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港珠澳大橋香港工程管理處
Hong Kong - Zhuhai - Macao Bridge
Hong Kong Project Management Office

Contract No. HY/2011/03: Hong Kong-Zhuhai-Macao Bridge
Hong Kong Link Road - Section between Scenic Hill
and Hong Kong Boundary Crossing Facilities
Landscape and Visual Plan Rev 14

APPENDIX G: TREE PRESERVATION AND PROTECTION



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6. Tree Protection

6.1 Tree Preservation and Protection

Old and Valuable Trees

Any rare and precious species of affected trees which may have amenity or conservation value shall be drawn to the attention of LCSD and AFCD to agree on the need for the proposed treatment. Reference is also made to ETWB TC(W) No. 29/2004 on Registration of Old and Valuable Trees (OVT) and Guidelines for their Preservation.

All the listed trees are within the designated built-up areas specified in the mentioned TC. In addition, reference were made to “Checklist of Rare and Precious plants of Hong Kong” (AFCD, 2004).

Criteria of classifying potentially registrable trees in terms of OVT under ETWB TC(W) No. 29/2004 – Para. 8 and Appendix B are shown as follows:

- Tree of large size (eg tree trunk diameter \geq 1m, measured at 1.3m above ground level);
- Tree of precious or rare species;
- Tree of particularly old age (eg \geq 100 years old);
- Tree of cultural, historical or memorable significance; and
- Tree of outstanding form.

Furthermore, wall trees as defined in HyD TC No. 3/2008 on Independent Vetting of Tree Works under the Maintenance of Highways Department should also be protected as appropriate.

Identification of OVT under the Project

According to Para. 7 of ETWB TC(W) No. 29/2004, only trees on unleased Government land within built-up areas or tourist attraction spots in village areas are eligible for inclusion in the Register. Upon checking against Appendix A (Location of Built-up Areas) of the technical circular, it is verified that none of the surveyed trees within the Project area fall into the designated built-up areas. The nearest designated built-up area is the Tung Chung New Town. Since interim connection to Tung Chung New Town is no longer necessary, no trees in Tung Chung New Town will be affected.

Furthermore, no important trees pursuant to ETWB TCW No. 3/2006 and no wall trees will be affected.

Tree transplanting

In terms of assessing the feasibility of tree transplanting, the following factors are considered:

- Possibility of in-situ tree retaining is exhausted.

- Form, health and amenity value.
- Survival rate after transplanting.
- Trees species, rarity and conservation status.
- Feasibility of access (In some cases transplantation would be difficult and dangerous due to the physical characteristics of the site and the inaccessibility of their situations.)
- The physical characteristics of the specimen trees (For example, the trees on steep slopes respond to the existing gradient with a higher proportion of roots on the downhill side and the root ball usually forms itself to the angle of slope. It is often difficult to find a similar location that is suitable for the transplantation of these trees. In addition, these trees often have an unbalanced crown that would make them unstable if transplanted to another location.)

Only trees with High/Medium survival rate after transplantation AND not on slope are proposed to be transplanted. Otherwise, affected trees are proposed to be felled.

In addition, all the transplanted trees will have minimum 1.2m soil allowance for tree planting excluding the drainage layer. A typical section is shown in **Figure 1** of this Report.

Related contractual clauses and specification clauses

6.2 Specific measures

Contractual and specification clauses for preservation and protection of trees are adopted from the sample clauses under the Cyber Manual for Greening. Reference to Sections 3 and 26 of the General Specification for Civil Engineering Works (2006 Edition) is also be made.

Site procedure

During construction, the following guidelines shall be followed to protect retained trees within and in the vicinity of the work area:

- Before the commencement of construction works, the contractor shall clearly identify those trees which are to be retained, transplanted and to be felled and be clearly marked on the layout plans.
- Trees shall be clearly marked on site prior to the commencement of site clearance works, with coloured numbers consistent with the Tree Survey Report for the Project. Trees to be retained shall also be clearly marked with surveyor's flagging or ribbon.
- Existing tree areas within the site works to be retained shall be protected during construction by temporary fencing.
- As a general rule the majority of a tree's roots lies within an area just greater than the spread of its crown and are at a depth of approximately 600mm. This may be less on heavy soils and greater on drier soils. Therefore, the following precautions

shall be undertaken in order to avoid damage to the trunks, roots and crowns of trees during construction:-

Heavy equipment and storage areas shall be placed outside the tree protection zone.

Care shall be taken to prevent trees being damaged by mechanical equipment both during site clearance works and construction works.

No fixings shall be driven into trees.

No workshop, canteens, or similar shall be installed beneath trees, nor shall equipment maintenance etc. be carried out under trees.

No excavation, including that for services, or changes in ground level shall take place within the spread of the crown of the trees, or a minimum of 1.5m from the tree trunk, as roots could be damaged.

