

Appendix 8.10 Preliminary Woodland Compensation Plan

1 Background

- 1.1.1 Ecological baseline studies including field surveys have been conducted at areas within 500 m distance from the Project boundary and areas likely to be impacted by the Project and associated works (as presented in **60604728/R42/Figure 8.4.1** to **60604728/R42/Figure 8.4.5**). Vegetation survey were conducted along the survey transect to collect representative data of the dominant species. During the construction phase, some area would be affected under the Project footprint (i.e. permanently or temporarily affected areas as presented in **60604728/R42/Figure 8.4.1** to **60604728/R42/Figure 8.4.5**).
- 1.1.2 As described in Section 8 of the EIA Report, about 0.16 ha and 0.09 woodland mainly located along Lion Rock Tunnel Road and within Lion Rock Country Park (LRCP) would be permanently and temporarily affected under the Project. Taking into account the ecological value of the affected woodlands and the time required to reinstate or establish mature woodland at the sites, provision of compensation woodland of ratio not less than 1:1 in terms of area is recommended. Reference would be made to *EIAO Guidance Note No.3/2010 – Flexibility and Enforceability of Mitigation Measures Proposed in an Environmental Impact Assessment Report*.
- 1.1.3 This Preliminary Woodland Compensation Plan (WCP) makes reference to the ecological field surveys of the Environmental Impact Assessment (EIA) Report, and aims to form the basis to guide the establishment of the proposed woodland compensation area (WLCA) to mitigate the potential woodland loss arising from the Project. A Final WCP should be further prepared in the detailed design phase of the Project to review and update the recommendations in this Preliminary Plan and be submitted to relevant government authorities (e.g. AFCD and EPD) for approval prior to the commencement of any construction activities.

2 Methodology

2.1 Identification of Woodland Compensatory Area

- 2.1.1 According to Section 8 of the EIA Report, approximately 0.25 ha of woodland areas within LRCP will be affected due to the Project. WLCA is therefore recommended to mitigate the ecological impacts as stated in the EIA Report. However, given space is limited within the Project site, unfragmented on-site woodland compensation is considered not practicable. To compensate for the ecological impact resulting from unavoidable loss of woodland off-site, habitat compensation would be provided in a “like for like” basis to the extent that this is practicable, as stated in Clauses 5.4.3 to 5.4.5 of Annex 16 of the EIAO-TM. Justification of the need of off-site woodland compensation is presented in **Appendix 8.9**.
- 2.1.2 To mitigate the ecological impact, woodland compensation area of not less than 0.25 ha is recommended under the Project. The potential WLCA is proposed at the agricultural land habitat west to the Sha Tin South Fresh Water Service Reservoir (STSFWR) (approximately 0.3 ha) within the assessment area. Indicative location is shown in **60604728/R42/Figure 8.5.1**. This area is selected to implement the woodland compensation due to the following reasons:
- lower ecological value of agricultural land habitat;
 - potential value of ecological enhancement through natural succession;
 - good connectivity and ecological linkage with the existing woodland in the vicinity;
 - less disturbed as locate away from the heavy traffic Lion Rock Tunnel Road;
 - existing vegetation coverage is mainly crops;
 - locate near the Project boundary; and
 - similar topographical condition and soil type comparable to the existing woodlands to be affected.

- 2.1.3 The potential WLCA also meets the following land status criteria to avoid potential conflicts with planned land uses:
- The area should be government land (i.e. currently unallocated government land west to STSFWR);
 - The area should situate outside any permitted burial ground; and
 - The area should not be of incompatible land zoning (such as “Village” zone).
- 2.1.4 The potential WLCA west to STSFWR is an agricultural land which is relatively flat with good soil condition. The site is sparsely vegetated with crop species such as Sweet Potato (*Ipomoea batatas*) and *Benincasa* spp.. This site is currently occupied by agricultural activities and of low ecological value. Given this site is located adjacent to existing woodland at west, it maintains a good ecological connectivity to woodland habitat and suitable for woodland compensation.
- 2.1.5 The potential location of WLCA is subject to the detailed design and site condition once the Project commences. Should any change in the location of potential WLCA, agreement / approval shall be obtained from relevant government authorities (e.g. AFCD and EPD) prior to commencement of any construction activities.

2.2 Implementation

Detailed Vegetation and Tree Survey

- 2.2.1 A detailed vegetation and tree survey should be conducted to verify the site condition and vegetation composition of the potential WLCA prior to the commencement of site preparation of WLCA. The survey findings will be verified and reviewed to facilitate the update of Final WCP, where necessary. If any plant species of conservation importance is identified at WLCA, the species shall be preserved in-situ. The surveys shall be carried out by a qualified ecologist / arborist with at least 10 years relevant experience.

Site Preparation

- 2.2.2 As no construction works are proposed at potential WLCA, site preparation for WLCA shall be prepared as early as possible once the Project commences. The WLCA shall first be cleared of rubbish, weeds and stones over 25 mm diameter which may impact the growth of plant. The soil shall be ploughed or scarified to loosen the soil, facilitate air penetration and improve the soil drainage. Planting holes shall be 1.5 times greater than the root ball of the planted individuals. The depth should not be too deep that the root level would be below the surrounding ground level after planting. The prepared ground shall be protected from being compacted, eroded, silted up or damaged.

