PROPOSED GI WORKS:**

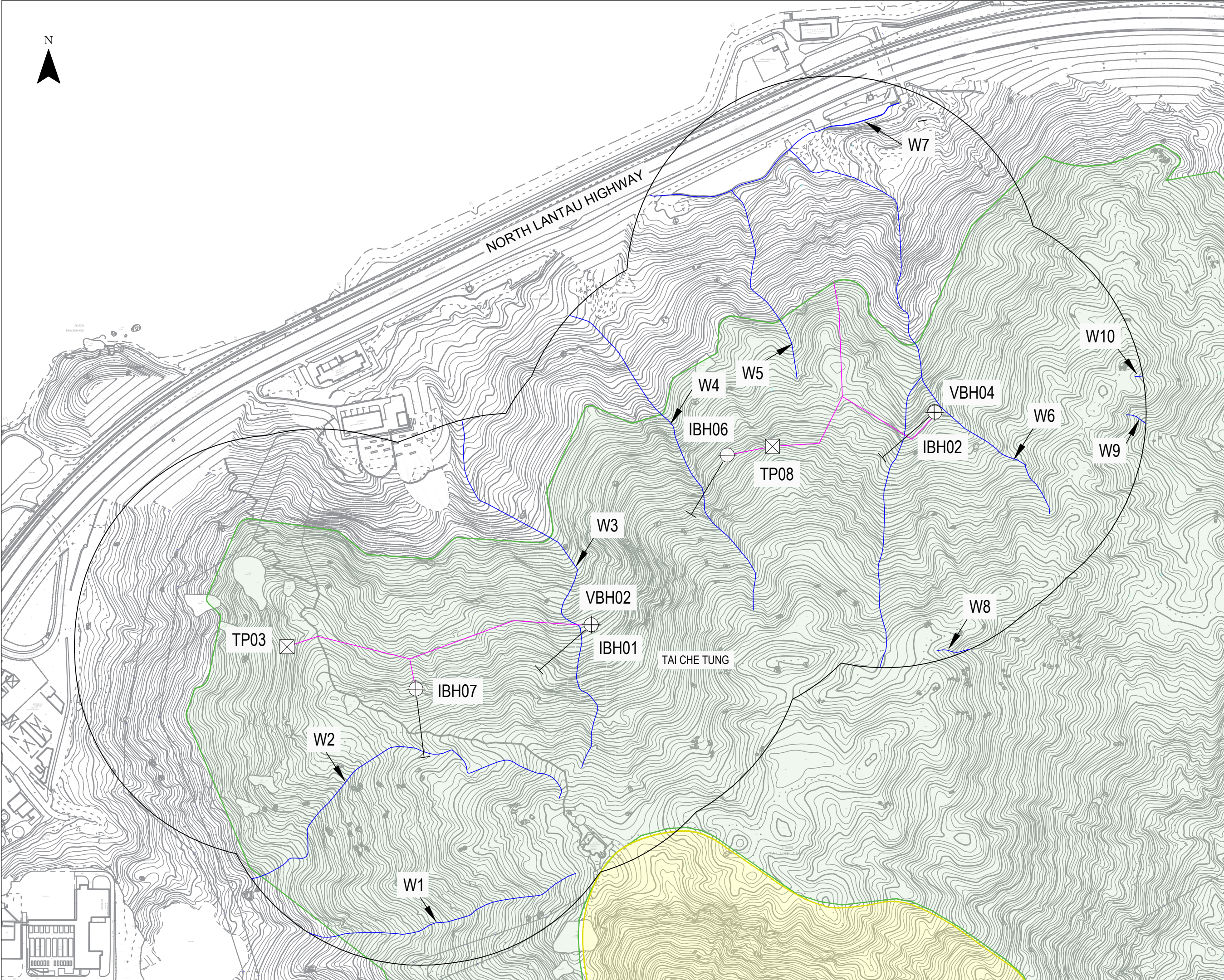
- VBH02 PROPOSED VERTICAL DRILLHOLE
- TP03 PROPOSED TRIAL PIT
- IBH01 PROPOSED INCLINED DRILLHOLE

**AIR SENSITIVE RECEIVERS:**

- REPRESENTATIVE AIR SENSITIVE RECEIVERS

Rev.	Date	Description	Checked	Approved
Employer				
 土木工程拓展署 CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT				
Project				
GROUND INVESTIGATION WORKS FOR UNDERGROUND QUARRYING AT SHAM SHUI KOK, NORTH LANTAU WITHIN LANTAU NORTH (EXTENSION) COUNTRY PARK				
Title				
REPRESENTATIVE AIR SENSITIVE RECEIVERS (ASRs)				
Consultant				
				
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Drawn		Approved		
Scale	A3	Status	Rev	
1:6500				
Drawing No.				
FIGURE 3.1				
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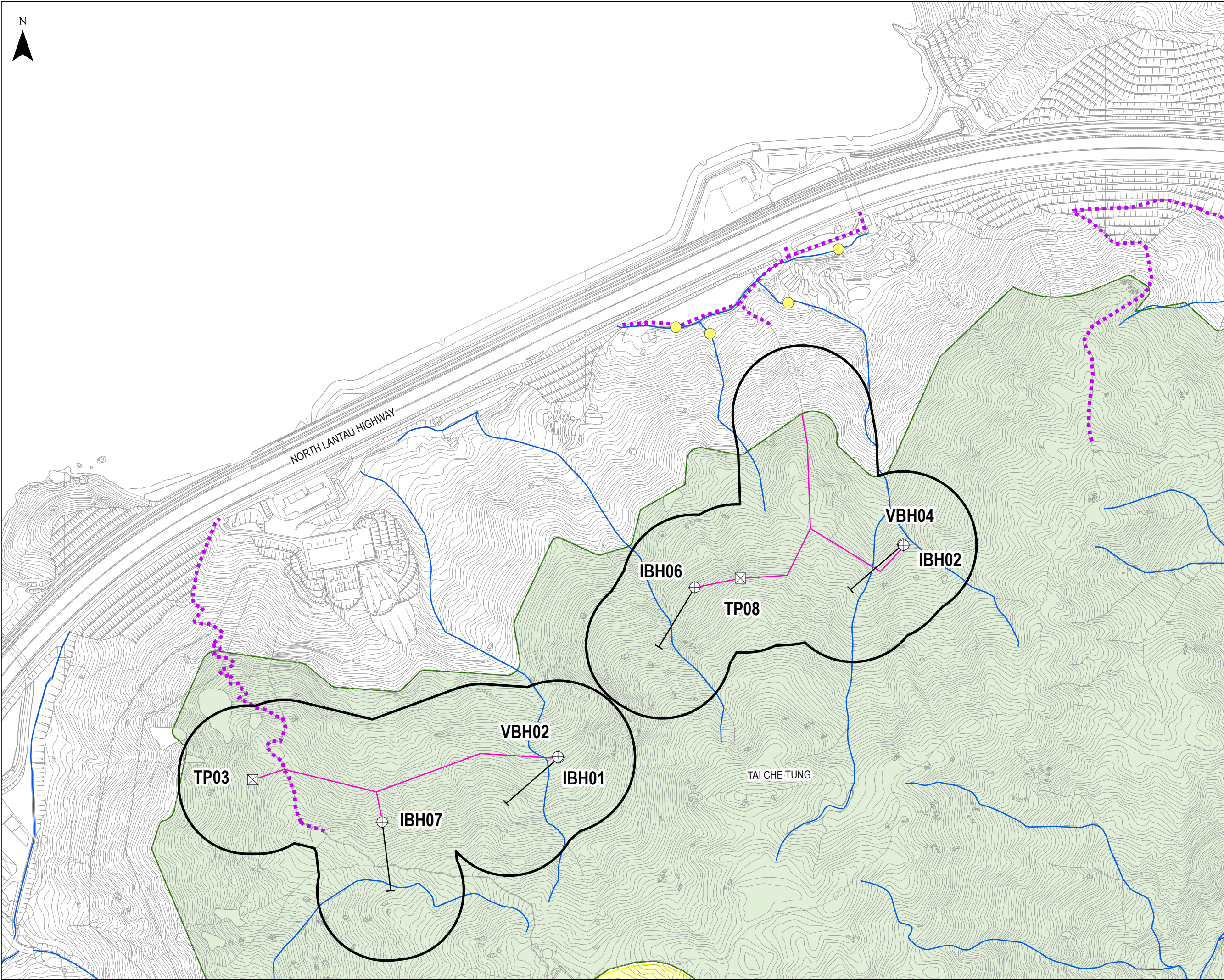
- LEGEND:**
- 300m ASSESSMENT AREA
  - LANTAU NORTH (EXTENSION) COUNTRY PARK
  - CONSERVATION AREA
  - PROPOSED ACCESS LADDER FOR GROUND INVESTIGATION (ABOUT 0.7M WIDE)

