

MTR Corporation Limited

HONG KONG SECTION OF GUANGZHOU -
SHENZHEN - HONG KONG EXPRESS RAIL LINK
(No. EP-349/2009)

Vegetation Survey Report for
Tai Shu Ha Road West (Rev 1)

Certified by: 

Position: Independent Environmental Checker

Date: 16 August 2010

MTR Corporation Limited

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SHENZHEN - HONG KONG EXPRESS RAIL LINK
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Tai Shu Ha Road West (Rev 1)

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Position:

Environmental Team Leader

Date:

12 AUG 2010

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1 INTRODUCTION

1.1 Background

- 1.1.1 The “Hong Kong Section of Guangzhou-Shenzhen-Hong Kong Express Rail Link (XRL)” project (hereinafter known as “the Project”) comprises a 26 km long underground rail line on a dedicated track. The track runs from the terminus at West Kowloon to the Hong Kong boundary at Huanggang, where it connects with the Mainland section of the Guangzhou-Shenzhen-Hong Kong Express Rail Link. The Project also comprises construction and operation of ventilation buildings, emergency access point, stabling sidings, maintenance facilities, and an emergency rescue station (**Figure C8016/C/XRL/ENS/M50/001 to 003**).
- 1.1.2 An Environmental Impact Assessment (EIA) study for the Project was conducted in accordance with EIA Study Brief No. ESB-197/2008. It was based on the available information obtained during preliminary design stage. The EIA study concluded that the Project would be environmentally acceptable with the implementation of recommended mitigation measures.
- 1.1.3 The EIA Report (Register No.: AEIA-143/2009) was approved on 28 September 2009 under the Environmental Impact Assessment Ordinance (EIAO). Following the approval of the EIA Report, an Environmental Permit (EP) was granted on 16 October 2009 (EP No: EP-349/2009) for the construction and operation of the Project.
- 1.1.4 Under the Project, Tai Shu Ha Road West Magazine Site (TSW) was selected as one of the explosive magazine sites (as referred to **Figure C8016/C/XRL/ENS/M51/001**). TSW is located at the Tai Tong East Borrow Area. The works area of TSW is located entirely within a Conservation Area (CA) zoned under the Tai Tong Outline Zoning Plan (OZP) (Statutory Plan No. S/YL-TT/14) (as referred to **Figure C8016/C/XRL/ENS/M51/301**). The CA is zoned to protect and retain the existing natural landscape, ecological or topographical features of the area for conservation, educational and research purposes. The zoning ordinances also separate sensitive natural environments, such as the Tai Lam Country Park, from adverse effects of development. To restore the borrow area, fast growing exotic species (e.g. *Acacia* spp., *Melaleuca quinquenervia*) were planted extensively in the area. The area is maintained by AFCD from 2003 to 2012. Recently, native species (e.g. *Machilus* spp., *Reevesia thyrsoidea*, *Schefflera heptaphylla*, and *Phyllanthus emblica*) were planted to increase diversity.
- 1.1.5 Although construction works for TSW would be small in scale, direct impact on trees and understorey vegetation would be inevitable. According to the requirements as stated in the EIA Report paragraph 3.371 and EP condition 2.12 (iii), in order to mitigate the loss of green areas, ecological enhancement in form of planting should be provided in the places affected by the Project at TSW.
- 1.1.6 A detailed vegetation survey covering the affected habitats should be conducted in TSW, prior to the commencement of site clearance, for formulating effective mitigatory planting proposal in TSW. Species chosen for planting should be similar to those identified *in situ*, native to Hong Kong, food source for local wildlife, and available in local nurseries. The proposed site planting measures should also be provided in accordance with ETWB TCW No. 3/2006.
- 1.1.7 Based on the detailed vegetation survey results, a Vegetation Survey Report (hereinafter known as ‘the Report’) should be prepared for TSW; and a Planting Proposal should be developed accordingly.
- 1.1.8 Mature trees to be felled would be covered under a separate study conducted by another consultant of MTR. Comprehensive information on tree survey and tree transplanting proposal would be presented in *Tree Removal Application for XRL – TRA-10: Works in Yuen Long District (Tai Shu Ha)*.

1.2 Purpose of the Report

- 1.2.1 This Report presents the results of the detailed vegetation survey conducted in TSW, and proposes vegetation species suitable for mitigatory planting. Detailed planting plans are also provided as a blueprint for the future compensatory planting process.

2 METHODOLOGY

- 2.1.1 Vegetation species within the scheme boundary of TSW (as referred to **Figure C8016/C/XRL/ENS/M51/301**) were identified as far as practicable, with their relative abundance recorded. The species name (both scientific and Chinese names), form, rarity in Hong Kong, and protection status were also recorded. Identification of vegetation species and status in Hong Kong were made reference to Hong Kong Herbarium (2004) and Corlett *et al.* (2000).