Planting and Establishment Works

- 2.2.3 Planting will comprise species native to the local area, which are selected based on their suitability, stock availability in the market as well as ecological values for the area. Use of native species shall be maximized as far as possible in accordance with the *Guiding Principles on Use of Native Plant Species in Public Works Projects*. Existing native tree / shrub species identified within the affected woodland and species commonly found from nearby woodland would be proposed to plant at WLCA. To further enhance the WLCA, any exotic and undesirable plant species (e.g. White Popinac (*Leucaena leucocephala*)) identified in the detailed vegetation and tree survey would be removed and replaced by native species during the planting. Native seedlings/whip trees are proposed for tree planting for their higher survival rate and high adaption to new habitats. Existing trees and shrubs present on the potential WLCA should be retained as far as possible or be treated according to the results and the recommendation under the tree survey. Some potential species for compensatory planting are recommended below:

Potential Species	Growth Form
Aporosa (<i>Aporosa dioica</i>)	Tree
Castanopsis (<i>Castanopsis fissa</i>)	Tree
Chinese Alangium (<i>Alangium chinense</i>)	Tree or shrub
Chinese Elaeocarpus (<i>Elaeocarpus chinensis</i>)	Tree or small tree
Hance's Syzygium (<i>Syzygium hancei</i>)	Tree
Hong Kong Gordonia (<i>Polyspora axillaris</i>)	Shrub or small tree
Ivy Tree (<i>Schefflera heptaphylla</i>)	Tree
Lance-leaved Sterculia (<i>Sterculia lanceolata</i>)	Tree
Myrobalan (<i>Phyllanthus emblica</i>)	Tree or shrub
Pop-gun Seed (<i>Bridelia tomentosa</i>)	Shrub or small tree
Pond Spice (<i>Litsea glutinosa</i>)	Tree
Schima (<i>Schima superba</i>)	Tree
Strawberry Tree (<i>Myrica rubra</i>)	Tree
Sweet Gum (<i>Liquidambar formosana</i>)	Tree
Yellow Cow Wood (<i>Cratoxylum cochinchinense</i>)	Tree or shrub
Chinese Hackberry (<i>Celtis sinensis</i>)	Tree
Incense Tree (<i>Aquilaria sinensis</i>)*	Tree
Butulang Canthium (<i>Canthium dicoccum</i>)*	Tree
Ailanthus (<i>Ailanthus fordii</i>)*	Tree

* Potential species of conservation importance recommended to be transplanted or compensated as identified in the EIA Report. The WLCA also serves as the recipient site for the flora species of conservation importance to be transplanted or reprovisioned under the Project. For the compensation, the ratio shall meet the minimum compensation ratio of 1:1 in terms of quantity. The species and exact number of plant species of conservation importance to be transplanted or compensated are subject to review and verify according to Final Plant Preservation and Transplantation Proposal and Tree Survey Report during the detailed design phase of this Project.

- 2.2.4 The native seedlings/whip trees will be tentatively planted at an initial spacing of 1500 mm in staggered pattern on flat area, followed by thinning during the establishment period to decrease the potential competition between trees. The exact number and tree/shrub species shall be reviewed and confirmed in the Final WCP subject to detailed design and detailed vegetation and tree survey and agreed with AFCD and EPD during the detailed design phase of the Project.
- 2.2.5 Tentative planting methodologies of trees on slope make reference to the Table 2.1 of the *GEO Publication No. 1/2011 Technical Guidelines on Landscape Treatment for Slopes*. Planting pits will be dug according to the tree planting plan recommended by a qualified ecologist / arborist with at least 10 years relevant experience during the detailed design phase of the Project. The size of the pit depends on the size of the proposed plant species. Pits will be backfilled around the plant with soil mix comprising soil and fertilizer. The soil condition at the proposed location should be improved, in accordance with Section 3 of *General Specification for Civil Engineering Works*. Routine watering and maintaining these plantings shall be conducted during the planting and establishment period. The actual method of planting works shall be reviewed, proposed and submitted to the relevant authorities for agreement at the detailed design phase of the Project.
- 2.2.6 The WLCA start to establish when the newly plant individuals adapt to the soil and environment and create a woodland habitat. The time required for the establishment depends various factors including rainfall, temperature, and vegetation growth. In order to enhance the establishment of planted individuals within the WLCA, after planting works, regularly watering of the tree or shrub individuals is recommended once being planted. To maintain moisture, watering of plants during both planting stage and dry season shall be conducted regularly. Appropriate pest control measure such as the use of pesticide or removal of diseased plant parts shall be performed if necessary. Weeding in the WLCA shall also be conducted.

