4-5-1

MASTERPLAN LIMITED
Planning and Development Advisors
領賢規劃顧問有限公司

Your Ref: Y/I-DB/2
Town Planning Board
15/F, North Point Government Offices
333 Java Road, North Point
Hong Kong

7 April 2017

By Hand

Dear Sir,

Section 12A Application No.Y/I-DB/2
For rezoning the permissible use from staff quarters to permit flats at Area 6f, Discovery Bay
Response to Comments (5)

I refer to the abovementioned application which Town Planning Board has approved Planning Department's request to defer its consideration until 28 April 2017, and the departmental comments on the application made available by District Planning Office on 7 and 9 March 2017.

In response to the departmental comments, please find the enclosure and the clarification below for your consideration. It includes a new Geotechnical Planning Review Report in response to CEDD's comment.

Concept Plan

The Area 6f Concept Plan does not include any helipad. The helipad has been indicated under a separate application No.Y/I-DB/3 at Area 10b, which is withdrawn and no further consideration is required.

Water supplies and sewerage treatment facilities

We clarify the proposed approach for the Concept Plan at Area 6f. The applicant is ready and willing to make their own provision for water supply and sewage treatment arising from the Area 6f development where necessary. There is suitable existing land use zoning for Water Treatment Works, and space within Area 6f for Sewerage Treatment Plant. Technical assessments reports have been submitted to demonstrate the adequacy of this approach in terms of the capacity and the capability to meet the relevant standards. The applicant is familiar and experienced in this approach, which has been the case prior to the commissioning and connection to Siu Ho Wan public facilities.

This information clarifies and supplements the application, and does not constitute a material change as identified in Town Planning Board's Guideline No.32. It is consistent with the Guideline.

Yours faithfully,

Cynthia Chan
For and on behalf of
Masterplan Limited
Enc
cc. DPO/SKI (Attn: Helena Pang) Email
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Section 12A Application No.Y/I-DB/2 for rezoning the permissible use from staff quarters to flats at Area 6f
Applicant's response to the departmental comments made available by District Planning Office on 7 March 2017

H(GEO), CEDD's comment	Applicant's response
It is noted that there are public concerns related to the stability of the slopes adjacent to the proposed development. We would like to reiterate that the applicant is required to submit a Geotechnical Planning Review Report (GPRR) in support of the application and to assess the geotechnical feasibility of the proposed development. It is noted that the applicant proposes submitting the GPRR subsequent to approval of this application and prior to implementation of the development. However, the GPRR shall be submitted in support of the planning application according to the GEO Advice Note of Application under Town Planning Ordinance (Cap. 131). Please note that all building works under the proposed private development shall comply with the Buildings Ordinance demonstrating that they would not adversely affect the stability of any adjoining building, structure, land, street or services.	Accordingly, a GPRR has been prepared for the proposal, provided in **Appendix A**. Noted.
CTP/UD&L, PlanD's comment	**Applicant's response**
Please note that under the 2nd FI there was an additional 98 nos. of compensatory trees proposed in the Landscape Design proposal (Rev. B) comparing to the Landscape Design proposal (Rev. 0). The revised proposal of 148 nos. compensatory trees was not clearly indicated in Fig B1 Landscape Design Plan. An insufficient planting space was also noted on the Landscape Master Plan (Figure B.1). We have doubt that if the development site could accommodate such large number of compensatory trees. The applicant should review critically the total number of compensatory tree planting within the site. The impact on existing trees is based on the assumption that no slope work is necessary. As the western slopes are quite steep, should the risk factor changed due to residential development and render slope work necessary, the scope of works and impact on trees should be re-visited.	The 148 no. compensatory trees were proposed for the total aggregate girth of the affected 118 no. trees. In view of this comment, a more detail study has been carried out as shown in **Appendix B**. It shows that about 125 no. compensatory trees definitely fit into the site with good separation distance. Detail design will possibly accommodate more compensatory trees at the site. The 125 no. compensatory trees are more than the 118 no. affected trees (and therefore achieve a greater than 1:1 compensatory ratio by number). Given the vegetated slopes within the site that will be retained, and the site context with large areas of existing woodland outside the site boundary, the 125 no. compensatory trees proposed are considered reasonable and adequate. Noted. The impact will be re-visited at building plans preparation stage.
DSD's comment	**Applicant's response**
Please remind the applicants to check and ensure the proposed sewage works and their downstream sewage system shall have adequate capacity and be in good conditions to accommodate the sewage collected from the application site and its upstream catchments. The applicants and the successive owners of the proposed development shall effect any subsequent upgrading of the proposed works and the downstream sewage system whenever necessary.	The sewage flow from the proposed development will be treated in proposed new private Sewage Treatment Works (STW), which is separate from the existing sewerage system, so the proposed development at Area 6f will have no sewerage impact to the existing Discovery Bay sewerage system. The contingency measure of overflowing sewage from the proposed private STW to the existing Discovery Bay Sewage Pumping Station (SPS) No. 1 during emergency situation when the STW fails, was also proposed in the technical assessment report. Capacity check of the existing downstream sewerage system has been carried out and it is found that the downstream sewerage system are adequate to accommodate the sewage collected from

<table>
<tr><td></td><td>the application site under emergency situation and its upstream sewage catchments. Please find relevant revised paragraph 5.7.1.3 of the Environmental Study in Appendix C for details.</td></tr>
<tr><td>Please also remind the applicants to furnish us their detailed connection proposal in design stage.</td><td>Noted. Detailed connection proposal will be provided in design stage.</td></tr>
<tr><td>WSD's comment</td><td>Applicant's response</td></tr>
<tr><td>Referring to the Developer's 4th Further Information Submission, there is no drawing showing the Developer's proposed alternative water supply arrangement that involves a private water treatment works and a private fresh water supply network for supplying Area 6f and Area 10b that should be segregated from the existing network supplying WSD fresh water.

Please also note that our previous comments are still valid.</td><td>Please find Figure 5 and Figure 6 in Appendix D showing details of the proposed water supply "Option 2", which involves the provision of a private fresh water supply system to serve Area 6f. Under this water supply "Option 2", raw water will be extracted from the Discovery Bay Reservoir to a new private water treatment works. The treated water will then be transferred via a new pumping station to a nearby new Service Reservoir No. 3. A new fresh water distribution main will be laid from the service reservoir to provide fresh water supply to Area 6f. The entire new private water supply network, comprising water treatment works, pumping station, service reservoir, transmission and distribution mains will be an exclusive network to supply Area 6f only and will be totally segregated from the existing network supplied by WSD's fresh water.

For ease of reference, a summary of the two water supply options (Option 1 and Option 2) is as follows. Please be confirmed that the applicant has no preference, and can adopt either water supply option 1 or option 2 for the Area 6f development.
<table>
<tr><th>Water Supply Option</th><th>Fresh Water Supply</th><th>Flushing Water Supply</th><th>Figures</th></tr>
<tr><td>1</td><td>Supply source: Siu Ho Wan Water Treatment Works
Supply network: new distribution main that tee-off from existing DB private fresh water distribution main</td><td>Supply source: Discovery Bay Reservoir</td><td>4</td></tr>
<tr><td>2</td><td>Supply source: Discovery Bay Private Water Supply (Discovery Bay Reservoir)
Supply network: new water treatment works, pumping station, service reservoir, transmission and distribution main</td><td>Same as Option 1</td><td>5 and 6</td></tr>
</table>
Please find relevant revised text of the Executive Summary and section 6.6 in Appendix D to clearly present the above two water supply options for fresh water and flushing water supply to the proposed development.</td></tr>
</table>

In view of the above, our revised responses to your previous comments are as follows:

WSD's previous comments:	*Response*
If water is supplied for the additional residents by Discovery Bay's own water treatment works and discharged to the existing water supply networks (i.e. their treated water mixed with WSD's treated water), WSD has reservation to the proposal. As WSD has no authority and responsibility to monitor their water treatment works and the quality of the treated water, it would be quite difficult to identify and determine the responsibility of which party's fault if there is any contamination of water affecting the consumers. If the option is adopted, the new water supply network and the existing one must be segregated to avoid cross-contamination.	Additional information on the proposed private water supply system exclusively for Area 6f development (fresh water supply option 2) are provided in Figure 5, Figure 6 and the revised report text in **Appendix D**. This proposed private water supply system is proposed to be segregated from existing water supply system to avoid cross-contamination problem. This private fresh water supply system will only be used and clearly demarcated for Area 6f and will not affect other existing fresh water supply system in Discovery Bay that is supplied by WSD source. In the remote event that there is a fault in the fresh water supply network, the fault can easily be identified based on the location of customers. The private water supply system will be provided with quality monitoring and control instrumentation to ensure that the treated water quality of the new private system will fully conform to the Guidelines for Drinking-water Quality recommended by the World Health Organization, which is the water quality standard currently adopted by the WSD fresh water supply system.
It is noted that the general planning intention of the approved OZP is for a total population of 25,000 persons for the Discovery Bay development, and infrastructural capacities were considerations. Whilst the applicant has proposed an alternative water supply arrangement to provide private water supply by using the raw water stored in	See response above.

	the private Discovery bay Reservoir and building a private water treatment works to make a private water supply exclusively to the additional 4,000 persons in their rezoning areas, we have reservation on the rationality of this arrangement in the context of public perception, water quality control, etc. considering that the existing and planned residents (25,000) in Discovery bay are provided with WSDs fresh water supply. The applicant is required to submit further information on this alternative water supply arrangement for consideration.	
	It is noted that this s12A application involving Area 6f is related to another s12A application involving Area 10b. This application for Area 6f proposes an addition of 476 flats (1,190 residents), while the application for Area 10b proposes an addition of 1125 flats (2,813 residents). Apparently, the applicant has adopted a figure of 2.5 persons per flat. Nevertheless, according to DLO's letter dated 11.9.2014 to HKRCL commenting on the proposed Discovery Bay Master Plan 7.0B, it was stated that "based on the latest information of 2011 Census, the average household size is 2.7 in Discovery Bay. The applicant should justify the assumption of 2.5 persons per flat in this case. This issue needs to be addressed, as the household size affects the population figure and thus the estimation of demands on infrastructure. If the average household size is 2.7, even the 10,000 flats previously proposed in the draft Discovery Bay Master Plan 7.0E (developer's another submission) will mean a population of 27,000, which will already exceed the maximum population of 25,000 in the Discovery Bay OZP.	The 2.5 average persons per unit is derived from City Management's latest record (property management company of all Discovery Bay residential units) and the Working Group on Population Distribution Projections for 2013-2021. It is a more update and comprehensive survey than the 2011 Census survey conducted for Discovery Bay as it covered all the residential units at Discovery Bay which is therefore considered more accurate than the 2011 Census data at Discovery Bay. Planning Department has not raise any objection on this assumption

	It should be noted that the existing water supply system is based on a maximum population of 25000 in Discovery Bay, which is the population ceiling in the approved OZP in force. In Table 6.6 of the applicant's Planning Statement (Jan 2016), it is obvious that the applicant's intention is to exceed the 25,000 population by an addition of 403 persons (1,190 in this application + 2,813 in another application), and the water demand by an addition of 1722 cu m./day (512+1210). It has come to our attention that the total number of housing units permissible under MP 6.0E7h(a) should be 8,735 instead of 8,731. The error is minor and does not affect our assessment.	
AFCD's comment	**Applicant's response**	
We noted the R to C in the 4th F.I.. The applicant is reminded to provide elaboration with regard to their response in the relevant section of the Environmental Study Report. The applicant is suggested to consult relevant fishermen and/or mariculturists to gauge their views on the proposed development application at an early stage.	Noted. Please find relevant pages of the Environmental Assessment elaborating this regard in **Appendix E.** Noted. As there is no adverse water quality impact anticipated due to the discharge from the proposed STW in Area 6f, fisheries resources are not likely to be impacted The planning application has been published on several occasions on the first lodgment and the subsequent further information submission that constitute suitable consultation. In addition, on approval of the planning application, the OZP amendment will again be published for representations for Town Planning Board's consideration. However, relevant fishermen and/or mariculturists will be consulted, subsequent to approval of this planning application. Nevertheless, as suggested by EPD, constant liaison will still be maintained with the relevant department in case the possibility of conveying the additional sewage generated from the proposed development to the existing government sewage treatment facilities becomes feasible in the future, to avoid on-site sewage treatment works	

EPD's comment	Applicant's response
Water quality The applicant conducted a quantitative assessment to address the potential water quality impact arising from the proposed sewage treatment works (STW) to the water sensitive receivers during operational phase. The assessment results indicated an exceedance of TIN. As such, the applicant should explore and exhaust all practicable mitigation measures to further reduce the pollution loading on TIN level to the surrounding receiving water body, such as adoption of more advanced treatment technology, review the discharge location, continued to liaise with department concerned to convey the additional sewage generated from the development to the existing facilities, etc. Not until the applicant has demonstrated that all practicable mitigation measures are exhausted, we have reservation on the acceptability of the proposed development from water quality assessment point of view.	A nitrogen removal progress will be included in the proposed sewage treatment plant to reduce the TIN discharge concentration to 10mg/L. Nevertheless, constant liaison will still be maintained with the relevant department in case the possibility of conveying the additional sewage generated from the proposed development to the existing government sewage treatment facilities becomes feasible in the future.
Air quality The applicant clarified that the STW (with design capacity of around 440 cu.m per day) for Area 6f will be fully enclosed and installed with deodourizing unit of 99% removal efficiency with sufficient buffer distance between the exhaust of the deodourizing unit and air sensitive receivers (ASRs). The detailed requirement of the deodourizing unit and the location of the exhaust will be determined during the detailed design stage. We consider that the recommended control measures can adequately control the odour emissions from the STW with acceptable residual odour impact to the surrounding ASRs by detailed engineering design, thus we have no adverse comment from air quality planning point of view.	Noted EPD's no adverse comment from air quality planning point of view.
Nevertheless, please advise the applicant to consider adopting deodourizing unit with higher removal efficiency, say 99.5% or even higher, which has been proven to be technically achievable in the market, and locate the exhaust as far away from the ASRs as practicable, so as to further avoid any potential odour nuisance.	Noted, deodourizing unit with higher removal efficiency will be provided.
Besides, we understand the applicant has lately proposed to locate a helipad in an area within 400m of Area 6f under another application no. Y/I-DB/3 for Area 10b. According to the HKPSG, a helipad is considered as a noise emission land use/activity that "likely to cause significant concern". The proposed helipad, however, was not originally included in the application no. Y/I-DB/3, and an environmental assessment for such proposal has not been provided in that application yet. Please seek clarification from the applicant whether the environmental acceptability of the proposed helipad will be addressed in that application Y/I-DB/3 or in this application.	The helipad has been identified as a result of the removal from its existing location in the proposed Concept Plan for Area 10b under Application No.Y/I-DB/3 which is withdrawn. No further consideration is required.

FSD's comment	Applicant's response
The applicant should clarify whether an access in the form of emergency vehicular access (EVA) would be provided between Parkvale Drive and the internal EVA within proposed site. The proposed EVA shall comply with Section 6, Part D of the Code of Practice for Fire Safety in Buildings 2011 which is administered by Buildings Department. Even if the internal access within proposed site complies with EVA requirement, it will be useless without an EVA connecting to it and hence would be considered as undesirable from operational point of view. As the provision of EVA is under ambit of Buildings Department, you may also wish to consult them in this regard.	The applicant confirms that an access in the form of emergency vehicular access (EVA) will be provided between Parkvale Drive and the internal EVA within proposed site. The proposed EVA will comply with the requirements of the relevant Code of Practice issued and administered by the Buildings Department.
DLO/Is, LandsD's comment	**Applicant's response**
i. The proposed residential development involves formation of new access road connecting to Parkvale Drive and this would cut and extinguish part of the existing public hiking trail. The applicant shall revise its scheme to avoid affecting the existing public hiking trail.	The proposed new access road connecting Parkvale Drive and Area 6f will cross the existing hiking trail. Should this be a concern, the portion of hiking trail at issue, about 30metres in length, may be diverted as shown in **Appendix F.**
ii. The revised alignment of the sewer main in the present submission accords with our tenancy records, but minor discrepancy is still found in the alignment of the water main. The applicant shall further review its alignment.	Please find revised Figure 3 for the revised sewer alignment in **Appendix G**.
iii. Regarding the applicant's response in para. 6 and 7 in Page 4 of the R-to-C table, there is no direct submission from the applicant in relation to the subject rezoning application. The statement on Page 4 of the R-to-C table that HKR has made direct submission to this office on 3.8.2016 concerning the application is incorrect.	The separate direct submission refers to HKR's letter to DLO dated 3 Aug 2016. It is a reply in letter to DLO's query on undivided shares via their letter dated 20 July 2016 [ref. (53) in LD/DLO/IS 98/61V (M.P.6) Pt.10]. In spite of not being titled in relation to this rezoning application, the reply in letter should be relevant for consideration.
The applicant is required to substantiate its right and capacity under the Town Planning Ordinance to develop the site.	The applicant has had correspondences with Town Planning Board establishing the ownership of the site.
Should the Town Planning Board approve the re-zoning application, as mentioned in my earlier memo dated 26.4.2016, the applicant will have to apply to Lands D for approval to amend the MP, and amongst others, prove that they are the legal owner of the application site and have the capacity to execute the approval letter with the Government.	Noted.
iv. Besides, it is noted that the applicant has wrongly quoted the total number of housing units permissible under MP 6.0E7h(a) which shall be 8,735 instead of 8,731 in its response to WSD.	Noted and rectified in the response to WSD above.

Appendix A

Geotechnical Planning Review Report

Hong Kong Resort Company Limited

Proposed Residential Development at Area 6F, Discovery Bay

Geotechnical Planning Review Report

28 February 2017

WSP | PARSONS BRINCKERHOFF

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Executive Summary

This Geotechnical Planning Review Report presents the assessment of the geotechnical feasibility of the proposed development at Area 6f Discovery Bay, Lantau Island, in support of Section 12A Application for flats.

Based on the preliminary findings, the foundation, site formation and ELS schemes for the proposed development is considered to be geotechnical feasible to construct and there is no adverse impact to the nearby features.

The followings are the recommendations of the foundation, site formation and ELS works for the proposed residential development:-

- Shallow footing on rock and socketed H-pile foundation system is considered viable for the proposed medium-rise residential buildings.
- The proposed site formation works mainly comprise the formation of building platform at level of +55.0mPD by 1:2 fill slope and retaining wall. Permanent cut slopes with soil nails are also required for the construction of access road and the northern end of the building platform.
- Additional ground investigation works shall be carried out for detailed stability assessment on 9 nos. feature, namely Feature Nos. 10SW-B/C194, 10SW-B/C195, 10SW-B/C196, 10SW-B/C197, 10SW-B/C198, 10SW-B/C207, 10SW-B/C208, 10SW-B/C218, 10SW-B/C219 and the 2 nos. natural terrain located downhill to the proposed development, subsequent to Section 12A rezoning application and prior to commencement of works at the site. Slope upgrading works (if any) for the slopes located downhill to the proposed development shall be carried out by means of soil nailings. On the other hand, for the slopes that are uphill to the proposed development, the sub-standard slopes (if any) can either be stabilized by soil nails or carry out preventive measures such as the construction of barrier wall along the slope toe.
- The natural terrains that overlooked the site at the west meets the "Alert Criteria" as stipulated in GEO Report No. 138. Hence, a NTHS is required to be carried out to study the hazards and distinguish any mitigation measures required subsequent to Section 12A rezoning application and prior to commencement of works at the site.
- Local temporary open cut excavation will be required for the construction of pile caps and footings.

1. INTRODUCTION

WSP Hong Kong Limited was commissioned by Hong Kong Resort Co. Ltd., to carry out an assessment on the geotechnical feasibility of the proposed development at Area 6f Discovery Bay, Lantau Island in support of Section 12A Application for flats. GEO advice note for planning applications under Town Planning Ordinance (CAP. 131) – *'Requirements for a Geotechnical Planning Reviewing Report in support of planning applications'*, is used as a basis for the preparation of this report.

2. SITE DESCRIPTION

2.1 The Site

The site is located 100m to the west of the junction of Discovery Valley Road and Parkvale Drive, adjoining its southern and eastern site boundary respectively. There are 5 nos. existing residential buildings, i.e. Woodbury Court, Woodgreen Court, Woodland Court, Crystal Court and Coral court that are situated along Parkvale Drive in vicinity of the subject site with the separation distance of approximately 50m to 100m. The site area is approximately 7623m^2.

The site is shaped in irregular point-down pentagon. The majority portion of the subject site is situated on sloping ground dipping from west to east with ground level varies from +40mPD to +72mPD. There exists a relatively flat ground at the centre of the site with ground level at around +55mPD. A number of man-made slopes and natural terrains were found both within and outside the site.

The site location plan is shown in **Figure 1**.

2.2 Proposed Development

The proposed development comprises the construction of the followings:-

a) Two 18-storey residential buildings at the eastern part of the site; and
b) An access road for the site to be connected with existing Parkvale Drive;

The concept plan for the proposed development is shown in **Appendix A**.

2.3 Existing Features Located Within / in Vicinity of the Site

Features located within the Site

Total 4 nos. of registered slope features (i.e. Feature Nos. 10SW-B/C 194, 10SW-B/C 195, 10SW-B/C 196 and 10SW-B/C 219) along with 4 nos. of natural terrains are identified to fall partly / wholly within the site. The basic information of these existing features, with reference to Slope Information System (SIS) maintained by the Geotechnical Engineering Office (GEO) of CEDD, are summarized in the table as below.

Feature No.	Height / Angle / Length	CTL Category	Responsible Lot/Party	Remarks
10SW-B/C 194	23m, 25°, 110m	1	DD352L Lot 385RP	These slopes were formed in 1984 during the development of
10SW-B/C 195	6.0m, 27°, 55m	3	DD352L Lot 385RP	

10SW-B/C 196	45m, 30°, 30m	3	DD352L Lot 385RP	Area 6B at Discovery Bay by Binnie & Partners. BD File Ref. 6/9882/78 refers.
10SW-B/C 219	40m, 80°, 60m	3	DD352L Lot 385RP	
Natural Terrain A	27m. 25°, 130m	N/A	N/A	N/A
Natural Terrain B	40m. 35°, 32m	N/A	N/A	N/A
Natural Terrain C	35m. 28°, 135m	N/A	N/A	N/A
Natural Terrain D	29m. 32°, 150m	N/A	N/A	N/A

Features located in vicinity of the Site

There are total 7 nos. of registered slope features that are identified to be located in vicinity of the site, namely Feature Nos. 10SW-B/C197, 10SW-B/C198, 10SW-B/C 205, 10SW-B/C 207, 10SW-B/C208, 10SW-B/C 218 and 10SW-B/C 220. The basic information of these features are summarized in the table below:-

Feature No.	Height / Angle / Length	CTL Category	Responsible Lot/Party	Remarks
10SW-B/C197	12m, 40°, 45m	3	DD352L Lot 385RP; EXTS	These slopes were formed in 1984 during the development of Area 6B at Discovery Bay by Binnie & Partners. BD File Ref. 6/9882/78 refers.
10SW-B/C198	20m, 35°, 35m	3		
10SW-B/C 205	10.5m, 35°, 90m	1		
10SW-B/C 207	10m, 35°, 30m	3		
10SW-B/C208	20m, 35°, 45m	3		
10SW-B/C 218	40m, 30°, 90m	1		
10SW-B/C 220	6.0m, 40°, 125m	3		

The SIS information for the above features is enclosed in **Appendix B**. The layout of the identified features is shown in **Figure 2**.

3. Available Geotechnical Information

3.1 Geology

The published geological survey maps of 1:100,000 (1st Edition 2000) and Sheet 10 of the Hong Kong Geological Survey 1:20,000 (1st edition 1991) scale map series indicate that the site area is mainly underlain by megacrystic coarse- to fine- grained granite of Lantau Granite, feldsparphyric rhyodacite to porphyritic granitic dykes of East Lantau rhyodacite and debris flow deposits dominantly composed of sand, gravel, cobbles and boulders in silt matrix. No inferred fault is found within the site.