- PROPOSED GI WORKS:**
- VBH02 PROPOSED VERTICAL DRILLHOLE
  - TP03 PROPOSED TRIAL PIT
  - IBH01 PROPOSED INCLINED DRILLHOLE

- WATER SENSITIVE RECEIVERS:**
- NATURAL/ MODIFIED WATERCOURSE

Rev.	Date	Description	Checked	Approved
Employer				
 土木工程拓展署 CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT				
Project				
GROUND INVESTIGATION WORKS FOR UNDERGROUND QUARRYING AT SHAM SHUI KOK, NORTH LANTAU WITHIN LANTAU NORTH (EXTENSION) COUNTRY PARK				
Title				
REPRESENTATIVE WATER SENSITIVE RECEIVERS (WSRs)				
Consultant				
				
Designed		Checked		
Drawn		Approved		
Scale	A3	Status		Rev
1:5000				
Drawing No.				
FIGURE 3.2				
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**LEGEND:**

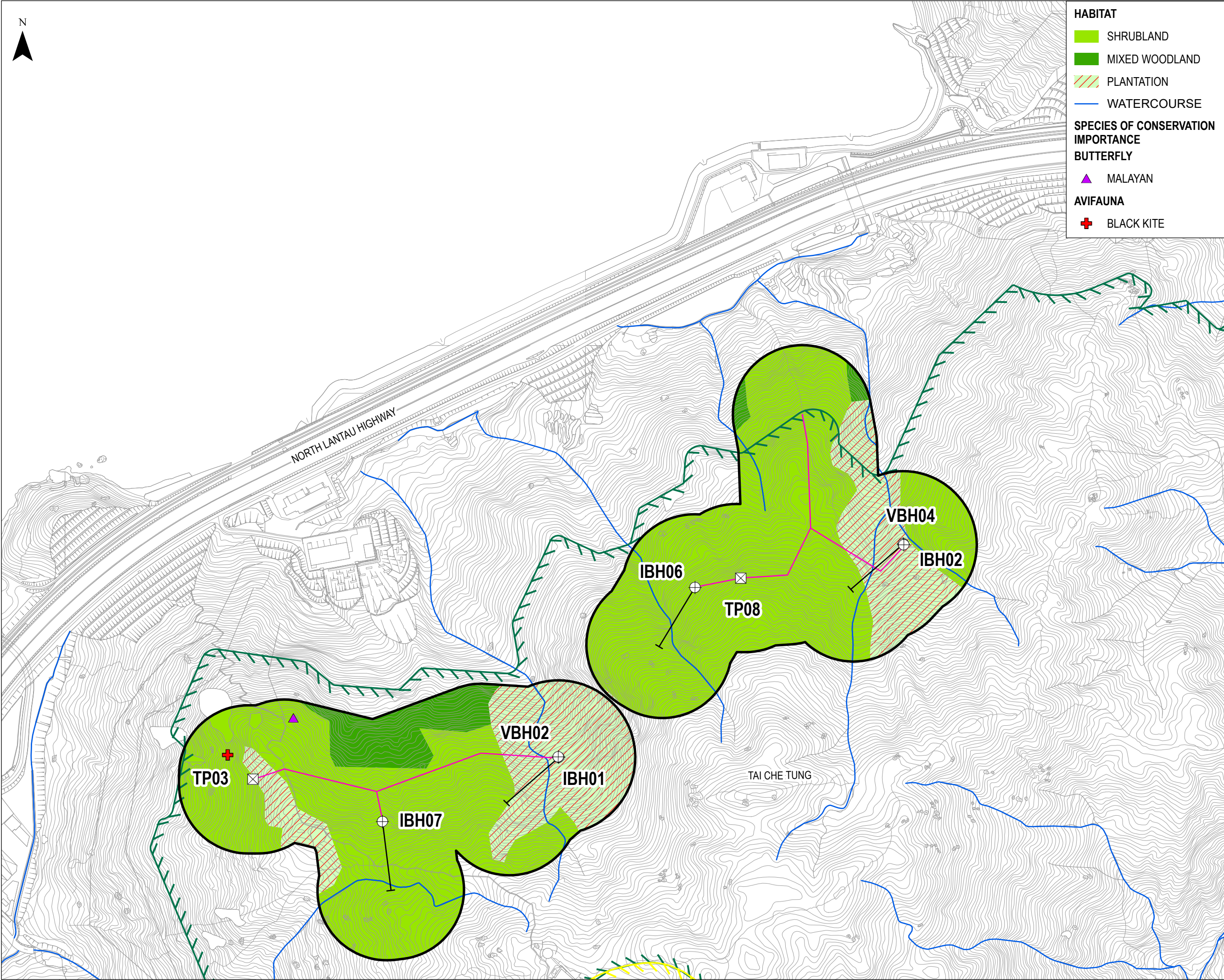
- 100m ASSESSMENT AREA
- LANTAU NORTH (EXTENSION) COUNTRY PARK
- CONSERVATION AREA
- SURVEY TRANSECT
- WATERCOURSE
- FRESHWATER ECOLOGY SAMPLING LOCATION
- PROPOSED ACCESS LADDER FOR GROUND INVESTIGATION (ABOUT 0.7m WIDE)