3 VEGETATION SURVEY RESULTS

- 3.1.1 Detailed vegetation survey was conducted in April 2010 within and in the vicinity of the TSW site boundary. Vegetation species within the survey area were identified and recorded. Photographic record of general site condition is presented in **Appendix A**.
- 3.1.2 The TSW was largely covered by exotic plantation (e.g. *Acacia auriculiformis*, *Casuarina equisetifolia*, and *Eucalyptus* spp. etc.), with an understorey of shrubs, herbs and climbers beneath the tree canopy, where exposed bare ground surface was very limited. During the survey, a total of 39 understorey vegetation species were recorded, including 25 trees/small trees/shrubs, 9 herbs and 5 climbers/vines. Nearly 90% of the identified species are native to Hong Kong, with only 4 exotic species (*Araucaria heterophylla*, *Bidens alba*, *Sonchus oleraceus* and *Thunbergia grandiflora*). Among the native plants, *Dicranopteris pedata*, *Machilus chekiangensis*, *Melastoma sanguineum* and *Schefflera heptaphylla* were the dominant species at TSW; while *Bidens alba* was the most abundant exotic species. Details of the recorded plant species are presented in **Appendix B**.

4 MITIGATORY PLANTING

4.1 Proposed Vegetation Species for Mitigatory Planting

- 4.1.1 Upon the completion of XRL construction works, the TSW would be reinstated to mitigate the loss of green areas. Mitigatory planting of vegetation would be carried out within the boundary of TSW.
- 4.1.2 According to the aforementioned criteria for selection of vegetation species for mitigatory planting, recommendations for the affected tree and understorey species are made and should be adopted as far as practicable.

Table 4.1 Recommended Existing Vegetation Species for Mitigatory Planting at TSW

Scientific Name	Growth Form	Native / Exotic to Hong Kong
<i>Castanopsis fissa</i>	Tree	Native
<i>Celtis sinensis</i>	Tree	Native
<i>Cinnamomum parthenoxylon</i>	Large tree	Native
<i>Litsea rotundifolia</i>	Shrub	Native
<i>Mallotus paniculatus</i>	Tree	Native
<i>Melastoma sanguineum</i>	Shrub	Native
<i>Psychotria asiatica</i>	Tree or shrub	Native
<i>Reevesia thyrsoidea</i>	Tree	Native

Scientific Name	Growth Form	Native / Exotic to Hong Kong
<i>Rhodomyrtus tomentosa</i>	Shrub	Native
<i>Schefflera heptaphylla</i>	Tree	Native

- 4.1.3 Within the 10 recommended native vegetation species, 6 tree species have been recommended to compensate for the loss of tree species, and 4 shrub species have been recommended to compensate for the loss of understorey species. All of these species currently exist within TSW site boundary (**Appendix B** refers).
- 4.1.4 Apart from the above proposed species, other native trees/shrubs that are generally well self-established and suitable for mitigatory planting would also be considered to further promote the flora biodiversity of TSW (**Table 4.2** refers). Recommendation is made with reference to *Clause 1.4.2, Part (iii) Compensatory Tree Planting Proposal of Tree Protection Plan*, which was submitted under EP Condition 2.15 in June 2010.

Table 4.2 Recommended Non-existing Vegetation Species for Mitigatory Planting at TSW

Scientific Name	Growth Form	Native / Exotic to Hong Kong
<i>Bischofia javanica</i>	Tree	Native
<i>Elaeocarpus sylvestris</i>	Tree	Native
<i>Gordonia axillaris</i>	Shrub or tree	Native
<i>Schima superba</i>	Tree	Native
<i>Viburnum odoratissimum</i>	Shrub or tree	Native

- 4.1.5 Based on the above recommendations for species selection, detailed mitigatory planting plans for the recommended tree and understorey species are proposed, and are presented in **Figure 822/W/PHV/ATK/A58/843** and **822/W/PHV/ATK/A58/847** respectively. The number of individuals to be planted is also presented in the figures. The plans should be adopted as a blueprint for the future mitigatory planting process.

4.2 Proposed Site Restoration Measures

- 4.2.1 During construction phase, the TSW site would be cleared and hard-paved for the construction of magazine, and the soil would therefore be compacted. To provide a suitable site condition for mitigation planting, specific site restoration measures are proposed and would be carried out prior to the commencement of mitigation planting. The relevant specification for the above site restoration works is provided in **Appendix C**.

