

MTR Corporation Limited

Tung Chung Cable Car Project

Marker Cable System Proposal (Revision 3)

June 2006

1 Introduction

This Proposal gives a description on the marker cable system which will be provided as a visible alert marker to indicate clearly the position of the cableway of the Tung Chung Cable Car System to enhance aviation safety, since the section of the cable car ropeway between Tower 2B and Tower 3 traverses an important flight egress and approach route for helicopters of the Government Flying Service and other commercial helicopters that are based on the adjacent Airport (Chek Lap Kok) Island.

2 Description of Marker Cable System

The marker cable system will comprise of a marker rope and two anchorage structures (*Drawing No. 5222/B/00/MHK/A12/001*). One of the anchorage structure will be located on the Scenic Hill of Airport Island near Tower 2A (*Drawing No. 5222/B/03/MHK/A12/001*) and another will be located near Tower 3 within the Proposed Lantau North (Extension) Country Park (*Drawing No. 5222/B/05/MHK/A12/001*). The marker rope alignment will extend for some 1730m from the Scenic Hill to Lantau. The marker rope will be offset by 26m and 40m from the main cableway at Airport and Lantau Islands respectively. The height of the ropeway will vary from approximately 63mPD at the Airport Island up to 278mPD on Lantau Island.

The installation of the marker rope and marking devices is substantially completed in early April 2006. Total 29 numbers of marker sphere of 60cm diameter are hung on the section of the marker cable over Tung Chung Channel where its height is exceeding 60mPD in alternate orange and white colour at a spacing of not more than 30m. 18 numbers of steady red obstacle lights are provided on the rope and the intensity of the lights is at minimum 10 candelas in compliance to International Civil Aviation Organization requirement for low-intensity obstacle lights. The lights will be automatically on at night and during daytime with poor visibility to provide necessary visual reference.

The anchorage structures above ground are approximately 40m² in area and will rise to a maximum of 5m in height. It will be constructed in reinforced concrete and a reinforced concrete drum sandwiched between two reinforced concrete walls will be used to fix the steel marker cable. The concrete walls will sit on a reinforced concrete pile cap. The pile cap is supported on a

system of raking and vertical mini piles anchored into Grade III rock that resist both vertical and lateral loads from the cable and the structure. A security wire chain fence will be provided around the perimeter of the anchor structure. The mesh fence is approximately 2.2m high.

Two footpaths, with an approximate width of 1.2m, are required to facilitate construction and future maintenance access to the anchors. Extended footpath leading from the existing ones is proposed for the anchor on Airport Island. As for the Lantau anchor, a small section of the emergency rescue trail built will be realigned. A small part of the redundant track will be kept for future access to the anchor and the remainder be removed and replanted.

At present, the coverage of mobile phone network along the cable car route in the country park is inadequate. It is considered crucial to install a mobile base station to improve the coverage. Telecommunication equipment will be installed at the Lantau anchor site, which includes 7 numbers of mobile phone equipment cabinet and 12 numbers of panel antenna. All equipment will be fixed on top of the pile cap (and thus there is no change to the permanent land loss). See *Drawing No. 5222/B/05/MHK/A12/001C*. The twelve panel antennae will be positioned to cover three directions: 4 numbers will be mounted on the wall of the anchorage structure facing Tung Chung town, while 4 numbers will be mounted on the pile cap (two on each post) facing Scenic Hill and another 4 will also be mounted on the pile cap (two on each post) facing the Airport. See **Figure 2.1**.

There are a number of requirements that have to be satisfied when deciding the layout of the antennae. The antenna must be so located that there is no obstruction in front of it to ensure the performance. Given the directions that the antennae need to be covered, it is not feasible to place the antennae in rows (one higher behind the other) or else the signal transmission will be affected. In addition, the antennae must be located out of the deflection zone of the marker rope. Other important consideration when deciding the layout of the antennae is to minimize the potential visual impact. The height of the antennae in front of the anchorage structure has been reduced to flush the top level of the structure, while the other four mounted on the wall are about 500mm above it. Besides, both the antennae and the equipment cabinets will be painted to match with the colour of the anchorage structure.

As part of the mobile base station, 4 numbers of panel antenna will be installed at Tower 3 facing south towards Nei Lak Shan, while 8 numbers

will be installed at Nei Lak Shan Angle Station with four facing Tower 3/ Tung Chung and another four facing Ngong Ping. See **Figures 2.2 and 2.3**. All will be mounted on either the tower or the angle station structure (and thus there is no change to the permanent land loss). The antennae will be painted to match with the colour of the structure.