**PROPOSED GI WORKS**

- VBH02 PROPOSED VERTICAL DRILLHOLE
- TP03 PROPOSED TRIAL PIT
- IBH01 PROPOSED INCLINED DRILLHOLE



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 土木工程拓展署 Civil Engineering and Development Department					
Project					
GROUND INVESTIGATION WORKS FOR UNDERGROUND QUARRYING AT SHAM SHUI KOK, NORTH LANTAU WITHIN LANTAU NORTH (EXTENSION) COUNTRY PARK					
Title					
SURVEY TRANSECT					
Consultant					
					
Designed				Checked	
Drawn				Approved	
Scale	A3	Status			Rev
1:5,000					
Drawing No.					
FIGURE 3.3					
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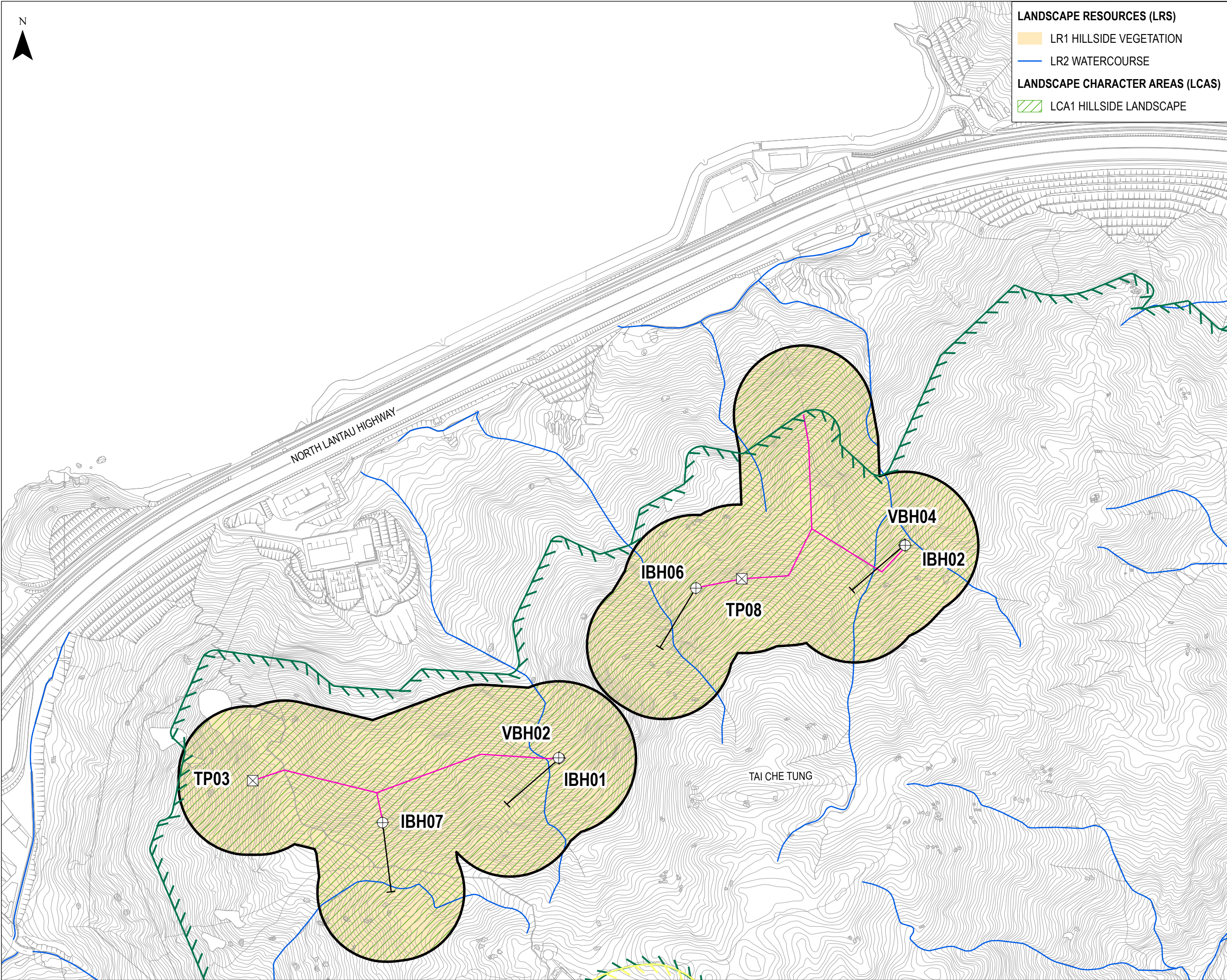


- HABITAT**
- SHRUBLAND
  - MIXED WOODLAND
  - PLANTATION
  - WATERCOURSE
- SPECIES OF CONSERVATION IMPORTANCE**
- BUTTERFLY**
- MALAYAN
- AVIFAUNA**
- BLACK KITE

- LEGEND:**
- 100m ASSESSMENT AREA
  - LANTAU NORTH (EXTENSION) COUNTRY PARK
  - CONSERVATION AREA
  - PROPOSED ACCESS LADDER FOR GROUND INVESTIGATION (ABOUT 0.7m WIDE)
- PROPOSED GI WORKS**
- VBH02 PROPOSED VERTICAL DRILLHOLE
  - TP03 PROPOSED TRIAL PIT
  - IBH01 PROPOSED INCLINED DRILLHOLE

Rev.	Date	Drawn	Description	Checked	Approved
Employer					
<div><div>土木工程拓展署 CEDD Civil Engineering and Development Department</div></div>					
Project					
GROUND INVESTIGATION WORKS FOR UNDERGROUND QUARRYING AT SHAM SHUI KOK, NORTH LANTAU WITHIN LANTAU NORTH (EXTENSION) COUNTRY PARK					
Title					
HABITAT MAP AND SPECIES OF CONSERVATION IMPORTANCE					
Consultant					
<div><div>asia infrastructure solutions</div></div>					
Designed				Checked	
Drawn				Approved	
Scale	A3	Status			Rev
1:5,000					
Drawing No.					
FIGURE 3.4					
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LANDSCAPE RESOURCES (LRS)

- LR1 HILLSIDE VEGETATION
- LR2 WATERCOURSE

LANDSCAPE CHARACTER AREAS (LCAS)

- LCA1 HILLSIDE LANDSCAPE

LEGEND:

- 100m ASSESSMENT AREA
- LANTAU NORTH (EXTENSION) COUNTRY PARK
- CONSERVATION AREA
- PROPOSED ACCESS LADDER FOR GROUND INVESTIGATION (ABOUT 0.7m WIDE)

PROPOSED GI WORKS

- VBH02 PROPOSED VERTICAL DRILLHOLE
- TP03 PROPOSED TRIAL PIT
- IBH01 PROPOSED INCLINED DRILLHOLE

Rev.	Date	Drawn	Description	Checked	Approved
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Employer

 土木工程拓展署  
Civil Engineering and Development Department

Project

GROUND INVESTIGATION WORKS FOR UNDERGROUND QUARRYING AT SHAM SHUI KOK, NORTH LANTAU WITHIN LANTAU NORTH (EXTENSION) COUNTRY PARK