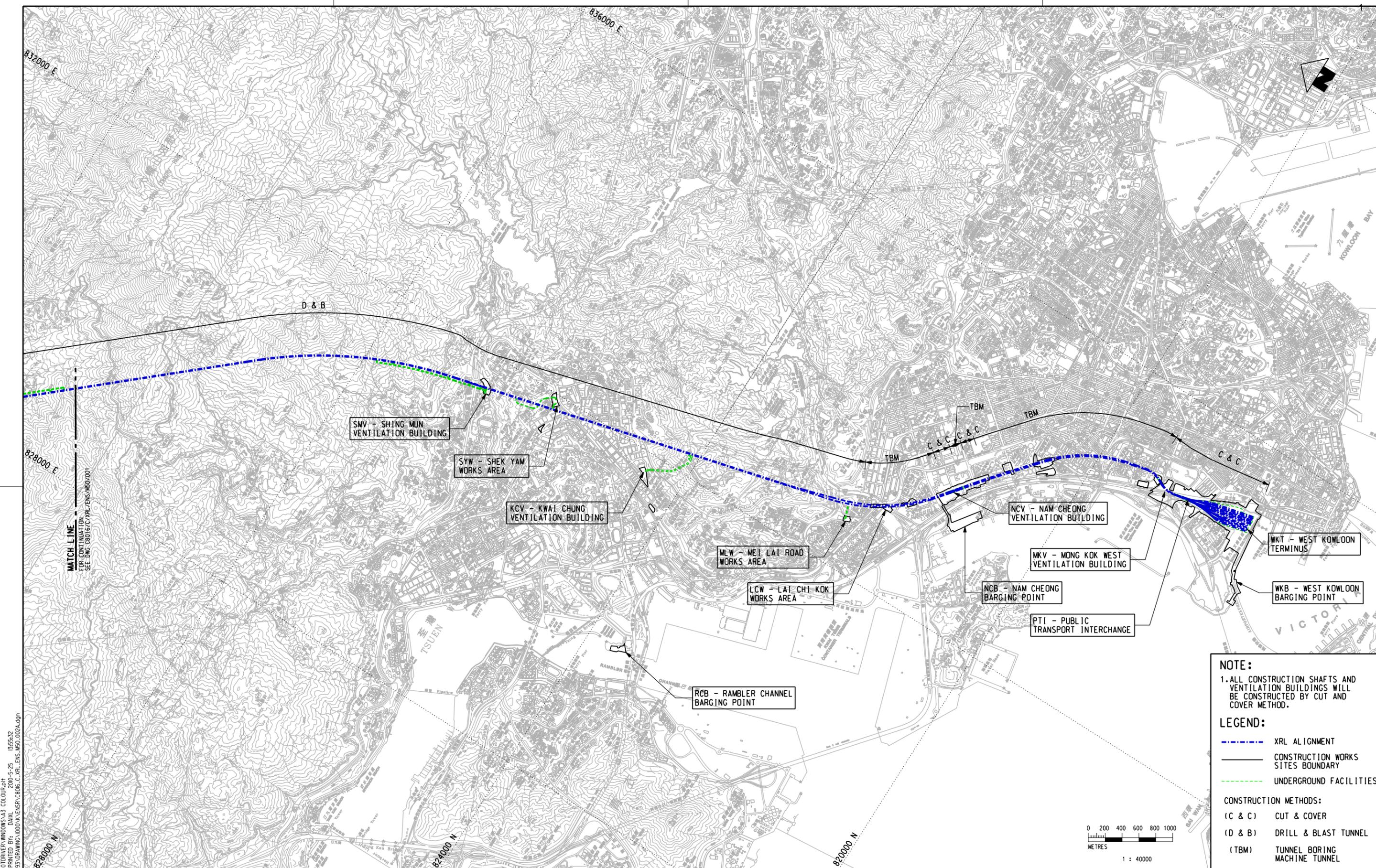
5 CONCLUSION

- 5.1.1 The proposed magazine site at Tai Shu Ha Road West (TSW) was largely covered by exotic plantation, with an understorey of shrubs, herbs and climbers beneath the tree canopy, where exposed bare ground surface was very limited. A total of 39 understorey species were recorded during the detailed vegetation survey within the site boundary of the proposed magazine site at Tai Shu Ha Road West. Nearly 90% of the identified species are native to Hong Kong.
- 5.1.2 Based on the selection criteria that species to be adopted for mitigatory planting in TSW site should be similar to the species identified *in situ*, native to Hong Kong, food source for local wildlife, and available in local nurseries, 15 native plant species would be adopted in mitigatory planting, comprising 11 tree and 4 shrub species to mitigate for the loss of green areas in the places affected by the Project.

