Hong Kong Housing Authority

Agreement No. CB20120293 Planning and Engineering Study for the Public Housing Site and Yuen Long Industrial Estate Extension at Wang Chau

Final Technical Report No.3J (TR-3J) Preferred Option and Technical Assessment - Tree Survey Report

REP-018-01

Final | May 2014

IMPORTANT – CONFIDENTIALITY

This project and study shall be kept confidential and any information contained in and/or related to the project/study shall not be disclosed to any person not involved in the project/study.

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1 INTRODUCTION

1.1 Project Background

1.1.1.1 As stated in the Chief Executive's 2011-12 Policy Address, the Administration is committed to expanding the land resources and increasing housing land supply. To meet this policy objective, the Planning Department (PlanD) has carried out a comprehensive review of the areas zoned "Green Belt" (GB) on the Outline Zoning Plans (OZPs) focusing on sites which are no longer green or degraded. A number of "GB" and "Open Storage" (OS) sites in Wang Chau, Yuen Long were identified as having potential for public housing (PH) development.

1.1.1.2 Subsequently, the Innovation and Technology Commission (ITC) and the Hong Kong Science and Technology Parks Corporation (HKSTP) advised of the need to expand the Yuen Long Industrial Estate (YLIE), in addition to the existing three Industrial Estates (IEs) at Tai Po, Tseung Kwan O and Yuen Long. It was requested to use a portion of the Wang Chau potential housing site for this purpose.

1.1.1.3 After due consideration, an agreement was reached between the Housing Department (HD) and ITC to share the site, tentatively with the northerly portion to be allocated for the YLIE extension (YLIEE), while the remaining south portion would be developed for public housing use. It was further agreed that no Potential Hazardous Installations (PHIs) would be located at the YLIEE so as to minimize the potential adverse impact on the neighbouring PHD.

1.1.1.4 **Figure 1.1.1** shows the location of the Project site. The PH and YLIEE sites at Wang Chau are zoned GB and OS on the Ping Shan OZP No. S/YL-PS/14. It is currently occupied by OS, vehicle parks, farmland, fallow land, grassland, rural residential dwellings and temporary structures.

1.1.1.5 Ove Arup & Partners Hong Kong Limited (Arup) was commissioned by Hong Kong Housing Authority (HKHA) under entrustments from the Government of the Hong Kong Special Administrative Region (HKSAR) & Hong Kong Science and Technology Parks Corporation (HKSTP) to conduct the Planning and Engineering Study for Public Housing Site and YLIEE at Wang Chau (the Study), which will examine the feasibility on developing public housing and YLIEE at Wang Chau by conducting planning, engineering and environmental assessments to formulate proposals for the PH site and YLIEE including the implementation strategies and programme for the proposed development.

1.2 Objectives of the Report

1.2.1.1 Following on the endorsement of the Technical Report (TR) on Option Generation, Evaluation and Preliminary Assessments (TR-2) in the Study Steering Group Meeting on 28 June 2013, a preferred development option has been formulated. According to the Clause 5.3(c) of the brief, technical assessments are required to demonstrate the feasibility of the preferred development option.

1.2.1.2 The Technical Report (TR-3) – Preferred Option and Technical Assessments under this P&E study is to undertake the technical assessments including traffic and transport assessments, drainage and sewerage impact assessment, water supply and utilities impact assessments, geotechnical assessments, foundation assessment, natural terrain hazard study, environmental impact assessment, financial assessment, air ventilation assessment and land requirement study to confirm the feasibility of the preferred development option and ascertain the implications that may arise.

1.2.1.3 As part of the TR-3, a tree survey was conducted. The survey has covered the entire Project area including the proposed PH site, YLIEE site and the work areas for the proposed associated infrastructure works as described in **Section 2** below. This report presents the findings of the tree survey.

1.3 Structure of this Report

1.3.1.1 The structure of this Technical Report is as follows:

Section 1 Introduces the background of the study, as well as the purpose of this report.

Section 2 Describes the surveyed area.

Section 3 Presents the methodology of tree identification and tree survey.

Section 4 Summarises the findings of the tree survey.

Section 5 Summarises the outline proposals for the tree compensation and transplanting works.

2 GENERAL DESCRIPTION OF SURVEYED AREAS

2.1 PH site

2.1.1.1 The proposed landuses within the PH site, comprising 18.81ha include residential with local open space, vehicle parking, retail, schools, integrated social welfare building (ISWB), PTI, roads, amenity greening and slope.