An extract of the geological survey map is enclosed in **Appendix C**.

3.2 Existing Ground Investigation Records

No record of previous ground investigation works in vicinity of the subject site can be obtained from Geotechnical Information Unit (GIU) of the Geotechnical Engineering Office (GEO). However, a geotechnical report for proposed residential building at Discovery Bay Development Area 6B, as prepared by LG Mouchel & Partners (Asia) Consulting Engineers in 1985, was found in the Buildings Department (BD). The geotechnical report states that a total of 31 drillholes were sunk in the associated area and the geology of the area generally comprised CDG with shallow bedrock encountered at shallow depth and exposed in many locations. Although no location plan could be found for the existing drillholes, geological sections in the vicinity of the proposed development at Area 6f were found. An extract of the information obtained from BD is enclosed in **Appendix D**. The findings from the report were generally in line with site observation, which rock face was found exposed at Feature Nos. 10SW-B/C219 and 10SW-B/C220.

3.3 Hydrology

No records of previous groundwater monitoring were retrieved from Geotechnical Information Unit (GIU) of the Geotechnical Engineering Office (GEO) within the site.

4. Proposed Works

According to the current concept layout plan, an access road for the proposed development will be required to construct to connect with existing Parkvale Drive. Podium deck with level of approx. 55mPD for the two proposed tower blocks will be constructed at the eastern side of the site. The tentative sequence of works will be as follows: -

1. Site formation for the platform at the eastern portion of the site;
2. Piled foundation / footing construction for the proposed tower blocks;
3. Construction of slope stabilization / preventive measures; and
4. Construction of superstructure;

Major works with geotechnical input are discussed in the following sections.

4.1 Foundation Works

Based on the available information, shallow bedrock is anticipated within the site area. The feasible foundation type shall be raft foundation on rock. In case of deep bedrock is encountered upon the completion of site specific ground investigation works, socketed H-pile shall be adopted. In either foundation scheme, both vertical load and lateral load from the proposed foundation system shall be resisted by bedrock to eliminate adverse impact to the downhill slope underneath the proposed development.

Exact foundation system to be adopted will be subjected to detailed design on the loading of the proposed residential buildings, the future ground investigation works and laboratory testing results.

4.2 Site Formation and Excavation and Lateral Support (ELS) Works

Based on the current concept layout plan, in order to form the building platform at approx. level of +55.0mPD, the majority platform has to be built by the construction a 1:2 fill slope along with toe retaining wall. At the northern end of the site, since the existing ground level is higher than

+55.0mPD, permanent cut slope is required. To facilitate the construction of access road connecting to Parkvale Drive, local cutting with soil nails is anticipated to be carried out on Feature No. 10SW-B/C218.

Local temporary open cut excavation will be required for the construction of pile caps and footings.

Schematic site formation plan and section are as shown in **Appendix E**.

4.3 Slope Stability Assessment

There are 11nos. features that are considered to affect or be affected by the proposed development, namely Feature Nos. 10SW-B/C194, 10SW-B/C195, 10SW-B/C196, 10SW-B/C197, 10SW-B/C198, 10SW-B/C207, 10SW-B/C208, 10SW-B/C218, 10SW-B/C219 and natural terrain A and D.

Based on the screening on available data, i.e. slope angle of adjacent slopes, shear strength parameters as adopted in the geotechnical report for Area 6B as obtained from the Buildings Department, the adjacent slopes shall have factor of safety above prevailing standard. Nonetheless, a detailed stability analysis shall be carried out, upon the completion of site specific ground investigation works and laboratory testing subsequent to Section 12A rezoning application, and prior to commencement of works at the site.

For slopes that are downhill to the proposed development, slope upgrading works (if any) shall be carried out by means of soil nailings. On the other hand, for slopes that are uphill and facing towards the proposed development, either slope upgrading works (if any) by soil nailings or slope preventive measures works by construction of barrier wall along the slope toe can be carried out.

4.4 Natural Terrain Hazard Studies

Screening of site subjected to natural terrain hazards was carried out in accordance with section 2.3.2 of GEO Report No. 138. Natural terrain B and C were found not satisfying the "In-principle Objection Criteria" but meet the "Alert Criteria". Hence, it is considered that an NTHS is required to study the hazards and identify any mitigation measures required subsequent to Section 12A rezoning application, and prior to commencement of work at the site.

5. Conclusion and Recommendation

This report presents the geotechnical feasibility of the proposed development. Based on the preliminary findings, the foundation, site formation and ELS schemes for the proposed development is considered to be geotechnical feasible to construct and there is no adverse impact to the nearby features.

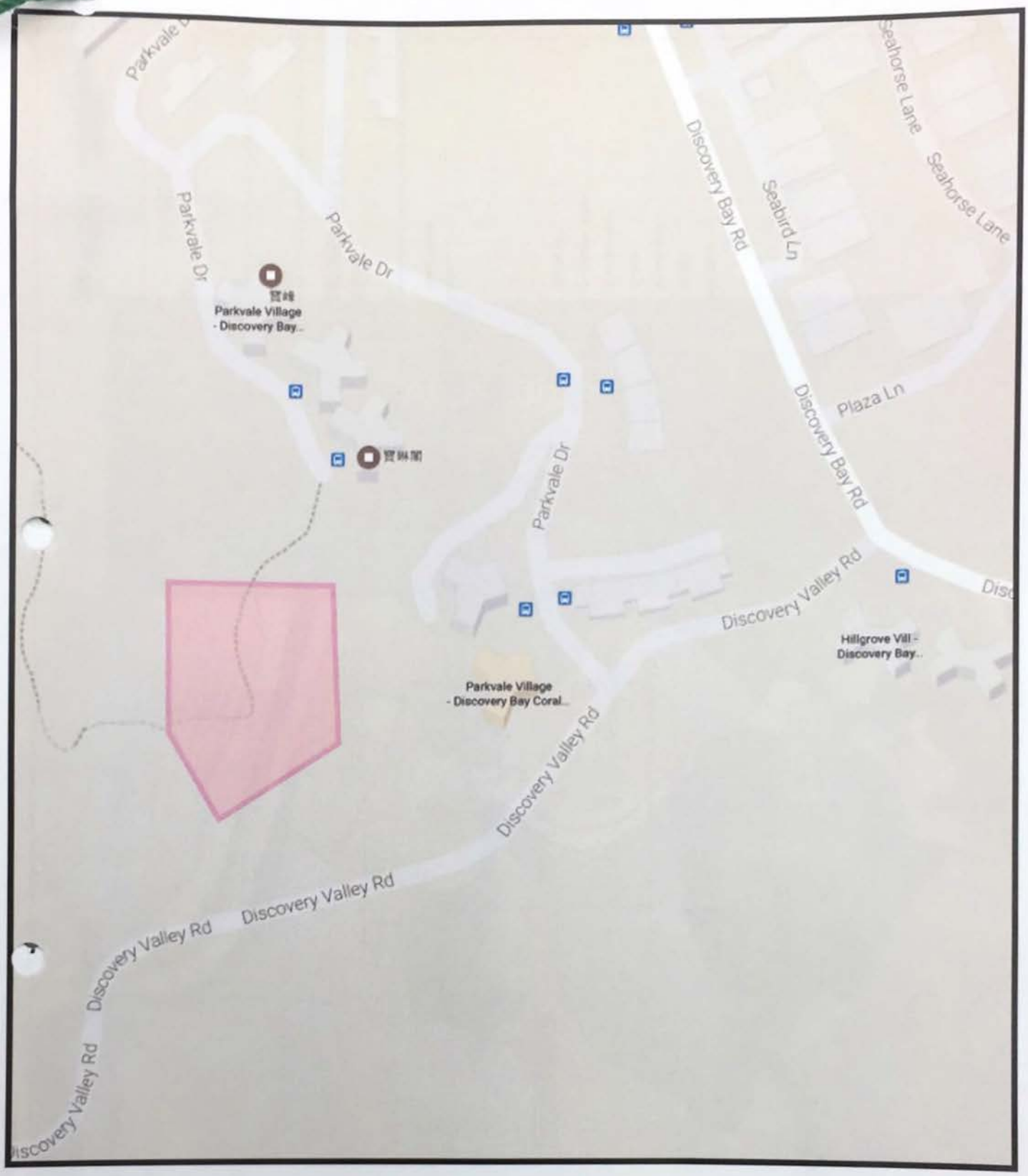
The followings are the recommendations of the foundation, site formation and ELS works for the proposed residential development:-

- Shallow footing on rock and socketed H-pile foundation system is considered viable for the proposed medium-rise residential buildings.

- The proposed site formation works mainly comprise the formation of building platform at level of +55.0mPD by 1:2 fill slope and retaining wall. Permanent cut slopes with soil nails are also required for the construction of access road and the northern end of the building platform.
- Additional ground investigation works shall be carried out for detailed stability assessment on 9 nos. feature, namely Feature Nos. 10SW-B/C194, 10SW-B/C195, 10SW-B/C196, 10SW-B/C197, 10SW-B/C198, 10SW-B/C207, 10SW-B/C208, 10SW-B/C218, 10SW-B/C219 and the 2 nos. natural terrain located downhill to the proposed development, subsequent to Section 12A rezoning application and prior to commencement of works at the site. Slope upgrading works (if any) for the slopes located downhill to the proposed development shall be carried out by means of soil nailings. On the other hand, for the slopes that are uphill to the proposed development, the sub-standard slopes (if any) can either be stabilized by soil nails or carry out preventive measures such as the construction of barrier wall along the slope toe.
- The natural terrains that overlooked the site at the west meets the "Alert Criteria" as stipulated in GEO Report No. 138. Hence, a NTHS is required to be carried out to study the hazards and distinguish any mitigation measures required subsequent to Section 12A rezoning application and prior to commencement of works at the site.
- Local temporary open cut excavation will be required for the construction of pile caps and footings.

Although no adverse effect of works on adjoining features, ground and structures is envisaged, geotechnical monitoring should still be carried out to monitor the effect of works.

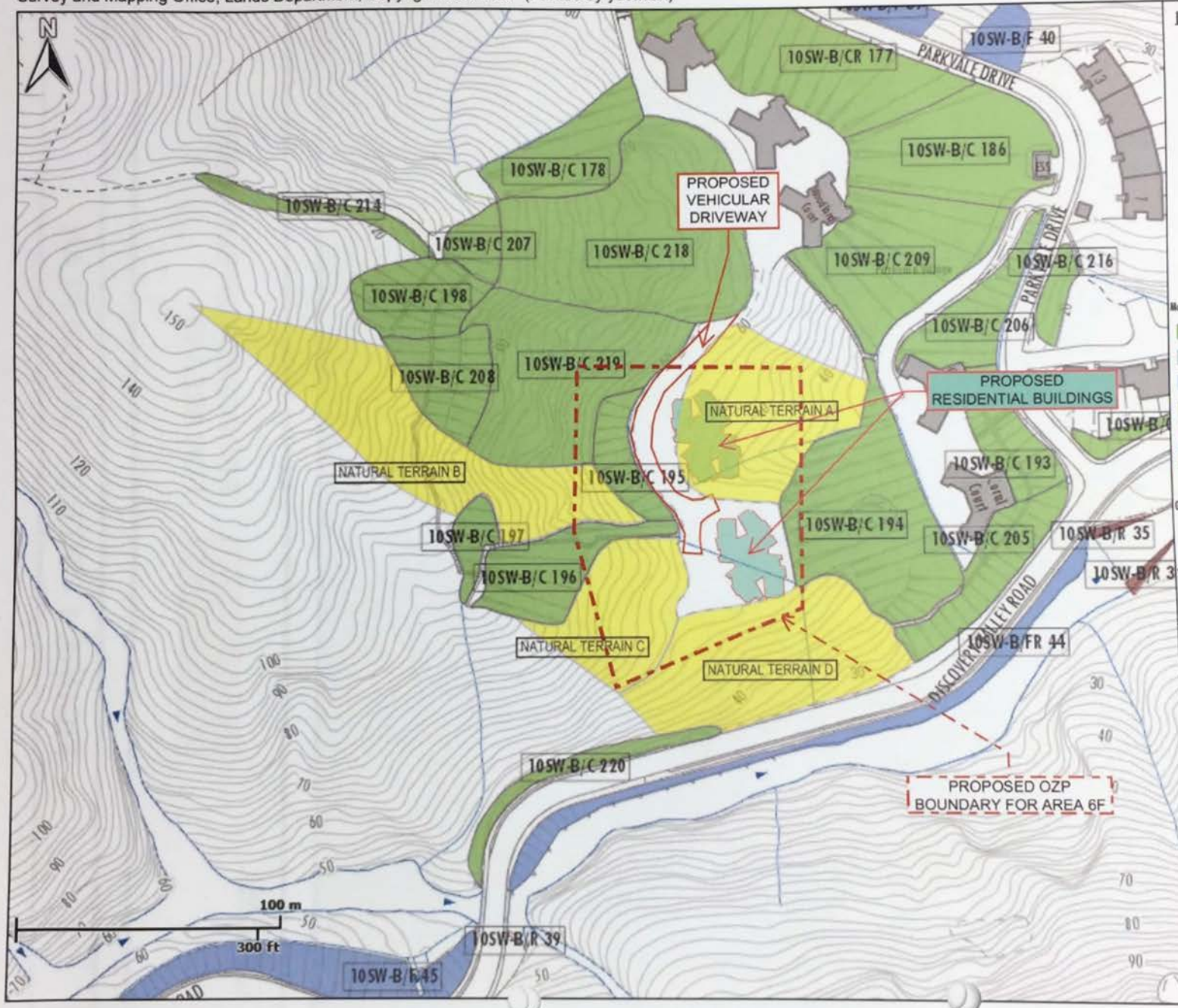
Figures



LEGEND:

PROPOSED OZP BOUNDARY FOR AREA 6F

FIGURE 1 - SITE LOCATION PLAN



LEGEND:

Man-made Feature
- Cut slope
- Disturbed terrain
- Fill slopes
- NT defence measure
- NT stabilisation measure
- Retaining walls

Slope Features
- Natural Terrains

Title
FIGURE 2 -
FEATURES LAYOUT PLAN

Division

Scale
1:2000

Date
2/3/2017

WSP | PARSONS BRINCKERHOFF

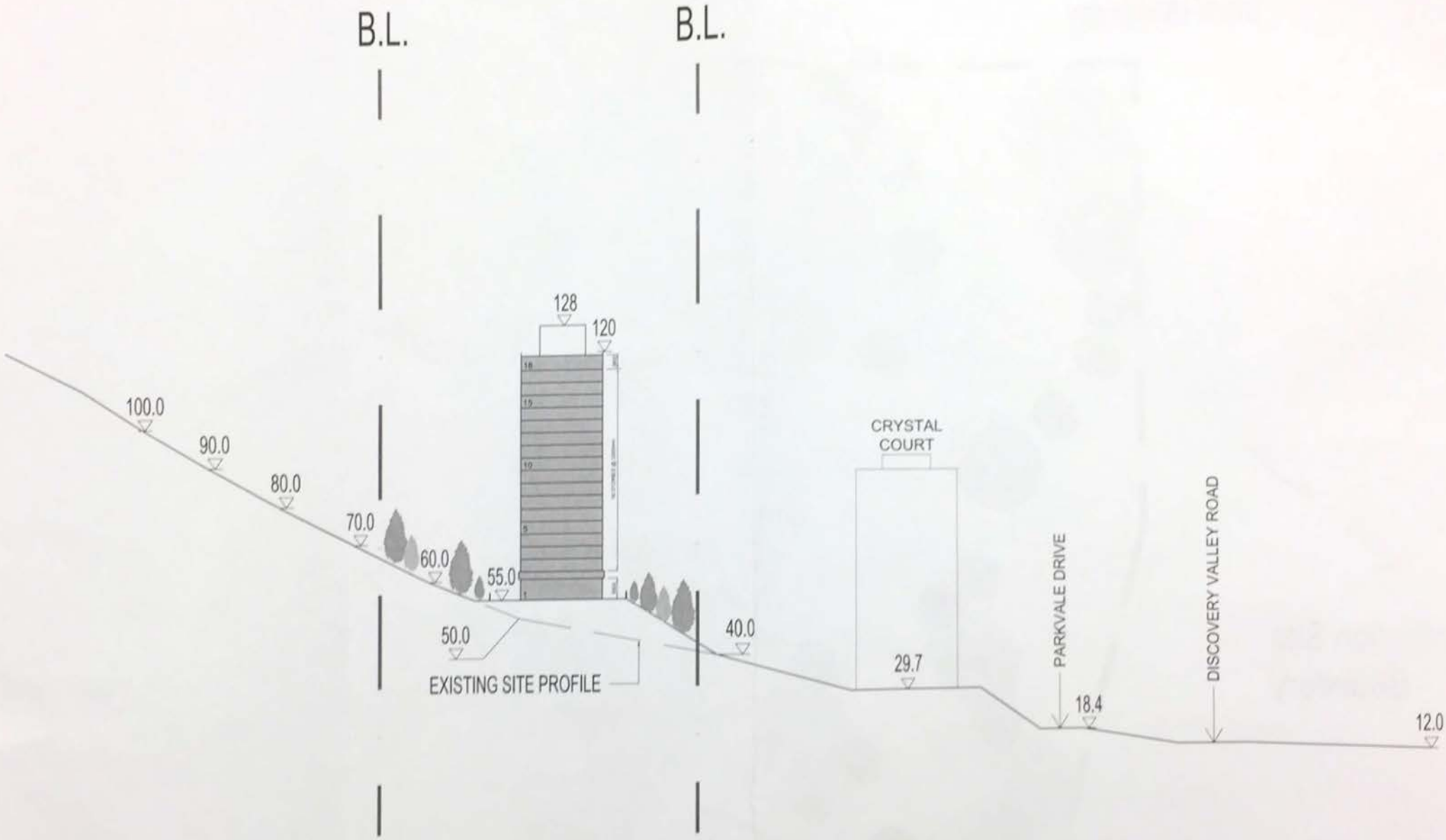
Part Print of Map Sheet(s) : 10SW-3B, 10SW-3D

Appendix A

Concept Development Plan

AREA 6f

PROPOSED RESIDENTIAL DEVELOPMENT - Concept Plan 3



AREA 6f

PROPOSED RESIDENTIAL DEVELOPMENT

SECTION A-A

Appendix B

Existing Registered Slope Features

BASIC INFORMATION

Location: 20M WEST OF CRYSTAL COURT AND CORAL COURT, DISCOVERY BAY, LANTAU

SIFT Ref.: 10SW-3D/S 9
First Registration Date: 24-Oct-1997
Ranking Score (NPRS): 1 (LPMit)
Silt Class: C2
Data Source: SIRST
Approximate Coordinates: Easting: 819329 Northing: 817262

CONSEQUENCE-TO-LIFE CATEGORY

Facility at Crest: District open space

Distance of Facility from Crest (m): 0
Facility at Toe: Residential

Distance of Facility from Toe (m): 8.50
Consequence-to-life Category: 1
Remarks: N/A

SLOPE PART

(1) Max. Height (m): 23 Length (m): 110 Average Angle (deg): 25

WALL PART

N/A

MAINTENANCE RESPONSIBILITY

(1) Sub Div.: 0 Private Feature Party: DD352 L Lot3858? Agent: N/A Land Cat.: N/A Reason Code: N/A MR Endorsement Date: 01-Sep-1997

DETAILS OF SLOPE / RETAINING WALL

Date of Inspection: 23-May-1997
Data Source: SIRST
Slope Part Drainage: (1) Position: Stepped Size(mm): 325

Wall Part Drainage: N/A

SLOPE PART

Slope Part (1)
Surface Protection (%): Bare: 25 Vegetated: 75 Chunam: 0 Shotcrete: 0 Other Cover: 0
Material Description: Material type: Soil & Rock Geology: Other geology
Berm: No. of Berms: N/A Min. Berm Width (m): N/A
Weepholes: Size (mm): N/A Spacing (m): N/A

WALL PART

N/A

SERVICES

N/A

CHECKING STATUS INFORMATION

N/A

BACKGROUND INFORMATION

GIU Cell Ref.: 10SW303

Map Sheet Reference (1:1000): 10SW- 30

Aerial Photos: Photo Number (Year)
44498 (1982)
44499 (1982)

Nearest Raingauge Station (Station Number): Sia Ho Wan Water Treatment Works, Sia Ho Wan (N23)

Date Collected On: 23-May-1997

Date of Construction, Subsequent Modification and Demolition: Modification: Constructed Before: 1982 After: 1981

Related Reports/Files or Documents:
File/Report: Development Ref. No.: GCMW9882/78
File/Report: Development Ref. No.: GCMW9882/78
File/Report: Development Ref. No.: GCMW9882/78
File/Report: Development Ref. No.: GCMW9882/78
File/Report: Development Ref. No.: GCMW9882/78
File/Report: Development Ref. No.: GCMW9882/78
File/Report: Development Ref. No.: GCMW9882/78
File/Report: Development Ref. No.: GCMW9882/78
File/Report: Development Ref. No.: GCMW9882/78
File/Report: Development Ref. No.: GCMW9882/78
File/Report: PWDC Ref. No.: GC4/1/2-3 (32) pt IV

Remarks: N/A

Follow Up Actions: N/A

DH-Order (To Be Confirmed with Buildings Department): None

Advisory Letter (To Be Confirmed with Buildings Department): None

LPMIS: None

ENHANCED MAINTENANCE INFORMATION

N/A

PHOTO

CEDD

SLOPE INFORMATION SYSTEM

GEOTECHNICAL ENGINEERING OFFICE
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Feature No. 10SW-B/C 194

RECORD RETRIEVED FROM SIS BY Ivan Yue ON 29/07/2016 15:27

BASIC INFORMATION

Location: 120M WEST OF CRYSTAL COURT, DISCOVERY BAY, LANTAU

SIFT Ref.: 10SW-30/S 10
First Registration Date: 24-Oct-1997
Ranking Score (KPRS): 0 (National)
Sift Class: C2
Data Source: SIRST
Approximate Coordinates: Easting: 819236 Northing: 817285

CONSEQUENCE-TO-LIFE CATEGORY

Facility at Crest: Undeveloped green belt

Distance of Facility from Crest (m): 0
Facility at Toe: District open space

Distance of Facility from Toe (m): 0
Consequence-to-life Category: 3
Remarks: N/A

SLOPE PART

(1) Max. Height (m): 6 Length (m): 55 Average Angle (deg): 27

WALL PART

N/A

MAINTENANCE RESPONSIBILITY

(1) Sub Div.: 0 Private Feature Party: DD352 L Lot3858P Agent: N/A Land Cat.: N/A Reason Code: N/A MR Endorsement Date: 01-Sep-1997

DETAILS OF SLOPE / RETAINING WALL

Date of Inspection: 23-May-1997
Data Source: SIRST
Slope Part Drainage: (1) Position: Stepped Size(mm): 325

Wall Part Drainage: N/A

SLOPE PART

Slope Part (1)
Surface Protection (%): Bare: 40 Vegetated: 60 Chunam: 0 Shotcrete: 0 Other Cover: 0
Material Description: Material type: Soil Geology: Other geology
Berm: No. of Berms: N/A Min. Berm Width (m): N/A
Weepholes: Size (mm): N/A Spacing (m): N/A

WALL PART

N/A

SERVICES

N/A

CHECKING STATUS INFORMATION

N/A

BACKGROUND INFORMATION

GIU Cell Ref.: 10SW3D2

Map Sheet Reference (1:1000): 10SW- 3D

Aerial Photos: Photo Number (Year)
N/A (N/A)