6 REFERENCE

Corlett, R.T., Xing, F., Ng, S.C., Chau, L.K.C. and Wong, L.M.Y. 2000. Hong Kong Vascular Plants: Distribution and Status. *Memoirs of the Hong Kong Natural History Society* 23: 1-5

Hong Kong Herbarium. 2004. *Check List of Hong Kong Plants 2004*. Agriculture, Fisheries and Conservation Department, HKSAR.



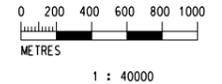
NOTE:
 1. ALL CONSTRUCTION SHAFTS AND VENTILATION BUILDINGS WILL BE CONSTRUCTED BY CUT AND COVER METHOD.

LEGEND:

- - - - - XRL ALIGNMENT
- CONSTRUCTION WORKS SITES BOUNDARY
- - - - - UNDERGROUND FACILITIES

CONSTRUCTION METHODS:

- (C & C) CUT & COVER
- (D & B) DRILL & BLAST TUNNEL
- (TBM) TUNNEL BORING MACHINE TUNNEL



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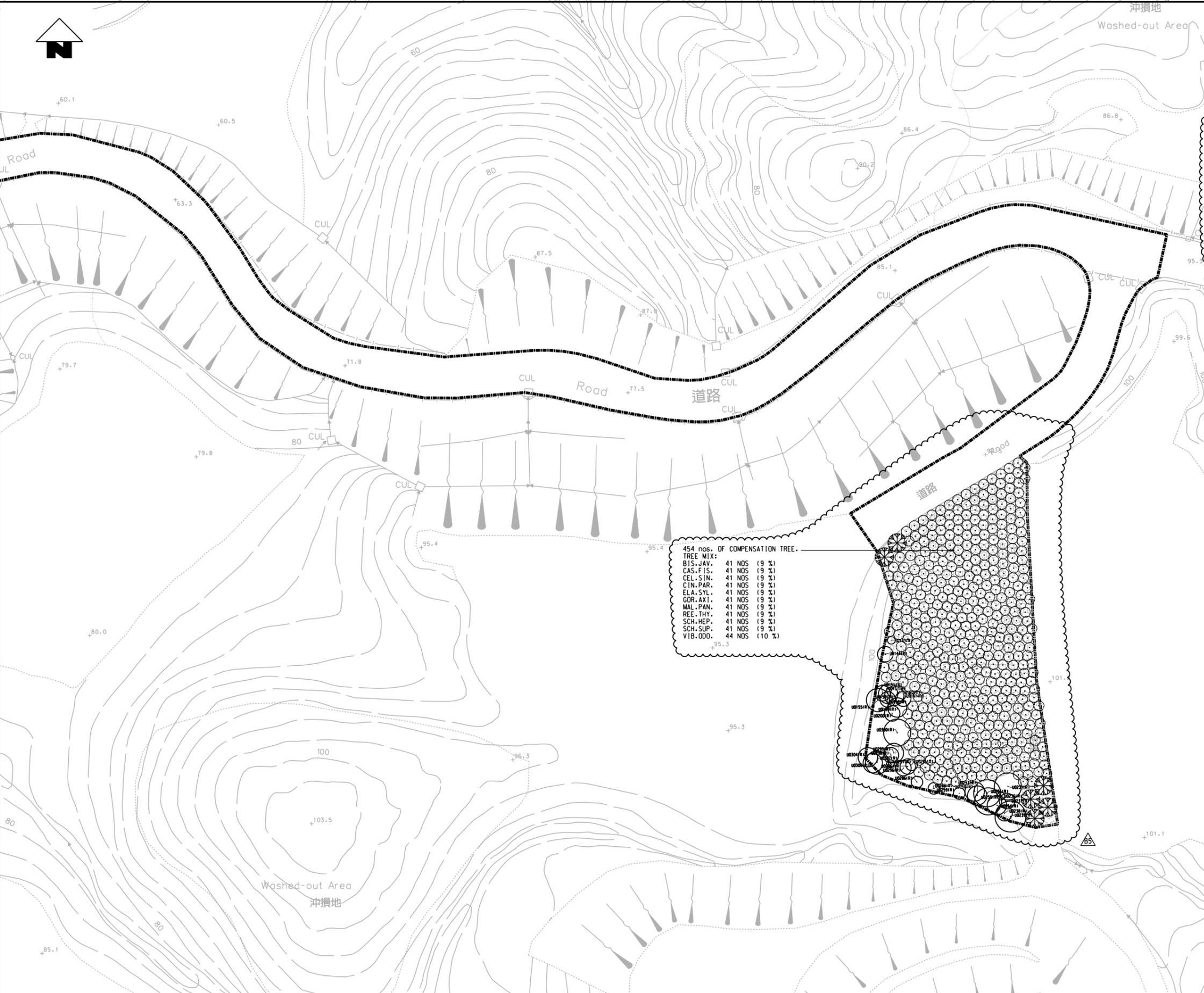
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DESIGNED	TWF
CHECKED	KCC
APPROVED	PL
DATE	25/MAY/2010