3 Habitat Loss

The works site for each anchor is approximately 900m² (30m x30m) in area. Approximate habitat loss arising from the construction of the proposed marker cable system is presented in **Table 1** below. The impact will be primarily on low shrub habitat of low ecological value. No tree will be felled. Note that actual permanent habitat loss is dependent on the final design of the anchorage structures and access trails. Land used temporarily will be restored upon completion of the works.

Table 1 Approximate Habitat Loss arising from Construction of Marker Cable System

Habitat	Description and Location	Permanent Loss Area (ha)	Temporary Loss Area (ha)	Total (ha)
Low shrub	Lower Anchor	0.0044	0.0856	0.09
	Upper Anchor	0.0042	0.0858	0.09
	Access Trails	0.0076	-	0.0076
Total Loss		0.0162	0.1714	0.1876

Note: The Table provides an approximate indication of the potential habitat loss. The values listed are based on the immediate footprint of the permanent works and their respective anticipated construction areas.

4 Architectural & Landscape Treatment of Anchor Structures

To minimize the visual impact of the proposed anchors, the structures will be treated with visually recessive colour and all the temporary works areas will be reinstated to the original profile upon completion of the works. Replanting of native species will be carried out at both anchor locations as shown on the Landscape Plans (**Figures A.2 and A.3**).

