

Appendix 8.7 Preliminary Plant Preservation and Transplantation Proposal

1 Background

1.1 Description of Concerned Area and Target Species

- 1.1.1 Ecological baseline studies including field surveys were conducted at areas within 500 m distance from the Project boundary and areas likely to be impacted by the Project and associated works under the Environmental Impact Assessment (EIA) study between February 2020 and April 2021 (as presented in **60607428/R42/Figure 8.4.1** to **Figure 8.4.5**). According to the latest findings and as evaluated in Section 8.8 of the EIA Report, four plant species of conservation importance (19 individuals of Ailanthus, nine individuals of Butulang Canthium, one individual of Incense tree and nine individuals of Rhodoleia) within the Project footprint would unavoidably be directly affected during construction phase (refer **60607428/R42/Figure 8.4.1** to **Figure 8.4.5** for permanently / temporarily affected areas). Another five flora species of conservation importance were recorded in close proximity to the footprint of Natural Terrain Hazard Mitigation Measures (NTHMMs) (i.e. one seedling of Incense Tree, one individual of Ailanthus and three clumps of Luofushan Joint-fir near the rigid barriers within Lion Rock Country Park (LRCP); and four individuals of Butulang Canthium, one individual of Hong Kong Pavetta and three individuals of Ailanthus near the proposed flexible barriers outside LRCP) near the flexible barriers outside LRCP).
- 1.1.2 To mitigate the potential adverse impacts to the identified plant species of conservation importance, mitigation measures have been considered and proposed, in the order of priority, preservation, transplantation and compensation, with reference to *EIAO Guidance Note No.3/2010 – Flexibility and Enforceability of Mitigation Measures Proposed in an Environmental Impact Assessment Report*. Preservation in-situ should be considered as the first priority to avoid direct loss to the plant species of conservation importance. In case preservation in-situ is not practical, transplantation should be considered to minimize unavoidably direct impact to the individual(s). Reference should be made to the *Guidelines on Tree Preservation during Development and TC(W) No. 4/2020 Tree Preservation*. Whenever transplantation is not suitable (e.g. due to technical feasibility (e.g. steep slope), poor plant health, form or structural condition), compensatory planting for this species should be proposed.
- 1.1.3 This Preliminary Plant Preservation and Transplantation Proposal (PPTP) recommends the methodology and preliminary mitigation measures on the potentially directly impacted plant species of conservation importance identified within the Project footprint. This Preliminary Proposal makes reference to the ecological field survey findings and design information available at the time of the preparation of the EIA Report.
- 1.1.4 A Final Plant Preservation and Transplantation Proposal (PPTP) should be prepared in the detailed design phase of the Project to review and update the recommendations in this Preliminary Proposal and be submitted to relevant Government authorities (e.g. AFCD and EPD) for approval prior to the commencement of any construction activities, tree preservation and transplantation works.

2 Methodology

2.1 Pre-construction Survey

- 2.1.1 A detailed vegetation survey within latest available Project footprint should be conducted prior to the commencement of construction to update and ascertain the locations, conditions and abundance of the plant species of conservation importance that would be directly affected by the Project (refer to **60607428/R42/Figure 8.4.1** to **Figure 8.4.5** for permanent / temporary affected areas assessed under the EIA study). Recorded plant species of conservation importance should be surveyed and tagged during the detailed vegetation survey. An updated location plan, plant schedule and photographic record shall be prepared based on the survey findings. The survey shall be carried out by a qualified ecologist / botanist with at least 10 years relevant experience.