EXPRESS RAIL LINK

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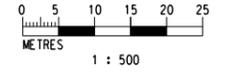
TITLE C8016 ENVIRONMENTAL TERM CONSULTANCY FOR XRL OVERALL VIEW OF ALIGNMENT		SCALE 1 : 40000 (A3)	FIGURE NO. C8016/C/XRL/ENS/M50/002	REV. A
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454 nos. OF COMPENSATION TREE.
 TREE MIX:
 BIS-JAV. 41 NOS (9 %)
 CAS-FIS. 41 NOS (9 %)
 CEL-SIN. 41 NOS (9 %)
 CIN-PAR. 41 NOS (9 %)
 ELA-SYL. 41 NOS (9 %)
 GOR-AXI. 41 NOS (9 %)
 MAL-PAN. 41 NOS (9 %)
 REE-THY. 41 NOS (9 %)
 SCH-HEP. 41 NOS (9 %)
 SCH-SUP. 41 NOS (9 %)
 VIB-ODO. 44 NOS (10 %)

LEGEND:

Type	Botanical Name	Chinese Name	Standard	Spacing	Size (HxSPRxDIA)	Quantity
種類	學名	中文名稱	規格	種植間距	規格	數量
TREE	樹種					
BIS-JAV.	BISCHOFIA JAVANICA	薑藤木	STANDARD	2.5M	3.5Mx2.5Mx0.06M	41
CAS-FIS.	CASTANOPSIS FISSA	葵斗雞栗	STANDARD	2.5M	4Mx2.5Mx0.06M	41
CEL-SIN.	CELTIS SINENSIS	朴樹	STANDARD	2.5M	3.5Mx2Mx0.06M	41
CIN-PAR.	CINNAMOMUM PARTHENOXYLON	黃樟	STANDARD	2.5M	3.5Mx2.5Mx0.06M	41
ELA-SYL.	ELAEOCARPUS SYLVESTRIS	山杜英	STANDARD	2.5M	3.5Mx2.5Mx0.06M	41
GOR-AXI.	GORDONIA AXILLARIS	大環茶	STANDARD	2.5M	3.5Mx2.5Mx0.06M	41
MAL-PAN.	MALLOTUS PANICULATUS	白欖	STANDARD	2.5M	3.5Mx2.5Mx0.06M	41
REE-THY.	REEVESIA THYRSOIDEA	梭羅樹	STANDARD	2.5M	3.5Mx2.5Mx0.06M	41
SCH-HEP.	SCHEFFLERA HEPTAPHYLLA	鴨腳木	STANDARD	2.5M	4Mx2Mx0.06M	41
SCH-SUP.	SCHIMA SUPERBA	木荷	STANDARD	2.5M	3.5Mx2.5Mx0.06M	41
VIB-ODO.	VIBURNUM ODORATISSIMUM	珊瑚樹	STANDARD	2.5M	3.5Mx2.5Mx0.06M	44



REV	DESCRIPTION	BY	DATE	APPROVED
B5	REVISION TO PLANTING SCHEDULE	AC	JUL10	TM
B4	REVISION TO PLANTING SCHEDULE	AC	JUN10	TM
B3	REVISION TO PLANTING SCHEDULE	AC	MAY10	TM
B2	REVISION TO PLANTING SCHEDULE	AC	MAR10	TM
B1	REVISION TO PLANTING SCHEDULE	AC	FEB10	TM
A	WORKING DRAWING ISSUE	AC	MAR10	TM

REV	DESCRIPTION	BY	DATE	APPROVED
B5	REVISION TO PLANTING SCHEDULE	AC	JUL10	TM
B4	REVISION TO PLANTING SCHEDULE	AC	JUN10	TM
B3	REVISION TO PLANTING SCHEDULE	AC	MAY10	TM
B2	REVISION TO PLANTING SCHEDULE	AC	MAR10	TM
B1	REVISION TO PLANTING SCHEDULE	AC	FEB10	TM
A	WORKING DRAWING ISSUE	AC	MAR10	TM

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 APPROVED TM
 DATE DEC/2009

ORIGINATOR
ATKINS Supported by Arup, TFP Farrells, DLS Knight Frank, BMT, Kenneth Ng