Title

LANDSCAPE RESOURCES (LRS) AND LANDSCAPE CHARACTER AREAS (LCAS)

Consultant



Designed		Checked	
Drawn		Approved	
Scale	A3	Status	Rev
1:5,000			



## Appendix 1 – Representative Photographs of Habitats in 100m Assessment Area and the Surrounding Areas

## Appendix 1 Representative Photographs of Habitats in 100m Assessment Area and the Surrounding Areas

**Watercourse**



**Watercourse**



**Watercourse**



**Mixed Woodland**





**Plantation**



**Shrubland**



## Appendix 2 – Plant Species Recorded



## Appendix 2 – Plant Species Recorded

Scientific Name	Chinese Name	Origin	Growth Form	Conservation and Protection Status <sup>1, 2</sup>	Mixed Woodland	Plantation	Shrubland	Watercourse	Remarks
<i>Acacia auriculiformis</i>	耳果相思	Exotic	Tree	LC (IUCN)	+	+++			
<i>Acacia confusa</i>	台灣相思	Exotic	Tree	LC (IUCN)	+++	+++			
<i>Acacia mangium</i>	大葉相思	Exotic	Tree	LC (IUCN)	++		+		
<i>Acorus gramineus</i>	石菖蒲	Native	Herb	LC (IUCN)				++	
<i>Adiantum flabellulatum</i>	扇葉鐵線蕨	Native	Herb	-	++	++	+		
<i>Adina pilulifera</i>	水團花	Native	Shrub/Tree	LC (IUCN)				+	
<i>Alangium chinense</i>	八角楓	Native	Shrub/Tree	LC (IUCN)	++		+++		
<i>Alpinia hainanensis</i>	草豆蔻	Native	Herb	-	++			++	
<i>Antidesma ghaesembilla</i>	方葉五月茶	Native	Tree	LC (IUCN)	+				
<i>Aporosa dioica</i>	銀柴	Native	Tree	-	++		++		
<i>Archidendron lucidum</i>	亮葉猴耳環	Native	Tree	LC (IUCN)			+		
<i>Ardisia crenata</i>	朱砂根	Native	Shrub	-	+	+			
<i>Asparagus cochinchinensis</i>	天門冬	Exotic	Herb	DD (IUCN)		+			
<i>Aster baccharoides</i>	白舌紫菀	Native	Herb/Shrub	-			+++		
<i>Bambusa</i> sp.	竹屬	-	Bamboo	-	+				
<i>Berchemia floribunda</i>	勾兒茶	Native	Climber	LC (IUCN)		+			
<i>Bidens alba</i>	白花鬼針草	Exotic	Herb	-	++		+		
<i>Blechnum orientale</i>	烏毛蕨	Native	Herb	-	++	++	+++	++	
<i>Boehmeria nivea</i>	芋麻	Exotic	Subshrub	-				++	
<i>Breynia fruticosa</i>	黑面神	Native	Shrub	LC (IUCN)	+		++		
<i>Callicarpa brevipes</i>	短柄紫珠	Native	Shrub	LC (IUCN)			+		
<i>Caryopteris incana</i>	蘭香草	Native	Herb	-			+		
<i>Cassytha filiformis</i>	無根藤	Native	Tree	-	+		+		
<i>Castanopsis fissa</i>	鰲菊錐	Native	Tree	LC (IUCN)	++		++		
<i>Casuarina equisetifolia</i>	木麻黃	Exotic	Tree	LC (IUCN)			+		

## Appendix 2 – Plant Species Recorded

Scientific Name	Chinese Name	Origin	Growth Form	Conservation and Protection Status <sup>1, 2</sup>	Mixed Woodland	Plantation	Shrubland	Watercourse	Remarks
<i>Cayratia corniculata</i>	角花烏蘘莓	Native	Vine	-		+			
<i>Celastrus hindsii</i>	青江藤	Native	Shrub/Climber	-	+				
<i>Celtis sinensis</i>	朴	Native	Tree	LC (IUCN)	+		+		
<i>Cerbera manghas</i>	海芒果	Native	Tree	LC (IUCN)				+	
<i>Cibotium barometz</i>	金毛狗	Native	Herb	VU and under State Protection (Category II) in China (AFCD 2003), Cap.586	+				Recorded from transect outside 100m Assessment Area
<i>Cinnamomum camphora</i>	樟	Native	Tree	LC (IUCN)	++	+	+		
<i>Cratoxylum cochinchinense</i>	黃牛木	Native	Shrub/Tree	LC (IUCN)	+		++		
<i>Cyclosorus parasiticus</i>	華南毛蕨	Native	Herb	-	+			+++	
<i>Cymbopogon tortilis</i>	扭鞘香茅	Native	Herb	-			+++		
<i>Cyrtococcum patens</i>	弓果黍	Native	Herb	-	++				
<i>Daemonorops jenkinsiana</i>	黃藤	Native	Climber	-	++			++	
<i>Dalbergia benthamii</i>	兩廣黃檀	Native	Climber	LC (IUCN); Cap.586 <sup>3</sup>	+++		+++		
<i>Daphniphyllum calycinum</i>	牛耳楓	Native	Shrub/Tree	LC (IUCN)	++	++	+++		
<i>Dendrotrophe varians</i>	寄生藤	Native	Vine	-		+			
<i>Dianella ensifolia</i>	山菅蘭	Native	Herb	-			++		
<i>Dicranopteris pedata</i>	芒萁	Native	Herb	-	++	+++	++++		
<i>Dimocarpus longan</i>	龍眼	Exotic	Tree	DD (IUCN), VU (TSLCHP)	+				
<i>Dioscorea bulbifera</i>	黃獨	Native	Vine	-	+++				
<i>Duhaldea cappa</i>	羊耳菊	Native	Herb	-	+		++		