5 Attachments

Drawings

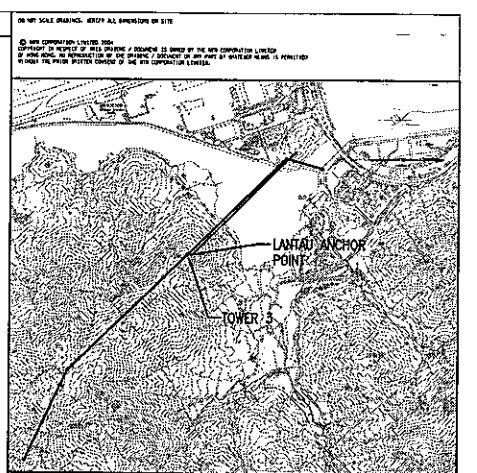
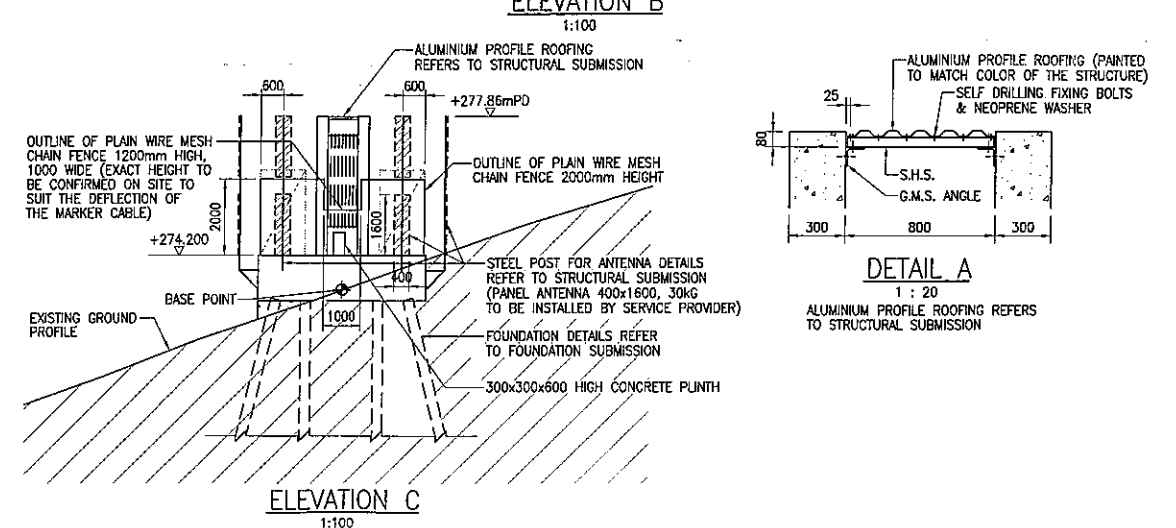
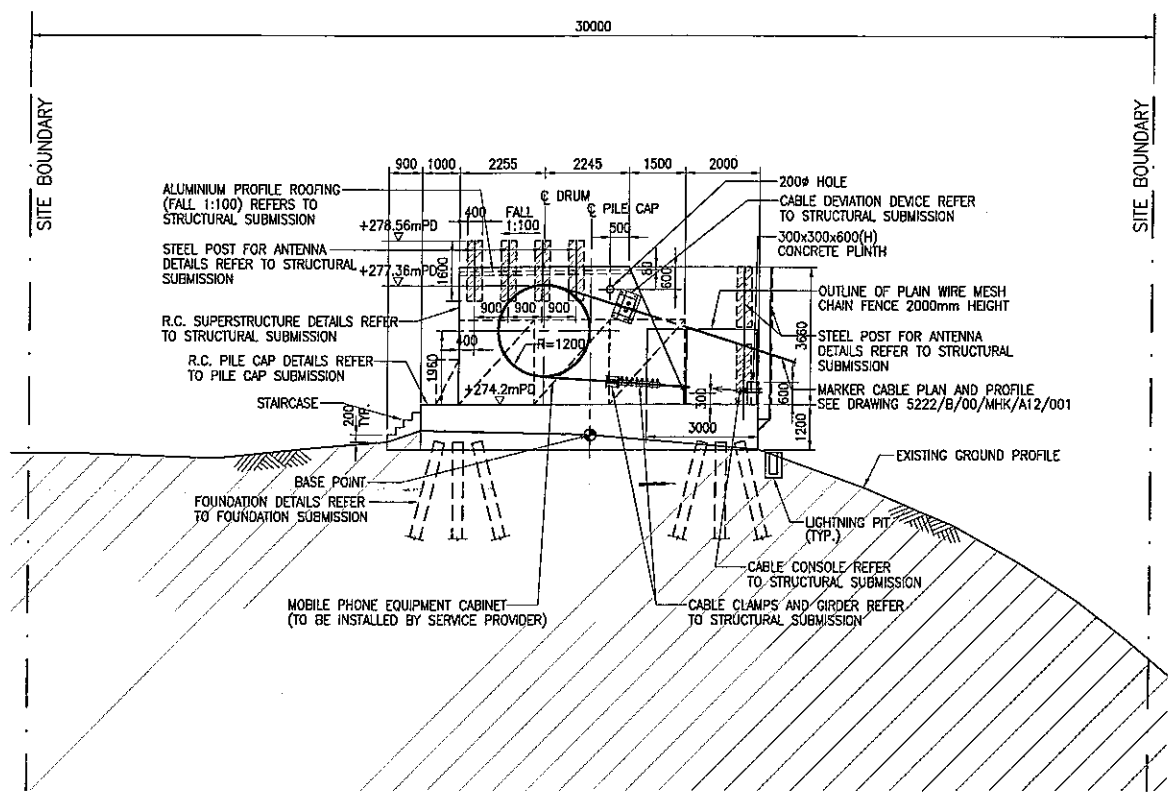
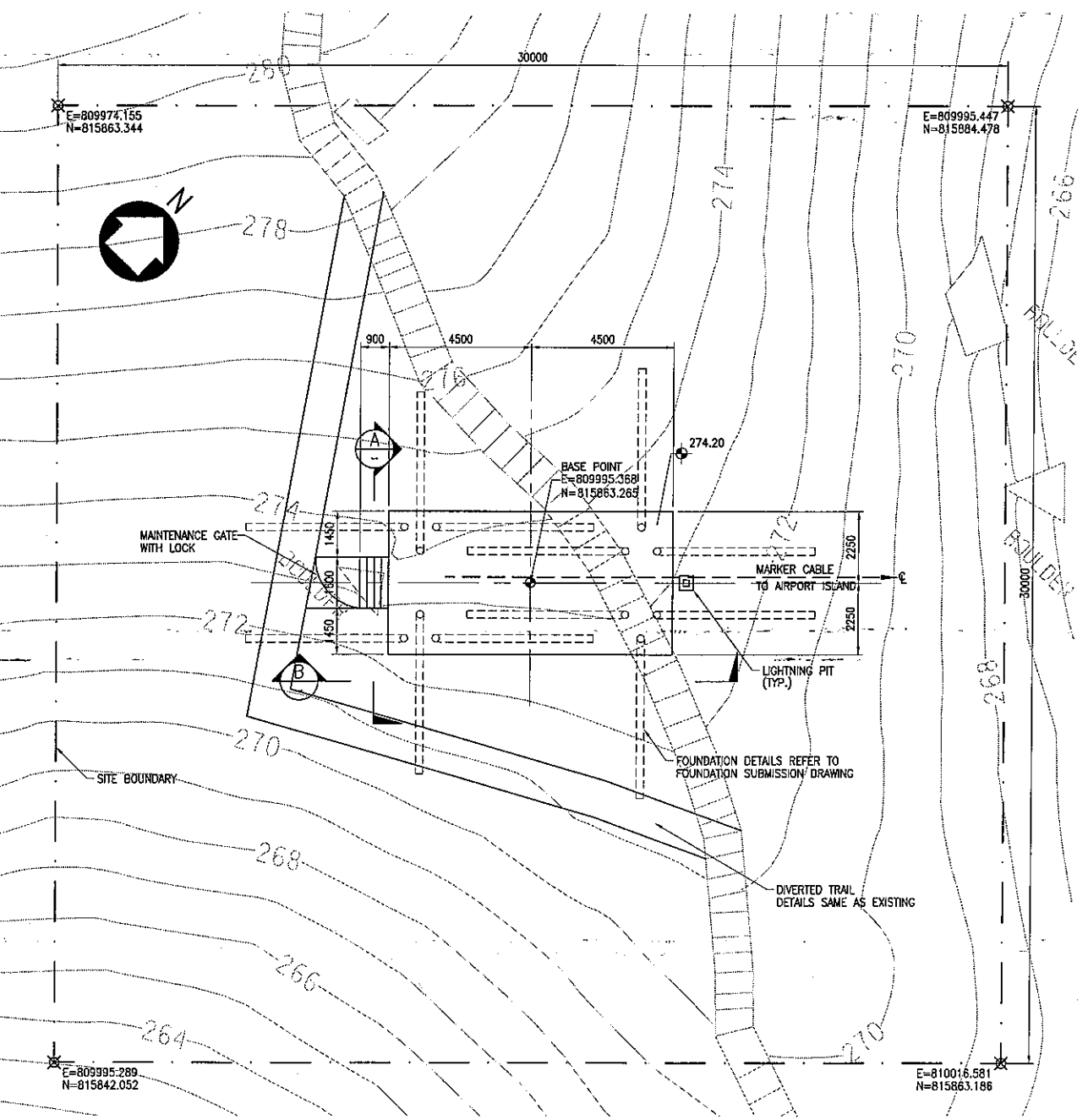
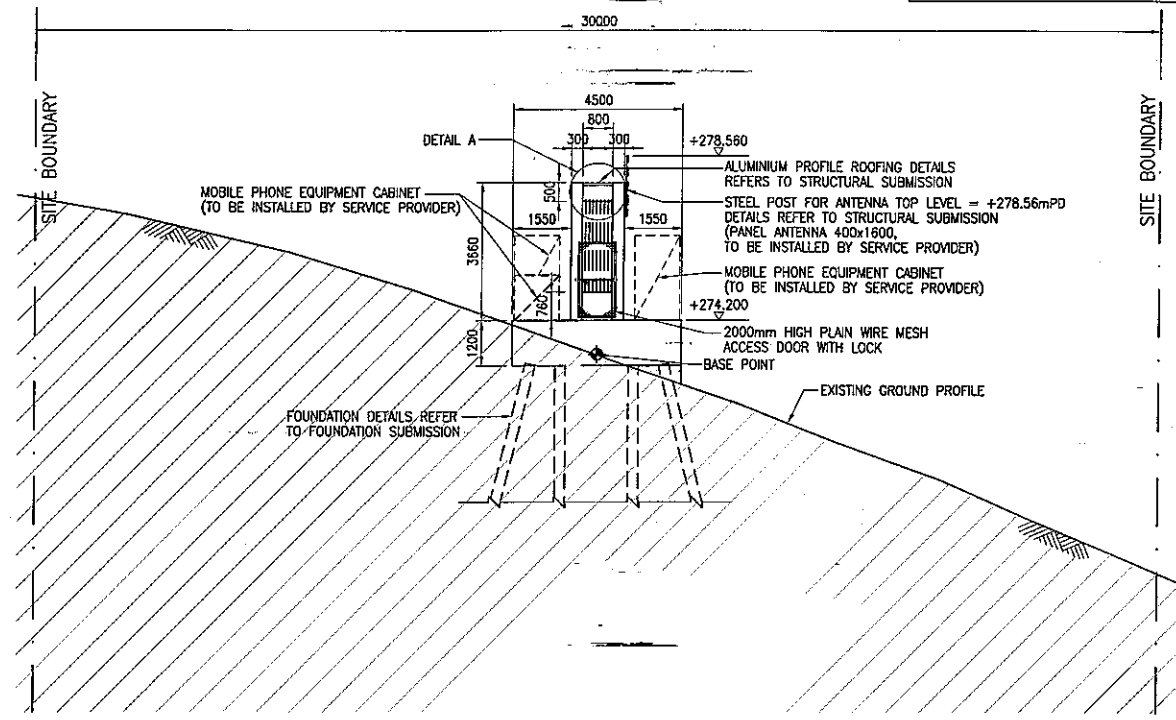