2.1.1.2 Within the PH site approximately 14.49ha is proposed for residential purposes. A plot ratio (PR) of 6.0 (i.e. 5.86 domestic and 0.14 non-domestic) and maximum building height of 41 storeys is proposed. A total domestic GFA of 848,750 m^2 and retail GFA of 19,760 m^2 will be accommodated. The proposed development option could provide a total of 16,975 flats to cater for a population of around 52,113 people.

2.1.1.3 The PH site can be roughly divided into three portions with the south western portion consisting of residential blocks 1 to 10 (Phase 1), the central portion consisting of residential blocks 11 to 17 (Phase 2) and the northern portion consisting of residential blocks 18 to 24 (Phase 3). The central and northern portions are bisected by the proposed northern local access road.

2.1.1.4 The latest PH site boundary and the proposed development layout plan are provided in **Figure 1.1.1**.

2.2 YLIEE site

2.2.1.1 The YLIEE site has a total area of 14.65ha with 11.66ha reserved for industrial use, consisting of 16 individual industrial plots. A PR ratio of 2.5 with a maximum building height of 8 storeys is proposed.

2.2.1.2 The major types of land use are industrial, local open space, vehicle parking space and road access. The local open space is currently occupied by woodland which will be preserved on-site. An on-site ecological compensation area and woodland compensation areas are also proposed. The existing woodland within the proposed woodland compensation area will be retained in situ.

2.2.1.3 The latest YLIEE site boundary and the proposed development layout plan are presented in **Figure 1.1.1**.

2.3 Indicative Temporary Works Areas for Associated Infrastructure Works

2.3.1 Road Improvement Works

2.3.1.1 There are a total of 4 local improvement proposals on existing road junctions to meet the increased traffic demand generated by the development of PH and YLIEE site. All these proposed improvements are within the boundary of existing highway infrastructure.

2.3.1.2 The tentative scope of the proposed road improvement works roads are summarized in **Table 2.3.1** below.

Table 2.3.1: Summary of Road Improvement Works

Junction		Proposed Improvement Works
Ref	Location	
RW1	Fuk Hi Street / Long Ping Road and access road to PH site	Preliminary junction improvement has been included for this junction. A section of approximately 150m long of the north bound of Fuk Hi Street would be widened A section of approximately 150m long of the north bound of Long Ping Road would be widened Some minor refinement of the local access road to Ting Fook Villas
RW2	Fuk Hi Street / Wang Lok Street	An additional left turn lane from Wang Lok Street to Fuk Hi Street
RW3	Long Ping Road / Fung Chi Road and access road to GIC building	Minor reconfiguration of road junction layout to facilitate new access road connection
RW5	Shui Bin Wai Interchange	Local junction reconfiguration at WB lane from Long Ping Road into Shui Bin Wai Interchange

2.3.1.3 The proposed road or junction improvement works and its associated indicative temporary works areas are shown in **Figure 1.1.1**.

2.3.2 Sewerage/Drainage/ Water Supply Infrastructure

2.3.2.1 Construction of new sewers/ stormwater drainage pipes and upgrading works for existing sewers/ drainage pipes/ fresh water mains outside the Project Site have been proposed along Fuk Hi Street, Long Ping Road and Fung Chi Road to cater for the demand as a result of the increased population of the proposed development.

2.3.2.2 The proposed infrastructure works and associated indicative temporary works areas are shown in **Figure 1.1.1**. They are all contained within the boundary of existing highway infrastructure.

2.4 Tree Survey Areas

2.4.1.1 The tree survey has been undertaken to cover all existing trees located within the proposed PH site, YLIEE site and temporary works areas. In addition, trees that sit just outside of these boundaries and within the potential zone of influence for development works have also been included to ensure the full likely impact on trees can be evaluated.