## Appendix 2 – Plant Species Recorded

Scientific Name	Chinese Name	Origin	Growth Form	Conservation and Protection Status <sup>1, 2</sup>	Mixed Woodland	Plantation	Shrubland	Watercourse	Remarks
<i>Elephantopus tomentosus</i>	白花地膽草	Native	Herb	-		++			
<i>Embelia laeta</i>	酸藤子	Native	Climber	-	+++	++	++++		
<i>Embelia ribes</i>	白花酸藤子	Native	Climber	-			+		
<i>Eucalyptus robusta</i>	大葉桉	Exotic	Tree	NT (IUCN)		+++			
<i>Eurya chinensis</i>	米碎花	Native	Shrub/Tree	-	+				
<i>Eurya nitida</i>	細齒葉柃	Native	Shrub/Tree	-	++		++		
<i>Ficus elastica</i>	印度榕	Exotic	Tree	LC (IUCN)	+				
<i>Ficus fistulosa</i>	水同木	Native	Tree	LC (IUCN)				+	
<i>Ficus hirta</i>	粗葉榕	Native	Shrub/Tree	-			+		
<i>Gardenia jasminoides</i>	梔子	Native	Shrub	LC (IUCN)			+		
<i>Glochidion eriocarpum</i>	毛果算盤子	Native	Shrub/Tree	LC (IUCN)	++		++		
<i>Glochidion lanceolarium</i>	大葉算盤子	Native	Shrub/Tree	-			+		
<i>Glochidion wrightii</i>	白背算盤子	Native	Shrub/Tree	-		+	++		
<i>Gnetum luofuense</i>	羅浮買麻藤	Native	Tree	NT (IUCN)		+			
<i>Gnetum parvifolium</i>	小葉買麻藤	Native	Tree	LC (IUCN)		+			
<i>Hedyotis acutangula</i>	方骨草	Native	Herb	-			+		
<i>Hedyotis hedyotideia</i>	牛白藤	Native	Shrub	-	+		+		
<i>Helicteres angustifolia</i>	山芝麻	Native	Shrub	-	+		++		
<i>Homalium cochinchinense</i>	天料木	Native	Shrub/Tree	LC (IUCN)	+		+		
<i>Ilex asprella</i>	梅葉冬青	Native	Shrub	-	+++		++		
<i>Ischaemum</i> sp.	鴨嘴草屬	-	Herb	-			++		
<i>Itea chinensis</i>	鼠刺	Native	Shrub/Tree	LC (IUCN)			+		
<i>Lantana camara</i>	馬纓丹	Exotic	Shrub	-	++				
<i>Leucaena leucocephala</i>	銀合歡	Exotic	Shrub/Tree	-	++				
<i>Liquidambar formosana</i>	楓香	Native	Tree	LC (IUCN)			+		

## Appendix 2 – Plant Species Recorded

Scientific Name	Chinese Name	Origin	Growth Form	Conservation and Protection Status <sup>1, 2</sup>	Mixed Woodland	Plantation	Shrubland	Watercourse	Remarks
<i>Liriope spicata</i>	山麥冬	Native	Herb	-			++		
<i>Litsea cubeba</i>	木薑子	Native	Shrub/Tree	LC (IUCN)			+		
<i>Litsea glutinosa</i>	潺槁	Native	Tree	LC (IUCN)	++		+++		
<i>Litsea rotundifolia</i> var. <i>oblongifolia</i>	豺皮樟	Native	Tree	-	++	++	++		
<i>Lophatherum gracile</i>	淡竹葉	Native	Herb	-		++			
<i>Lophostemon confertus</i>	紅膠木	Exotic	Tree	LC (IUCN)	++	++++	+		
<i>Lygodium japonicum</i>	海金沙	Native	Herb	-	+++	+++	++++		
<i>Lygodium scandens</i>	小葉海金沙	Native	Herb	-	++	++	++++		
<i>Machilus chekiangensis</i>	浙江潤楠	Native	Tree	LC (IUCN)		++	+		
<i>Macrothelypteris torresiana</i>	普通針毛蕨	Native	Herb	-			+		
<i>Maesa perlaris</i>	鯽魚膽	Native	Shrub	-			+		
<i>Mallotus paniculatus</i>	白楸	Native	Tree/Shrub	LC (IUCN)	+++	++	+++		
<i>Melastoma dodecandrum</i>	地荃	Native	Herb	LC (IUCN)			++		
<i>Melastoma malabathricum</i>	野牡丹	Native	Shrub	-		++	+++		
<i>Melastoma sanguineum</i>	毛荃	Native	Shrub	LC (IUCN)	++	++	++		
<i>Melicope pteleifolia</i>	三桠苦	Native	Shrub/Tree	LC (IUCN)		+	+		
<i>Microcos nervosa</i>	布渣葉	Native	Shrub/Tree	-	+++				
<i>Millettia nitida</i>	亮葉雞血藤	Native	Climber	LC (IUCN)			+		
<i>Millettia speciosa</i>	美麗崖豆藤	Native	Climber	-		+	+		
<i>Miscanthus floridulus</i>	五節芒	Native	Herb	-			++		
<i>Miscanthus sinensis</i>	芒	Native	Herb	-	+		+++		
<i>Morella rubra</i>	楊梅	Native	Tree	-	+		+		
<i>Morinda parvifolia</i>	雞眼藤	Native	Shrub	-	++				
<i>Morus alba</i>	桑	Native	Shrub/Tree	LC (IUCN)	+				
<i>Mucuna birdwoodiana</i>	白花油麻藤	Native	Climber	-	+				

## Appendix 2 – Plant Species Recorded

Scientific Name	Chinese Name	Origin	Growth Form	Conservation and Protection Status <sup>1, 2</sup>	Mixed Woodland	Plantation	Shrubland	Watercourse	Remarks
<i>Mussaenda erosa</i>	楠藤	Native	Shrub	-			+		
<i>Mussaenda pubescens</i>	玉葉金花	Native	Shrub	-	+		+		
<i>Osbeckia chinensis</i>	天香爐	Native	Herb	-			+		
<i>Paederia scandens</i>	雞矢藤	Native	Herb	-	+		+		
<i>Palhinhaea cernua</i>	鋪地蜈蚣	Native	Herb	-			+++		
<i>Pericampylus glaucus</i>	細圓藤	Native	Vine	-			+		
<i>Phyllanthus emblica</i>	油甘子	Native	Tree/Shrub	LC (IUCN)	+		++		
<i>Polyspora axillaris</i>	大頭茶	Native	Shrub/Tree	LC (IUCN)		+	+		
<i>Praxelis clematidea</i>	假臭草	Exotic	Herb	-			+		
<i>Psychotria asiatica</i>	山大刀	Native	Tree/Shrub	LC (IUCN)	+++		+		
<i>Psychotria serpens</i>	蔓九節	Native	Shrub	-			++		
<i>Pueraria lobata</i> var. <i>montana</i>	葛麻姆	Native	Climber	-		+			
<i>Rhaphiolepis indica</i>	車輪梅	Native	Shrub/Tree	LC (IUCN)	++		+++		
<i>Rhodomyrtus tomentosa</i>	桃金娘	Native	Shrub	LC (IUCN)	++	++	+++		
<i>Rhus chinensis</i>	鹽膚木	Native	Shrub/Tree	LC (IUCN)	+		+++		
<i>Rhus hypoleuca</i>	白背鹽膚木	Native	Tree	-	++		++		
<i>Rhus succedanea</i>	野漆樹	Native	Shrub/Tree	LC (IUCN)		+	+++		
<i>Sageretia thea</i>	雀梅藤	Native	Shrub	-	+		+		
<i>Sapium discolor</i>	山烏柏	Native	Tree	-	+		++		
<i>Sarcandra glabra</i>	草珊瑚	Native	Subshrub	-	+++				
<i>Schefflera heptaphylla</i>	鴨腳木	Native	Shrub/Tree	LC (IUCN)	++		++		
<i>Schima superba</i>	木荷	Native	Shrub/Tree	LC (IUCN)		++++			
<i>Scleria ciliaris</i>	華珍珠茅	Native	Herb	LC (IUCN)		++			
<i>Setaria</i> sp.	狗尾草屬	-	Herb	-			+		
<i>Smilax china</i>	金剛藤	Native	Climbing vine	-			++		