No soil, debris or construction materials shall be deposited around and against the trunk of a tree as this causes bark damage and compaction of the soil.

No fire shall be lit below the branches and no petrol, oil or caustic substances stored near the trees.

No trees shall be used for anchoring or winching purposes or for the display of signs.

Protective Fencing

Temporary Protective Fencing that extends beyond the dripline (Crown Spread Area) shall be adopted to protect trees during construction. The following figures refer.

Figure 6.1 Temporary Protective Fencing to Preserve Tree (Individual Tree)

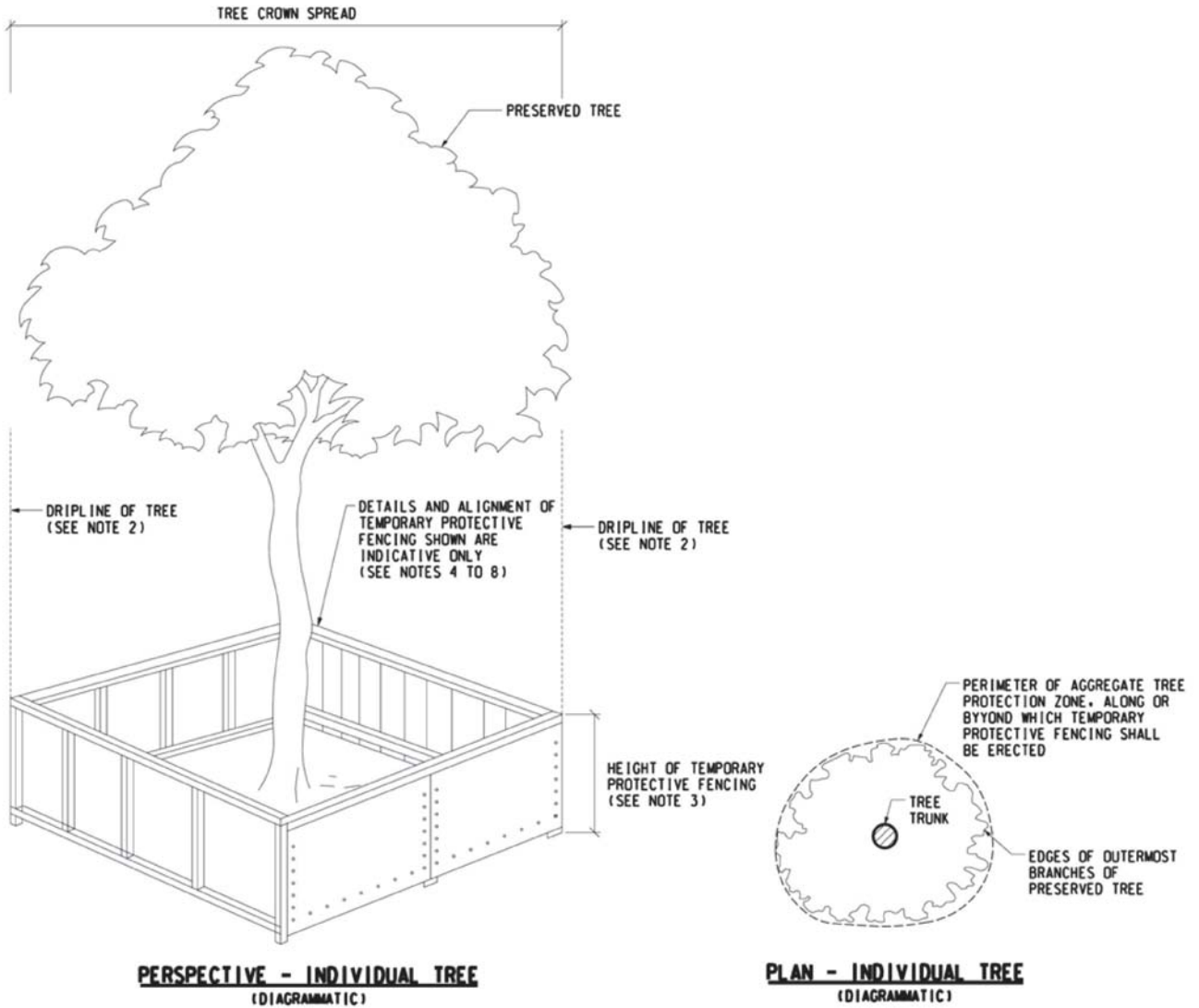
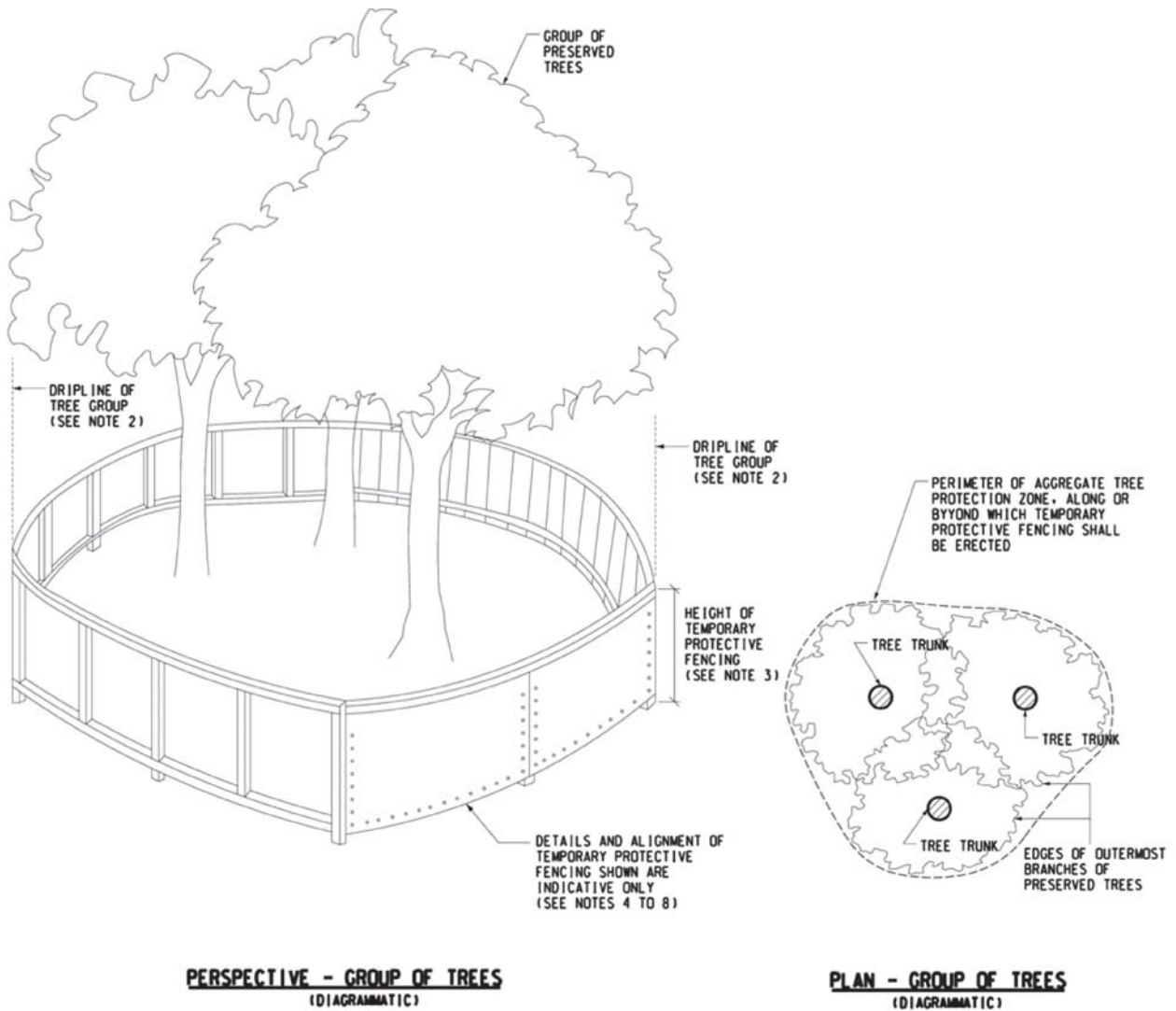
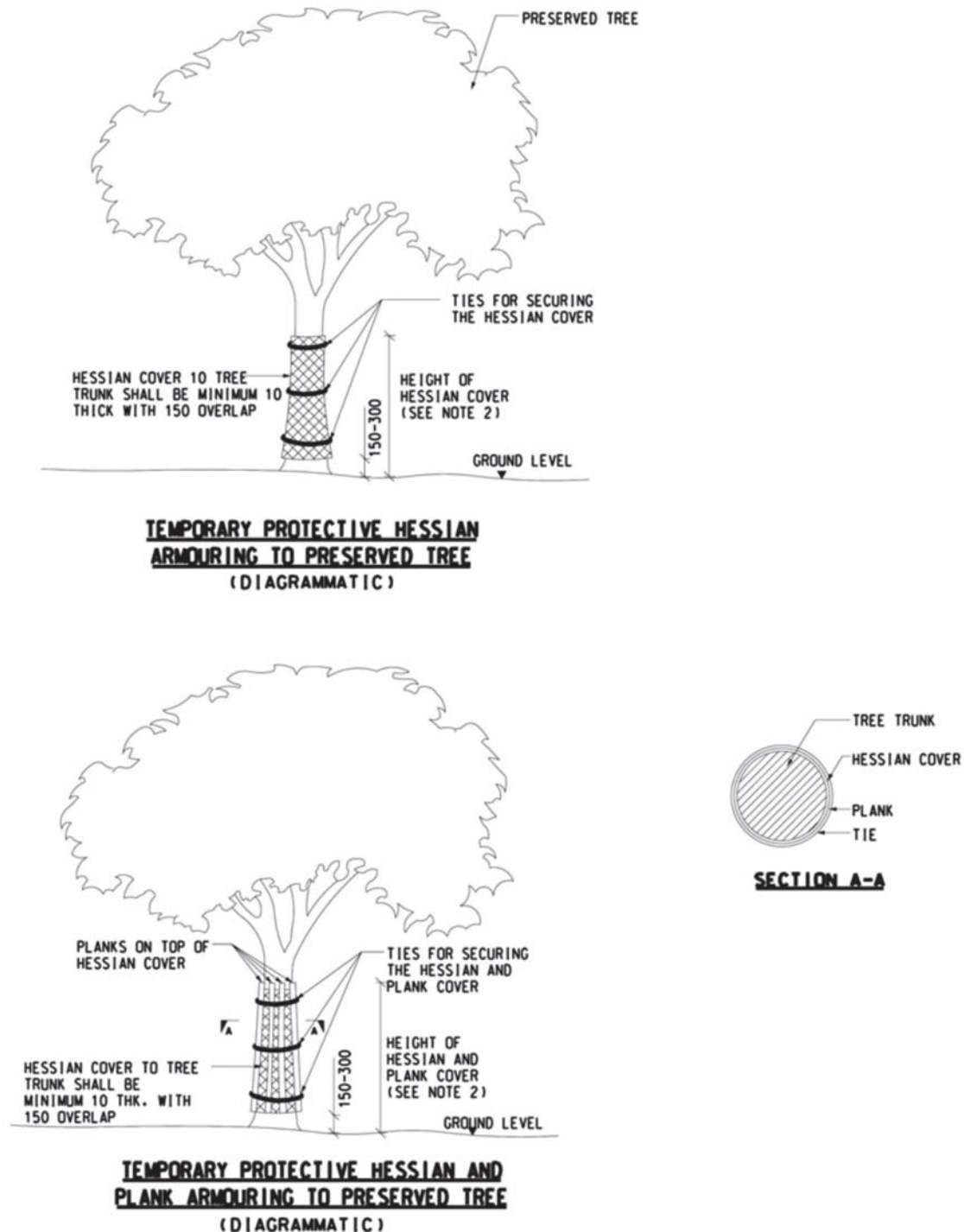