3 TREE SURVEY METHODOLOGY

3.1 Legislation and Guidelines

3.1.1.1 In preparation of this Tree Survey Report, reference has been made to the following technical circulars, practice notes and publications:

- Register of Old and Valuable Trees in Hong Kong;
- Forests and Countryside Ordinance (Cap. 96);
- Protection of Endangered Species of Animals and Plants Ordinance (Cap. 586);
- Lands Administration Office Practice Note (LAO PN) Issue No. 7/2007 – Tree Preservation and Tree Removal Application for Building Development in Private Projects;
- ETWB TCW No. 3/2006 - Environment, Transport and Works Bureau Technical Circular (Works) No. 3/2006 - Tree Preservation;
- ETWB TCW No. 29/2004 - Environment, Transport and Works Bureau Technical Circular (Works) No. 29/2004 - Registration of Old and Valuable Trees (OVTs), and Guidelines for their Preservation;
- General Regulation (GR) 740;
- Urban Council Publication - 'Champion Trees in Urban Hong Kong' (1994);
- Provisional Urban Council Publication - 'Champion Trees in Urban Hong Kong'(1998) Chinese Version;
- Agriculture, Fisheries and Conservation Department Publication - 'Check List of Hong Kong Plants' (2012); and
- Agriculture, Fisheries and Conservation Department Publication - 'Rare and Precious Plants of Hong Kong' (2003).

3.1.1.2 At the time of commissioning and preparation of the tree survey, ETWB TCW No. 3/2006 and LAO PN Issue No. 7/2007 have been followed as the current guidance.

3.2 Tree Identification and Survey Methodology

3.2.1 General

Individual Tree

3.2.1.1 In preparation of the tree survey, a plant is considered as a "tree" if its trunk diameter measures 95mm or more at a height of 1.3m above ground level.

3.2.1.2 Individual trees have been surveyed where access was available. For these trees, the following information and characteristics were noted:

- Tree reference number.
- Botanical name.
- DBH (diameter at breast height).
- Height.
- Crown spread.
- Tree health condition (Good/Fair/Poor/Dead).
- Tree form (Good/Fair/Poor).
- A prediction of the survival rate after transplanting.
- Photographic records.

Tree Group

3.2.1.3 In areas where access was not possible, trees were surveyed in groups. Each tree group was surveyed on a site walk-over basis. The following information was recorded:

- Tree group reference number.
- Botanical name.
- Range of average DBH (diameter at breast height).
- Typical tree health condition (Good/Fair/Poor).
- Typical tree form (Good/Fair/Poor).
- Photographic records (consisting of several general shots of the tree group wherever a reasonable vantage point was available).

Tree Numbering

3.2.1.4 Every individual tree has been assigned an individual reference number starting with the prefix 'T' and given a number starting with '001'. Trees have been labelled during the survey.

3.2.1.5 Similarly, each tree group has been assigned an individual reference letter, such as 'Tree Group A'.

3.2.2 Survey Methodology

3.2.2.1 The survey schedules include the following information on each tree or group of trees surveyed.

- **Tree reference number**: Tree reference number as marked on site and shown in the plan.
- **Tree species**: The botanical name is used.
- **DBH**: In millimetres taken at 1300mm height above ground level.
- **Height**: In metres (excluding tree group).
- **Crown spread**: In metres (excluding tree groups).
- **Tree health condition**: Either Good, Fair, Poor or Dead
- **Tree form**: Either Good, Fair or Poor.
- **Amenity value:** Either High, Medium or Low.
- **Survival rate after transplanting:** High, Medium or Low.
- **Recommendation for treatment:** Retain, Transplant or Fell.

Tree health condition

3.2.2.2 Health and condition: graded Good, Fair, Poor or Dead. Factors considered include:

a) Foliage

- Colour and small size indicating possible damage to roots.
- Presence of insect infestations and fungal infections on foliage.
- Physical damage caused by typhoons despite trees being usually able to recover from this within one growing season.

b) Twigs

- Poor shoot growth and die-back.
- Presence of insect infestations and fungal infections on twigs and branches.
- Twig damage to be noted particularly if the crown of the tree is unbalanced.

c) Branches

- Inspect for dead or crossing branches.
- Broken, damaged or cut branches.

d) Trunk

- Tightly forked trunks which may be a potential source of weakness in trees.
- Visible cavities , bark damage and fungal growth.

3.2.2.3 Assessment of tree health and condition considers the above factors and attributes the following classifications:

Good	Trees with a low incidence of the less serious features listed above and a high chance of a fast recovery from such features.
Fair	Trees with a higher incidence of the less serious features and a medium chance of recovery.
Poor	Trees with more serious health features and with a low chance of recovery, even with remedial measures.
Dead	No signs of life.