## Appendix 2 – Plant Species Recorded

Scientific Name	Chinese Name	Origin	Growth Form	Conservation and Protection Status <sup>1, 2</sup>	Mixed Woodland	Plantation	Shrubland	Watercourse	Remarks
<i>Stephania longa</i>	冀箕篤	Native	Vine	-			+		
<i>Sterculia lanceolata</i>	假蘋婆	Native	Tree	LC (IUCN)	++				
<i>Strophanthus divaricatus</i>	羊角拗	Native	Liana/Shrub	-		+	+		
<i>Strychnos angustiflora</i>	牛眼馬錢	Native	Liana	-	+				
<i>Symplocos cochinchinensis</i> var. <i>laurina</i>	黃牛奶樹	Native	Tree	-	+				
<i>Syzygium hancei</i>	韓氏蒲桃	Native	Shrub/Tree	LC (IUCN)			+		
<i>Syzygium jambos</i>	蒲桃	Exotic	Tree	LC (IUCN)			+		
<i>Syzygium levinei</i>	山蒲桃	Native	Shrub/Tree	-			+		
<i>Tadehagi triquetrum</i>	葫蘆茶	Native	Shrub	-	+		+		
<i>Tetradium glabrifolium</i>	棟葉吳茱萸	Native	Tree	-	+		+		
<i>Thysanolaena latifolia</i>	粽葉蘆	Native	Herb	-				++	
<i>Trema tomentosa</i>	山黃麻	Native	Shrub/Tree	LC (IUCN)			+		
<i>Tylophora ovata</i>	娃兒藤	Native	Liana	-	++		++		
<i>Urena lobata</i>	尙梵天花	Native	Shrub	LC (IUCN)			++		
<i>Uvaria macrophylla</i>	紫玉盤	Native	Shrub	-	+++				
<i>Viburnum odoratissimum</i>	珊瑚樹	Native	Shrub/Tree	LC (IUCN)			+		
<i>Wedelia trilobata</i>	三裂葉鳶尾菊	Exotic	Herb	-			+		
<i>Zanthoxylum avicennae</i>	簕欖	Native	Tree	LC (IUCN)	++	++	+++		
<i>Zanthoxylum nitidum</i>	兩面針	Native	Shrub	LC (IUCN)	+				
Total no. of species recorded					74	37	93	10	

Notes:

1. Conservation and Protection Status refers to the literature below.

- (a) Protected under the Forestry Regulations under Forests and Countryside Ordinance (Cap. 96)
- (b) Protected under the Protection of Endangered Species of Animals and Plants Ordinance (Cap. 586)

## Appendix 2 – Plant Species Recorded

- (c) Agriculture, Fisheries and Conservation Department (AFCD). 2003. Rare and Precious Plants of Hong Kong. Agriculture, Fisheries and Conservation Department, HKSAR, Hong Kong. 234pp: VU=Vulnerable
- (d) Corlett, et al. 2000. Hong Kong Vascular Plants. Memoirs of the Hong Kong Natural History Society, No. 23. 1-157
- (e) International Union for Conservation of Nature (IUCN). 2025. The IUCN Red List of Threatened Species (2025-1). Conservation Status: DD= Data Deficient; LC = Least Concern; NT = Near Threatened
- (f) Qin, et al. 2017. Threatened Species List of China's Higher Plants (TSLCHP). Biodiversity Science, 25(7), 696-744. Conservation Status: VU = Vulnerable

2. Species of conservation importance is in **bold** type.

3. The recorded *Dalbergia benthamii* is a woody climber species and not relevant to timber exploitation and therefore not considered as a species of conservation importance locally.



## Appendix 3 – Fauna Species Recorded

## Appendix 3 – Fauna Species Recorded

**Table 1 Mammal species recorded during surveys from August to October 2024**

Species	Conservation and Protection Status <sup>1</sup>	Local Distribution <sup>2</sup>	Mixed Woodland	Shrubland
Indochinese Forest Rat <i>Rattus andamanensis</i>	-	Widely distributed in countryside areas throughout Hong Kong	1	
Eurasian Wild Pig <i>Sus scrofa</i>	-	Very widely distributed in countryside areas throughout Hong Kong		1
<b>Total number of species recorded</b>		<b>2</b>	<b>1</b>	<b>1</b>

**Notes:**

1. Conservation and protection status refers to Fellowes et al. (2002), Red List of China's Vertebrates (Jiang et al. 2016), IUCN (2024), CITES (2024), Cap. 170 and Cap. 586.
2. Local distribution follows HKBIH (AFCD 2024).

## Appendix 3 – Fauna Species Recorded

Table 2 Bird species recorded during surveys from August to October 2024

Species	Principal Status <sup>1</sup>	Conservation and Protection Status <sup>2,3</sup>	Mixed Woodland	Shrubland	Plantation	Watercourse	In Flight
House Swift <i>Apus nipalensis</i>	R,SpM	-					10
Greater Coucal <i>Centropus sinensis</i>	R	-	2				
Black Kite <i>Milvus migrans</i>	W,R	(RC); CITES(II); NKPWA(II); Cap.586					1
Long-tailed shrike <i>Lanius schach</i>	R	-			1		
Black Drongo <i>Dicrurus macrocercus</i>	M,Su	-		2			
Large-billed Crow <i>Corvus macrorhynchos</i>	R	-					4
Japanese Tit <i>Parus minor</i>	-	-	3		1		
Chinese Bulbul <i>Pycnonotus sinensis</i>	R	-	6				
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	R	-	5	4		3	
Barn Swallow <i>Hirundo rustica</i>	SpM,Su	-					6
Yellow-bellied Prinia <i>Prinia flaviventris</i>	R	-	1	2	1		

### Appendix 3 – Fauna Species Recorded

Species	Principal Status <sup>1</sup>	Conservation and Protection Status <sup>2,3</sup>	Mixed Woodland	Shrubland	Plantation	Watercourse	In Flight
Plain Prinia <i>Prinia inornata</i>	R	-	2				
Common Tailorbird <i>Orthotomus sutorius</i>	R	-	2	2	1		
Swinhoe's White-eye <i>Zosterops simplex</i>	R, W*	-	2	2			8
Oriental Magpie Robin <i>Copsychus saularis</i>	R	-			1		
Asian Brown Flycatcher <i>Muscicapa dauurica</i>	M,W	-			1		
Eurasian Tree Sparrow <i>Passer montanus</i>	R	-				50	
White-rumped Munia <i>Lonchura striata</i>	R	-	8				
White Wagtail <i>Motacilla alba</i>	W,R	-				1	
<b>Total number of species recorded</b>		<b>19</b>	<b>9</b>	<b>5</b>	<b>6</b>	<b>3</b>	<b>5</b>

#### Notes:

- Principal status refers to Carey et al. (2001): R = Resident; W = Winter Visitor; S = Summer Visitor; M = Migrant; A = Autumn; Sp = Spring; P = Present all year, exact composition unknown. A hyphen indicates that the species has been recorded too infrequently to allow an assessment of its status to be made. Asterisk \* refers to limited records from the season(s).
- Conservation and protection status refers to Fellowes et al. (2002), Red List of China's Vertebrates (Jiang et al. 2016), IUCN (2024), CITES (2024), Cap. 170 and Cap. 586.
  - Conservation status by Fellowes et al. (2002): RC = Regional Concern. Letters in parentheses indicate that the assessment is on the basis of restrictedness in breeding and/or roosting sites rather than in general occurrence.
  - Protection status by CITES (2023): II = Listed in Appendix II of CITES.
  - Protection status by NKPWA (2021): II = Class II of NKPWA.
  - Cap. 586 = Protection of Endangered Species of Animals and Plants Ordinance.
- Species of conservation importance is in **bold** type.