2.2 In-situ Preservation

2.2.1 Under the EIA Study, a total of 23 individuals of six plant species of conservation importance, including three (3) mature and six (6) young individuals of *Rhodoleia* near Lung Cheung Road Park (P1-P9), one (1) seedling of Incense Tree, one (1) individual of *Ailanthus* and three (3) clumps of Luofushan Joint-fir near the proposed rigid barriers within Lion Rock Country Park (LRCP) (P11-P15), one (1) mature individual of *Ailanthus* east to Hung Mui Kuk Barbecue Area (P28), and four (4) individuals of *Butulang Canthium*, one (1) individual of Hong Kong Pavetta and three (3) individuals of *Ailanthus* near the proposed flexible barriers outside LRCP (P29-P36) near the flexible barriers outside LRCP are recommended to be preserved in-situ (refer to **60607428/R42/Figure 8.6.1** to **Figure 8.6.3**). To protect the proposed retained plant species of conservation importance, the following measures shall be implemented before and during the construction phase:

- All construction works shall be confined within the site boundary. Hoardings should be erected along the site boundaries.
- Before the commencement of construction works, the proposed retained plant species of conservation importance should be checked and clearly tagged on site.
- The Contractor should brief the workers on the locations of retained and transplanted plant species of conservation importance to avoid any direct impact to these plants.
- A plant protection zone should be set up for tree species of conservation importance, as follows the *Guidelines on Tree Preservation during Development*. Rigid fencing of at least 1.5 m away from tree trunk should be set up as plant protection zone. Bright-coloured fencing of 1.5 m in height shall be erected to avoid trespassing.
- Construction equipment and stockpile shall be placed outside the plant protection zone. Care should be taken to prevent plant species of conservation importance being damaged by mechanical equipment both during site clearance works and construction work.
- Anchoring or winching works on the retained trees/plants should not be permitted.
- Regular inspection should be conducted to check the integrity of the plant protection zone and the plant condition.

2.3 Transplantation

2.3.1 Under the EIA Study, a total of six (6) individuals of two plant species of conservation importance, including one (1) seedling of Incense Tree (P18) and five (5) young individuals of *Butulang Canthium* at the slope toe west to Hung Mui Kuk Barbecue Area (P19-P23), are proposed to be transplanted (refer to **60607428/R42/Figure 8.6.1** to **Figure 8.6.3**). These species were generally in good health, form and structural condition, thus was considered to be tolerant to, and suitable for transplantation. A detailed vegetation survey should be conducted to verify number and the condition of the individuals proposed to be transplanted and to evaluate and ascertain the suitability of transplantation prior to the site formation stage.

Identification of Potential Recipient Sites

2.3.2 In order to allow quicker adaption upon transplantation, the recipient sites for the transplanted individuals should possess consistent/similar habitat characteristics (i.e. soil condition, topography, dominated plant species) as their existing habitats.

2.3.3 The proposed woodland compensation area under this Project to the west of Sha Tin South Fresh Water Service Reservoir within the assessment area is identified as a suitable potential recipient site for the proposed transplantation. Indicative location of the site is shown in **60607428/R42/Figure 8.6.2**. The site is currently an agricultural land, which is sparsely vegetated with crop species such Sweet Potato (*Ipomoea batatas*) and *Benincasa* spp.. It is relatively flat with good soil condition. Furthermore, given its proximity to existing woodland to its west, the site maintains a good ecological connectivity to the adjacent woodland habitat.

The suitability of the potential recipient site would be reviewed during the detailed design phase and before the transplantation works. Should there be any other suitable recipient sites identified and proposed in the later stage of the Project, relevant authorities (e.g. EPD, AFCD) shall be consulted in advance for prior consideration.

Preparation of Recipient Site

- 2.3.4 Before transplantation, site clearance should be carried out at the selected and agreed recipient site and overgrown weeds / rubbish should be removed. Planting holes should be carefully assigned and marked with individual plant numbers before the transplantation to provide adequate growth space for future growth. Any large stones / materials in and around the selected planting holes that could affect plant growth should be removed. 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 transplanted individuals. The depth should not be too deep that the root level would be below the surrounding ground level after transplanting. The prepared ground shall be protected from being compacted, eroded, silted up or damaged.