Tree Form

3.2.2.4 Assessment of tree form following inspections are classified as follows:

Good	Trees with well-balanced form, upright, evenly branching, well-formed crown and generally in accordance with the standard form for its species.
Fair	Trees with generally balanced form with natural compensation for loss of branches or leaning trunks.
Poor	Trees with very unbalanced form, leaning, suffering loss of major branches with general damage and growing close to adjacent trees, growing within hard standing or structures (walls, buildings, foundations).

Amenity Value of Trees

3.2.2.5 Amenity value is determined with reference to the size and maturity of the trees, tree form, health condition, scarcity, rarity, ecology and wildlife value, function, and unique characteristics of the individual tree..

Assessment of amenity tree value is classified as follows:

High	Including trees of particularly rare are or protected species, Old and Valuable Trees, fung shui woodlands, high quality visual appearance with good health condition and form.
Medium	Including trees of moderate quality visual appearance of average health and condition.
Low	Including trees of low quality visual appearance of poor health and condition.

Survival Rate after Transplanting

3.2.2.6 This assessment is based on the health of the tree and the practicalities of transplantation, a prediction is then made or the likely survival rate:

High	Very likely to survive transplantation.
Medium	>50% possibility of survival.
Low	Unlikely to survive due to poor health/form or difficult to transplant.

Treatment of Trees

3.2.2.7 Existing trees to be retained should be protected during construction and those in direct conflict with proposals, requiring felling, should be confirmed on site by the Engineer's Representative.

3.2.2.8 The treatment proposed for each tree is dependent on the following considerations.

a) Retain

3.2.2.9 The feasibility of retaining trees has been considered with regard to the following:

- Potential damage to trees as a result of the proximity to the works.
- Localised changes to ground level which may affect the ground water table and cause plant stress.
- Potential conflicts between tree roots and the proposed works.

b) Transplant

3.2.2.10 In situations where it is impossible to retain trees which will be directly affected by construction works then transplantation should be the first consideration. The

criteria upon which the assessment of transplanting trees is based includes the following:

- Variety of species – species which are considered rare in Hong Kong are particularly important.
- Condition of the tree - especially trees with balanced form, in good health and with high amenity value.
- Size and maturity - small and younger trees with less developed root systems have a better chance of surviving transplantation while larger, mature trees are difficult to transplant both logistically and in terms of survival rate.
- Access - large machinery may be required to lift the trees, steep slopes and rocky terrain therefore make access less practical.

c) Fell

3.2.2.11 Trees in direct conflict with the proposals which cannot be transplanted will require felling, this includes.

- Dead, damaged, diseased or hazardous trees.
- Trees which may be destabilised due to removal of adjacent trees.
- Trees which are unsuitable for the proposed development such as invasive or poisonous species within a public open space.

4 SUMMARY OF TREE SURVEY FINDINGS

4.1.1.1 The tree survey for the PH site, YLEE Site, indicative temporary works areas was undertaken between Feb to Sep 2013. Trees that sit just outside of these boundaries and within the potential zone of influence for development works have also been included to ensure the full likely impact on trees can be evaluated.

4.1.1.2 The Tree Survey Plans for individual trees is shown in **Appendix A**. The relevant characteristics of trees are identified in the Tree Assessment Schedules in **Appendix B**. Images of the trees taken during the survey are presented in **Appendix C**.

4.1.1.3 The Tree Survey Plans for tree groups are shown in **Appendix D.** The relevant characteristics of tree group are identified in the Tree Group Assessment Schedules in **Appendix E**. Photographs of the tree groups are presented in **Appendix F**.

4.1.1.4 A total of 1679 trees have been individually surveyed. The total number of trees surveyed as groups is estimated to be 194 within 15 tree groups.

4.1.1.5 Amongst the 1873 trees surveyed, 63 species range from common to very common (within Hong Kong); no rare tree species were recorded.

4.1.1.6 There are no registered Old and Valuable Trees (OVTs) identified within or in the immediate vicinity of the Project Area.

4.1.1.7 High conservation value and protected trees are not found but a few trees with high amenity value are found within or in the immediate vicinity of the Project Area.

Individual Trees

4.1.1.8 The dominant tree species within the survey area were common to Hong Kong including *Macaranga tanarius, Dimocarpus longan, Ficus microcarpa, Ficus variegata var. chlorocarpa,* and *Syzygium jambos.* The condition of the surveyed trees is generally considered to be **Fair to Poor**.