## Appendix 3 – Fauna Species Recorded

**Table 3 Amphibian species recorded during surveys from August to October 2024**

Species	Conservation and Protection Status <sup>1</sup>	Local Distribution <sup>2</sup>	Mixed Woodland	Plantation	Watercourse
Asiatic Painted Frog <i>Kaloula pulchra</i>	-	Widely distributed in Hong Kong	1	2	
Paddy Frog <i>Fejervarya multistriata</i>	-	Widely distributed throughout Hong Kong			1
Günther's Frog <i>Sylvirana guentheri</i>	-	Widely distributed throughout Hong Kong			2
Brown Tree Frog <i>Polypedates megacephalus</i>	-	Widely distributed throughout Hong Kong	1	40	
Greenhouse Frog <i>Eleutherodactylus planirostris</i>	-	Widely distributed throughout Hong Kong	15	13	1
<b>Total number of species recorded</b>		<b>5</b>	<b>3</b>	<b>3</b>	<b>3</b>

**Notes:**

1. Conservation and protection status refers to Fellowes et al. (2002), Red List of China's Vertebrates (Jiang et al. 2016), IUCN (2024), CITES (2024), Cap. 170 and Cap. 586.
2. Local distribution follows HKBIH (AFCD 2024).

## Appendix 3 – Fauna Species Recorded

Table 4 Reptile species recorded during surveys from August to October 2024

Species	Conservation and Protection Status <sup>1</sup>	Local Distribution <sup>2</sup>	Mixed Woodland	Shrubland	Plantation
Changeable Lizard <i>Calotes versicolor</i>	-	Widely distributed throughout Hong Kong.	1	1	
Chinese Gecko <i>Gekko chinensis</i>	-	Widely distributed throughout Hong Kong.	1		
Bowring's Gecko <i>Hemidactylus bowringii</i>	-	Distributed throughout Hong Kong.			3
<b>Total number of species recorded</b>		<b>3</b>	<b>2</b>	<b>1</b>	<b>1</b>

**Notes:**

1. Conservation and protection status refers to Fellowes et al. (2002), Red List of China's Vertebrates (Jiang et al. 2016), IUCN (2024), CITES (2024), Cap. 170 and Cap. 586.
2. Local distribution follows HKBIH (AFCD 2024).

## Appendix 3 – Fauna Species Recorded

Table 5 Butterfly species recorded during surveys from August to October 2024

Species	Conservation and Protection Status <sup>1,4</sup>	Local Distribution <sup>2</sup>	Status in HK <sup>3</sup>	Mixed Woodland	Shrubland	Plantation	Watercourse	Remarks
Bush Hopper <i>Ampittia dioscorides</i>	-	Widely distributed throughout Hong Kong	Uncommon	1				
Forest Hopper <i>Astictopterus jama</i>	-	Widely distributed throughout Hong Kong	Common	2	2			
Formosan Swift <i>Borbo cinnara</i>	-	Widely distributed throughout Hong Kong	Common			1		
Restricted Demon <i>Notocrypta curvifascia</i>	-	Widely distributed throughout Hong Kong	Uncommon			1		
Contiguous Swift <i>Polytremis lubricans</i>	-	Widely distributed throughout Hong Kong	Common			1		
<b>Malayan</b> <i>Megisba malaya</i>	<b>LC</b>	<b>North Lantau Island</b>	<b>Very Rare</b>		<b>1</b>			
Transparent 6-line Blue <i>Nacaduba kurava</i>	-	Widely distributed throughout Hong Kong	Common	6				
Plum Judy <i>Abisara echerius</i>	-	Widely distributed throughout Hong Kong	Very Common	4	5	6		
Large Faun <i>Faunis eumeus</i>	-	Widely distributed throughout Hong Kong	Common			1		
Tawny Rajah <i>Charaxes bernardus</i>	-	Widely distributed throughout Hong Kong	Common			1		



### Appendix 3 – Fauna Species Recorded

Species	Conservation and Protection Status <sup>1,4</sup>	Local Distribution <sup>2</sup>	Status in HK <sup>3</sup>	Mixed Woodland	Shrubland	Plantation	Watercourse	Remarks
Shan Nawab <i>Polyura nepenthes</i>	-	Widely distributed throughout Hong Kong	Uncommon	1				
Blue-spotted Crow <i>Euploea midamus</i>	-	Widely distributed throughout Hong Kong	Very Common			1		
Glassy Tiger <i>Parantica aglea</i>	-	Widely distributed throughout Hong Kong	Common			1		
Indian Fritillary <i>Argyreus hyperbicus</i>	-	Widely distributed throughout Hong Kong	Common		1			
Angled Castor <i>Ariadne ariadne</i>	-	Widely distributed throughout Hong Kong	Common	1				
Color Sergeant <i>Athyma nefte</i>	-	Widely distributed throughout Hong Kong	Common	1				
Staff Sergeant <i>Athyma selenophora</i>	-	Widely distributed throughout Hong Kong	Common		1	1		
Rustic <i>Cupha erymanthis</i>	-	Widely distributed throughout Hong Kong	Very Common				1	
Common Mapwing <i>Cyrestis thyodamas</i>	-	Widely distributed throughout Hong Kong	Common		1			
Great Eggfly <i>Hypolimnas bolina</i>	-	Widely distributed throughout Hong Kong	Common	2	1	1	1	
Common Archduke <i>Lexias pardalis</i>	-	Widely distributed throughout Hong Kong	Suspected Species			3		

### Appendix 3 – Fauna Species Recorded

Species	Conservation and Protection Status <sup>1,4</sup>	Local Distribution <sup>2</sup>	Status in HK <sup>3</sup>	Mixed Woodland	Shrubland	Plantation	Watercourse	Remarks
Common Sailer <i>Neptis hylas</i>	-	Widely distributed throughout Hong Kong	Very Common			1		
Short-banded Sailer <i>Phaedyra columella</i>	-	Widely distributed throughout Hong Kong	Common		1			
Dark Evening Brown <i>Melanitis phedima</i>	-	Widely distributed throughout Hong Kong	Uncommon			1		
Dark-Brand Bush Brown <i>Mycalesis mineus</i>	-	Widely distributed throughout Hong Kong	Very Common			2		
Common Five-ring <i>Ypthima baldus</i>	-	Widely distributed throughout Hong Kong	Very Common	1	3			
Tailed Jay <i>Graphium agamemnon</i>	-	Widely distributed throughout Hong Kong	Common	1	1			
Common Jay <i>Graphium doson</i>	-	Widely distributed throughout Hong Kong	Common		1			
Common Bluebottle <i>Graphium sarpedon</i>	-	Widely distributed throughout Hong Kong	Very Common	3	2	1		
Chinese Peacock <i>Papilio bianor</i>	-	Widely distributed throughout Hong Kong	Common		1			
Common Mime <i>Chilasa clytia</i>	-	Widely distributed throughout Hong Kong	Common		2			
Red Helen <i>Papilio helenus</i>	-	Widely distributed throughout Hong Kong	Very Common	5	1	4		