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TITLE
CONTRACT 822
TSE UK TSUEN TO SHEK YAM TUNNELS
TAI SHU HA (YUEN LONG) MAGAZINE SITE
LANDSCAPE PLAN

SCALE 1 : 500 (A1)
 DRAWING NO. 822/W/PHV/ATK/A58/843
 REV. B5

APPENDIX A

**REPRESENTATIVE PHOTOGRAPHS OF GENERAL SITE
CONDITION AND TYPICAL VEGETATION AT TSW**



General site condition at TSW



General site condition at TSW



Consultancy Agreement No. C8016
 Express Rail Link (XRL)
 Environmental Term Consultancy
**Representative Photographs of General Site
 Condition and Typical Vegetation at TSW**

SCALE	N.T.S.	DATE	May-10
CHECK	-	DRAWN	YYG
JOB NO.	60150393	Appendix No.	Appendix A
		Rev	-

APPENDIX B

**VEGETATION SPECIES RECORDED AND RECOMMENDED
FOR MITIGATORY PLANTING AT TSW**

Appendix B
Understorey Vegetation Species Recorded and Recommended for Mitigatory Planting at TSW

Family(科名)	中文名	Scientific Name	Growth Form ⁽¹⁾	Native / Exotic to Hong Kong	Distribution in Hong Kong	Abundance on Site	Suitable Species for Mitigatory Planting	Species Selected for Mitigatory Planting ⁽²⁾
THEACEAE (山茶科)	黃瑞木	<i>Adinandra millettii</i>	shrub or small tree	native	common	x	✓	
APOCYNACEAE (夾竹桃科)	念珠藤	<i>Alyxia sinensis</i>	climber	native	common	x		
EUPHORBIACEAE (大戟科)	銀柴	<i>Aporosa dioica</i>	tree	native	very common	x	✓	
THYMELAEACEAE (瑞香科)	牙香樹	<i>Aquilaria sinensis</i>	tree	native	common (listed under Protection of Endangered Species of Animals and Plants Ordinance Cap. 586; Wild Plant under State protection: Category II; China Plant Red Data Book; and Illustration of Rare & endangered plant in Guangdong Province)	x	✓	
ARAUCARIACEAE (南洋杉科)	異葉南洋杉, 南洋杉	<i>Araucaria heterophylla</i>	tree	exotic	introduced, common	x		
MYRTACEAE (桃金娘科)	崗松	<i>Baeckea frutescens</i>	tree	native	very common	x	✓	
ASTERACEAE (菊科)	白花鬼針草	<i>Bidens alba</i>	herb	exotic	very common	xx		
BLECHNACEAE (烏毛蕨科)	烏毛蕨	<i>Blechnum orientale</i>	herb	native	very common	x		
BLECHNACEAE (烏毛蕨科)	蘇鐵蕨	<i>Brainea insignis</i>	herb	native	common (Status in China: Vulnerable; and Wild Plant under State protection: Category II)	x		
EUPHORBIACEAE (大戟科)	黑面神, 鬼畫符	<i>Breynia fruticosa</i>	shrub	native	very common	x		
FAGACEAE (殼斗科)	蠟蒴蕪, 裂斗蕪栗	<i>Castanopsis fissa</i>	tree	native	common	x	✓	#
ULMACEAE (榆科)	朴樹	<i>Celtis sinensis</i>	tree	native	common	x	✓	#
LAURACEAE (樟科)	黃樟	<i>Cinnamomum parthenoxylon</i>	large tree	native	common	x	✓	#
GLEICHENIACEAE (裏白科)	芒萁	<i>Dicranopteris pedata</i>	herb	native	very common	xxx		
EUPHORBIACEAE (大戟科)	黃桐, 黃蟲樹	<i>Endospermum chinense</i>	tree	native	restricted	xx		
THEACEAE (山茶科)	大頭茶	<i>Gordonia axillaris</i>	shrub or small tree	native	common	x	✓	#
LAURACEAE (樟科)	豺皮樟	<i>Litsea rotundifolia</i>	shrub	native	very common	xx	✓	#
LYGODIACEAE (海金沙科)	海金沙, 羅網藤	<i>Lygodium japonicum</i>	climber	native	very common	xx		
LYGODIACEAE (海金沙科)	小葉海金沙, 石草藤	<i>Lygodium scandens</i>	climber	native	common	xx		
LAURACEAE (樟科)	浙江潤楠	<i>Machilus chekiangensis</i>	tree	native	common	xxx		
LAURACEAE (樟科)	楠屬	<i>Machilus</i> spp.	tree	n/a	n/a	xx	✓	
EUPHORBIACEAE (大戟科)	白楸	<i>Mallotus paniculatus</i>	tree	native	very common	x	✓	#
MELASTOMATAACEAE (野牡丹科)	毛椴	<i>Melastoma sanguineum</i>	shrub	native	common	xxx	✓	#
POACEAE (禾本科)	剛莠竹	<i>Microstegium ciliatum</i>	perennial procumbent herb	native	very common	xx		
GRAMINEAE (禾本科)	五節芒	<i>Miscanthus floridulus</i>	perennial herb	native	common	x		
LIDACEAE (酢漿草科)	酢漿草	<i>Oxalis corniculata</i>	perennial herb	native	very common	x		
RUBIACEAE (茜草科)	九節, 山大刀	<i>Psychotria asiatica</i>	tree or shrub	native	very common	x	✓	#
RUBIACEAE (茜草科)	蔓九節, 穿根藤	<i>Psychotria serpens</i>	climber: vine	native	very common	xx		
PTERIDIACEAE (鳳尾蕨科)	長葉甘草蕨, 蜈蚣草	<i>Pteris vittata</i>	herb	native	very common	x		
STERCULIACEAE (梧桐科)	梭羅樹	<i>Reevesia thyrsoidea</i>	tree	native	common	xx	✓	#
MYRTACEAE (桃金娘科)	桃金娘, 崗椴	<i>Rhodomyrtus tomentosa</i>	shrub	native	very common	x	✓	#
ANACARDIACEAE (漆樹科)	野漆	<i>Rhus succedanea</i>	shrub or small tree	native	common	x		