Preparation of Root Ball

- 2.3.5 The transplantation work shall preferably be carried out in early spring or autumn. If transplantation is to be conducted in summer, the root ball preparation work should be carried out in early morning or late afternoon to avoid intense heat in noon and should avoid overcast / rainy days.
- 2.3.6 For plants which do not have extensive root system, no root pruning is required and preparation of root ball covering the entire root system is recommended. The preparation of root ball for trees shall be prepared under the supervision of qualified landscape contractor (who are on the List of Approved Suppliers of Materials and Specialist Contractors for Public Works under Landscaping category, managed by the Development Bureau).
- 2.3.7 The plants should be well-watered before lifting. After digging up the plant, the root ball shall be fully wrapped by damp Hessian and secured with a metal net or similar materials. Caution shall be taken to avoid damaging the plants during lifting / movement. They shall be picked up by their root balls but not the stem or leaves. The leaves shall be softly wrapped with tarpaulin to protect from damage during transportation. The plants should be tagged before transporting and the original locations shall be indicated on a map to facilitate subsequent checking and monitoring.

Transplantation

- 2.3.8 Lifted plants should be transplanted to the recipient site as soon as possible. Transplantation work shall preferably be done on the same day of lifting. Where same day transplantation is not possible, the lifted plant should be transported to a nursery before transplanting into their recipient site. At the nursery, light shading shall be provided to protect the plant from heat and minimize evapotranspiration. The plant nursery location and requirements should be proposed by a qualified ecologist / botanist with at least 10 years relevant experience and agreed with AFCD and/or EPD in advance.
- 2.3.9 At the recipient site, all wrappings should be removed before planting into the prepared pit. Soil excavated during pit preparation should be reused for backfilling during transplantation. The soil should be slightly tamped to stabilize the transplanted plant. The plant should be well-watered once being transplanted. Mulches shall be applied on soil surface to maintain moisture, as nutrients source and protection from sunlight and weed growth. Robust and bright fencing should be erected to protect the plants.

2.4 Compensation

- 2.4.1 Flora species of conservation importance recorded within Lion Rock Country Park that could be transplanted, including five young individuals of Butulang Canthium (e.g. <0.5 m in height) and one seedling of Incense Tree, are detailed in **Section 2.3**. For the remaining 22

individuals of two plant species of conservation importance recorded at engineered slope along Lion Rock Tunnel Road, including, 14 mature and four (4) young individuals of *Ailanthus* (P10, P24-P27, P37, P39-P44 and P46-P51), and four (4) young individuals of *Butulang Canthium* (P16-P17, P38 and P45), are proposed to be fell considering the high failure of transplantation works due to site conditions and low survival rate, and compensatory planting is recommended. These plants are relatively large in size (e.g. >0.5 m in height) and/or grew on steep engineered slopes with relatively dry soil, thus the roots of the plants are likely to grow wide and deep to reach groundwater and anchor on the slope. In this case, this would likely result in high failure of preparation of a balanced root ball and low survival rate of plant after transplantation. To attempt to avoid/minimize impacts on the plants as far as practical, the exact numbers to be fell would be reviewed subject to the site condition and during the detailed design phase. *Butulang Canthium* is a common native species in Hong Kong and listed as "Vulnerable" in IUCN Red List. *Ailanthus* is a rare species in countryside but a widely cultivated species as roadside trees and ornamental trees. This species is listed under Forests and Countryside Ordinance (Cap. 96). Thus, the impact of direct loss of the above species would be minor to moderate, if unmitigated.