Nearest Raingauge Station (Station Number): Siu Ho Wan Water Treatment Works, Siu Ho Wan (N23)

Date Collected On: 23-May-1997

Date of Construction, Subsequent Modification and Demolition: Modification: Constructed Before: 1982 After: 1981

Related Reports/Files or Documents:
File/Report: Development Ref. No.: GCMW9882/78
File/Report: Development Ref. No.: GCMW9882/78
File/Report: Development Ref. No.: GCMW9882/78
File/Report: Development Ref. No.: GCMW9882/78
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File/Report: Development Ref. No.: GCMW9882/78
File/Report: Development Ref. No.: GCMW9882/78
File/Report: Development Ref. No.: GCMW9882/78
File/Report: PWDC Ref. No.: GC(4/1/2-3 II(32) pt IV

Remarks: N/A

Follow Up Actions: N/A

DH-Order (To Be Confirmed with Buildings Department): None

Advisory Letter (To Be Confirmed with Buildings Department): None

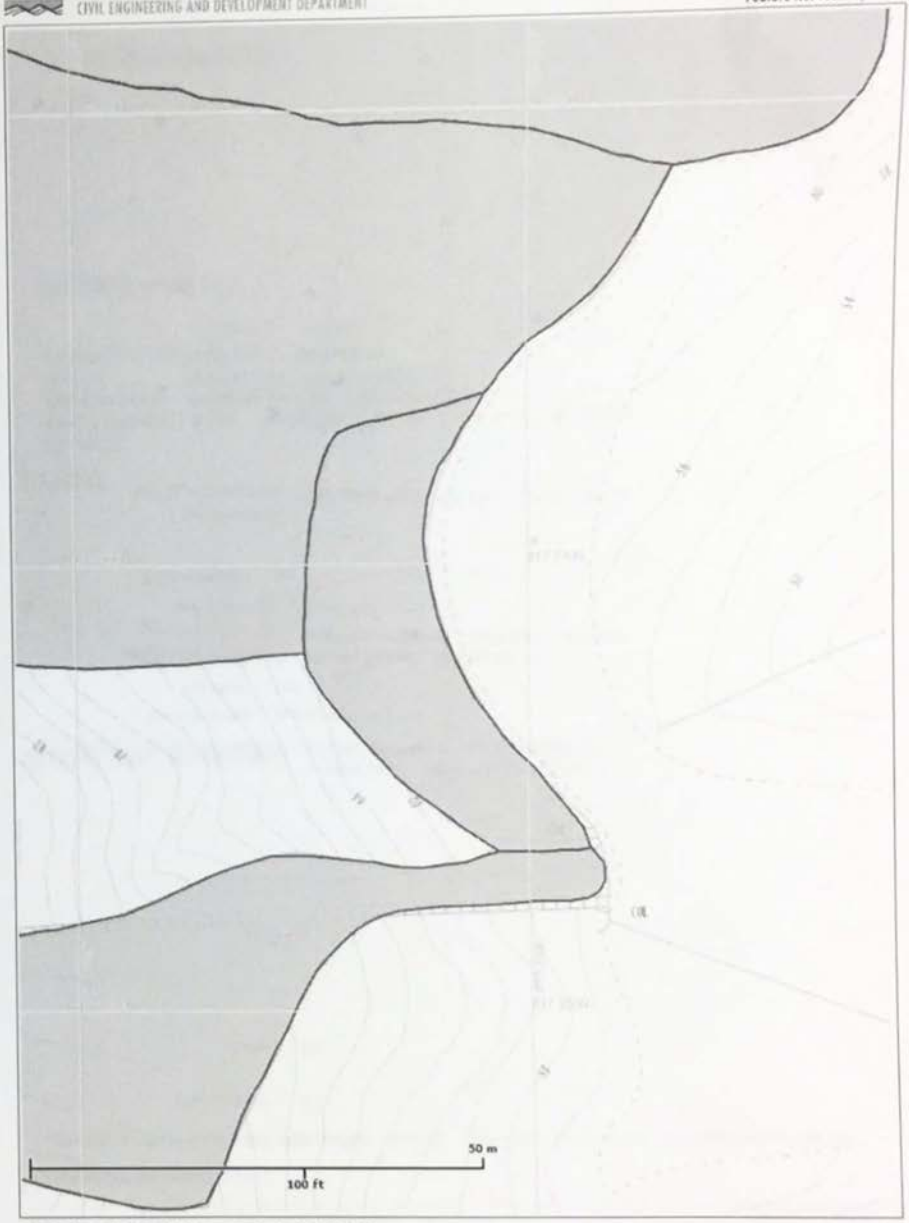
LPMIS: None

ENHANCED MAINTENANCE INFORMATION

N/A

PHOTO

Feature No. 10SW-B/C 195



Feature No. 10SW-B/C 19

BASIC INFORMATION

Location: 160M WEST OF CORAL COURT ON PARKVALE DRIVE, DISCOVERY BAY, LANTAU

SIFT Ref.: 10SW- 3D/S 11
First Registration Date: 24-Oct-1997
Ranking Score (NPRS): 0 (Notional)
Sift Class: C2
Data Source: SIRST
Approximate Coordinates: Easting: 819216 Northing: 817250

CONSEQUENCE-TO-LIFE CATEGORY

Facility at Crest: Road/footpath with very low traffic density

Distance of Facility from Crest (m): 0
Facility at Toe: District open space

Distance of Facility from Toe (m): 0
Consequence-to-life Category: 2
Remarks: N/A

SLOPE PART

(1) Max. Height (m): 45 Length (m): 30 Average Angle (deg): 30

WALL PART

N/A

MAINTENANCE RESPONSIBILITY

(1) Sub Div.: 0 Private Feature Party: DD352 L Lot3858RP Agent: N/A Land Cat.: N/A Reason Code: N/A MR Endorsement Date: 01-Sep-1997

DETAILS OF SLOPE / RETAINING WALL

Date of Inspection: 26-May-1997
Data Source: SIRST
Slope Part Drainage: (1) Position: Stepped Size(mm): 325

Wall Part Drainage: N/A

SLOPE PART

Slope Part (1)
Surface Protection (%): Bare: 40 Vegetated: 60 Chunam: 0 Shotcrete: 0 Other Cover: 0
Material Description: Material type: Soil & Rock Geology: Other geology
Berm: No. of Berms: N/A Min. Berm Width (m): N/A
Weepholes: Size (mm): N/A Spacing (m): N/A

WALL PART

N/A

SERVICES

N/A

CHECKING STATUS INFORMATION

N/A

BACKGROUND INFORMATION

GIU Cell Ref.:	10SW3D2
Map Sheet Reference (1:1000):	10SW- 3D
Aerial Photos:	Photo Number (Year) 44498 (1982) 44499 (1982)
Nearest Raingauge Station (Station Number):	Siu Ho Wan Water Treatment Works, Siu Ho Wan (N23)
Data Collected On:	26-May-1997
Date of Construction, Subsequent Modification and Demolition:	Modification: Constructed Before: 1982 After: 1981
Related Reports/Files or Documents:	File/Report: Development Ref. No.: GCWM9882/78 File/Report: PWDC Ref. No.: GC(4/1/2-3 f(32) ptIV
Remarks:	N/A
Follow Up Actions:	N/A

DH-Order (To Be Confirmed with Buildings Department): None

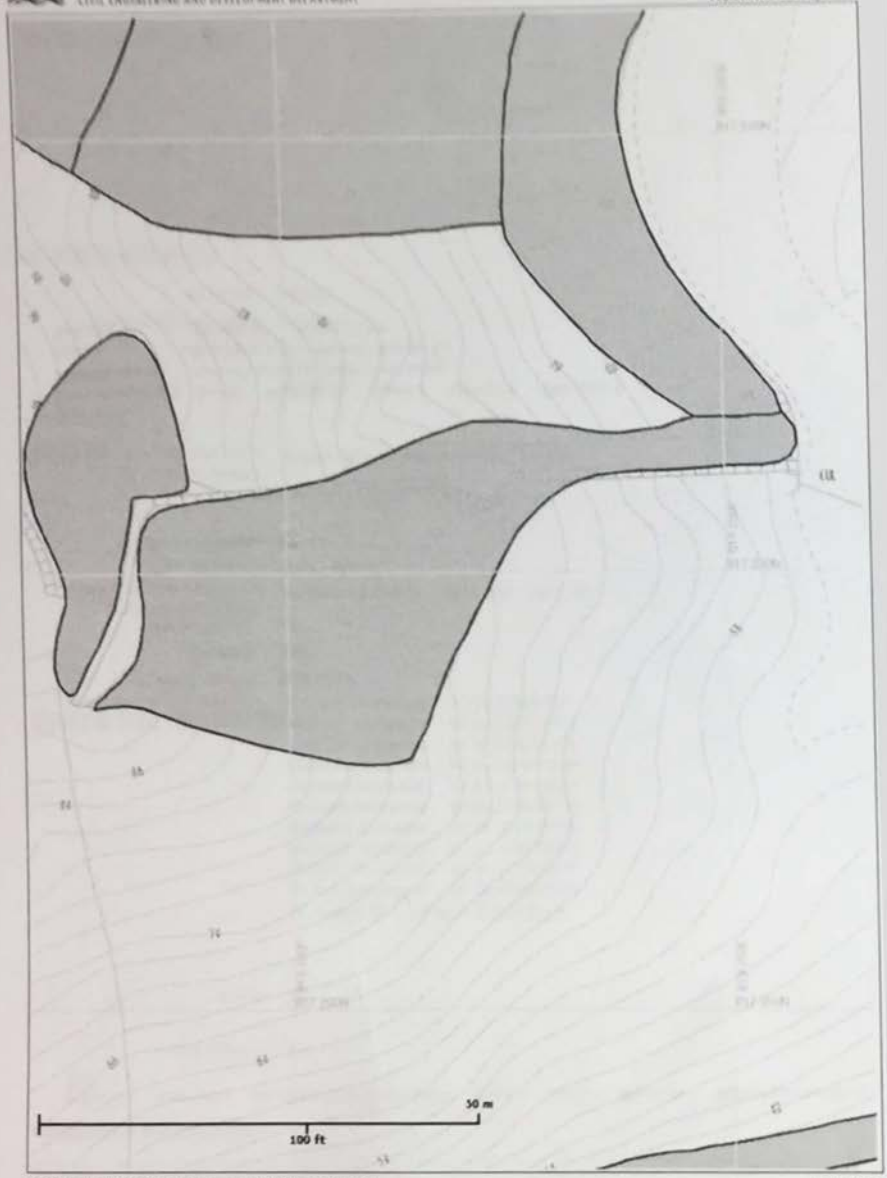
Advisory Letter (To Be Confirmed with Buildings Department): None

LPMIS: None

ENHANCED MAINTENANCE INFORMATION

N/A

PHOTO


50 m
100 ft

BASIC INFORMATION

Location:	190M WEST OF CORAL COURT ON PARKVALE DRIVE, DISCOVERY BAY, LANTAU
SIFT Ref.:	10SW-30/S 12
First Registration Date:	24-Oct-1997
Ranking Score (NPRS):	0 (Notional)
Sift Class:	C2
Data Source:	SIRST
Approximate Coordinates:	Easting: 819178 Northing: 817259

CONSEQUENCE-TO-LIFE CATEGORY

Facility at Crest:	Road/footpath with very low traffic density
Distance of Facility from Crest (m):	0
Facility at Toe:	District open space
Distance of Facility from Toe (m):	70
Consequence-to-life Category:	3
Remarks:	N/A

SLOPE PART

(1) Max. Height (m): 12 Length (m): 45 Average Angle (deg): 40

WALL PART

N/A

MAINTENANCE RESPONSIBILITY

(1) Sub Div.: 0 Private Feature Party: DD352L LOT385 RP &EXTS THERETO Agent: N/A Land Cat.: 1 Reason Code: 1 MR Endorsement Date: 23-Sep-2016

DETAILS OF SLOPE / RETAINING WALL

Date of Inspection: 26-May-1997
Data Source: SIRST
Slope Part Drainage: N/A

Wall Part Drainage: N/A

SLOPE PART

Slope Part (1)
Surface Protection (%): Bare: 90 Vegetated: 10 Chunam: 0 Shotcrete: 0 Other Cover: 0
Material Description: Material type: Soil Geology: Other geology
Berm: No. of Berms: N/A Min. Berm Width (m): N/A
Weepholes: Size (mm): N/A Spacing (m): N/A

WALL PART

N/A

SERVICES

N/A

CHECKING STATUS INFORMATION

N/A

BACKGROUND INFORMATION

GIU Cell Ref.: 10SW3D2

Map Sheet Reference (1:1000): 10SW- 3D

Aerial Photos: Photo Number (Year)
44498 (1982)
44499 (1982)

Nearest Raingauge Station (Station Number): Siu Ho Wan Water Treatment Works, Siu Ho Wan (N23)

Date Collected On: 26-May-1997

Date of Construction, Subsequent Modification and Demolition: Modification: Constructed Before: 1982 After: 1981

Related Reports/Files or Documents:

File/Report: Development	Ref. No.: GCMW9882/78
File/Report: Development	Ref. No.: GCMW9882/78
File/Report: Development	Ref. No.: GCMW9882/78
File/Report: Development	Ref. No.: GCMW9882/78
File/Report: Development	Ref. No.: GCMW9882/78
File/Report: Development	Ref. No.: GCMW9882/78
File/Report: Development	Ref. No.: GCMW9882/78
File/Report: Development	Ref. No.: GCMW9882/78
File/Report: Development	Ref. No.: GCMW9882/78
File/Report: Development	Ref. No.: GCMW9882/78
File/Report: PWDC	Ref. No.: GC4/1/2-3 II(32) pt IV

Remarks: N/A

Follow Up Actions: N/A

DH-Order (To Be Confirmed with Buildings Department): None

Advisory Letter (To Be Confirmed with Buildings Department): None

LPMIS: None

ENHANCED MAINTENANCE INFORMATION

N/A

PHOTO


10SW-B/C 197
10SW-B/C 197
10SW-B/C 196
50 m
100 ft

BASIC INFORMATION

Location: 200M WEST OF CRYSTAL COURT ON PARKVALE DRIVE, DISCOVERY BAY, LANTAU

SIFT Ref.: 10SW-30/S 13
First Registration Date: 24-Oct-1997
Ranking Score (NPRS): 0 (Notional)
Slit Class: C2
Data Source: SIRST
Approximate Coordinates: Easting: 819158 Northing: 817351

CONSEQUENCE-TO-LIFE CATEGORY

Facility at Crest: Road/footpath with very low traffic density

Distance of Facility from Crest (m): 0
Facility at Toe: District open space

Distance of Facility from Toe (m): 70
Consequence-to-life Category: 3
Remarks: N/A

SLOPE PART

(1) Max. Height (m): 20 Length (m): 35 Average Angle (deg): 35

WALL PART

N/A

MAINTENANCE RESPONSIBILITY

(1) Sub Div.: 0 Private Feature Party: 000321 LOT385 RP AEXTS INERITO Agent: N/A Land Cat.: 1 Reason Code: 1 ME Endorsement Date: 23 Sep 2016

DETAILS OF SLOPE / RETAINING WALL

Date of Inspection: 26-May-1992
Data Source: SIRST
Slope Part Drainage: (1) Position: Stepped Size(mm): 325

Wall Part Drainage: N/A

SLOPE PART

Slope Part (1)
Surface Protection (%): Bare: 75 Vegetated: 25 Chunam: 0 Shotcrete: 0 Other Cover: 0
Material Description: Material type: Soil Geology: Decomposed granite
Berm: No. of Berms: 2 Min. Berm Width (m): 1.50
Weepholes: Size (mm): N/A Spacing (m): N/A

WALL PART

N/A

SERVICES

N/A

CHECKING STATUS INFORMATION

N/A

BACKGROUND INFORMATION

GIU Cell Ref.:	10SW3D2
Map Sheet Reference (1:1000):	10SW- 3D
Aerial Photos:	Photo Number (Year) 44498 (1982) 44450 (1982)
Nearest Raingauge Station (Station Number):	Siu Ho Wan Water Treatment Works, Siu Ho Wan (N23)
Date Collected On:	26-May-1997
Date of Construction, Subsequent Modification and Demolition:	Modification: Constructed Before: 1982 After: 1981
Related Reports/Files or Documents:	File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: PWDC Ref. No.: GC4/1/2-3 II(32) ptIV
Remarks:	N/A
Follow Up Actions:	N/A

DH-Order (To Be Confirmed with Buildings Department): None

Advisory Letter (To Be Confirmed with Buildings Department): None

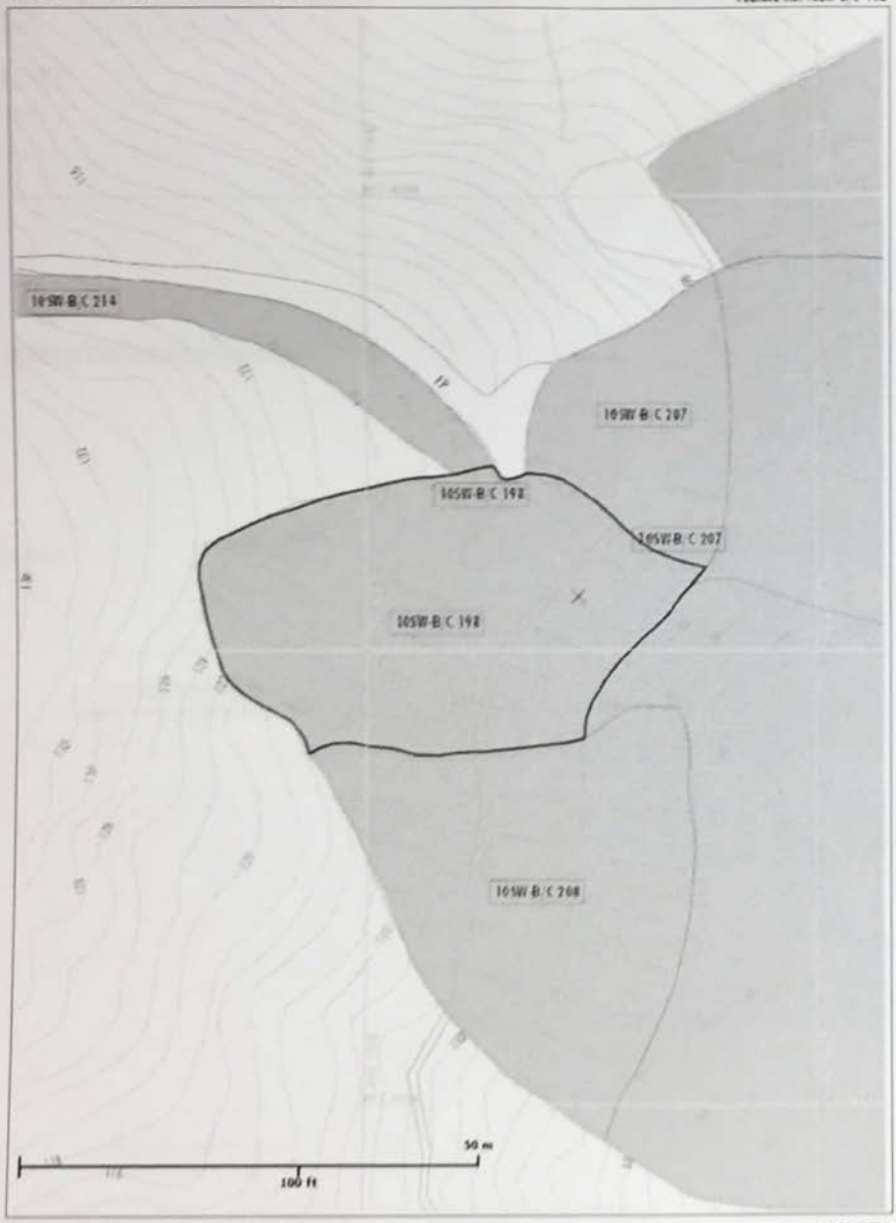
LPMIS: None

ENHANCED MAINTENANCE INFORMATION

N/A

PHOTO

10SW-B/C198


10SW-B/C 214
10SW-B/C 207
10SW-B/C 198
10SW-B/C 207
10SW-B/C 198
10SW-B/C 208
50 m
100 ft

BASIC INFORMATION

Location: IMMEDIATELY SOUTH OF CORAL COURT, DISCOVERY BAY, LANTAU

SIFT Ref.: 11DSW- 30/S 35
First Registration Date: 24-Oct-1997
Ranking Score (KPRS): 0 (LPMit)
Sift Class: C2
Data Source: SIRST
Approximate Coordinates: Easting: 819379 Northing: 817248

CONSEQUENCE-TO-LIFE CATEGORY

Facility at Crest: Residential

Distance of Facility from Crest (m): 0
Facility at Toe: Road/footpath with low traffic density

Distance of Facility from Toe (m): 1.20
Consequence-to-life Category: 1
Remarks: N/A

SLOPE PART

(1) Max. Height (m): 10.50 Length (m): 90 Average Angle (deg): 35

WALL PART

N/A

MAINTENANCE RESPONSIBILITY

(1) Sub Div.: 0 Private Feature Party: DD352L LOT385 RP &EXTS THERETO Agent: N/A Land Cat.: 1 Reason Code: 1 MR Endorsement Date: 23-Sep-2016

DETAILS OF SLOPE / RETAINING WALL

Date of Inspection: 23-May-1997
Data Source: SIRST
Slope Part Drainage: (1) Position: Stepped Size(mm): 325

Wall Part Drainage: N/A

SLOPE PART

Slope Part (1)
Surface Protection (%): Bare: 50 Vegetated: 50 Chunam: 0 Shotcrete: 0 Other Cover: 0
Material Description: Material type: Soil Geology: Other geology
Berm: No. of Berms: 1 Min. Berm Width (m): 2
Weepholes: Size (mm): N/A Spacing (m): N/A

WALL PART

N/A

SERVICES

(1) Utilities Type: Water Main Size(mm): 0 Location: On crest Remark: Size cannot be determined
(2) Utilities Type: Sewer/Drain Size(mm): 0 Location: On crest Remark: Size cannot be determined
(3) Utilities Type: Gas Size(mm): 0 Location: On crest Remark: Size cannot be determined
(4) Utilities Type: Telecom Size(mm): 0 Location: On crest Remark: Size cannot be determined
(5) Utilities Type: Electricity Size(mm): 0 Location: On crest Remark: Size cannot be determined
(6) Utilities Type: Sewer/Drain Size(mm): 0 Location: On crest Remark: Size cannot be determined

CHECKING STATUS INFORMATION

N/A

BACKGROUND INFORMATION

GIU Cell Ref.:	10SW3D3
Map Sheet Reference (1:1000):	10SW- 3D
Aerial Photos:	Photo Number (Year) 44498 (1982) 44499 (1982)
Nearest Raingauge Station (Station Number):	Siu Ho Wan Water Treatment Works, Siu Ho Wan (N23)
Date Collected On:	23-May-1997
Date of Construction, Subsequent Modification and Demolition:	Modification: Constructed Before: 1982 After: 1981
Related Reports/Files or Documents:	File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: PWDC Ref. No.: GC4/1/2-3 I(32) ptIV
Remarks:	N/A
Follow Up Actions:	N/A