4.1.1.9 Fruit tree and shade tree species are found widely within the village environs. The dominant fruit tree species include *Dimocarpus longan* and *Clausena lansium*. Other fruit tree species include *Artocarpus macrocarpus, Carica papaya, Mangifera indica* and *Psidium guajava*. The dominant shade tree species was *Macaranga tanarius*. Other shade tree species surveyed include *Ficus var. chlorocarpa, Khaya senegalensis (Desr.) A. Juss, Cinnamomum camphora, Ficus virens* var. *sublanceolata, Acacia confusa, Aleurites moluccana, Ficus hispida, Spathodea campanulata* and *Lagerstroemia speciosa*. Their condition is generally considered to be **Fair**.

4.1.1.10 Roadside trees surveyed along Long Ping Road include *Aleurites moluccana, Bombax ceiba, Melaleuca quinquenervia, Melia azedarach, Cinnamomum camphora* and *Lagerstroemia speciosa*. On Fuk Hi Street, species recorded are *Livistona chinensis, Melaleuca quinquenervia, Khaya senegalensis (Desr.) A. Juss, Aleurites moluccana* and *Bombax ceiba. Ficus virens* var. *sublanceolata, Melaleuca quinquenervia, Bauhinia blakeana, Callistemon viminalis, Aleurites*

moluccana, Hibiscus tiliaceus, Delonix regia, Albizia lebbeck, Cassia surattensis, Spathodea campanulata, Grevillea robusta, Lagerstroemia speciosa and *Ficus microcarpa. Ficus microcarpa, Albizia lebbeck, Melaleuca quinquenervia, and Bischofia javanica Blume* were recorded on Wang Lok Street. Their condition is generally considered to be **Fair to Good**.

4.1.1.11 Trees recorded within the agricultural land near Tai Tseng Wai include *Macaranga tanarius, Clausena lansium, Cinnamomum camphora, Dimocarpus longan, Ficus microcarpa* and *Mangifera indica*. Their condition is generally considered to be **Fair**.

4.1.1.12 Plantation trees cover the slopes running parallel to Long Ping Road; dominant species include *Acacia confusa, Broussonetia papyrifera, Albizia lebbeck, Ficus virens* var. *sublanceolata, Bombax ceiba, Aleurites moluccana, Spathodea campanulata, Macaranga tanarius, Ficus microcarpa, Lagerstroemia speciosa, Eucalyptus torelliana, Ficus altissima* and *Ficus variegata* var. *chlorocarpa*. Some fruit tree species were also found including *Litsea monopetala, Dimocarpus longan, Syzygium jambos* and *Clausena lansium*. Tree condition is generally considered to be **Poor**.

4.1.1.13 The tree species within the Open Storage area include *Macaranga tanarius, Ficus microcarpa, Ficus variegata* var. *chlorocarpa, Leucaena leucocephala, Ficus hispida, Ficus virens* var. *sublanceolata, Bridelia tomentosa, Carica papaya, Spathodea campanulata, Artocarpus macrocarpus, Artocarpus macrocarpus, Casuarina equisetifolia, Erythrina variegata, Schefflera heptaphylla, Albizia lebbeck, Podocarpus marcophyllus*. Their condition is generally considered to be **Fair to Poor**.

Tree Group

4.1.1.14 Fifteen tree groups (**Tree Group A** to **Tree Group O** in **Appendix D**) were surveyed mainly containing common fruit tree species. The dominant fruit tree species include *Dimocarpus longan, Clausena lansium, Artocarpus macrocarpus, Litchi chinensis, Mangifera indica* and *Carica papaya.* Shade tree species including *Ficus hispida, Macaranga tanarius, Ficus variegata* var. *chlorocarpa, Liquidambar* and *Cinnamomum camphora* were also found. The tree condition is generally considered to be **Fair to Good**.