- 2.4.2 Compensatory planting of the unavoidably lost plant species of conservation importance should follow the *Guidelines on Tree Preservation during Development* and *TC(W) No. 4/2020 Tree Preservation*. For the compensation of fourteen (14) individuals of mature *Ailanthus*, compensatory planting in heavy standard size should be considered as detailed in Section 10 of the EIA Report. For compensation of four (4) young individuals of *Ailanthus* and four (4) young individuals of *Butulang Canthium*, compensatory planting of species ratio of 1:1 in terms of quantity is recommended, i.e. at least, 4 nos. and 4 nos. of whip trees or seedlings *Ailanthus* and *Butulang Canthium* shall be planted respectively to compensate the net loss of the species, subject to market availability and future design. The compensatory planting shall be undertaken as early as possible once the potential woodland compensation area is ready to receive the plant. The agricultural land west to Sha Tin South Fresh Water Service Reservoir within the assessment area is identified as a suitable potential recipient site for the proposed compensatory planting (refer to **60607428/R42/Figure 8.6.2**) as detailed in **Section 2.3.3**. Before compensation, site clearance and preparation should be carried out at the selected and agreed site as detailed in **Section 2.3.3**. Should there be any other suitable compensation site be identified and proposed during the detailed design phase of the Project, agreement / approval shall be obtained from relevant government authorities (e.g. AFCD and EPD) prior to commencement of any construction activities.

3 Maintenance and Monitoring Programme

3.1 Monitoring of Preserved Plants

- 3.1.1 During the first year of construction phase, monthly monitoring of the conditions of the preserved plants and site audit of the recommended protection measures should be conducted. For the remainder of construction phase of the Project, monthly monitoring should be conducted at areas with construction activities near the plant protection zone of the preserved plants. For area without construction activities nearby, monitoring at preserved individuals should be done once every three months. Photographic record of the preserved individuals should be taken during every monitoring. The regular monitoring should be carried out by a qualified ecologist / botanist with at least 10 years relevant experience.

3.2 Post-transplantation and Post-compensation Maintenance

- 3.2.1 A 3-year and a 9-year establishment period would be provided for the flora species of conservation importance proposed to be transplanted and compensated by provision of compensatory planting respectively. If any transplanted / compensated individual dies during the establishment period and during construction phase due to non-compliance of the approved Final PPTP, replacement planting of new individual of the same species should be conducted subject to agreement with AFCD.
- 3.2.2 Throughout establishment period, weekly watering shall be implemented in the first three months subject to weather condition and the frequency of watering for the remaining establishment period shall be proposed by the qualified ecologist / botanist who supervises the

transplantation work / compensatory planting based on the local environment of the recipient site. The frequency should be adjusted depending on the soil moisture.

3.2.3 Pruning/weeding and pest control shall also be implemented monthly in the first three months and bi-monthly in the remaining establishment period, or when instructed by the qualified ecologist / botanist. Weeding shall be carried out by hand as far as practicable. Appropriate pest control measure such as the use of pesticide or removal of diseased plant parts shall be performed if necessary.

3.2.4 Use of mulches is recommended to help conserve moisture, maintain moderate soil temperature, and control weeds around plants.

3.3 Post-Transplantation and Post-compensation Monitoring

3.3.1 The health conditions of the transplanted and compensated plants at the recipient site should be monitored during the 3-year and 9-year establishment period respectively. Monitoring of the transplanted / compensated plants should be conducted bi-weekly in the first three months and monthly in throughout the remaining establishment period. Monitoring of transplanted / compensated individuals should continue during the remainder of the construction phase after the establishment period once every 3 months, given that the health conditions during the establishment period remained fair to good. Monitoring frequency during post establishment period (throughout construction phase) would be subject to adjustment based on site conditions and the advice of the qualified ecologist / botanist who supervises the transplantation work / compensatory planting.

3.3.2 The post-transplantation and post-compensation monitoring shall be carried out by a qualified local ecologist or botanist with at least 10 years relevant experience to be certified by ET and verified by the IEC. The ecologist or botanist shall form part of the ET.

3.4 Reporting

3.4.1 The results of the monitoring of conditions of the preserved plants, transplanted plants and compensatory planting should be reported in the monthly Environmental Monitoring and Audit (EM&A) Reports during construction phase. Photographic records of the preserved, transplanted and compensated plant individuals should be included in Monthly EM&A Reports.