DH-Order (To Be Confirmed with Buildings Department): None

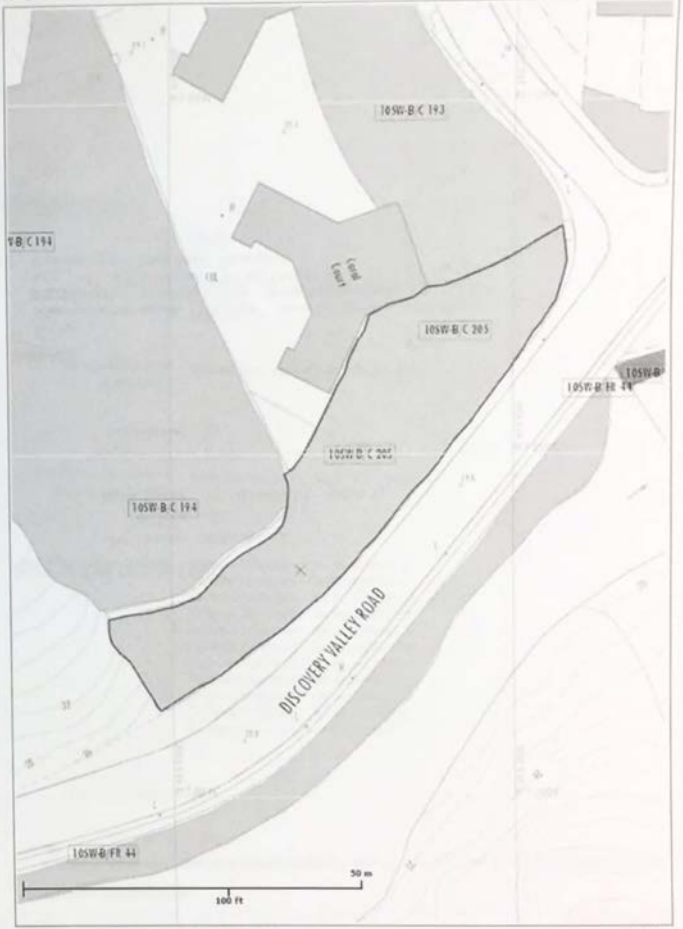
Advisory Letter (To Be Confirmed with Buildings Department): None

LPMIS: None

ENHANCED MAINTENANCE INFORMATION

N/A

PHOTO


10SW-B/C 193
10SW-B/C 194
Lord Court
10SW-B/C 205
10SW-B/FR 44
10SW-B/C 194
DISCOVERY VALLEY ROAD
10SW-B/FR 44
50 m
100 ft

BASIC INFORMATION

Location:	130M W OF WOODLAND COURT ON PARKVALE DRIVE, DISCOVERY BAY, LANTAU
SIFT Ref.:	10SW- 3D/S 37
First Registration Date:	24-Oct-1997
Ranking Score (NPRS):	0 (Notional)
Sift Class:	C2
Data Source:	SIRST
Approximate Coordinates:	Easting: 819180 Northing: 817375

CONSEQUENCE-TO-LIFE CATEGORY

Facility at Crest:	Road/footpath with very low traffic density
Distance of Facility from Crest (m):	0
Facility at Toe:	Undeveloped green belt
Distance of Facility from Toe (m):	0
Consequence-to-life Category:	3
Remarks:	N/A

SLOPE PART

(1) Max. Height (m): 10 Length (m): 30 Average Angle (deg): 35

WALL PART

N/A

MAINTENANCE RESPONSIBILITY

(1) Sub Div.: 0 Private Feature Party: DD352L LOT385 RP &EXTS THERETO Agent: N/A Land Cat.: I Reason Code: I MR Endorsement Date: 23-Sep-2016

DETAILS OF SLOPE / RETAINING WALL

Date of Inspection: 26-May-1997
Data Source: SIRST
Slope Part Drainage: (1) Position: Stepped Size(mm): 325

Wall Part Drainage: N/A

SLOPE PART

Slope Part (1)
Surface Protection (%): Bare: 80 Vegetated: 20 Cbunam: 0 Shotcrete: 0 Other Cover: 0
Material Description: Material type: Soil & Rock Geology: Decomposed granite
Berm: No. of Berms: 1 Min. Berm Width (m): 1.50
Weepholes: Size (mm): N/A Spacing (m): N/A

WALL PART

N/A

SERVICES

N/A

CHECKING STATUS INFORMATION

N/A

BACKGROUND INFORMATION

GIU Cell Ref.:	10SW3D2
Map Sheet Reference (1:1000):	10SW- 3D
Aerial Photos:	Photo Number (Year) 44498 (1982) 44499 (1982)
Nearest Raingauge Station (Station Number):	Siu Ho Wan Water Treatment Works, Siu Ho Wan (N23)
Data Collected On:	26-May-1997
Date of Construction, Subsequent Modification and Demolition:	Modification: Constructed Before: 1982 After: 1981
Related Reports/Files or Documents:	File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: PWDC Ref. No.: GC4/1/2-3 H(32) ptIV
Remarks:	N/A
Follow Up Actions:	N/A

DH-Order (To Be Confirmed with Buildings Department): None

Advisory Letter (To Be Confirmed with Buildings Department): None

LPMIS: None

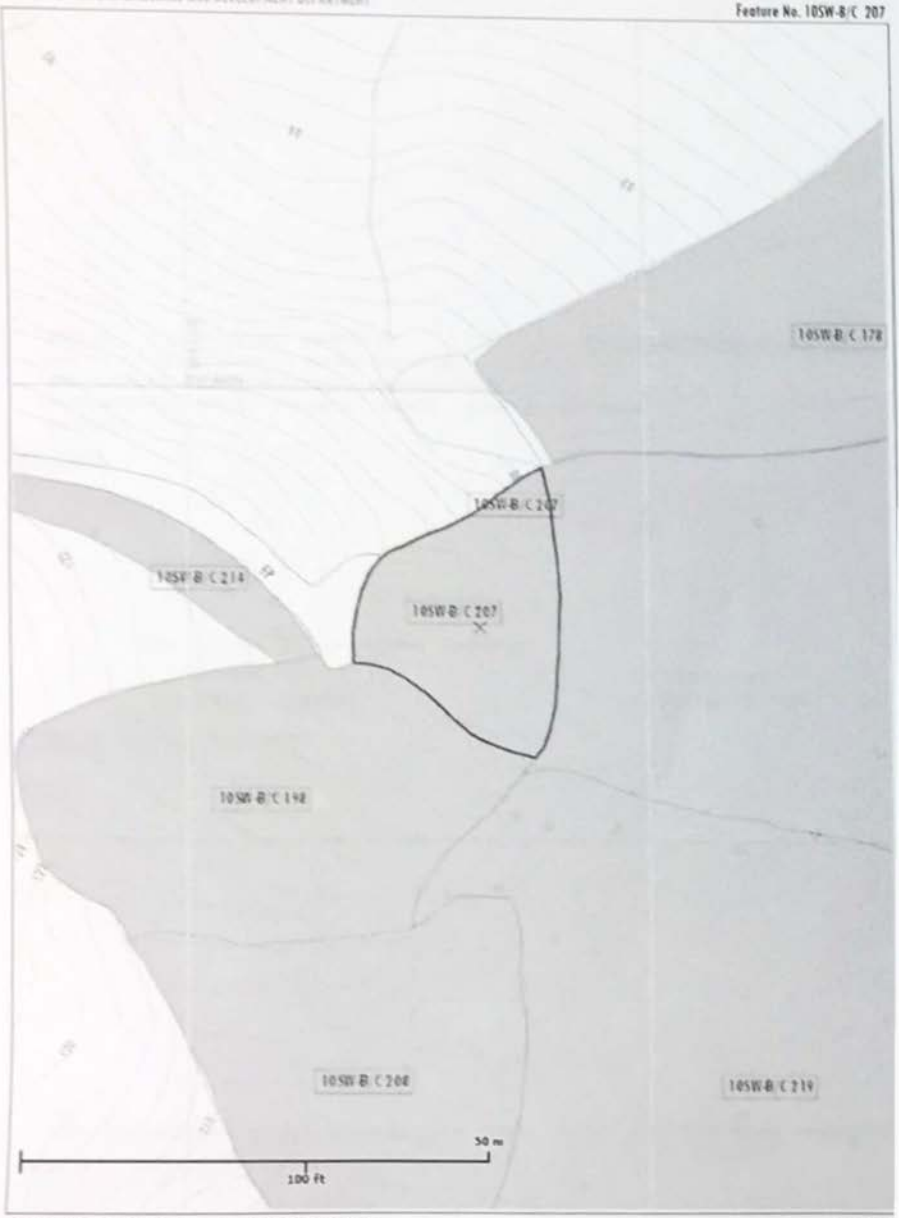
ENHANCED MAINTENANCE INFORMATION

N/A

PHOTO

CEDD **SLOPE INFORMATION SYSTEM**
GEOTECHNICAL ENGINEERING OFFICE
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Feature No. 10SW-B/C 207



BASIC INFORMATION

Location: 200M W OF CRYSTAL COURT ON PARKVALE DRIVE, DISCOVERY BAY, LANTAU

SIFT Ref.: 10SW- 30/S 38
First Registration Date: 24-Oct-1997
Ranking Score (NPRS): 0 (National)
Sift Class: C2
Data Source: SIRST
Approximate Coordinates: Easting: 819170 Northing: 817318

CONSEQUENCE-TO-LIFE CATEGORY

Facility at Crest: Road/footpath with very low traffic density

Distance of Facility from Crest (m): 0
Facility at Toe: District open space

Distance of Facility from Toe (m): 55
Consequence-to-life Category: 3
Remarks: N/A

SLOPE PART

(1) Max. Height (m): 20 Length (m): 45 Average Angle (deg): 35

WALL PART

N/A

MAINTENANCE RESPONSIBILITY

(1) Sub Div.: 0 Private Feature Party: DD352L LOT385 RP &EXTS THERETO Agent: N/A Land Cat.: 1 Reason Code: 1 MR Endorsement Date: 23-Sep-2016

DETAILS OF SLOPE / RETAINING WALL

Date of Inspection: 26-May-1997
Data Source: SIRST
Slope Part Drainage: (1) Position: Stepped Size(mm): 325

Wall Part Drainage: N/A

SLOPE PART

Slope Part (1)
Surface Protection (%): Bare: 70 Vegetated: 30 Chunam: 0 Shotcrete: 0 Other Cover: 0
Material Description: Material type: Soil & Rock Geology: Other geology
Berm: No. of Berms: 2 Min. Berm Width (m): 1.20
Weepholes: Size (mm): N/A Spacing (m): N/A

WALL PART

N/A

SERVICES

N/A

CHECKING STATUS INFORMATION

N/A

BACKGROUND INFORMATION

GIU Cell Ref.:	10SW3D2
Map Sheet Reference (1:1000):	10SW- 3D
Aerial Photos:	Photo Number (Year) 44498 (1982) 44499 (1982)
Nearest Raingauge Station (Station Number):	Siu Ho Wan Water Treatment Works, Siu Ho Wan (N23)
Date Collected On:	26-May-1997
Date of Construction, Subsequent Modification and Demolition:	Modification: Constructed Before: 1982 After: 1981
Related Reports/Files or Documents:	File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: PWDC Ref. No.: GC4/1/2-3 f(32) ptIV
Remarks:	N/A
Follow Up Actions:	N/A

DH-Order (To Be Confirmed with Buildings Department): None

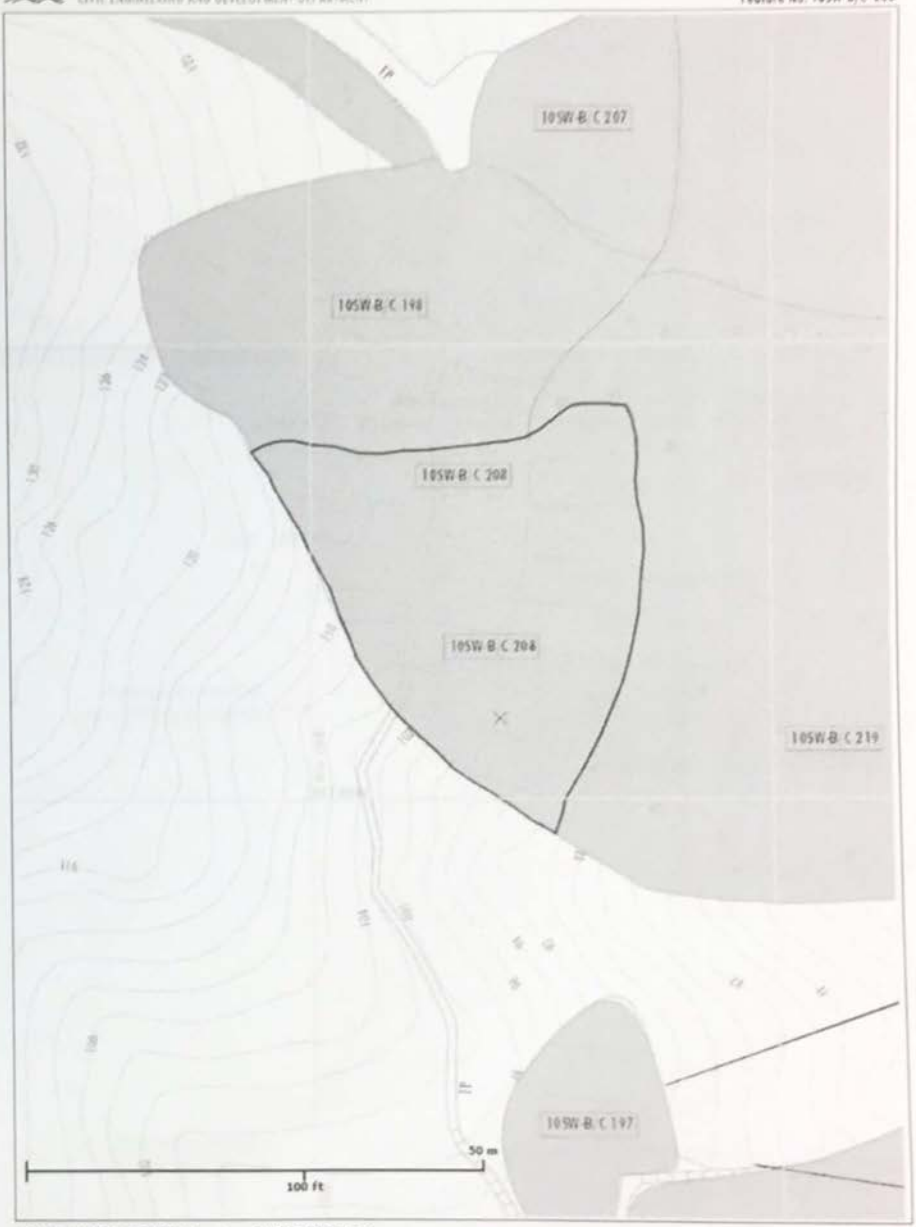
Advisory Letter (To Be Confirmed with Buildings Department): None

LPMIS: None

ENHANCED MAINTENANCE INFORMATION

N/A

PHOTO


10SW-B/C 207
10SW-B/C 198
10SW-B/C 208
10SW-B/C 206
10SW-B/C 219
10SW-B/C 197
50 m
100 ft

BASIC INFORMATION

Location:	40M WEST OF WOODLAND COURT ON PARKVALE DRIVE, DISCOVER BAY, LANTAU
SIFT Ref.:	10SW-3D/S 54
First Registration Date:	24-Oct-1997
Ranking Score (NPRS):	0 (LPMit)
Sift Class:	C2
Data Source:	SIRST
Approximate Coordinates:	Easting: 819241 Northing: 817371

CONSEQUENCE-TO-LIFE CATEGORY

Facility at Crest:	Undeveloped green belt
Distance of Facility from Crest (m):	0
Facility at Toe:	Residential
Distance of Facility from Toe (m):	13
Consequence-to-life Category:	1
Remarks:	N/A

SLOPE PART

(1) Max. Height (m): 40 Length (m): 90 Average Angle (deg): 30

WALL PART

N/A

MAINTENANCE RESPONSIBILITY

(1) Sub Div.: 0 Private Feature Party: DD352L LOT385 RP &EXTS THERETO Agent: N/A Land Cat.: 1 Reason Code: 1 ME Endorsement Date: 16-Jan-2017

DETAILS OF SLOPE / RETAINING WALL

Date of Inspection: 26-May-1997
Data Source: SIRST
Slope Part Drainage: (1) Position: Stepped Size(mm): 325

Wall Part Drainage: N/A

SLOPE PART

Slope Part (1)
Surface Protection (%): Bare: 80 Vegetated: 20 Chunam: 0 Shotcrete: 0 Other Cover: 0
Material Description: Material type: Rock Geology: N/A
Berm: No. of Berms: N/A Min. Berm Width (m): N/A
Weepholes: Size (mm): N/A Spacing (m): N/A

WALL PART

N/A

SERVICES

N/A

CHECKING STATUS INFORMATION

N/A

BACKGROUND INFORMATION

GIU Cell Ref.:	10SW30Z
Map Sheet Reference (1:1000):	10SW- 30
Aerial Photos:	Photo Number (Year) 44499 (1982) 44500 (1982)
Nearest Raingauge Station (Station Number):	Siu Ho Wan Water Treatment Works, Siu Ho Wan (N23)
Date Collected On:	26-May-1997
Date of Construction, Subsequent Modification and Demolition:	Modification: Constructed Before: 1982 After: 1981
Related Reports/Files or Documents:	N/A
Remarks:	N/A
Follow Up Actions:	N/A

PHOTO

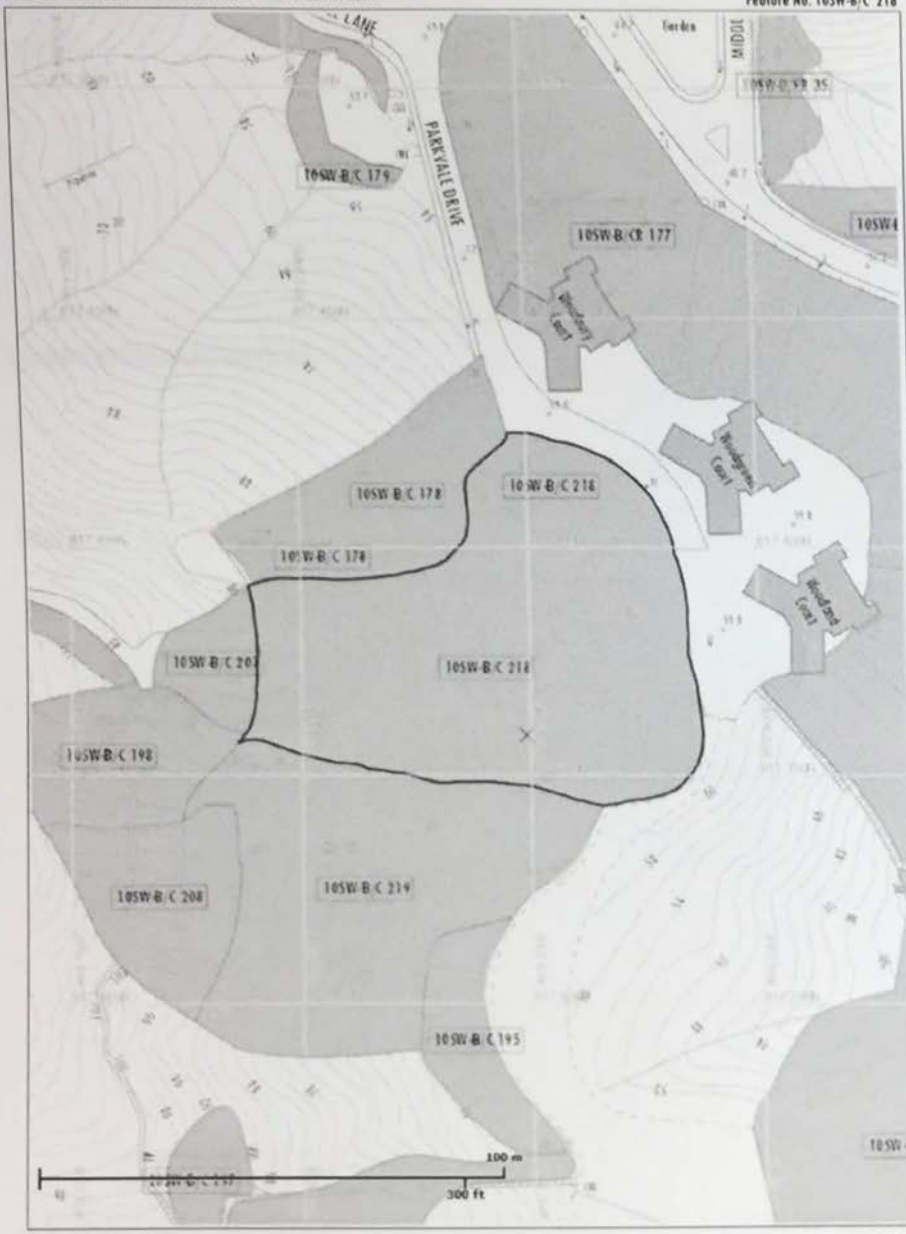
DH-Order (To Be Confirmed with Buildings Department): None

Advisory Letter (To Be Confirmed with Buildings Department): None

LPMIS: None

ENHANCED MAINTENANCE INFORMATION

N/A


PARKVALE DRIVE
MIDDLE
10SW-B/C 179
10SW-B/C 177
10SW-B/C 178
10SW-B/C 218
10SW-B/C 176
10SW-B/C 202
10SW-B/C 218
10SW-B/C 198
10SW-B/C 208
10SW-B/C 219
10SW-B/C 195
100 m
300 ft

BASIC INFORMATION

Location: 150M W OF CRYSTAL COURT ON PARKVALE DRIVE, DISCOVERY BAY, LANTAU

SIFT Ref.: 10SW-3D/S 55
First Registration Date: 24-Oct-1997
Ranking Score (NPRS): 2 (National)
Sift Class: C2
Data Source: SIRST
Approximate Coordinates: Easting: 819212 Northing: 817318

CONSEQUENCE-TO-LIFE CATEGORY

Facility at Crest: Undeveloped green belt

Distance of Facility from Crest (m): 0
Facility at Toe: District open space

Distance of Facility from Toe (m): 0
Consequence-to-life Category: 3
Remarks: N/A

SLOPE PART

(1) Max. Height (m): 40 Length (m): 60 Average Angle (deg): 80

WALL PART

N/A

MAINTENANCE RESPONSIBILITY

(1) Sub Div.: 0 Private Feature Party: DD352 L Lot3858P Agent: N/A Land Cat.: N/A Reason Code: N/A MR Endorsement Date: 01-Sep-1997

DETAILS OF SLOPE / RETAINING WALL

Date of Inspection: 26-May-1997
Data Source: SIRST
Slope Part Drainage: (1) Position: Stepped Size(mm): 325

Wall Part Drainage: N/A

SLOPE PART

Slope Part (1)
Surface Protection (%): Bare: 60 Vegetated: 40 Chunam: 0 Shotcrete: 0 Other Cover: 0
Material Description: Material type: Soil & Rock Geology: Other geology
Berm: No. of Berms: N/A Min. Berm Width (m): N/A
Weepholes: Size (mm): N/A Spacing (m): N/A

WALL PART

N/A

SERVICES

N/A

CHECKING STATUS INFORMATION

N/A

BACKGROUND INFORMATION

GIU Cell Ref.: 10SW3D2

Map Sheet Reference (1:1000): 10SW - 3D

Aerial Photos: Photo Number (Year)
44499 (1982)
44500 (1982)

Nearest Raingauge Station (Station Number): Siu Ho Wan Water Treatment Works, Siu Ho Wan (N23)

Date Collected On: 26-May-1997

Date of Construction, Subsequent Modification and Demolition: Modification: Constructed Before: 1982 After: 1981

Related Reports/Files or Documents:

File/Report: Development	Ref. No.: GCMW9882/78
File/Report: Development	Ref. No.: GCMW9882/78
File/Report: Development	Ref. No.: GCMW9882/78
File/Report: Development	Ref. No.: GCMW9882/78
File/Report: Development	Ref. No.: GCMW9882/78
File/Report: Development	Ref. No.: GCMW9882/78
File/Report: Development	Ref. No.: GCMW9882/78
File/Report: Development	Ref. No.: GCMW9882/78
File/Report: Development	Ref. No.: GCMW9882/78
File/Report: Development	Ref. No.: GCMW9882/78
File/Report: PWDC	Ref. No.: GC4/1/2-3 K(32) pt4