Summary

4.1.1.15 Summary of the existing trees is provided in **Table 4.1.1** and **Table 4.1.2** below:

Table 4.1.1: Summary of individual existing trees

Botanical Name	Chinese Name	Total
Acacia confusa	台灣相思	85
Acacia mangium	馬占相思	5
Alangium chinense	八角楓	1
Albizia lebbeck	大葉合歡	5
Aleurites moluccana	石栗	44
Araucaria heterophylla	異葉南洋杉	1
Artocarpus macrocarpus	波羅蜜	10
Bauhinia blakeana	洋紫荊	56
Bauhinia variegata	宮粉羊蹄甲	1
Bischofia javanica Blume	茄苳	1
Bombax ceiba	木棉	58
Bridelia tomentosa	土蜜樹	4
Broussonetia papyrifera	構樹	18
Callistemon viminalis	串錢柳	27
Carica papaya	番木瓜	8
Cassia fistula	臘腸樹	11
Cassia siamea	鐵刀木	1
Cassia surattensis	黃槐決明	9
Casuarina equisetifolia	木麻黃	9
Celtis sinensis	朴樹	29
Cerbera manghas	海杧果	1
Cinnamomum burmannii	陰香	1
Cinnamomum camphora	樟	44
Clausena lansium	黃皮	21
Crateva unilocularis	樹頭菜	3
Delonix regia	鳳凰木	25
Dimocarpus longan	龍眼	153
Diospyros kaki	柿	1
Elaeodendron orientale	福木	2
Eriobotrya japonica	枇杷	2
Erythrina variegata	刺桐	2
Eucalyptus citriodora	檸檬桉	2
Eucalyptus robusta	大葉桉	19
Eucalyptus torelliana	毛葉桉	16
Ficus altissima	高山榕	4
Ficus benjamina	垂葉榕	25
Ficus elastica	印度榕	1
Ficus hispida	對葉榕	12
Ficus microcarpa	榕樹	144
Ficus variegata var. *chlorocarpa*	青果榕	104
Ficus virens var. sublanceolata	黃葛樹	33
Grevillea robusta	銀樺	5
Hibiscus tiliaceus	黃槿	25
Khaya senegalensis (Desr.) A. Juss.	非洲桃花心木	63
Lagerstroemia speciosa	大花紫薇	23
Leucaena leucocephala	銀合歡	60
Ligustrum sinense	山指甲	5
Litsea glutinosa	潺槁樹	1
Liquidambar	楓香樹	1
Litsea monopetala	假柿樹	11
Macaranga tanarius	血桐	263
Mangifera indica	杧果	20
Melaleuca quinquenervia	白千層	48
Melia azedarach	苦楝	5
Michelia x alba	白蘭	3
Podocarpus marcophyllus	羅漢松	1
Psidium guajava	番石榴	5
Roystonea regia	王棕	3

Botanical Name	Chinese Name	Total
Sapium sebiferum	烏桕	3
Schefflera heptaphylla	鵝掌柴	3
Spathodea campanulata	火焰樹	39
Syzygium jambos	蒲桃	71
Syzygium samarangense	洋蒲桃	1
Washingtonia robusta	華盛頓葵	2
Dead Trees (Unidentifiable)	N/A	20
	Grand Total	**1679**

Table 4.1.2: Summary of existing trees in Tree Groups

Botanical Name	Chinese Name	Total
Artocarpus macrocarpus	波羅蜜	7
Carica papaya	番木瓜	3
Cinnamomum camphora	樟	1
Clausena lansium	黃皮	59
Dimocarpus longan	龍眼	103
Ficus hispida	對葉榕	6
Ficus variegata var. *chlorocarpa*	青果榕	1
Liquidambar	楓香樹	1
Litchi chinensis	荔枝	7
Macaranga tanarius	血桐	3
Mangifera indica	杧果	3
	Grand Total	**194**

5 TREE RETENTION, TRANSPLANTING AND FELLING PROPOSALS

5.1 General Principles

5.1.1.1 The tree retention, transplantation and felling proposals of this report have been prepared with reference to ETWB TCW No. 3/2006 - Tree Preservation, which were the current guidelines at the time of conducting the survey.

5.1.1.2 An evaluation of the impact of the proposed development on the existing individual trees was undertaken. The recommendation for each individual tree is recorded using colour coding on the Tree Survey Plan in **Appendix A** with recommendations for retention, transplanting or felling recorded in the Tree Assessment Schedule in **Appendix B**.