3.5 Maintenance Agent and Resource Implications

3.5.1 The implementation and maintenance of the above proposed mitigation measures (i.e. preservation, transplantation and compensation) shall be fully funded by the Project Proponent. The transplanted and compensated individuals should be maintained in the 3-year and 9-year establishment period respectively. If any transplanted / compensated individual dies during the establishment period and during construction phase due to non-compliance of the approved Final PPTP, replacement planting of new trees of the same species should be conducted subject to agreement with AFCD. Upon fully established, the mitigation planting would be handover to the long-term maintenance agent identified and agreed in accordance with the *DEVB TCW No. 6/2015 Maintenance of Vegetation and Hard Landscape Features for ad hoc maintenance*.

3.6 Example of Precedent and Successful Cases

3.6.1 The recommended hierarchy of mitigation measures to minimise ecological impacts to plant species of conservation importance, i.e. preservation, transplantation and compensation, has been widely implemented in various approved EIA studies. Transplantation and/or compensation of plant species of conservation importance such Incense Tree and Butulang Canthium have also been adopted in the below approved EIA studies:

- Tung Chung New Town Extension (Register No.: AEIAR-196/2016)
- In-situ Re-provisioning of Sha Tin Water Treatment Works - South Works (Register No.: AEIAR-187/2015)

- Sha Tin Cavern Sewage Treatment Works (Register No.: AEIAR-202/2016)

4 Conclusion

- 4.1.1 Four flora species of conservation importance (19 individuals of Ailanthus, nine individuals of Butulang Canthium, one individual of Incense tree and nine individuals of Rhodoleia) recorded within Project footprint is anticipated to be directly affected during construction phase. Another five flora species of conservation importance were recorded in close proximity to the footprint of NTHMMs (i.e. one seedling of Incense Tree, one individual of Ailanthus and three clumps of Luofushan Joint-fir near the rigid barriers within LRCP; and four individuals of Butulang Canthium, one individual of Hong Kong Pavetta and three individuals of Ailanthus near the proposed flexible barriers outside LRCP) near the flexible barriers outside LRCP). To mitigate the potential adverse impacts to the identified plant species of conservation importance, nine individuals of Rhodoleia, six individuals of Ailanthus, one seedling of Incense Tree, three clumps of Luofushan Joint-fir and four individuals of Butulang Canthium are proposed to be preserved in-situ, while transplantation of one individual of Incense Tree and five individuals of Butulang Canthium is also recommended. Compensatory planting of Ailanthus and Butulang Canthium is recommended to mitigate for the unavoidable loss of the 22 individuals that are considered unsuitable for transplantation.
- 4.1.2 The preserved plants should be clearly tagged on site and sufficient protection measures as recommended in the PPTP (e.g. setup of rigid fencing around plant protection zone of at least 1.5 m from the tree trunk) should be implemented before the commencement of construction works. Monthly monitoring should be conducted at areas with construction activities near the plant protection zone of the preserved plants.
- 4.1.3 The agricultural land west of Sha Tin South Fresh Water Service Reservoir within the assessment area is identified as a suitable potential recipient site for the proposed transplantation and compensatory planting. Should there be any other suitable compensation site be identified and proposed in the later stage of the Project, agreement / approval shall be obtained from relevant government authorities (e.g. AFCD and EPD) prior to commencement of any construction activities. Before transplantation / compensation, site clearance and preparation should be carried out at the selected and agreed site. The transplantation / compensatory planting should be undertaken prior to commencement of construction. The respective post-transplantation and post-compensation maintenance works should be carried out by the Contractor for 3-year and 9-year establishment period after the transplantation and compensatory planting.
- 4.1.4 Regular monitoring of the conditions of the preserved plants, transplanted plants and compensatory planting should be conducted through the construction stage. Monitoring results and photographic records of the preserved, transplanted and compensated plant individuals should be reported in the monthly EM&A Reports.
- 4.1.5 A Final PPTP should be prepared during the detailed design phase of the Project to review and update the recommendations in this Preliminary Proposal and be submitted to relevant Government authorities (e.g. AFCD and EPD) for approval prior to the commencement of any construction activities.