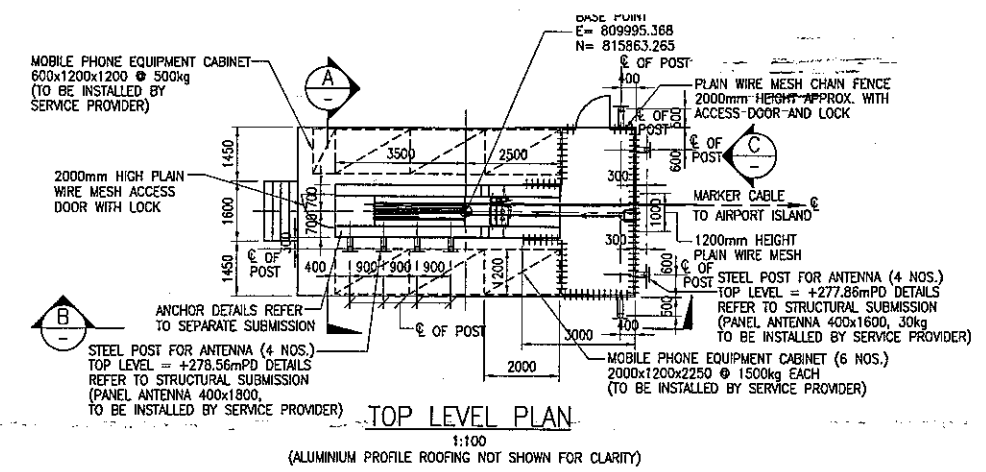
- 5222/B/00/MHK/A12/001 Plan & Profile of Marker Cable
- 5222/B/03/MHK/A12/001B Scenic Hill Anchorage Point Layout
- 5222/B/05/MHK/A12/001C Lantau Anchorage Point Layout