2.3 Maintenance and Monitoring Programme

Maintenance Programme

- 2.3.1 After initial planting works at WLCA, maintenance works shall be carried out during the replanting and establishment period which generally takes at least 9 years. Regular weeding and pest control shall be implemented monthly in the first three months and bi-monthly in the remaining establishment period. To maintain moisture, watering of plants during both planting stage and dry season shall be conducted regularly. Watering frequency shall be implemented weekly in the first three months subject to weather condition and the frequency for the remaining establishment period shall be proposed by the qualified ecologist / arborist who supervises the planting work based on the local environment of the WLCA. The frequency should be adjusted

depending on the soil moisture. Weeding in the WLCA shall be conducted regularly or when instructed by the qualified ecologist / arborist to avoid competition for water, nutrients, sunlight and growing space. Weeding shall be carried out by hand as far as practicable.

- 2.3.2 Appropriate pest control measure such as removal of diseased plant parts shall be performed if necessary. Subject to the health condition and the survival of the ecological plantings, replanting works should be conducted to replace the dead or poor health individual with same species, where necessary.

Monitoring Programme

- 2.3.3 Monitoring on the health condition of the planted individuals at WLCA shall be conducted during the planting and establishment period which normally takes at least 9 years. Monitoring of the planted individuals should be conducted bi-weekly in the first three months and once in each of the following month in the remaining establishment period. During the remainder of the construction phase, monitoring of planted individuals should continue, however the frequency would be reduced to once every 3 months, given that the health conditions during the planting and establishment period remained fair to good. The monitoring shall be carried out by a qualified ecologist / arborist with at least 10 years relevant experience.

2.4 Reporting

- 2.4.1 Monitoring findings, site observation and recommendations on replanting woodland maintenance shall be reported in the Monthly EM&A Reports. Photographic record of the WLCA shall be also supplemented in the EM&A Reports.

2.5 Maintenance Agent and Resource Implications

- 2.5.1 The woodland compensation shall be carried out as early as possible once the Project commences, to allow time for the woodland to reach a level of maturity and perform its mitigation role. The management and maintenance of the established woodland compensation area will be regulated by the *DEVB TCW No. 6/2015 Maintenance of Vegetation and Hard Landscape Features*. The Project Proponent shall properly establish the ecological plantings recommended by the EIA Report after the possession of the WLCA until the plantings are fully established (which normally takes at least 9 years) and before hand over of the established woodland to the long-term maintenance party identified and agreed in accordance with the *DEVB TCW No. 6/2015* after the establishment period for ad hoc maintenance. The Project Proponent shall be responsible to provide necessary recurrent cost for the maintenance and monitoring works .

2.6 Example of Precedent and Successful Cases

- 2.6.1 Provision of ecological compensatory planting to mitigate woodland loss has been adopted and implemented under precedent approved EIA Projects, compensatory planting were proposed on areas that were considered suitable for woodland re-provision, such as hillside shrubland, plantation, grassland and engineered slope. Examples included:

a. Housing Sites in Yuen Long South (Register No.: AEIAR-215/2017)

- Area of woodland loss: about 2.42 ha
- Area of proposed compensatory: about 12 ha
- Location of proposed WCLA: at the hillside area currently zoned as "Conservation Area"

b. Tung Chung New Town Extension (Register No.: AEIAR-196/2016)

- Area of woodland loss: about 5.72 ha
- Area of proposed compensatory planting: about 11 ha

- Location of proposed WCLA: Areas adjoining the woodlands near the existing service reservoirs, and hillsides to the east of Tung Chung Road
- c. Sha Tin Cavern Sewage Treatment Works (Register No.: AEIAR-202/2016)
- Area of woodland loss: about 0.65 ha
 - Area of proposed compensatory planting: about 0.92 ha
 - Location of proposed WCLA: at hillside shrubland/plantation and engineered slope at Nui Po Shan
- d. Liantang / Heung Yuen Wai Boundary Control Point and Associated Works (AEIAR-193/2015)
- Area of woodland loss: about 6.2 ha
 - Area of proposed compensatory planting: about 18.6 ha
 - Location of proposed WCLA: at hillside shrubland/grassland at Cheung Shan

3 Conclusion

- 3.1.1 According to the EIA Report, approximately 0.25 ha of woodland within LRCP will be affected due to the Project. To mitigate the ecological impact evaluated as of low to moderate significance, the temporarily affected woodland (0.09 ha) would be reinstated and provision of woodland compensation of not less than 0.25 ha is recommended under the Project.
- 3.1.2 The potential WLCA is proposed at the agricultural land habitat west to the STSFWR (approximately 0.3 ha) within the assessment area.
- 3.1.3 The woodland compensation shall be carried out as early as possible once the Project commences, to allow time for the woodland to reach a level of maturity and perform its mitigation role. Planting will comprise species directly affected under the Project, native to the local area, which are selected based on their suitability, stock availability in the market as well as ecological values for the area. Existing native tree / shrub species identified within the affected woodland and species commonly found from nearby woodland would be proposed to plant at WLCA.
- 3.1.4 A maintenance and monitoring programme shall be implemented during the planting and establishment period which normally takes at least 9 years. All planted individuals shall be regularly monitored and maintained, including watering, weeding and pest control.
- 3.1.5 The above recommended measures are anticipated to mitigate the ecological impact arising from woodland loss. Hence, no unacceptable residual ecological impacts are expected from the Project.