5.1.1.3 An evaluation of the impact of the proposed development on the existing tree groups was undertaken. The recommendation for each tree group is recorded on the Tree Survey Plan in **Appendix D** with recommendation for retention, transplanting or felling recorded in the Tree Group Assessment Schedule in **Appendix E.**

5.2 Proposed Treatment of Trees

5.2.1.1 The proposed numbers for retention, transplanting and felling as a result of the development works are provided in **Table 5.2.1.**

Preservation of Existing Trees to be Retained

5.2.1.2 To protect the trees to be retained, the Contractor is recommended to implement the following measures/practices during the whole period of construction works:

- Erect protective fencing to prevent access into the tree protection zone.
- The limits of site clearance are to be agreed by the Site Supervisor on site before site clearance commences.
- No nails or other fixings shall be driven into trees.
- No materials or machinery shall be stored under or against trees.
- Tree surgery work may be required to enhance the health and amenity value of retained trees.

Trees to be Transplanted

5.2.1.3 Where it is not possible for trees to be retained in-situ, transplantation to other permanent locations is recommended.

5.2.1.4 The criteria for recommending the transplantation of existing trees makes reference to paragraph 17 (b) of the ETWB TCW No. 3/2006 which states '*…This should be considered as far as possible unless the trees affected are of low conservation and amenity value, or have a low chance of surviving or recovering to its normal form after transplanting*'.

5.2.1.5 A total of **536** trees are recommended to be transplanted. The likely success rate of transplantation cannot be guaranteed; therefore this figure should be treated as indicative.

5.2.1.6 At this Feasibility Stage, an off-site area has been identified at Kai Shan which would be suitable for use as a woodland compensation area, it is recommended that a proportion of these trees should be transplanted to this location. Nonetheless, the project proponent shall identify the final location prior to submission of the Tree Felling Application during the detailed design stage of the Project.

Trees to be Felled

5.2.1.7 The criteria for recommending the transplantation of existing trees makes reference to paragraph 17(d) of the ETWB TCW No. 3/2006 which states '… *Felling of trees will only be considered as a last resort under the following circumstances:*

- *There is no practical alternative and the tree to be felled is neither included in the Register of Old and Valuable Trees under ETWB TCW No. 29/2004 nor potentially eligible to be registered as such; or*
- *The tree has an unrecoverable health problem and is in poor condition; or*
- *The tree is ineligible for transplanting on or off site because of its low conservation and amenity value, or its low chance of surviving or recovering to its normal form after transplanting*'.

5.2.1.8 A total number of **962** trees are recommended to be felled, excluding **20** dead trees and **60** *Leucaena leucocephala*.

Compensatory Planting

5.2.1.9 Compensatory planting for the loss of the **962** trees (accumulated individual trees DBH loss: 190.2m + tree groups DBH loss: 67.2m = total accumulated DBH lost: **257.4m**).

5.2.1.10 The following compensation ratios are recommended:

- A DBH Compensation Ratio = approx. **1:1**

5.2.1.11 Approximately **2574 trees** averaging 100mm DBH (or a mix of tree sizes with the same total girth) are recommended to be planted as compensation, these should be:

- High in amenity or ecological value.
- Adaptable to the surroundings.
- Varying ages, form and habit to provide appearance of succession, mimic natural woodland age structure, provide visual diversity and appear more natural.
- Available in the market place.

Summary of Recommendations

5.2.1.12 A summary of recommendations is given in **Table 5.2.1** and **Table 5.2.2** below.

Table 5.2.1 Summary of the trees recommended to be Retained/Transplanted/Felled

Existing Trees Surveyed	Within or Immediately Adjacent to the Site.		Indicative Temporary Works Areas	Outside Development and Indicative Temporary Works Areas	Proposed Woodland Compensation Area	Local Open Space	Sub-total
	PH site	YLIEE site					
Individual trees to be Retained	0	0	3	250	9	13	295
Trees in groups to be Retained	0	0	0	20	0	0	
Individual trees to be Transplanted	208	65	141	19	0	0	536
Trees in tree groups to be Transplanted	103	0	0	0	0	0	
Individual Good/ Fair/ Poor trees to be Felled	742	146	40	23	0	0	1042 (including 20 Dead trees and 60 *Leucaena leucocephala*)
Individual Dead trees to be Felled	20	0	0	0	0	0	
Trees in tree groups to be Felled	71	0	0	0	0		
					Total of Existing Trees Surveyed		1873

Table 5.2.2 Summary of the Compensatory Planting

	Total
Compensate for tree loss	962 trees (20 dead trees an 60 *Leucaena leucocephala* excluded)
DBH loss (m)	257.4m
Compensatory trees (average DBH 0.1m)	257.4/ 0.1
Number of compensatory trees (approx.)	**2574 trees**

5.2.1.13 It should be noted that this is a preliminary tree survey conducted at a project feasibility stage. The WoCA shall be planted with native trees and shrubs. The planting proposal will be determined and provided in the Woodland Compensation Proposal to be submitted in the next stage of study.