Figures

- Figure 2.1 Indicative Layout of Telecommunication Equipment at Lantau Anchor
- Figure 2.2 Indicative Layout of Antennae at Tower 3
- Figure 2.3 Indicative Layout of Antennae at Nei Lak Shan Angle Station
- Figure A.2 Master Landscape Plan for Scenic Hill
- Figure A.3 Master Landscape Plan for Lantau

DRAWING NO. 5222/B/05/MHK/A12/001

BD REF. No. BD/3/9905/031(MCWI1P)



NOTES:

- A. GENERAL NOTES :**
- ALL DIMENSIONS ARE SHOWN IN MILLIMETERS (MM) UNLESS OTHERWISE STATED.
 - THE ANCHORAGE IS DESIGNED TO RESIST THE WIND PRESSURE FOR GENERAL TERRAIN IN ACCORDANCE WITH CODE OF PRACTICE ON WIND EFFECT, HONG KONG - 1983.
 - FOUNDATION PLANS WILL BE SUBMITTED SEPARATELY.
 - NO FIRE SERVICES INSTALLATION IS PROVIDED.
 - ALL SITE FORMATION AND FOUNDATION DETAILS (INCLUDING PROPOSED CUTTING, FILL SLOPES, PILES ARE INDICATIVE ONLY AND NOT FOR APPROVAL.
 - FOR ALIGNMENT AND PROFILE OF MARKER ROPE PLEASE REFER TO DRAWING NO. 5222/B/00/MHK/A12/001.
 - LANDSCAPE ARRANGEMENT WILL BE SUBMITTED TO RELEVANT GOVERNMENT DEPARTMENTS.
 - THE CONCRETE WALL AND THE PILE CAP SHALL BE PAINTED (COLOR TO BE CONFIRMED BY THE ARCHITECT).
 - THE MOBILE PHONE EQUIPMENT AND ANTENNA SHALL BE PAINTED TO MATCH CONCRETE COLOR.