Appendix B

Understorey Vegetation Species Recorded and Recommended for Mitigatory Planting at TSW

Family(科名)	中文名	Scientific Name	Growth Form ⁽¹⁾	Native / Exotic to Hong Kong	Distribution in Hong Kong	Abundance on Site	Suitable Species for Mitigatory Planting	Species Selected for Mitigatory Planting ⁽²⁾
ARALIACEAE (五加科)	鵝掌柴, 鴨腳木	<i>Schefflera heptaphylla</i>	tree	native	very common	xxx	✓	#
ASTERACEAE (菊科)	苦苣菜, 苦蕒菜	<i>Sonchus oleraceus</i>	herb	exotic	very common	x		
STERCULIACEAE (梧桐科)	假蘋婆, 七姐果	<i>Sterculia lanceolata</i>	semi-deciduous tree	native	very common	x	✓	#
ACANTHACEAE (爵床科)	大花老鴉嘴	<i>Thunbergia grandiflora</i>	herbaceous vine	exotic	common, cultivated or naturalized	x		
ULMACEAE (榆科)	山黃麻	<i>Trema tomentosa</i>	shrub or small tree	native	common	xx	✓	
VERBENACEAE (馬鞭草科)	山牡荊	<i>Vitex quinata</i>	small tree	native	common	x	✓	
RUTACEAE (芸香科)	籐欖花椒, 籐欖	<i>Zanthoxylum avicennae</i>	tree or shrub	native	common	x	✓	

Note: (1) Hong Kong Herbarium (2004). (2) Based on availability from plant nursery.

Code for Abundance: xxxx=abundant; xxx=frequent; xx=occasional; x=scarce

APPENDIX C

**RELEVANT SPECIFICATION ON SITE
RESTORATION WORKS FOR TSW**

Appendix C

Relevant Specification on Site Restoration Works for TSW

- Preparatory works** AN2.6.01 (1) Before soiling or planting for landscape softworks and establishment works starts, preparatory works shall be carried out by one or more of the treatments stated in this **Section AN2.6**, as appropriate or as stated elsewhere in the Contract.
- (2) Location of existing underground services shall be determined prior to the start of any excavation and preparatory works.
- Cleaning ground** AN2.6.02 (1) Weeds and any unwanted vegetation as confirmed by the Engineer, rubbish, litter, stones exceeding 25mm diameter and all deleterious material shall be removed from the surface of the ground and the soil for planting.
- (2) The Contractor shall not use chemicals including herbicide or fire for clearance of vegetation, unless otherwise instructed or approved by the Engineer. When the use of herbicide is approved by the Engineer, the Contractor shall comply with the requirements in **Clause AN2.9.09**.
- (3) Clearance of vegetation by cutting grass and vines, if specified or if instructed or agreed by the Engineer, shall include cutting of grass and vines to within 25mm of ground level on either sloping ground or flat ground around trees or other vegetation.
- (4) Clearance of vegetation by cutting and grubbing out vines and undergrowth, if specified or if instructed or agreed by the Engineer, shall include severing of the stems of all vines and undergrowth stumps on either sloping ground or flat ground within woodland. Prior to commencement of vegetation clearance, the Contractor shall clearly confirm with the Engineer which vegetation, if any, is to be retained.