Remarks: N/A

Follow Up Actions: N/A

DH-Order (To Be Confirmed with Buildings Department): None

Advisory Letter (To Be Confirmed with Buildings Department): None

LPMJS: None

ENHANCED MAINTENANCE INFORMATION

N/A

PHOTO

Feature No. 10SW-B/C 219

BASIC INFORMATION

Location: 130M W OF WOODLAND COURT ON PARKVALE DRIVE, DISCOVERY BAY, LANTAU

SIFT Ref.: 10SW- 3D/S 37
First Registration Date: 24-Oct-1997
Ranking Score (NPRS): 0 (Notional)
Sift Class: C2
Data Source: SIRST
Approximate Coordinates: Easting: 819180 Northing: 817375

CONSEQUENCE-TO-LIFE CATEGORY

Facility at Crest: Road/footpath with very low traffic density

Distance of Facility from Crest (m): 0
Facility at Toe: Undeveloped green belt

Distance of Facility from Toe (m): 0
Consequence-to-life Category: 3
Remarks: N/A

SLOPE PART

(1) Max. Height (m): 10 Length (m): 30 Average Angle (deg): 35

WALL PART

N/A

MAINTENANCE RESPONSIBILITY

(1) Sub Div.: 0 Private Feature Party: DD352L LOT385 RP &EXTS THERETO Agent: N/A Land Cat.: 1 Reason Code: 1 MR Endorsement Date: 23-Sep-2016

DETAILS OF SLOPE / RETAINING WALL

Date of Inspection: 26-May-1997
Data Source: SIRST
Slope Part Drainage: (1) Position: Stepped Size(mm): 325

Wall Part Drainage: N/A

SLOPE PART

Slope Part (1)
Surface Protection (%): Bare: 80 Vegetated: 20 Chunam: 0 Shotcrete: 0 Other Cover: 0
Material Description: Material type: Soil & Rock Geology: Decomposed granite
Berm: No. of Berms: 1 Min. Berm Width (m): 1.50
Weepholes: Size (mm): N/A Spacing (m): N/A

WALL PART

N/A

SERVICES

N/A

CHECKING STATUS INFORMATION

N/A

BACKGROUND INFORMATION

GIU Cell Ref.:	10SW3D2
Map Sheet Reference (1:1000):	10SW- 3D
Aerial Photos:	Photo Number (Year) 44498 (1982) 44499 (1982)
Nearest Raingauge Station (Station Number):	Siu Ho Wan Water Treatment Works, Siu Ho Wan (N23)
Data Collected On:	26-May-1997
Date of Construction, Subsequent Modification and Demolition:	Modification: Constructed Before: 1982 After: 1981
Related Reports/Files or Documents:	File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: PWDC Ref. No.: GC4/1/2-3 f(32) ptIV
Remarks:	N/A
Follow Up Actions:	N/A

DH-Order (To Be Confirmed with Buildings Department): None

Advisory Letter (To Be Confirmed with Buildings Department): None

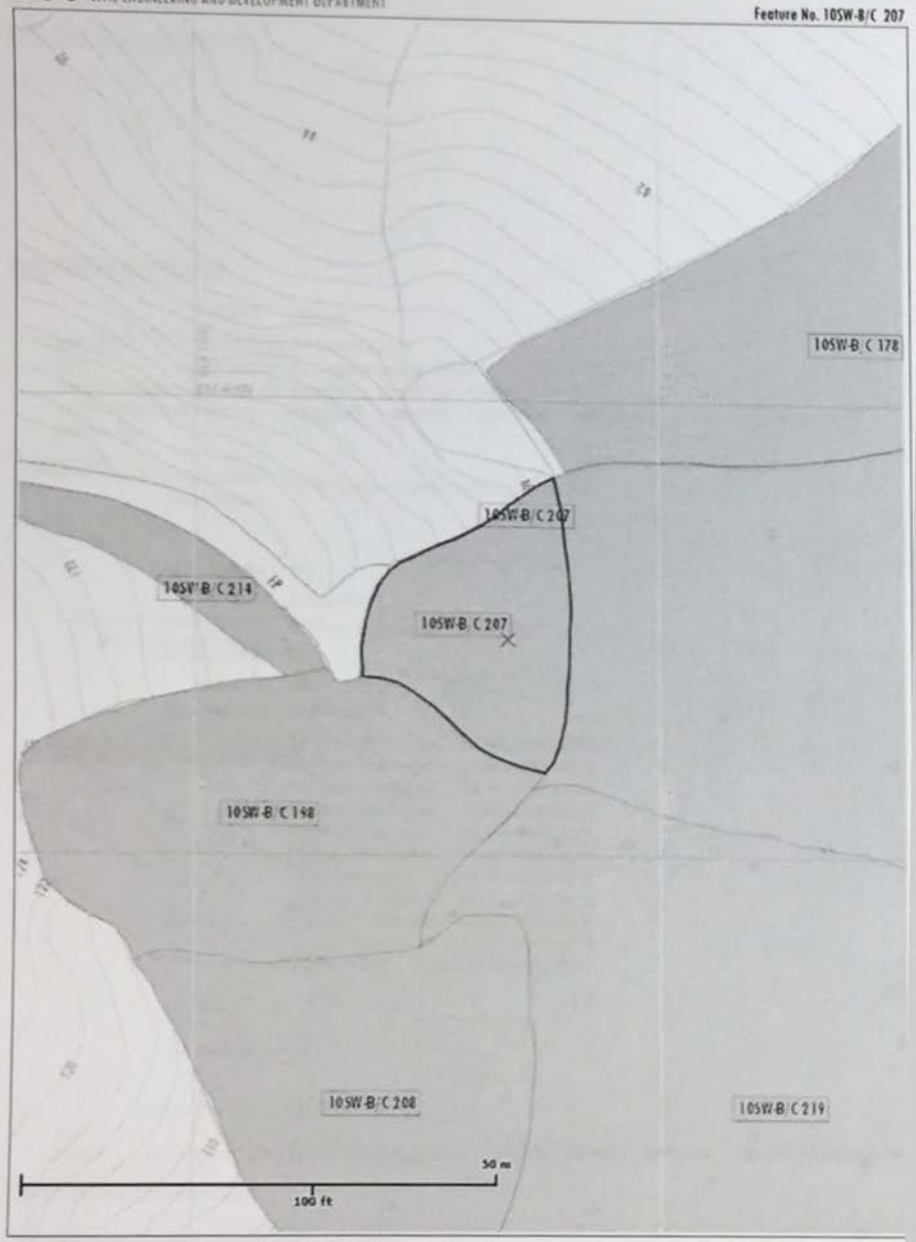
LPMIS: None

ENHANCED MAINTENANCE INFORMATION

N/A

PHOTO

Feature No. 10SW-B/C 207



BASIC INFORMATION

Location: UPSLOPE OF DISCOVERY VALLEY ROAD, 200M W OF JUNCTION WITH PARKVALE DRIVE, DISCOVERY BAY, LANTAU

SIFT Ref.: 10SW-3D/S 56
First Registration Date: 24-Oct-1997
Ranking Score (NPRS): 0 (Notional)
Sift Class: C2
Data Source: SIRST
Approximate Coordinates: Easting: 819210 Northing: 817173

CONSEQUENCE-TO-LIFE CATEGORY

Facility at Crest: Undeveloped green belt

Distance of Facility from Crest (m): 0
Facility at Toe: Road/footpath with low traffic density

Distance of Facility from Toe (m): 7
Consequence-to-life Category: 3
Remarks: N/A

SLOPE PART

(1) Max. Height (m): 6 Length (m): 125 Average Angle (deg): 40

WALL PART

N/A

MAINTENANCE RESPONSIBILITY

(1) Sub Div.: 0 Private Feature Party: 0D352L LOT385 RP &EXTS THERETO Agent: N/A Land Cat.: 1 Reason Code: 1 MR Endorsement Date: 23-Sep-2016

DETAILS OF SLOPE / RETAINING WALL

Date of Inspection: 23-May-1997
Data Source: SIRST
Slope Part Drainage: N/A

Wall Part Drainage: N/A

SLOPE PART

Slope Part (1)
Surface Protection (%): Bare: 40 Vegetated: 60 Chunam: 0 Shotcrete: 0 Other Cover: 0
Material Description: Material type: Soil & Rock Geology: Other geology
Berm: No. of Berms: N/A Min. Berm Width (m): N/A
Weepholes: Size (mm): N/A Spacing (m): N/A

WALL PART

N/A

SERVICES

N/A

CHECKING STATUS INFORMATION

N/A

BACKGROUND INFORMATION

GIU Cell Ref.:	10SW3DS
Map Sheet Reference (1:1000):	10SW- 3D
Aerial Photos:	Photo Number (Year) 44498 (1982) 44500 (1982)
Nearest Raingauge Station (Station Number):	Siu Ho Wan Water Treatment Works, Siu Ho Wan (N23)
Date Collected On:	23-May-1997
Date of Construction, Subsequent Modification and Demolition:	Modification: Constructed Before: 1981 After: 1979
Related Reports/Files or Documents:	File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: Development Ref. No.: GCMW9882/78 File/Report: PWDC Ref. No.: GC4/1/2-3 II(32) pt4
Remarks:	N/A
Follow Up Actions:	N/A

OH-Order (To Be Confirmed with Buildings Department): None

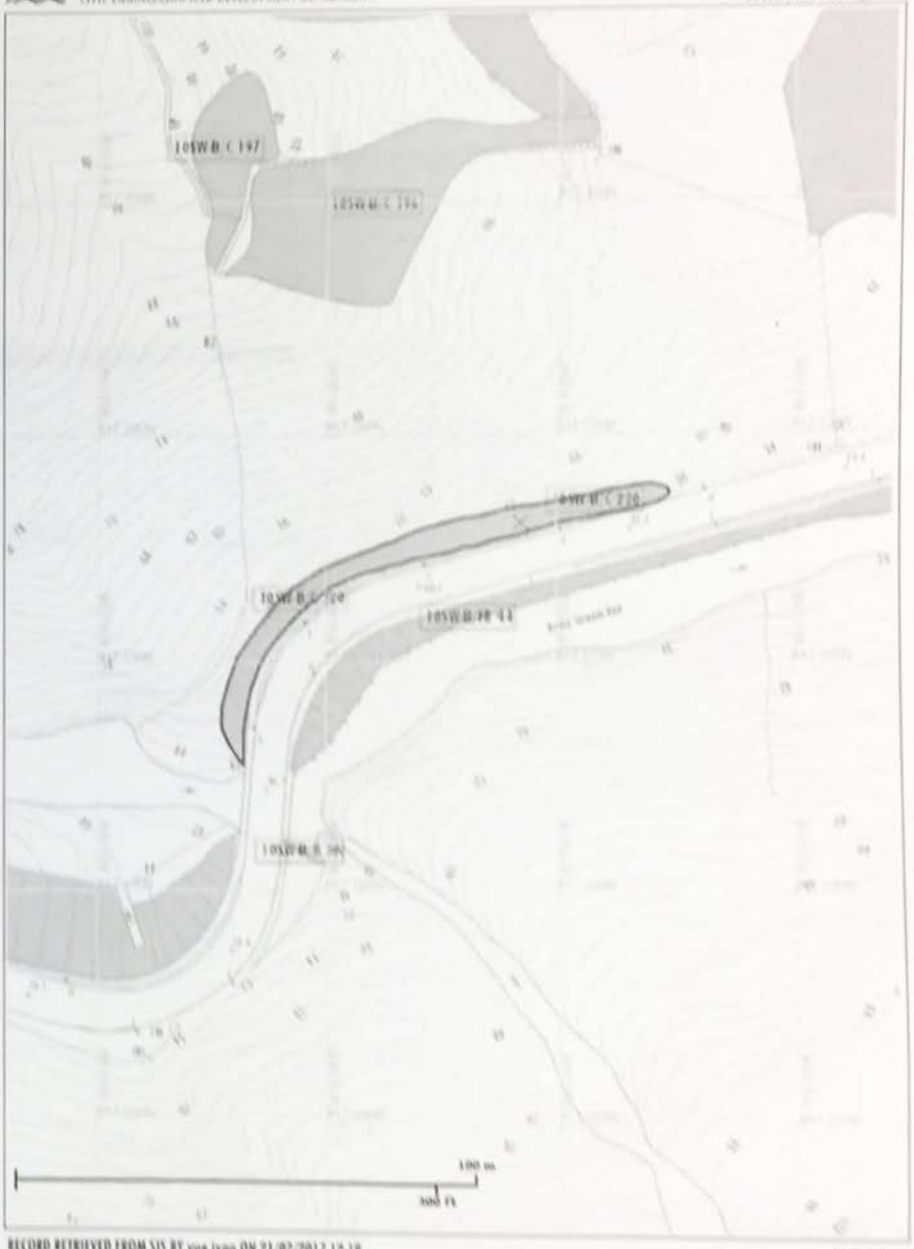
Advisory Letter (To Be Confirmed with Buildings Department): None

LPMIS: None

ENHANCED MAINTENANCE INFORMATION

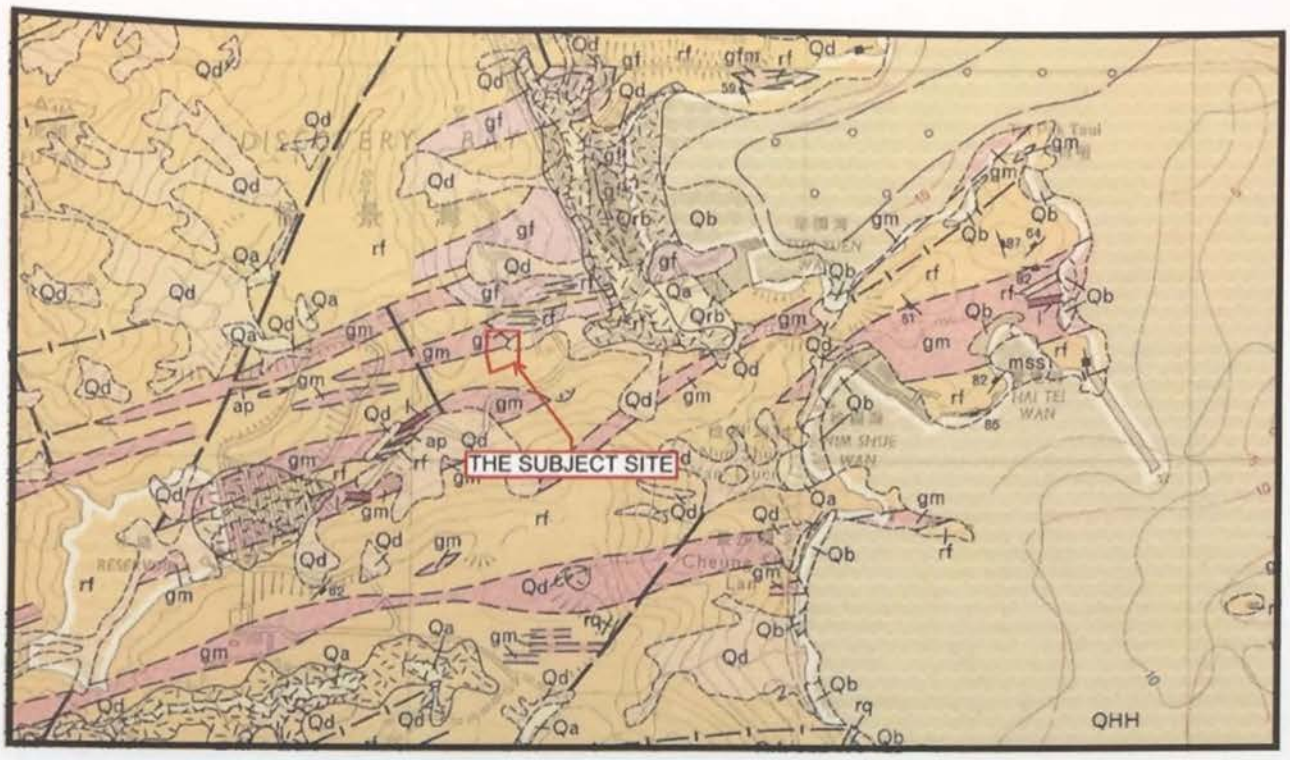
N/A

PHOTO


10SW-B/C 197
10SW-B/C 196
10SW-B/C 220
10SW-B/C 44
100 m
300 ft

Appendix C

Geological Map



LEGEND:

Debris flow deposits ····· 坡積、洪積物 — Qd — 基質爲粉砂的砂、礫石、中礫和漂礫 ····· Sand, gravel, cobbles and boulders in silt matrix

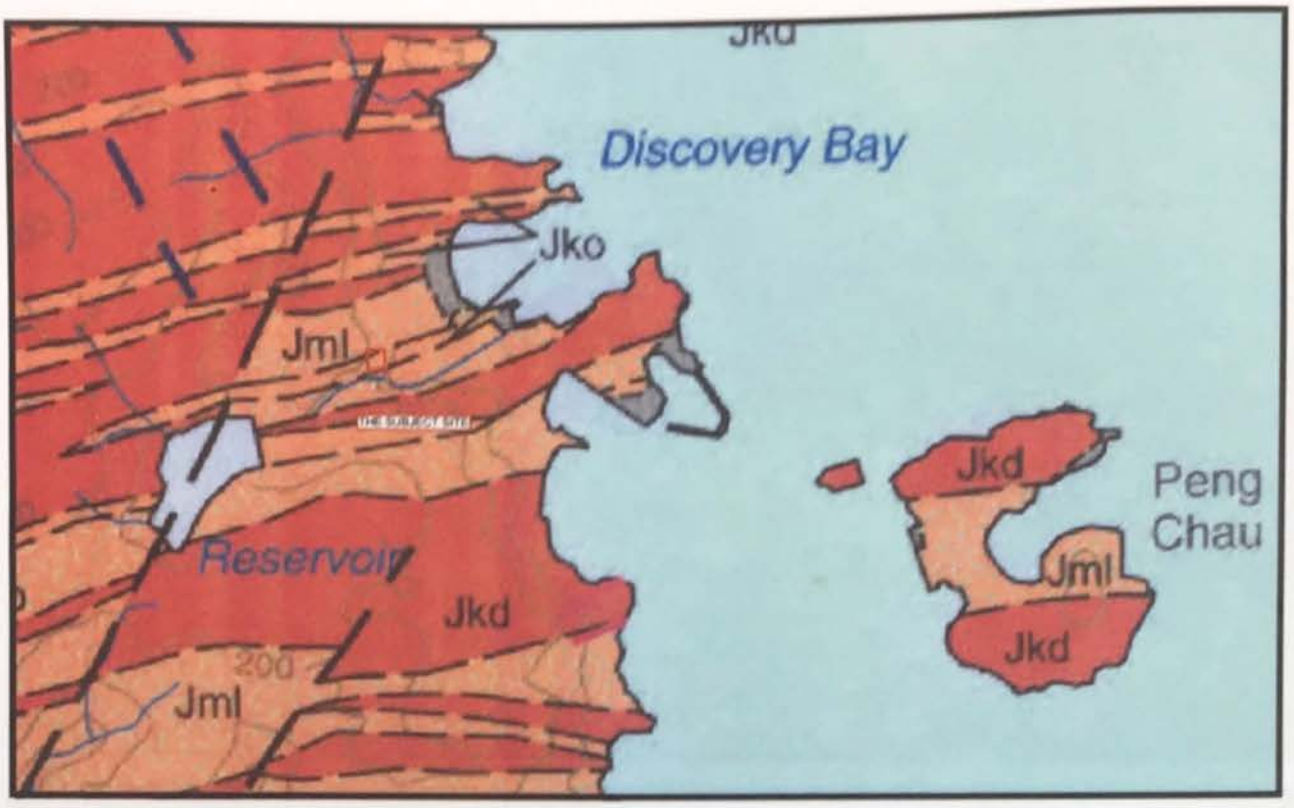
MAJOR INTRUSIVE IGNEOUS ROCKS 主要侵入火成岩

gf	細粒花崗岩，＜2毫米	Fine-grained granite, <2mm
gfm	中細粒花崗岩	Fine- to medium-grained granite
gm	中粒花崗岩，2－6毫米	Medium-grained granite, 2-6mm
sqf	細粒石英正長岩，＜2毫米	Fine-grained quartz syenite, <2mm
sqm	中粒石英正長岩，2－6毫米	Medium-grained quartz syenite, 2-6mm
gd	花崗閃長岩	Granodiorite
gdf	細粒花崗閃長岩，＜2毫米	Fine-grained granodiorite, <2mm
rf	長石斑岩	Feldsparphyric rhyolite
rq	石英斑岩	Quartzphyric rhyolite
ap	細晶岩	Aplite
p	偉晶岩	Pegmatite
q	石英脈	Quartz vein

GEOLOGICAL LINES 地質界綫

- Geological boundary, superficial deposit
- Fill boundary, with limit of reclamation at date shown — 1982
- Geological boundary, solid rock
- Fault (crossmark indicates downthrow side)
- Mineral vein
- Photogeological lineament
- Dyke to dyke contact
- Landslide backscar

GEOLOGICAL MAP (SCALE 1:20000)



LEGEND:

Jkt	Sha Tin Granite	Equigranular coarse- and fine- to medium-grained biotite granite	Kwai Chung Suite
Jko	East Lantau Rhyolite	Feldsparphyric rhyolite to porphyritic granite dykes	
Jkd	East Lantau Rhyodacite	Feldsparphyric rhyodacite to porphyritic granite dykes	
Jkn	Needle Hill Granite	Porphyritic fine-grained granite and equigranular medium-grained granite	
Jkc	Sham Chung	Flow-banded porphyritic rhyolite sill	
Jkl	South Lamma Granite	Equigranular medium-grained biotite granite	
	Hok Tsui Rhyolite	Quartzphyric rhyolite dykes	
Jmal	Tai Lam Granite	Porphyritic medium-grained to equigranular fine-grained leucogranite	A-type Subsuite — Lamma Suite
Jms	Tsing Shan Granite	Equigranular to inequigranular two-mica granite	
Jmc	Chek Lap Kok Granite	Equigranular fine-grained leucogranite	
	Chek Mun Rhyolite	Quartzphyric rhyolite dykes	
Jml	Lantau Granite	Megacrystic coarse-grained biotite granite	I-type Subsuite
Jmt	Tai Po Granodiorite	Porphyritic medium- and fine-grained granodiorite	

Geological lines

- Superficial deposits
- Solid geology
- Fault
- Thrust

Topographical symbols

- Major roads
- Streams and rivers
- Contours (vertical interval 100 metres with supplementary contour at 50 metres)
- Hong Kong SAR boundary

GEOLOGICAL MAP (SCALE 1:100000)

Appendix D

Extract of Geotechnical Report from BD

LG Mouchel & Partners (Asia)
Consulting Engineers

ROSCO H. N. HO Authorised Person
for and on behalf of HO & IP Architects
Engineers & Development Consultants Ltd.

6/9880/18(p)4

HO & IP ARCHITECTS

Reference No. 90196

Proposed Residential
Building Discovery Bay
Development Area 6B

GEOTECHNICAL REPORT

CONTENTS

1. INTRODUCTION
2. THE SITE
3. SITE INVESTIGATION AND GROUND CONDITIONS
4. STRENGTH PARAMETERS OF SOILS
5. SITE FORMATION DESIGN GUIDELINES AND CRITERIA
6. FOUNDATIONS
7. CONCLUSIONS
8. REFERENCES

FIGURES

1. Key Plan
2. Site Plan
3. Geological Section A-A
4. Geological Section B-B
5. Geological Section C-C
6. Geological Section D-D
7. Geological Section E-E
8. Strength Envelope of CDG
9. Strength Envelope of FILL

1. INTRODUCTION

It is proposed to develop the sites referenced 6B1, 6B2, 6B3 and 6B4 in Area 6B at Discovery Bay, Lantau Island (see Figures 1 and 2). The development will consist of blocks of high rise, medium rise and low rise residential buildings on platforms formed in 1984.