5.2.1.14 During the detailed design stage, the Project Proponent shall carry out an updated tree survey and submit Tree Felling Applications. The exact number of trees to be Retained/Transplanted/Felled will be reviewed. The final tree transplantation locations shall be identified and the compensatory tree planting plan shall be prepared and submitted together with species mix as refer to the typical planting mixes presented in **Table 5.2.3** below.

Table 5.2.3 Typical Planting Mixes by Location

Native Woodland Planting Mix
Aporusa dioica (Aporusa)
Bischofia javanica (Bishop wood)
Castanopsis fissa (Chestnut oak)
Celtis sinensis (Chinese Hackberry)
Cinnamomum burmannii(Padang cassia)
Cinnamomum camphora (Camphor tree)
Cratoxylum cochinchinense(Kayu Arang)
Litsea glutinosa(Bollywood)
Sapium discolour(Tallow Tree)
Schefflera heptaphylla(Ivy Tree)
Ilex rotunda(Chinese Holly)
Diospyros vaccinioides(Small Persimmon)
Gardenia jasminoides(cape jasmine)
Breynia fruticosa(Waxy Leaf)
Ligustrum sinense(Chinese Privet)
Litsea rotundifolia var. oblongifolia(Litsea rotundifolia)
Melastoma malabathricum(Malabar Melastome)
*Melastoma dodecandrum(*Twelve Stamen Melastoma)
Ilex asprella(Rough-leaved Holly)
Rhodomyrtus tomentosa(Rose Myrtle)
Rhaphiolepis indica(India Hawthorn)
Ixora chinensis (West Indian Jasmine)
Tetradium glabrifolium (Melia-leaved Evodia)
Viburnum odoratissimum (Sweet Viburnum)
Vitex negundo (Five-leaved chaste tree)
Zanthoxylum avicennae (Prickly Ash)
Roadside Amenity and Street Tree Planting
Aleurites moluccana (Candlenut Tree)
Bischofia javanica (Autumn Maple)
Bombax ceiba (Cotton Tree)
Cinnamomum camphora (Camphor Tree)
Delonix regia (Flame of the Forest)
Ficus benjamina (Weeping Fig)
Liquidambar formosana (Sweetgum)
Melaleuca quinquenervia (Paperbark Tree)
Terminalia mantaly (Madagascar Almond)

Amenity/ Ornamental Landscape Planting
Crateva unilocularis (Spider Tree)
Duranta erecta(Sapphire Showers)
Gomphrena globosa (Globe Amaranth)
Hibiscus rosa-sinensis (Chinese hibiscus)
Ixora chinensis (West Indian Jasmine)
Ligustrum sinense (Chinese Privet)
Murraya paniculata (Orange Jessamine)
Osmanthus fragrans (sweet osmanthus)
Pentas lanceolata (Egyptian Starcluster)
Perilla frutescens (Perilla)
Salvia splendens (scarlet sage)
Schefflera heptaphylla (Ivy tree)
Tetradium glabrifolium (Melia-leaved Evodia)
Viburnum odoratissimum (Sweet Viburnum)
Vitex negundo (Five-leaved chaste tree)
Zanthoxylum avicennae (Prickly Ash)
Slope Greening (Engineered Slopes)
Acacia confusa (Acacia)
Ardisia crenata (Hilo Holly)
Baeckia frutescens (Dwarf Mountain Pine)
Celtis sinensis (Chinese Hackberry)
Ficus microcarpa (Chinese Banyan)
Gordonia axillaris (Gordonia)
Ligustrum sinense (Chinese Privet)
Litsea glutinosa (Pond Spice)
Machilus chinensis (Hongkong Machilus)
Machilus thunbergii (Red Machilus)
Melastoma sanguineum (Melastoma)
Psychotria rubra (Wild Coffee)
Raphiolepis indica (Hongkong Hawthorn)
Reevesia thyrsoidea (Reevesia)
Rhodomyrtus tomentosa (Rose Myrtle)
Sapium discolor (Mountain Tallow)
Sterculia lanceolata (Scarlet Sterculia)
Uvaria microcarpa (Uvaria)