REVISION	DESCRIPTION	BY	DATE	APPROVED
C	BD 3rd AMENDMENT ALUMINIUM PROFILE ROOFING ADDED FENCE LAYOUT REVISED, MOBILE PHONE SERVICE EQUIPMENTS ADDED	PL	MAR 06	JB
B	BD 2nd AMENDMENT TOTAL NUMBER AND POSITION OF LIGHTNING PIT REVISED	BC	OCT 05	PY
A	BD 1st AMENDMENT	BC	OCT 05	PY
--	BD SUBMISSION	--	JUN 05	PY



ORIGINATOR: Meinhardt (HK) Ltd
Consulting Engineers
in association with
Geotechnical Consulting Group (Asia) Ltd.
100% Limited

C5222 MARKER ROPE FOR AVIATION LANTAU ANCHORAGE POINT LAYOUT

SCALE	1 : 100 (A1)	CAD REF	A12001.DWG	AS BUILT DATE NO	DATE	DATE	DATE	DATE
DATE	JUN. 2005	DESIGNED	BC	DRAWING NO	5222/B/05/MHK/A12/001	REV	C	
DRAWN	BC	CHECKED	PY	APPROVED	PY			



Figure 2.1

Indicative Layout of Telecommunication Equipment at Lantau Anchor



Figure 2.2

Indicative Layout of Antennae at Tower 3



Figure 2.3

Indicative Layout of Antennae at Nei Lak Shan Angle Station



MIXED SHRUB PLANTING WITH OCCASIONAL SMALL TREES

30m x 30m TEMPORARY WORKS AREA

EXISTING TREE TO BE RETAINED

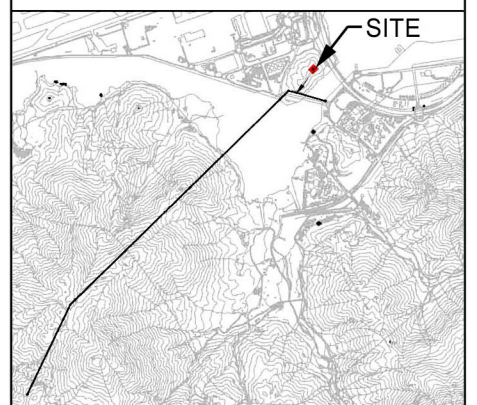
MIXED SHRUB PLANTING WITH OCCASIONAL SMALL TREES (ALL NATIVE SPP.)

ANCHOR STRUCTURE TO BE TREATED WITH A VISUALLY RECES-SIVE COLOUR

ANCHOR STRUCTURE SECURED WITH CHAIN LINKED FENCE

EXISTING TREE TO BE RETAINED

SCATTERED NATIVE SHRUB PLANTING TO BLEND IN WITH SURROUNDING VEG-ETATION



BLOCK PLAN

REVISION	DESCRIPTION	BY	DATE	APPROVED
TUNG CHUNG CABLE CAR : MARKER ROPE FOR AVIATION				
ORIGINATOR		Meinhardt (HK) Ltd Consulting Engineers in association with Geotechnical Consulting Group (Asia) Ltd. Ullrich Limited		
TITLE				
MASTER LANDSCAPE PLAN				
SCALE	AS SHOWN	CAD REF		AS-BUILT APPROVED
DATE	JUNE 2005			
DRAWN	DESIGNED	DRAWING NO		REV
CHECKED	APPROVED	FIGURE A.2		



BLOCK PLAN



LAYOUT PLAN

FIRST ISSUE

REVISION	DESCRIPTION	BY	DATE	APPROVED

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**TUNG CHUNG CABLE CAR :
 MARKER ROPE FOR AVIATION**

ORIGINATOR: Meinhardt (HK) Ltd
 Consulting Engineers
 in association with
 Geostructural Consulting Group (Asia) Ltd.
 USTA Limited

TITLE: **Landscape Plan for Lantau**

SCALE	AS SHOWN	CAD REF	AS REV'D
DATE	JUNE 2005		
DRAWN	DESIGNED	DRAWING NO	REV
CHECKED	APPROVED	Figure A3	