L.G. Mouchel & Partners (Asia) were requested by the Architect - Ho & Ip Architects to carry out minor site formation modification to suit the current developments.

Major site formation for the sites have been carried out and completed in early 1984. The design for this had been prepared by Binnie & Partners International in 1980 (Ref. 1). The design report was based on a comprehensive site investigation consisting of 36 drillholes and entensive laboratory testing.

Design principles for the site formation modification will basically follow those used in the previous major site formation design.

This reports presents the results of the recent site investigation, recommends foundation types and summarizes the design principles to be adopted in the site formation modification.

2. THE SITE

The sites (6B1, 6B2, 6B3 and 6B4) are located on the natural hillside facing Tai Pak Wan. Platforms at levels of +30m PD (6B1), +60m PD (6B2), +20m PD (6B3) and +32m PD (6B4) have been formed in 1984 by cutting into the hillside and placing a small amount of compacted fill. The cut slopes are generally 30° and not exceeding 35°. 1.5m wide berms with drainage channels are provided on the cut slopes at 7.5m vertical intervals. All the soil slope surfaces are protected with hydroseeding.

Rock exposures are present in many locations (see Figure 2).

3. SITE INVESTIGATION AND GROUND CONDITIONS

Adequate site investigation was carried out for the previous site formation design. For the current development, 31 drillholes (see ref. 2 for borehole records) were sunk at locations shown on Figure 2 for the foundation design. These drillholes generally confirm the ground conditions as revealed by the previous investigation.

The site investigations and field inspections show that the ground consists of very dense, coarse grained decomposed granite. Bedrock is very shallow and is exposed in many locations. The exposed rock is mainly strong, moderately to slightly decomposed granite. Random, closely spaced tight joints are present. Adverse sheeting joints do not appear to exist.

Geological sections through the sites and access roads are shown on Figures 3 to 7.

4. STRENGTH PARAMETERS OF SOILS

Strength parameters of c' = 16.2 kPa and $\phi = 40.5^{o}$ for completely decomposed granite (CDG) have been derived in the previous site formation study. Further laboratory tests (see ref. 3) on CDG and compacted fill have been carried out in the current site investigation. The triaxial compression test results confirm these parameters (see Figure 8) and show the following strength parameters for compacted fill (see Figure 9):-

$$c' = 3.6 \text{ kPa}$$
$$\phi = 36.8^{o}$$

The following strength parameters which have been used in the previous site formation design are also recommended for the current site formation modification and other permanent works design:-

	CDG	FILL
c', kPa	5	0
ϕ, degrees	40	39

For temporary works design, strength parameters of c' = 15 kPa and $\phi' = 40^{o}$ may be used for CDG.

5. SITE FORMATION DESIGN GUIDELINES AND CRITERIA

5.1 Soil Slopes

- Maximum cut slope angles in completely decomposed granite (CDG) to be 35°.
- Maximum compacted fill slope angle to be 30°.
- The finished slope surfaces to be protected with hydroseeding.
- Berms, 1.5m wide with surface channels to be provided at maximum vertical intervals of 7.5m.

5.2 Rock Slopes

Small cuttings in rock may be required. The maximum slope height of these cuttings is not expected to exceed 5m. Maximum slope angle should not exceed 60°. It is recommended that during construction the exposed rock faces should be mapped and the potential for failure assessed. Where necessary, flatter slope angles should be adopted.

5.3 Stability Checking of Formed Slopes

In the previous site formation, slopes formed under the criteria of section 5.1 were found to have a factor of safety exceeding 1.40 under assumed 1 in 10 years ground water conditions. Notwithstanding this, critical new slopes should be checked to confirm that adequate factors of safety are achieved.

As in the previous site formation design, traffic loadings of 11.5 kPa and 4.0 kPa for roads and carparks respectively should be incorporated in the stability analyses.

6. FOUNDATIONS

Rock head is generally exposed or very close to the formation level. Shallow spread footings and short piles on rock will be most appropriate. With this foundation system, all the building loads will be transmitted to bedrock and hence the slope stability will not be affected.

Hand dug caissons should not cause large groundwater drawdown nor associated problems as the existing water table is close to or below rock head level.

For buildings close to the slopes, lateral loads on the building should be transmitted to and resisted by the bedrock.

7. CONCLUSIONS

The sites have been formed. Only minor earthwork is required to suit the proposed development. As revealed in the previous site formation design, all the sites are stable. As the bedrock is shallow and all the proposed buildings will be founded on bedrock, the stability of the sites will not be affected.

8. REFERENCES

1. Binnie & Partners International, "Report on the Proposed Site Formation at Discovery Bay, Lantau Island, Lot 385 in D.D. 352, Area 6B, Vol. 1 - Geotechnical Report".

2. Hong Kong Resort Co. Ltd., "Site Investigation Report" for Area 6B, Discovery Bay, Lantau Island, Hong Kong, Reference 85308.

3. Ho & Ip Architects, "Site Investigation Report - Laboratory Soil Testing" for Area 6B, Discovery Bay, Lantau Island, Hong Kong, Reference 85308 dated 23rd May 1985.

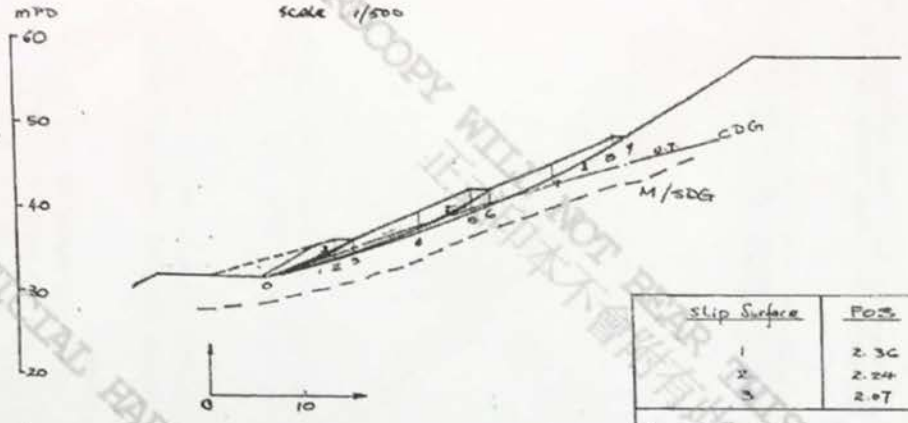
S.L. Lam

Mouchel
LGMouchel&Partners(Asia)
Consulting Engineers

PROJECT 9019G

LOWLAND DEVELOPMENT -
DISCOVERY BAY - AREA 6

AREA 6B1 SECTION A-A

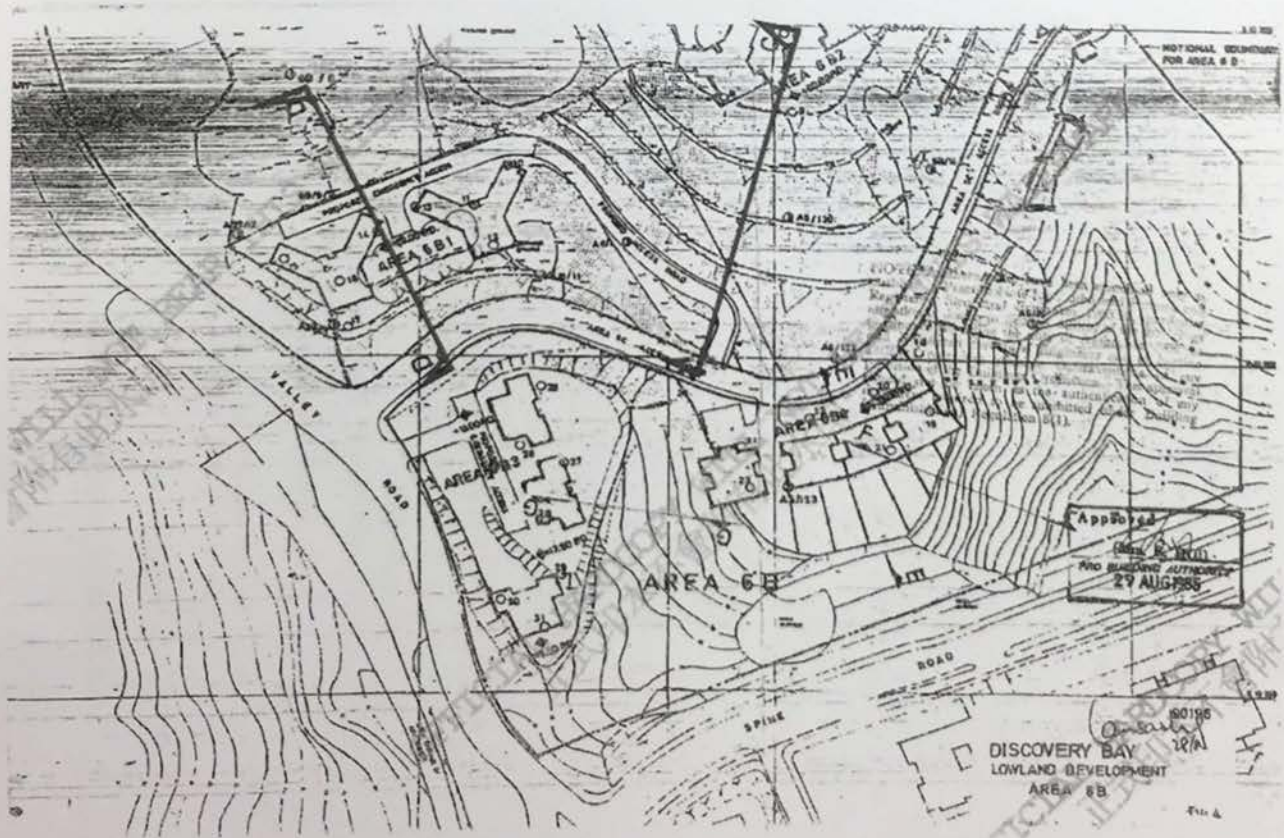


Slip Surface	FOS
1	2.36
2	2.24
3	2.07

(Note γ = 19.6 kN/m³
c' = 5 kN/m²
ϕ = 40°)

FOR GROUND PROFILE & SEEPAGE PARAMETERS
PLEASE REFER TO "GEOTECHNICAL REPORT"
Ref: 9019G

GEOTECHNICAL CONTROL OFFICE
7 MAY 1986
RECEIVED



Mouchel
LGMouchel&Partners(Asia)
Consulting Engineers

Geological Section

Fig. 6

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Geological Section

Fig. 5

SECTION B-B Scale 1/500

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Geological Section

Fig. 4

SECTION A-A Scale 1/500

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Geological Section

Fig. 3

Discovery Bay

6/9884/78(P)

FUGAR 富嘉工程建築有限公司
ENGINEERING & CONSTRUCTION CO. LTD.
3/F., BLK. B & C, THOMSON COMM. BLDG., 8 THOMSON RD., HONG KONG. TEL: 5-295078

Site Investigation Report

(Job No. 85308)

Location: Area 6B1, 6B2, 6D1 & 6D2, Discovery Bay,

Lantau Island, Hong Kong.

Architect/Consultant: Hong Kong Resort Co. Ltd.,

FUGAR ENGINEERING & CONSTRUCTION CO., LTD.
3/F., Blk. 'B' & 'C', Thomson Comm. Bldg., 8 Thomson Rd., Hong Kong
Tel.: 5-285079

REPORT ON DRILLHOLE BOREHOLE No. BH-1 Sheet 1 of 1

Client/Consultant Hong Kong Resort Co. Ltd.
Job No./Tender No. J85308
Location Discovery Bay, Area 6B2, Lantau
Ex. Ground Level/Sea Bed Level +60.02MPD Tesind.
Coordinates N E

Orientation Vertical
Method Drilling
Machine R-5
Core Barrel Flushing Medium Water
Date From 2-5-85 To 2-5-85

SAMPLE						WATER RECEIVE	LEGEND	DEPTH (M)	DESCRIPTION OF STRATA
SOIL SAMPLE DEPTH	SOIL SAMPLE BLS/305mm	TYPE	CORE REC	CORE RQD					
			60					0.00	Existing ground surface
								0.30	
								0.60	Filled soil.
1.50	17	U76							Cobbles.
1.95	(8)	D							
2.40									Yellowish brown silty
3.00	41	U76							
3.45	(16)	D							sand.
3.90								4.50	
4.50	(79)	D							Yellowish brown dense
4.90									
6.00	(114)	D							silty sand.
6.45									
7.50	250/0.20	D							(C. D. G.)
7.70								8.20	
8.20			93	80					
								9.70	Greyish white with pink
			100	95					
								11.10	speckled strong jointed
			100	90					
								12.30	slightly decomposed
			100	90					Feldspar Porphyry.
13.50								13.50	
									Bottom of
									hole

U: Undistu
U: Undisturbed Sample
L: Liner Sample
M: Marker Sample
P: Piston Sample
D: Disturbed Sample
(A numerical figure after a symbol designates the size of sample in mm)

S: S.P.T.
( ): N Value/305 mm.
-: Hole Depth
Ws: Washed Sample
W: Water Sample

Remarks

DRILLER: N. T. Yuen SUPERVISOR: Philip Ng

FUGAR ENGINEERING & CONSTRUCTION CO., LTD.
3/F., Blk. 'B' & 'C', Thomson Comm. Bldg., 8 Thomson Rd., Hong Kong
Tel.: 5-285079

REPORT ON DRILLHOLE BOREHOLE No. BH-2 Sheet 1 of 1

Client/Consultant Hong Kong Resort Co. Ltd.
Job No./Tender No. J85308
Location Discovery Bay, Area 6B2, Lantau
Ex. Ground Level/Sea Bed Level +59.10MPD Island.
Coordinates N E

Orientation Vertical
Method Drilling
Machine F-5
Core Barrel Flushing Medium Water
Date From 1-5-85 To 1-5-85

SAMPLE: SOIL SAMPLE DEPTH	SAMPLE: SOIL SAMPLE BLS/305mm	SAMPLE: TYPE	CORE: REC.	CORE: RQD	WATER RETURN	LEGEND	DEPTH (m)	DESCRIPTION OF STRATA
							0.00	Existing ground surface
							0.50	Filled soil.
1.20			100				1.20	Greyish white slightly decomposed porphyre.
			96	80			1.80	
			100	85			3.25	Yellowish brown silty sand.
			97	82			4.70	(C. D. G.)
			100	90			5.95	Greyish white with pink speckled strong and jointed slightly decomposed Feldspar Porphyry.
6.25			100	88			6.25	Bottom of hole

Nx

U: Undistu
U: Undisturbed Sample
L: Liner Sample
M: Mazier Sample
P: Piston Sample
D: Disturbed Sample
(A numerical frigue after a symbol designates the size of sample in mm)

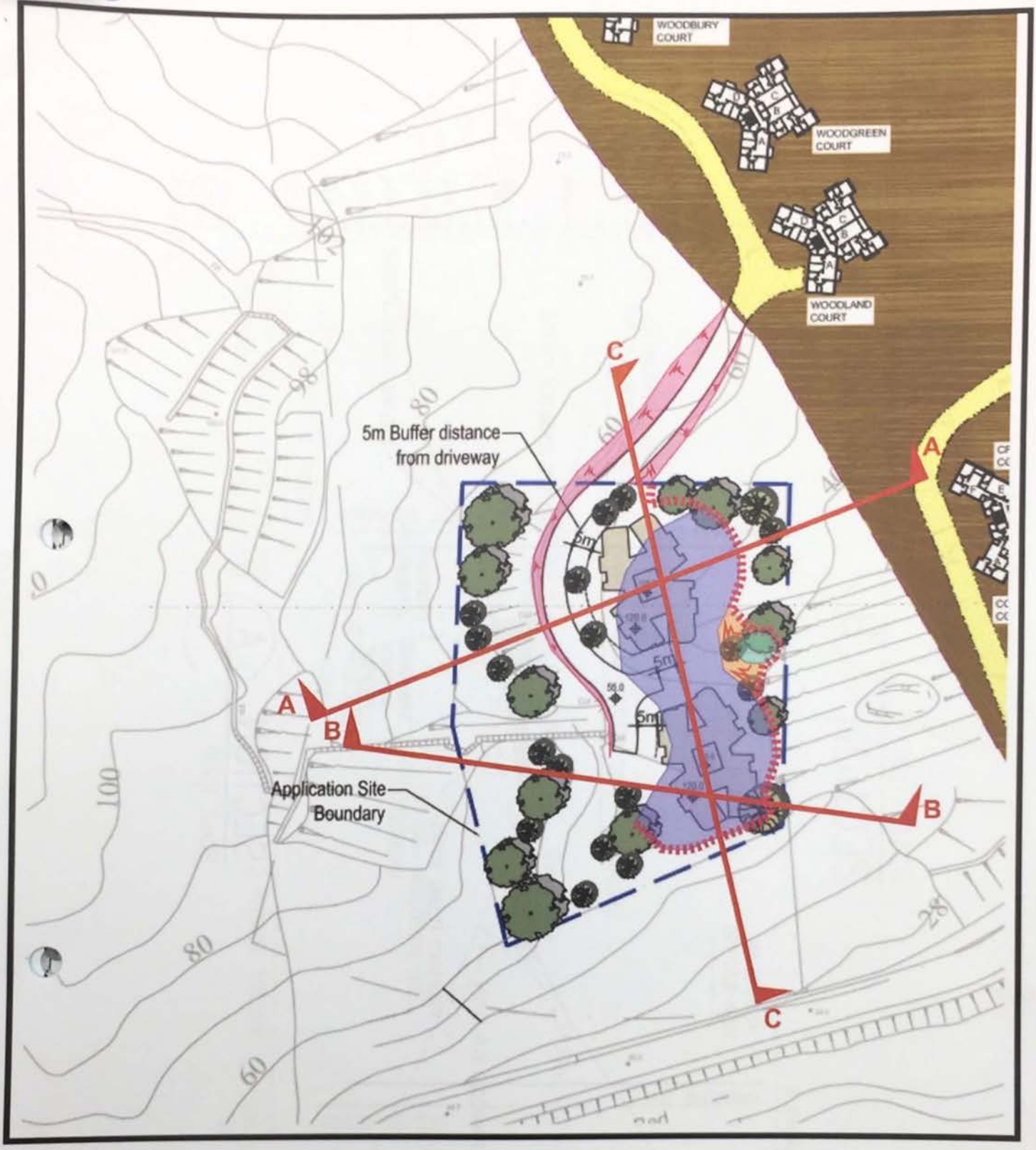
S: S.P.T.
( ): N Value/305 mm.
⊣: Hole Depth
Ws: Washed Sample
W: Water Sample

Remarks

DRILLER: N. T. Yuen SUPERVISOR: Philip Ng

Appendix E

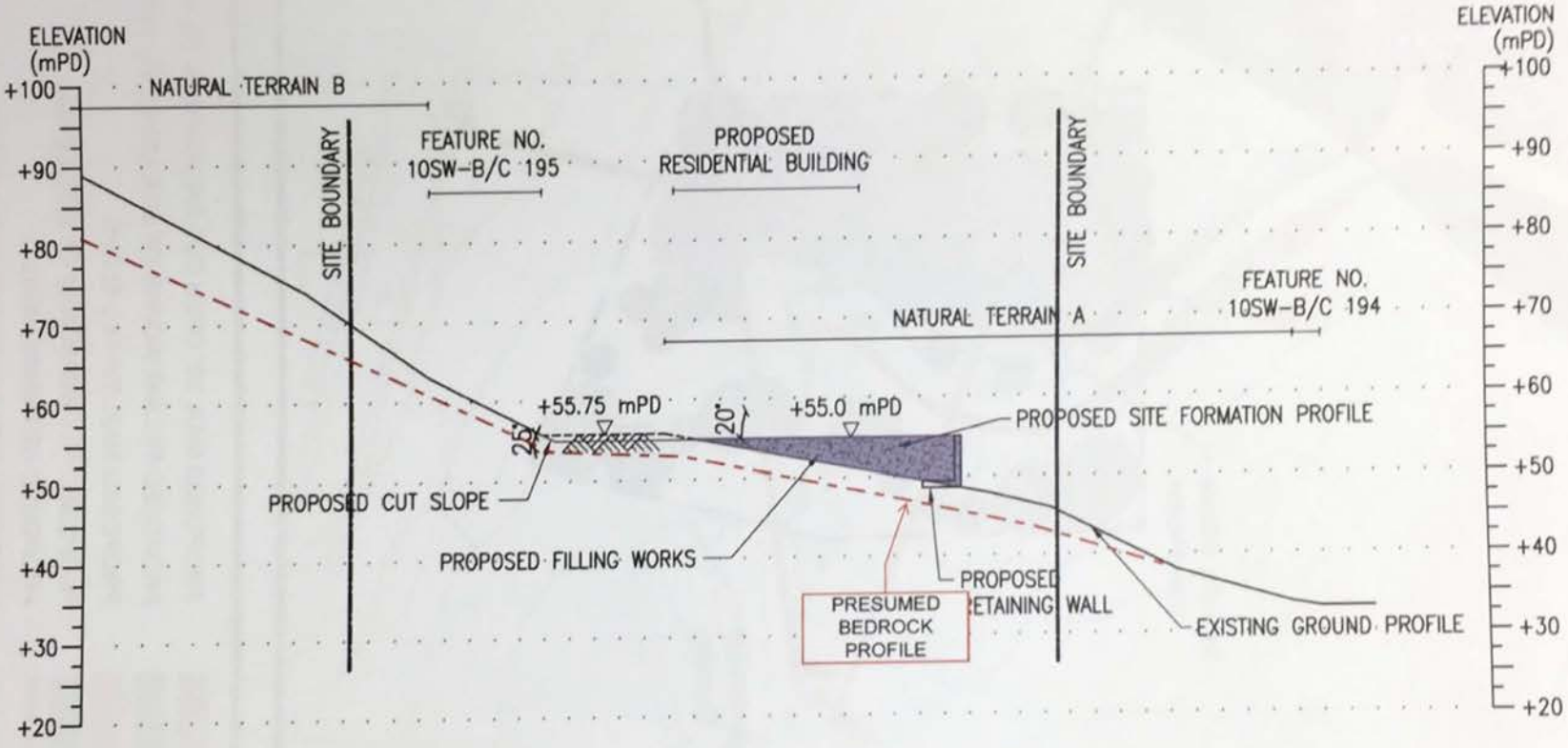
Schematic Site Formation Plan and Sections



LEGEND:

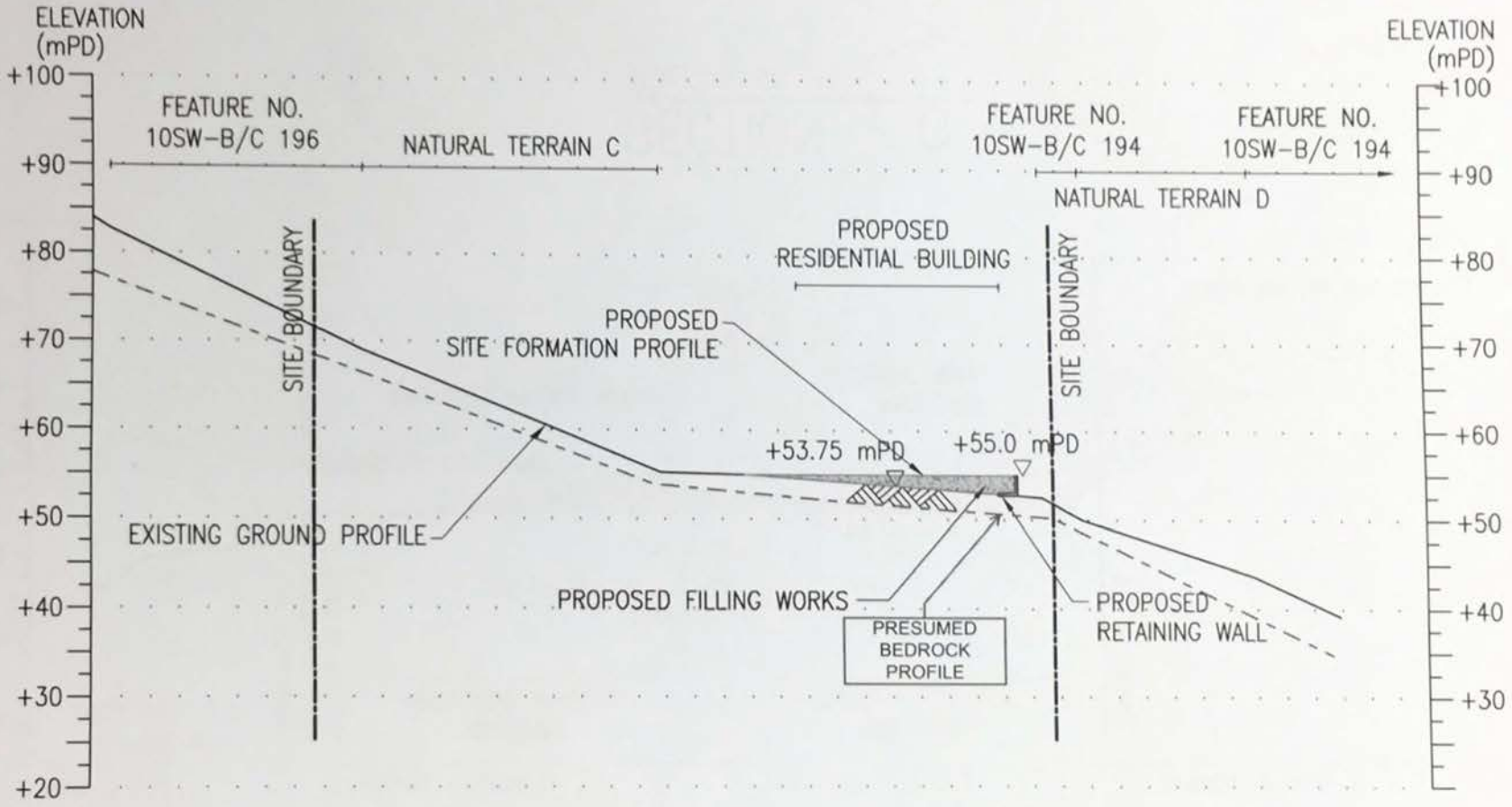
- PROPOSED MAX. 25° OPEN CUT EXCAVATION TO +55mPD
- PROPOSED FILLING WORKS OF SITE LEVEL TO +55mPD
- PROPOSED MAX. 30° FILL SLOPE
- PROPOSED FILLING WORKS OF SITE LEVEL
- PROPOSED RETAINING WALL
- PROPOSED OZP BOUNDARY FOR AREA 6F

APPENDIX E - SCHEMATIC SITE FORMATION PLAN



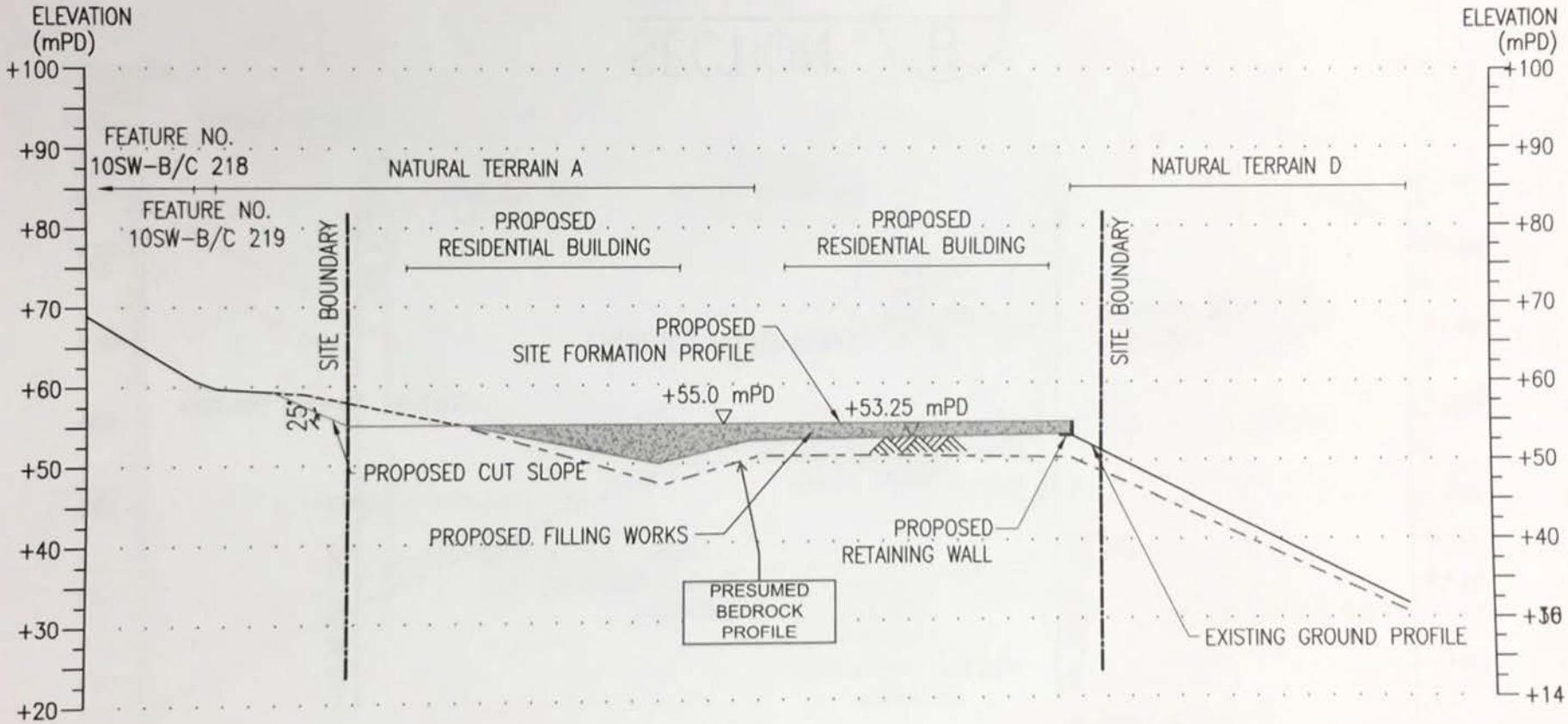
SECTION A

SCALE 1:200



SECTION B

SCALE 1:200



SECTION C

SCALE 1:200

Appendix B

Detail Study of Compensatory Trees

NORTH

LEGEND

- SITE BOUNDARY
- PROPOSED DEVELOPMENT LAYOUT
- EXISTING TREE GROUPS TO BE RETAINED
- COMPENSATORY TREE (125 NOS.)

NOTES
1. PLANTING SPECIES SELECTION SUBJECT TO DETAILED DESIGN STAGE.
2. MINIMUM SPACING FOR TREES OF SMALL ULTIMATE SIZE: 3m.
3. MINIMUM SPACING FOR TREES OF MEDIUM TO LARGE ULTIMATE SIZE: 4m.

128.0
120.0
55.0
128.0
120.0

Coral Court

SCALE 1 : 600
0 10 20 30m

申請編號 Application No. : Y/I-DB/2
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Revision	Date	Description	Drawn by	Checked by	Approved by

Job Title
DISCOVERY BAY OPTIMIZATION OF LAND USE - REFINEMENT OF AREA 6F

Drawing Title
COMPENSATORY PLANTING PLAN

Drawing No.
PT30/6F/P/CP01

Scale
1:600@A3

Drawn by	EI	Checked by	DK	Approved by	TO	Date	MAR 2017	Job. No.	PT30

雅邦 Urbis Limited
Planning, Urban Design, Landscape, Golf & Environmental Consultants
Urbis Limited, 11/F Siu On Centre, 188 Lockhart Road, Wan Chai, Hong Kong. Tel : 2802 3333 Fax : 2802 8662

Appendix C

Revised Environmental Study (relevant pages)

term should not be totally ruled out. For example, the Government is currently actively seeking cavern development as a new source of land supply. If in the future, it is deemed suitable that the existing SHWSTW can be relocated into a cavern site to vacate valuable land for development, the relocated SHWSTW can be such designed to accommodate the increased sewage flows from the Discovery Bay.

5.7 Contingency Measures

5.7.1.1 Contingency planning for disruption of normal STW operation will need to be considered in the planning and design of the STW. Scenarios like power failure, treatment facility malfunction, fire or flooding, should be considered.

5.7.1.2 The following initial contingency measures can be considered to control the emergency overflows from the STW thereby polluting the stream and the receiving water bodies at Discovery Bay:

- Dual feed power supply for the STW.
- Suitable backup of treatment process in the STW.

5.7.1.3 Should these measures fail, other further contingency measures should be considered to deal with the emergency sewage overflows:

- Due to the Area 6f site is located at a high elevation, it is proposed to provide an emergency overflow pipe from the proposed STW at Area 6f to existing sewage pumping station no. 1 (SPS1) located at the junction of Discovery Bay Road and Discovery Valley Road. During emergency situation, sewage from the STW can overflow to SPS1 which will transfer the sewage flow to SHWSTW. Capacity of the existing Discovery Bay downstream sewerage system to handle the sewage flow during STW emergency overflow situation has been checked and results indicate that the existing downstream sewerage system are adequate to accommodate the sewage from both Area 6f and existing sewerage catchment (Refer to **Table 5.4**).

Table 5.4: Summary of Capacity Check for Downstream Sewerage System

Downstream SPS		**SPS 1** [3]	**SPS 3**
Pump Capacity (m^3/d)	Duty (2 pumps)	**32,832**	**32,832**
	Stand-by (1 pump)	16,416	16,416
Population	Existing Catchment	25,000	25,000
	Area 6f	1,190	1,190
Estimated ADWF (m^3/d)	Existing Catchment [1]	9,200	9,200
	Area 6f	440	440
	Total	9,640	9,640
Peak Flow[2] (m^3/d)	Total	**28,920**	**28,920**

Note:

(1) To estimate the ADWF of the existing catchment, it is assumed that there are 50% of R2 developments and 50% of R3 developments for the existing Discovery approved 25,000 population. 15% allowance has been made for the sewage from other commercial activities.

(2) Peaking factor of 3 is adopted according to the total contribution population derived based on the approach illustrated in Table 5.2

(3) To be conservative in this assessment, it has been assumed that the sewage flow of the SPS 1 is the same as the most downstream SPS3.

- As the sewage flows is relatively small (440 m^3/day ADWF), sewage tanker vehicles (each vehicle can remove $12m^3$ of sewage) could also be considered to remove some sewage from the Area 6f STW to existing SHWSTW during emergency case.

Appendix D

Relevant Revised Figures and Pages of Studies on Water Supply

N

Siu Ho Wan
Water Treatment
Works and Siu Ho Wan Fresh
Water Pumping Station

Discovery Bay Fresh
Water Booster Pumping Station

Ex 1600
Ex 1200
Ex 450
Ex 450
DISCOVERY BAY TUNNEL
SIENA AVENUE
DISCOVERY BAY ROAD
Ex 300
Ex 450
DISCOVERY BAY

Ex 1200
(To Tung Chung Fresh
Water Service Reservoir)

Detail A

Area 6f
New 50
New 150
Ex 300
Ex 200
Ex 200
Ex 200
Ex 300
Ex 450
Ex 450

Discovery Bay
Reservoir

Fresh Water Service
Reservoirs No.1 & No.2
and Pumping Station

Ex 450

Fresh and
Flushing Water
Supply for Area 6f

New DN150 fresh water main
New DN50 flushing water main
Tee off from
existing DN300
flushing water
main
Tee off from
existing
DN450 fresh
water main
Existing DN300 flushing water main
Existing DN450 fresh water main

Detail A
(NTS)

Legend

Ex 450	Existing Fresh Water Main
Ex 200	Existing Flushing Water Main
New 150	New Fresh Water Main
New 50	New Flushing Water Main

申請編號 Application No. : Y/I-DB/2
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Job Title
DISCOVERY BAY - OPTIMIZATION OF LAND USE

FIGURE 4

Date	Scale
April 2017	1:15000
Drawn	Job No.
SY	236078

Drawing Title
EXISTING AND PROPOSED WATER SUPPLY LAYOUT PLAN FOR OPTION 1 - SUPPLY FROM SIU HO WAN WATER TREATMENT WORKS

ARUP

Siu Ho Wan
Water Treatment
Works and Siu Ho Wan Fresh
Water Pumping Station

Ex 1600

Ex 1200

Ex 450

Ex 450

DISCOVERY BAY TUNNEL

Discovery Bay Fresh
Water Booster Pumping Station

Ex 1200
(To Tung Chung Fresh
Water Service Reservoir)

SIENA AVENUE

DISCOVERY BAY ROAD

Ex 300

Ex 450

DISCOVERY
BAY

DISCOVERY BAY
(TAI PAK WAN)

Refer to Figure 6 for details

Area 6f

New 50

New 150

Ex 200

Ex 300

Ex 200

Ex 200

Fresh Water Service Reservoirs No.1 & No.2
and Pumping Station

Ex 300

Discovery Bay
Reservoir

Proposed Private Fresh
Water Service Reservoir
No.3

Ex 450

Proposed Discovery Bay Private Water Treatment Works (WTW) and Fresh Water Pumping Station at the location of the previous Discovery Bay WTW decommissioned in 2000

PENG CHAU

0 70 140 210 280 350
METRES

Legend

Ex 450	Existing Fresh Water Main
Ex 200	Existing Flushing Water Main
New 150	New Fresh Water Main
New 50	New Flushing Water Main

申請編號 Application No. : Y/I-DB/2
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Job Title
DISCOVERY BAY - OPTIMIZATION OF LAND USE

FIGURE 5

Date	Scale	Drawing Title
April 2017	1:15000	EXISTING AND PROPOSED WATER SUPPLY LAYOUT PLAN FOR OPTION 2 - SUPPLY FROM DISCOVERY BAY PRIVATE WATER SUPPLY SYSTEM (SHEET 1 OF 2)
Drawn: SY	Job No.: 236078	

ARUP

Legend

Ex 450	Existing Fresh Water Main
Ex 200	Existing Flushing Water Main
New 150	New Fresh Water Main
New 50	New Flushing Water Main
	Re-commission existing or new draw -off pipe and transmission main

Fresh and flushing water supply for Area 6f

Area 6f

New DN50 flushing water main

New DN150 fresh water main

Tee off from existing DN300 flushing water main

Existing DN300 flushing water main

Existing DN450 fresh water main

New DN150 fresh water main

Existing DN300 flushing water main

Existing DN450 fresh water main

Recommission existing or construct new draw-off pipe and transmission main from Discovery Bay Reservoir to supply proposed Discovery Bay Private Water Treatment Works

Existing Fresh Water Pumping Station

Existing Fresh Water Service Reservoir No.2

Proposed Private Fresh Water Service Reservoirs No.3

New 150

Proposed Discovery Bay Private Water Treatment Works (WTW) and Fresh Water Pumping Station at the location of the previous Discovery Bay WTW decommissioned in 2000

Existing Fresh Water Service Reservoir No.1

Water Treatment Plant

Discovery Valley Road

Rocky Stream

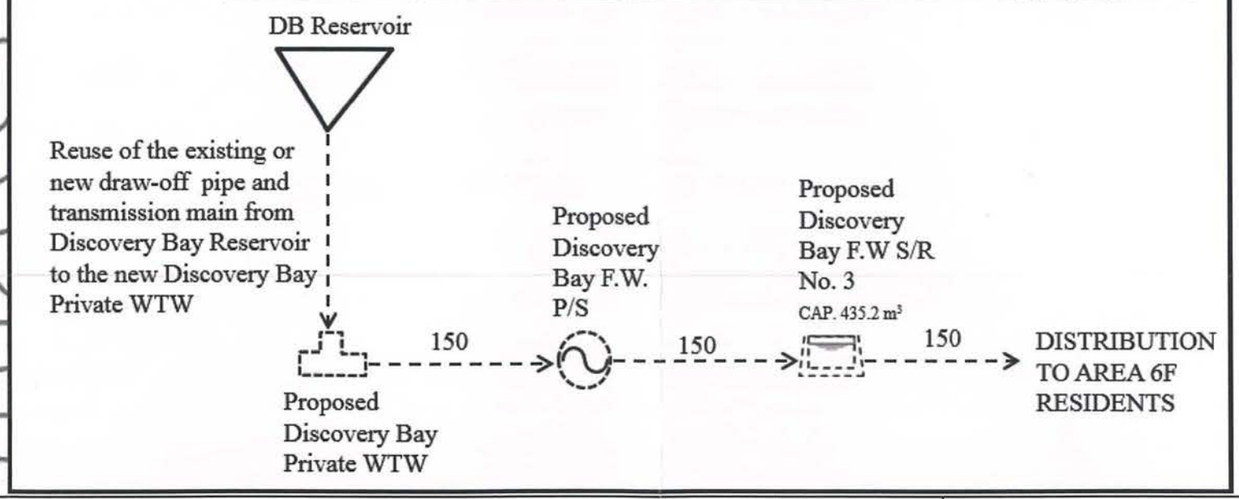
Nullah

Parkvale

Hillgrove Village

申請編號 Application No. : Y/I-DB/2
此頁摘自申請人提交的文件。
This page is extracted from applicant's submitted documents.

Schematic Layout of the Proposed Private Fresh Water Supply System



Job Title: DISCOVERY BAY - OPTIMIZATION OF LAND USE

FIGURE 6

Date	Scale	Drawing Title
April 2017	NTS	EXISTING AND PROPOSED WATER SUPPLY LAYOUT PLAN FOR OPTION 2 - SUPPLY FROM DISCOVERY BAY PRIVATE WATER SUPPLY SYSTEM (SHEET 2 OF 2)
Drawn: SY	Job No.: 236078	

ARUP

Siu Ho Wan Sewage Treatment Works (SHWSTW) for further treatment and disposal via the internal rising mains between the sewage pumping stations and existing 450mm diameter twin rising mains laid along Discovery Bay Tunnel to SHWSTW. SHWSTW is a chemically enhanced primary treatment (CEPT) with design treatment capacity of 180,000 m^3/d and a design peak flow of 3,750 l/s.

EPD commented in May 2015 that the current capacity of SHWSTW has been allocated for other existing and planned future developments so SHWSTW has no spare capacity to cater for the additional sewage from the potential developments at Discovery Bay despite that additional flow due to potential developments for both 6f and 10b is only 0.8% of the current SHWSTW design treatment capacity. EPD also advised that there is currently no plan to increase the design capacity of the SHWSTW in the short and medium terms.

As the EPD cannot commit to provide extra treatment capacity in SHWSTW for the proposed development in Area 6f in the short and medium terms, an alternative sewerage option of discharging the sewage from the Area 6f to an on-site small Discovery Bay Sewage Treatment Works (DBSTW) is proposed.

Nevertheless, the possibility of discharging additional sewage flows generated from the Discovery Bay potential developments to SHWSTW in the long term should not be totally ruled out. For example, the Government is actively seeking cavern development as a new source of land supply. If in the future, it is deemed suitable that the existing SHWSTW can be relocated into a cavern site to vacate valuable land for development, the relocated SHWSTW can be such designed to accommodate the increased sewage flows from the Discovery Bay.

HKRCL opines that, should EPD plans for infrastructure extension of the SHWSTW in the long term, EPD should consider all private and public developments in the vicinity on equal and fair basis.

Water Supply

Discovery Bay falls within supply zone of Siu Ho Wan Water Treatment Works (SHWWTW) via the Siu Ho Wan Fresh Water Pumping Station (FWPS). To meet the additional water demand arising from the proposed development at Area 6f estimated to be 512 m^3/d, two fresh water supply options have been formulated: (i) Option 1 – supply from Siu Ho Wan Water Treatment Works (SHWWTW); and (ii) Option 2 – supply from Discovery Bay Private Water Supply System. Both supply options are considered to be technically feasible and either water supply option can be considered to serve Area 6f development.

Under fresh water supply Option 1, the proposed development at Area 6f will be supplied by fresh water from the Siu Ho Wan Water Treatment Works, through teeing off from the existing water main along the Discovery Valley Road. The additional water demand from Area 6f is only 0.17% of the 300,000 m^3/d ultimate upgraded capacity of SHWWTW, the upgraded SHWWTW is likely to be able to support this small amount of additional water demand from the development. It has also been checked that other existing infrastructures such as the Discovery Bay booster pumping station, Fresh Water Service Reservoir No. 1 and No. 2 and fresh water mains are adequate to support the additional water demand from the Area 6f.

Under fresh water supply Option 2, it is proposed that a new private fresh water supply system within Discovery Bay be provided to supply the additional fresh water demands from the potential development. Raw water will be abstracted from the Discovery Bay Reservoir and treated at a new Discovery Bay Water Treatment Works. The treated water will be transferred to a nearby new service reservoir and distributed to Area 6f via new transmission and distribution network. This new fresh water supply system for Area 6f will be entirely segregated from the existing Discovery Bay fresh water supply network (supplied by WSD's Siu Ho Wan Water Treatment Works). There will be no interconnection between the existing Discovery Bay and the new fresh water supply network to eliminate any potential risk of cross-contamination.

The flushing water supply for the current residents at Discovery Bay are sourced from Discovery Bay Reservoir. It has been checked that the existing reservoir has enough storage even during a drought year to meet the additional flushing water demand of 84 m^3/d. The flushing water supply for the potential development Area 6f will be provided from the existing Discovery Bay Reservoir through teeing off from existing DN300 flushing water main along Discovery Valley Road.

Discovery Bay Fresh Water Service Reservoirs No. 1 and No. 2. They are interconnected and located at the same level of around +95 mPD with top water level of +101 mPD. Discovery Bay Fresh Water Service Reservoirs No. 1 and No. 2 have capacities of 7,250 m^3 and 2,992 m^3 respectively. Total capacity of these two service reservoirs is 10,242 m^3.

6.5 Existing Flushing Water Supply System

6.5.1.1 Discovery Bay has its own flushing water supply system by intercepting existing hillside runoff by catchwater to the Discovery Bay Reservoir for flushing purpose. Existing flushing water supply system is illustrated in **Figure 4**.

6.5.1.2 The existing Discovery Bay Reservoir also provides both fresh and flushing water supply to the adjacent Nim Shue Wan Village.

6.5.1.3 Discovery Bay Reservoir collects and stores rainwater to supply flushing water to existing Discovery Bay developments and fresh and flushing water to Nim Shue Wan Village. It has a rainwater catchment area of around 138 ha, including 18 ha of the reservoir itself (at top water level). Summary details of the Discovery Bay Reservoir are provided in **Table 6.3**.

Table 6.3: Description of Discovery Bay Reservoir

Name of Reservoir	Supply Zone	Capacity (m^3)	Invert Level (mPD)	Top Water Level (mPD)
Discovery Bay Reservoir	Discovery Bay and Nim Shue Wan Village	3,400,000	+125	+175

6.6 Fresh Water Supply Impacts and Provisions

Two water supply options have been formulated to provide fresh water supply to the proposed development at Area 6f. Both supply options are considered to be technically feasible and either water supply option can be adopted to serve Area 6f.