(5) All cut materials resulting from vegetation clearance shall be disposed of from the Site to locations approved by the Engineer.

(6) Any voids left by the operation of cleaning ground shall be backfilled with imported subsoil.

Ripping

AN2.6.03 The ground shall be ripped by drawing a tine through the soil to a depth of 300mm at 500mm centres. All obstructions to cultivation or deleterious material brought to the surface shall be removed and voids left by the ripping operation shall be filled with soil of the same type as existing. Ground at a slope exceeding 15° to the horizontal shall not be ripped.

Contaminated ground

AN2.6.04 Ground that is contaminated by oil, chemicals or other substances, which in the opinion of the Engineer may affect plant growth adversely, shall be excavated to 500mm below the contaminated depth and beyond the extent of the contamination. Voids left by excavation shall be filled with uncontaminated soil of the same type as existing.

Excavation to soil formation level

AN2.6.05 (1) Areas to be filled with uniform layers of topsoil and / or soil-mix shall be excavated to the soil formation levels as indicated in the Drawings. If not specified in the Drawings, soil formation levels shall be as follows:

(a) shrub planting – 600mm below finished soil level;

(b) ground cover planting – 300mm below finished soil level;

(c) turfing - 150mm below finished soil level;.

(2) At-grade tree pits shall be excavated to the specified tree pit depth.

(3) The base of the planting area / tree pit shall be broken up to a further depth of 300mm to ensure proper drainage.

(4) All excavated subsoil material shall be removed from

site unless it satisfies the criteria for imported subsoil, in which case it may be used for creation of soil-mix.

Soiling

- AN2.6.09
- (1) No topsoil or soil-mix shall be spread before the soil formation level and subsoil condition has been checked and approved by the Engineer.
 - (2) Placing and spreading of soil shall not take place during periods of heavy rains, nor when the topsoil and / or soil-mix is saturated. When, in the opinion of the Engineer, conditions are unsuitable for placing and spreading of soil, operations shall cease and shall only be resumed when authorised by the Engineer.
 - (3) The Contractor shall ensure that the topsoil or soil-mix heaps are properly maintained, including weed control where necessary, until such time as the topsoil or soil-mix is placed in its final position.
 - (4) Topsoil and / or soil-mix shall be spread and levelled to the depth stated in the Contract unless otherwise directed. The loose depth of the applied material shall be sufficient to allow the level of the area to comply with the finished levels as specified after natural settlement and natural compaction have taken place. After natural settlement and natural compaction, the finished level of the applied material shall be 50mm below all edges of the planting area unless otherwise specified or directed. The finished level of soil-mix over areas to be hydroseeded shall be 25mm above adjacent kerbs, paving, covers, frames and other hardware.
 - (5) After soiling, the Contractor shall take all necessary preventative measures to control erosion and siltation. The Contractor shall restore or replace any portion of the Site, including those which have been both the subject of a certificate of completion of a Section, which erodes, silts up or is otherwise damaged. The Contractor shall be responsible for

ensuring that the topsoil or soil-mix maintains its specified quality between the time after deposition and the planting operations.

Cultivation

AN2.6.10 (1) Cultivation is the controlled de-compaction of the upper layer of soil to provide an evenly textured, friable planting medium with sufficient air penetration and water retention for favourable plant growth.

(2) Cultivation of areas stated in the Contract or instructed by the Engineer shall be carried out in accordance with the following or as stated elsewhere in the Contract:

Minimum depth of cultivation (mm)	Pre-planting fertilizer (g/m ²)	Thickness of pre-planting fertilizer and soil conditioner over the surface before cultivation (mm)
150	25	100
300	50	200
450	75	300

(3) Cultivated soil shall be hand picked to remove any stones exceeding 25mm diameter and all other deleterious materials. All such materials shall be disposed of from the Site.

(4) Cultivation shall not be carried out on slopes of gradient 1:2 or steeper so as to maintain the slope stability and to prevent erosion.

**Protection of
prepared ground**

AN2.6.12 (1) Prepared ground shall be protected from compaction, erosion and siltation and shall not be used by construction plant, other vehicles or pedestrian traffic.

(2) Prepared ground that becomes compacted, eroded, silted up or damaged shall be replaced or dealt with by methods agreed by the Engineer.

Removal of material

AN2.6.13 Weeds, rubbish, litter, stones exceeding 25mm diameter and deleterious material removed during ground preparation shall be disposed of by the Contractor by methods agreed by the Engineer.