### Appendix 3 – Fauna Species Recorded

Species	Conservation and Protection Status <sup>1,4</sup>	Local Distribution <sup>2</sup>	Status in HK <sup>3</sup>	Mixed Woodland	Shrubland	Plantation	Watercourse	Remarks
Great Mormon <i>Papilio memnon</i>	-	Widely distributed throughout Hong Kong	Very Common			1		
Paris Peacock <i>Papilio paris</i>	-	Widely distributed throughout Hong Kong	Very Common			2		
Spangle <i>Papilio protenor</i>	-	Widely distributed throughout Hong Kong	Very Common			1		
Common Grass Yellow <i>Eurema hecabe</i>	-	Widely distributed throughout Hong Kong	Very Common			3		
<b>Forget-me-not</b> <b><i>Catochrysops strabo</i></b>	-	<b>Pui O, Tai Po Kau, Fung Yuen, Shing Mun, Sha Lo Wan.</b>	<b>Very Rare</b>			1		<b>Recorded outside 100m Assessment Area</b>
<b>Metallic Cerulean</b> <b><i>Jamides alecto</i></b>	-	<b>Victoria Peak, Fung Yuen, Chuen Lung, Mui Wo</b>	<b>Very Rare</b>		2			
<b>Tiny Grass Blue</b> <b><i>Zizula hylax</i></b>	-	<b>Lung Kwu Tan, Fung Yuen, Sha Lo Wan</b>	<b>Very Rare</b>			5		
<b>Total number of species recorded</b>			<b>39</b>	<b>12</b>	<b>16</b>	<b>22</b>	<b>2</b>	

#### Notes:

- Conservation and protection status refers to Fellowes et al. (2002), IUCN (2024), CITES (2024), Cap. 170 and Cap. 586.
  - Conservation status by Fellowes et al. (2002): LC = Local Concern.
- Local distribution follows HKBIH (AFCD 2024).
- Status in Hong Kong: Chan, A., Cheung, J., Sze, P., Wong, A., Wong, E. and Yau, E. 2011. A Review of the Local Restrictedness of Hong Kong Butterflies. Hong Kong Biodiversity 21: 1-12
- Species of conservation importance is in **bold** type.

## Appendix 3 – Fauna Species Recorded

Table 6 Dragonfly species recorded during surveys from August to October 2024

Species	Conservation and Protection Status <sup>1</sup>	Local Distribution <sup>2</sup>	Status in HK <sup>3</sup>	Mixed Woodland	Shrubland	Plantation	Watercourse
Black-banded Gossamerwing <i>Euphaea decorata</i>	-	Widely distributed in all streams of Hong Kong	Abundant			2	3
Orange-tailed Sprite <i>Ceriatagrion auranticum</i>	-	Widely distributed in weedy ponds, marshes, abandoned fields or grasslands adjacent to waters	Abundant			2	14
Yellow Featherlegs <i>Copera marginipes</i>	-	Widely distributed in lowland streams, ditches, and weedy margins of pond throughout Hong Kong.	Abundant			3	
Red-faced Skimmer <i>Orthetrum chrysis</i>	-	Widely distributed in pools and marshy areas adjacent to flowing streams throughout Hong Kong	Abundant			1	2
Common Blue Skimmer <i>Orthetrum glaucum</i>	-	Widely distributed in streams, conduits, drainage channels, seepages and road gutters throughout Hong Kong	Abundant	4	2	1	6
Marsh Skimmer <i>Orthetrum luzonicum</i>	-	Widely distributed in abandoned paddies, marshy swampy and boggy locations	Abundant		2		1
Common Red Skimmer <i>Orthetrum pruinosum</i>	-	Widely distributed in slow streams, ponds, rain puddles and irrigation conduits	Abundant			2	7

### Appendix 3 – Fauna Species Recorded

Species	Conservation and Protection Status <sup>1</sup>	Local Distribution <sup>2</sup>	Status in HK <sup>3</sup>	Mixed Woodland	Shrubland	Plantation	Watercourse
Lesser Blue Skimmer <i>Orthetrum triangulare</i>	-	Widely distributed in ponds, marshes and slow-flowing streams adjacent to woodlands throughout Hong Kong.	Common			1	
Wandering Glider <i>Pantala flavescens</i>	-	Widely distributed all over Hong Kong	Abundant	30	15	30	3
Indigo Dropwing <i>Trithemis festiva</i>	-	Favours sluggish sections of streams with a strong current or the small rock pools in of mountain streams. Widespread in Hong Kong	Abundant	3			
Total number of species recorded			10	3	3	8	7

**Notes:**

1. Conservation and protection status refers to Fellowes et al. (2002), (Jiang et al. 2016), IUCN (2024), CITES (2024), Cap. 170 and Cap. 586.
2. Local distribution follows HKBIH (AFCD 2024).
3. Status in Hong Kong: Wilson, K.D.P. 2004. Field Guide to the Dragonflies of Hong Kong. Agriculture, Fisheries and Conservation Department.

## Appendix 3 – Fauna Species Recorded

Table 7 Aquatic Invertebrate species recorded during surveys from August to October 2024

Species	Conservation and Protection Status <sup>1,3</sup>	Local Distribution <sup>2</sup>	Recorded Location	Remarks
Black-banded Gossamerwing (Larva) <i>Euphaea decorata</i>	-	Widely distributed in all streams throughout Hong Kong	Watercourse at Proposed North Portal	
Freshwater Shrimp <i>Caridina cantonensis</i>	-	-	Watercourse at Proposed North Portal	
Unidentified Freshwater Prawn <i>Macrobrachium</i> sp.	-	-	Watercourse at Proposed North Portal	
Apple Snail <i>Pomacea canaliculata</i>	-	-	Watercourse at Proposed North Portal; watercourse at Proposed South Portal	
<b>South China Grappletail (Larva)</b> <b><i>Heliogomphus scorio</i></b>	<b>LC</b>	<b>Widely distributed in fast-flowing woodland streams throughout the New Territories</b>	<b>Watercourse at beyond 100m north the proposed GI works</b>	<b>Recorded outside 100m Assessment Area</b>

**Notes:**

- Conservation and protection status refers to Fellowes et al. (2002), IUCN (2024), CITES (2024), Cap. 170 and Cap. 586.
  - Conservation status by Fellowes et al. (2002): LC = Local Concern.
- Local distribution follows HKBIH (AFCD 2024).
- Species of conservation importance is in **bold** type.

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