6.6.2 Fresh Water Supply Option 1 – Supply from Siu Ho Wan Water Treatment Works

Under this option, the proposed development at Area 6f will be supplied by fresh water from the Siu Ho Wan Water Treatment Works, through teeing off from the existing water main along the Discovery Valley Road (Refer to **Figure 4** for details).

6.6.2.2 **Siu Ho Wan Water Treatment Works and Siu Ho Wan Fresh Water Pumping Station**

6.6.2.3 The existing capacity of the SHWWTW is insufficient to supply the

existing developments, other concurrent and future developments within the supply zone of SHWWTW. However, the future expansion works of SHWWTW and Siu Ho Wan FWPS to a capacity of 300,000 m^3/d should be adequate to supply both its catchment and additional fresh water (1,721 m^3/d) to Discovery Bay potential developments at both Area 6f and 10b (i.e. 0.57% of 300,000 m^3/d ultimate upgraded capacity of SHWWTW).

6.6.2.4 Existing capacity of Siu Ho Wan FWPS is same as SHWWTW (150,000 m^3/d). Upgrading of Siu Ho Wan FWPS to 300,000 m^3/d would be necessary.

6.6.2.5 **Discovery Bay Fresh Water Booster Pumping Station**

6.6.2.6 Existing Discovery Bay Fresh Water Booster Pumping Station has four pump bays and house three pump sets (2 duty and 1 standby) with a reliable output of about 15,120 m^3/d (87.5 L/s each with 100.5m head) to deliver fresh water to Discovery Bay. It will be capable of delivering the total fresh water demand of Discovery Bay including the Discovery Bay potential developments at both Area 6f and 10b (12,574 m^3/d) as shown in **Table 6.6**.

Table 6.6: Total Fresh Water Demand of Discovery Bay

Supply Zone	Population	Population Type	Unit Flow Factor (m^3/person/d)	Fresh Water Demand (m^3/d)
Existing Discovery Bay Development	25,000	Residential	0.390 + 0.04	10,750
	4,100	School	0.025	102.5
Discovery Bay potential development Areas 6f	1,190	Residential	0.390 + 0.04	512
Discovery Bay potential development Areas 10b	2,813	Residential	0.390 + 0.04	1,210
			Total MDD =	12,574

6.6.2.7 The existing 450 mm pumping main from Discovery Bay Fresh Water Booster Pumping Station to Discovery Bay has been checked to be capable of meeting total fresh water demand of Discovery Bay and potential development. No upgrading of this trunk main would be envisaged. Detailed calculations are provided in **APPENDIX B3**.

6.6.2.8 **Fresh Water Service Reservoirs at Discovery Bay**

6.6.2.9 According to WSD's DI 1309, fresh water service reservoir requires total storage capacity of 0.85MDD (for isolated water supply zones), i.e. 11,136 m^3/d x 0.85 = 9,660 m^3 (to supply additional potential development at Area 6f only) and 12,574 x 0.85 = 10,688 m^3 (to supply additional potential development at both Area 6f and 10b). Detailed

calculations are provided in **APPENDIX B3** and summary of total fresh water demand of Discovery Bay is provided in above **Table 6.6**.

6.6.2.10 Total capacity of existing Discovery Bay Fresh Water Service Reservoirs No. 1 and No. 2 is 10,242 m^3 (7,250m^3 + 2,992m^3) > 9,660 m^3. Therefore, the storage volume is adequate for the existing Discovery Bay development and potential development at Area 6f. The storage volume of the existing reservoirs is marginally below 0.85MDD of the ultimate fresh water demand from the existing Discovery Bay and the potential developments for both 6f and 10b (total 10,688 m^3). Therefore, additional fresh water storage of 446m^3 will be required considering the cumulative effects including both Area 6f and Area 10b. Detailed calculations are provided in **APPENDIX B3**.

Under Option 2, it is proposed that a new private fresh water supply system within Discovery Bay be provided to supply the additional fresh water demands from the potential developments. Raw water will be abstracted from the Discovery Bay Reservoir and treated at a new Discovery Bay Water Treatment Works. The treated water will be transferred to a nearby new service reservoir and distributed to Area 6f via new transmission and distribution network. Details of the proposed water supply Option 2, including layout plan and schematic layout, are presented in **Figure 5 and 6.**

It is noted that this new fresh water supply system for Area 6f (under Option 2) will be entirely segregated from the existing Discovery Bay fresh water supply network (supplied by WSD's Siu Ho Wan Water Treatment Works). There will be no interconnection between the existing Discovery Bay and the new fresh water supply network to eliminate any potential risk of cross-contamination.

It is also noted that in fact similar fresh water supply arrangement (as Option 2) has been adopted in Discovery Bay for 20 years until 2000. The Discovery Bay residents were fully aware of and used to this arrangement and there had never been any concerns on the water quality of the fresh water produced from the private water treatment works.

Raw Water Supply Source - Discovery Bay Reservoir

6.6.3.5 Discovery Bay Reservoir has an invert level of 125mPD, a top water level of 175mPD and total of 3,400,000 m^3 storage. The existing Discovery Bay Reservoir supplies flushing water to Discovery Bay and both fresh and flushing water to the nearby Nim Shue Wan Village. Under this fresh water supply option 2, the existing Discovery Bay Reservoir will be extended to also supply fresh (and flushing) water supply for the potential development areas, as shown in **Table 6.7** below.

Table 6.7: Total Water Demand from Discovery Bay Reservoir

Supply Zone	Population	Population Type	Unit Flow Factor (m^3/person/d)	Flushing Water Demand (m^3/d)
Flushing Demand from Existing Discovery Bay Development	25,000	Residential	0.07	1,750
	4,100	School	0.025	102.5
Fresh and Flushing Water Demand from Existing Nim Shue Wan Village	150	Residential + Service Trades	0.23+0.04+0.07	51
Fresh and Flushing Demand from Discovery Bay potential development Areas 6f and 10b	4,003	Residential	0.39+0.04+0.07	2,001.5
			Total =	3,905

6.6.3.6 An analysis has been carried out to check the adequacy of water supply for the Discovery Bay Reservoir during a drought year. From the data collected from Hong Kong Observatory between year 2000 to 2014, the 12 month period from October 2010 to September 2011 has been selected as the drought year for assessment. Based on the lowest reservoir water level recorded between March 2008 and March 2014 (including the drought year), it has been conservatively estimated by taking into consideration all inflows and outflows to and from the reservoir that the remaining storage volume of Discovery Bay Reservoir after the drought year is around 0.36 million m^3. This means after taken into account of the various water demands from the existing and proposed developments of Discovery Bay and Nim Shue Wan Village and the reservoir evaporation loss throughout the drought year, the remaining reservoir volume after the drought year still has more than equivalent of 3 months of total water demand of 0.35 million m^3. (i.e. 3,905 m^3/d x 90 days). It demonstrates the Discovery Bay Reservoir has adequate storage to provide additional fresh (and flushing) water supply to both the potential developments at Area 6f and 10b. The relevant calculations for checking the capacity of Discovery Bay Reservoir in drought year are provided in **APPENDIX B3**.

New Discovery Bay Private Water Treatment Works and Pumping Station

The decommissioned draw-off pipe (previously used until 2000) at the existing Discovery Bay Reservoir will be re-commissioned or new draw-off pipe will be provided to deliver raw water from the Discovery Bay to the new Discovery Bay Private Water Treatment Works.

It is proposed that the new Discovery Bay Private Water Treatment Works will be located at the same location of the previously decommissioned water treatment works as shown in **Figure 6**. The new

private water treatment works will provide water treatment to the abstracted raw water. The water treatment works will include pump sets to transfer the treated fresh water to a nearby new service reservoir.

The capacity of the new Discovery Bay Private Treatment Works shall be based on peak flow of 1.5MDD (for a single service reservoir system), i.e. 512 m^3/d x 1.5 = 768 m^3/d (to supply potential development at Area 6f) only or (512+1,210) x 1.5 = 2,583 m^3/d (to supply potential development at both Areas 6f and 10b).

New Private Fresh Water Distribution System

In this private water supply system, the raw water after being treated in the private Discovery Bay Water Treatment Works, will be stored in a proposed private Fresh Water Service Reservoir No. 3 as shown in **Figure 6**.

According to WSD's DI 1309, the proposed Fresh Water Service Reservoir No. 3 requires total storage capacity of 0.85MDD (for isolated water supply zones), i.e. 512 m^3/d x 0.85 = 435.2 m^3 (to supply additional potential development at Area 6f only) or (512+1,210) x 0.85 = 1,463.7 m^3 (to supply additional potential development at both Area 6f and 10b).

The new DN150 distribution water main between the Service Reservoir No. 3 and the proposed development at Area 6f will then distribute the fresh water from the new service reservoir to the residents at Area 6f.

Water Quality Standard

Proper treatment and stringent quality monitoring and control will be implemented in this private water treatment and distribution system to ensure the water quality of this private system will fully conform to the Guidelines for Drinking-water Quality recommended by the World Health Organization (WHO), which is the water quality standard currently adopted by the WSD fresh water supply system.

6.7 Flushing Water Supply Impacts and Provisions

6.7.1 Discovery Bay Reservoir

6.7.1.1 Discovery Bay Reservoir provides flushing water to existing Discovery Bay and both fresh and flushing water to Nim Shue Wan Village. Following the current flushing water supply arrangement, flushing water for the potential development Areas 6f and 10b is proposed to be supplied by the Discovery Bay Reservoir. Detailed calculations are provided in **APPENDIX B3** and a summary of total water supply from Discovery Bay Reservoir is provided in **Table 6.8**.

Table 6.8: Total Water Demand from Discovery Bay Reservoir

Supply Zone	Population	Population Type	Unit Flow Factor (m^3/person/d)	Flushing Water Demand (m^3/d)
Flushing Demand from Existing Discovery Bay Development	25,000	Residential	0.07	1,750
	4,100	School	0.025	102.5
Fresh and Flushing Water Demand from Existing Nim Shue Wan Village	150	Residential + Service Trades	0.23+0.04+0.07	51.0
Flushing Demand from Discovery Bay potential development Areas 6f and 10b	4,003	Residential	0.07	280.2
			Total =	2,183.7

6.7.1.2 A similar analysis has been carried out to check the adequacy of water supply for the Discovery Bay Reservoir during a drought year. The assessment considered all inflows and outflows into and out of the reservoir during the drought year (12 months between October 2010 and September 2011). It estimated that after the drought year, the Discovery Bay Reservoir will still have around 0.99 million m^3 storage volume, which is still more than total water demand for a whole year (2,184 m^3/d x 365 = 0.80 million m^3). It shows that it is feasible to provide flushing water supply for the new potential developments from the Discovery Bay Reservoir. Capacity checking calculations for Discovery Bay Reservoir in the drought year are provided in **APPENDIX B3**.

6.7.1.3 Since the Discovery Bay Reservoir is feasible to provide flushing water supply for developments at both Area 6f and Area 10b, the Discovery Bay Reservoir is then adequate to provide flushing water supply for individual development at Area 6f.

6.7.2 Existing Flushing Water Main

6.7.2.1 The existing 300 mm diameter flushing water main from Discovery Bay Reservoir has been checked to be capable to supply flushing water to Discovery Bay as well as both fresh and flushing water to Nim Shue Wan Village. No upgrading of flushing water main would be envisaged. Checking calculations are attached in **APPENDIX B3**.

6.8 Proposed Fresh and Flushing Water Supply Systems

6.8.1 New 150 mm fresh water mains and new 50mm flushing water mains are proposed for water supply to potential development Areas 6f. **Figure 4** shows the proposed water supply layout plan (based on fresh

water supply option 1) and water main sizing calculations are attached in **APPENDIX B3**.

7 Conclusions

7.1.1 **Sections 4 to 6** have provided a baseline review and preliminary impact assessments on drainage, sewerage and water supply systems. Mitigation measures to existing facilities and recommendation on new facilities to cater for the potential developments have also been proposed.

7.2 Drainage System

7.2.1 The major existing drainage systems, such as box culverts, are checked to be capable of catering for the increase of surface runoff generated from the potential development Area 6f.

7.3 Sewerage System

7.3.1 Based on the understanding that the Government cannot commit to provide extra treatment capacity in SHWSTW for the proposed development in Area 6f in short and medium terms, an alternative solution has been proposed by providing a small sewage treatment plant of 440 m^3/d treatment capacity on Area 6f to treat the sewage flow generated from the development.

Discovery Bay falls within supply zone of SHWWTW via the Siu Ho Wan FWPS. To meet the additional water demand arising from the proposed development at Area 6f estimated to be 512 m^3/d, two fresh water supply options have been formulated to support the proposed development at Area 6f: (i) Option 1 – supply from Siu Ho Wan Water Treatment Works (SHWWTW); and (ii) Option 2 – supply from Discovery Bay Private Water Supply System. Both supply options are considered to be technically feasible and either water supply option can be adopted to serve Area 6f.

Under fresh water supply Option 1, the proposed development at Area 6f will be supplied by fresh water from the Siu Ho Wan Water Treatment Works, through teeing off from the existing water main along the Discovery Valley Road. The additional water demand from Area 6f is only 0.17% of the 300,000 m^3/d ultimate upgraded capacity of SHWWTW, it is likely to be able to support this small amount of

additional water demand from the development. It has also been checked that other existing infrastructures such as the Discovery Bay booster pumping station, Fresh Water Service Reservoir No. 1 and No. 2 and fresh water mains are adequate to support the additional water demand from the Area 6f.

Under fresh water supply Option 2, it is proposed that a new private fresh water supply system within Discovery Bay be provided to supply the additional fresh water demands from the potential development. Raw water will be abstracted from the Discovery Bay Reservoir and treated at a new Discovery Bay Water Treatment Works. The treated water will be transferred to a nearby new service reservoir and distributed to Area 6f via new transmission and distribution network. This new fresh water supply system for Area 6f will be entirely segregated from the existing Discovery Bay fresh water supply network (supplied by WSD's SHWWTW). There will be no interconnection between the existing Discovery Bay and the new fresh water supply network to eliminate any potential risk of cross-contamination.

The flushing water supply for the current residents at Discovery Bay are sourced from Discovery Bay Reservoir. It has been checked that the existing reservoir has enough storage even during a drought year to meet the additional flushing water demand of 84 m^3/d. The flushing water supply for the potential development Area 6f will be provided from the existing Discovery Bay Reservoir through teeing off from existing DN300 flushing water main along Discovery Valley Road.

Appendix E

Revised Environmental Study (relevant pages)

7.2.1.3 The area within Area 6f comprises of mainly grassland. There has been no evidence that there had been activities causing contamination issues in the past. Hence, it is considered that the contamination potential for Area 6f is unlikely.

7.2.1.4 An initial land contamination appraisal has been conducted to identify any locations within the potential development area that may have the potential for contamination in soil and groundwater. The appraisal mainly includes a review of the desktop information and supplemented with site surveys.

7.2.1.5 Based on the findings at this stage, no area with potential land contamination is identified.

7.3 Review on Ecological Issues

7.3.1.1 As discussed in **Section 1**, Area 6f has been included in the approved Discovery Bay OZP as "OU (Staff Quarters)", despite the fact that some of the planning parameters would need to be amended. Site clearance and formation work could be commenced to implement the development parameters in the approved OZP.

7.3.1.2 Site inspection reveals that Area 6f has previously been formed and disturbed and there is currently a wooded area formed within Area 6f. As revealed from historical aerial photographs, the wooded area was likely to be developed through plantation in around 20 years ago. According to the current design, out of 0.67ha of wooded area in Area 6f, roughly 66% (0.44 ha) of the wooded area would be retained. Only 34% (0.23 ha) of the total wooded area within Area 6f would be affected by the proposed development. The wooded area to be lost from the proposed development is summarised in **Table 7.2**.

Table 7.2 Summary of wooded area in Area 6f

Item	Area (ha)
Disturbed area within Area 6f	0.15
Wooded area within Area 6f	0.67
Total area of Area 6f	**0.82**
Disturbed area to be affected	0.15 (about 100% of total disturbed area)
Wooded area to be affected	0.23 (about 34% of total wooded area)
Area to be developed	**0.38**

7.3.1.3 In addition, a recent vegetation survey undertaken in the area shows

that the wooded area to be cleared consists of both exotic and native species such as *Macaranga tanarius* and *Pinus elliottii* respectively. All the species found within the development area are common species and neither protected nor of conservation concern. As such, the ecological impact associated within the site clearance are expected to be minimal. Moreover, good site practices, including dust suppression measures such as water spraying and the use of noise mitigation measures, would be implemented to mimise the indirect impacts during the construction stage. Therefore, it is considered that the impact on the surrounding ecology would be minimal.

7.3.1.4 As discussed in **Section 6.3.1.2**, a new STW will be established to receive and treat the sewage generated from the additional population from Area 6f. During operational phase, sewage generated will be treated in a small on-site sewage treatment work and would be discharged to a gravity sewage pipe leading to the sea near Discovery Bay Plaza. The area where effluent discharge point is located encompasses developed area, artificial seawall and coastal waters. It is located to the east of the Discovery Bay Plaza, surrounded by man-made features including the deck of Discovery Bay Ferry Pier to its north, and the artificial seawall of the Discovery Bay Plaza and La Costa to its west and south. The area has been highly disturbed by the historical construction of these features as well as the on-going human activities. The waters near the discharge point are constantly used by local vessels for pickup and drop-off such that the baseline condition of the coastal waters is disturbed. Hence, the ecological value of the artificial seawall and coastal water around the area would be low.

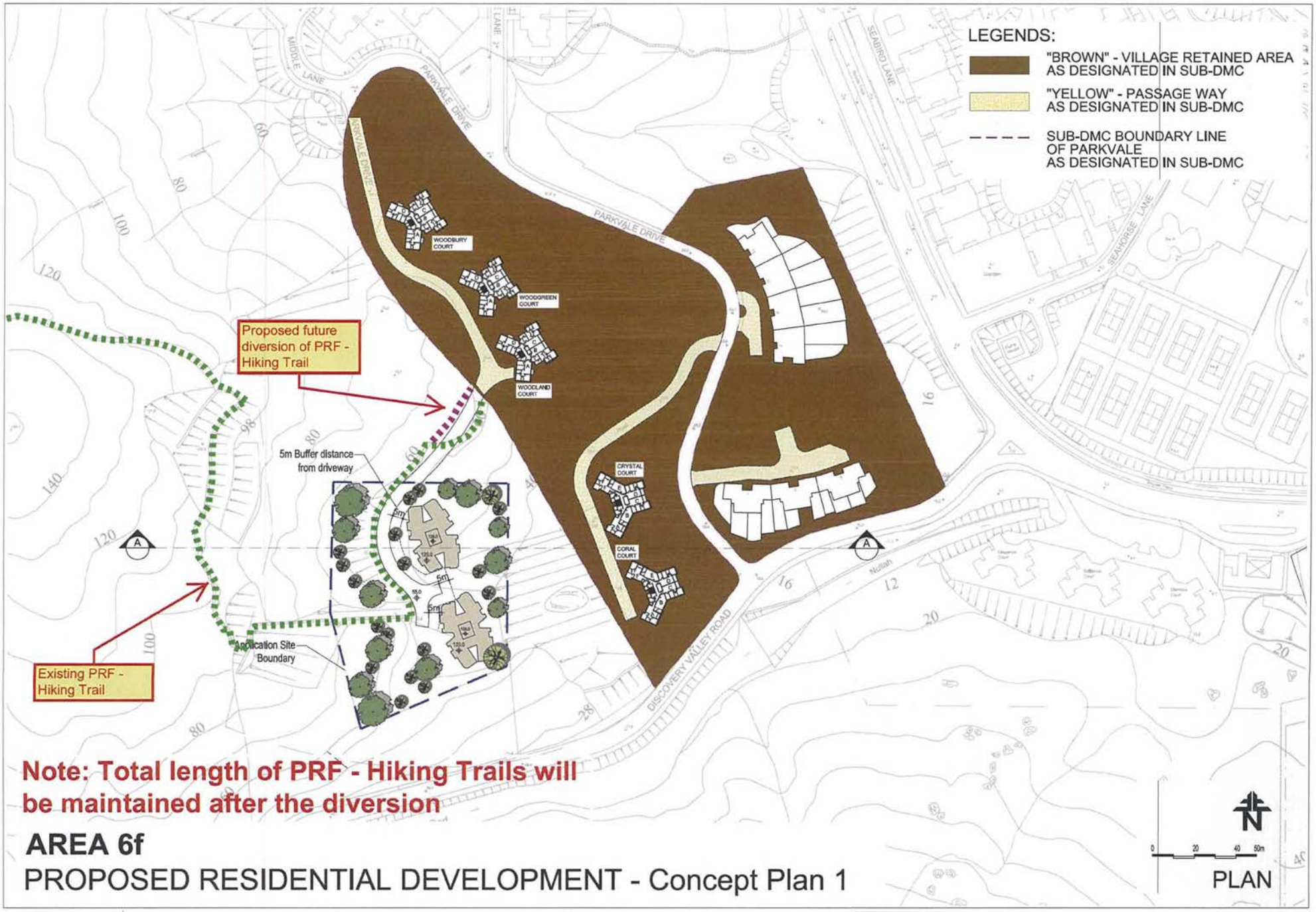
7.3.1.5 The closest ecological sensitive receiver is the Coastal Protection Area (CPA) in Tai Pak Tsui Peninsula which is located more than 250m away to the east of the discharge point. The coastline of the CPA comprises rocky and sandy shore, with two floating piers protruding from the rocky shore facing the discharge point. As the rocky shore of the CPA is at least 250m from the discharge point, and the rocky shore and coastal waters are constantly affected by the vessels berthing at the floating piers, the discharge is unlikely to cause significant change on the rocky shore. According to the results from the supplementary water quality assessment, most of the pollution concentrations would comply with relevant criteria. For TIN, the background concentration has exceeded the WQO already. The discharge concentration has therefore been reduced as much as practicable to ensure that the increase in TIN is minimised. On this basis, it is considered that the

effluent discharge would not cause adverse impacts on the nearest ecological sensitive receivers, including the CPA at Tai Pak Tsui Peninsula. Given the discharge concentration will be properly controlled and monitored, the ecological impacts during operational phase would be maintained to acceptable level.

7.3.1.6 The nearest fish culture zones (FCZs) are Cheung Sha Wan and Ma Wan which are located more than 6.5 km and 6.8 km away respectively. Also, the spawning and nursery ground for fisheries resources in the Southern Waters are located more than 7km away from the discharge point. Since the discharge point is near shore in Tai Pak Wan, the effluent plume would be screened by the headland of Tai Pak Tsui Peninsula and northeast Lantau between the discharge point and the FCZs / spawning and nursery ground for fisheries resources. Given these large separation distance and screening to the fisheries resources, both direct and indirect impacts are considered insignificant.

Appendix F

Diversion of Hiking Trail



Appendix G

Revised Sewer Alignment

Siu Ho Wan Sewage Treatment Works

Ex 900 gravity sewer Main

Ex 2x450 Rising Mains

DISCOVERY BAY TUNNEL

Sewage Pumping Station No. 3

SIENA AVENUE

Sewage Pumping Station No. 4

DISCOVERY BAY ROAD

Ex 500 Rising Main

DISCOVERY BAY

Area 6f

Sewage Pumping Station No. 2

Sewage Pumping Station No. 1

DISCOVERY VALLEY ROAD

Discovery Bay Reservoir

Proposed STW at Area 6f

Legend:

Existing Sewer / Rising Main

Proposed Sewage Treatment Works (STW)

申請編號 Application No. : Y/I-DB/2
此頁摘自申請人提交的文件。
This page is extracted from applicant's submitted documents.

Job Title: DISCOVERY BAY - OPTIMIZATION OF LAND USE		FIGURE 3
Date: DEC 2015	Scale: 1:15000	Drawing Title: EXISTING AND PROPOSED SEWERAGE LAYOUT PLAN
Drawn	Job No. 226079	ARUP