Figure 6.2 Temporary Protective Fencing to Preserve Tree (Group of Trees)



To directly and indirectly avoid affected trees becoming damaged by construction equipment, temporary protective armouring shall be utilised. The following figure refers.

Figure 6.3 - Temporary Protective Armouring to Preserve Tree (Hessian and Plank)



If trees are wounded or stressed during construction they become more susceptible to insect and disease attack. Any wounds to the bark shall be cleaned to sound wood by removing loose bark and wood, leaving a smooth edge around the wound. No application of a wound dressing is necessary.

Tree Pruning

No pruning to any retained trees of branches over 50mm dia shall be undertaken unless such pruning work is required and agreed under the Tree Removal Application. The contractor shall notify the Supervising Officer of any retained trees whose branches or root interfere with the works and thus require pruning. Pruning shall only commence after the Supervising Officers approval has been obtained. The contractor shall carry out approved pruning work during the site clearance stage unless otherwise instructed or agreed by the Supervising Officer.

Pruning work shall not be in excess of 20% of existing branch and root of an individual tree. The contractor shall comply with the requirements shown below when carrying out pruning work.

- The contractor shall provide all necessary tools and equipment for the pruning works, to comply with the following:-
 - (a) All necessary physical support and all necessary safety precautions shall be provided to protect people engaged in the pruning work as well as those people and property in the vicinity; and
 - (b) Cut limbs shall not be left in the crown of a tree upon completion of pruning, at times when the tree will be left unattended, or at the end of the workday.
- The contractor shall carry out pruning works in accordance with good horticultural practice and recommendations. The works shall be supervised by a suitably Qualified Professional approved by the Supervising Officer.
- The following procedures shall be undertaken:-
 - (a) Pruning and removal of branches and roots shall be done using sharp, clean implements to give a single flat, sloping face.
 - (b) Thinning cuts instead of heading cuts shall be used.
 - (c) Pruning cut shall be made just above and sloping away from an outward facing healthy bud.
 - (d) Branch bark ridge shall not be damaged, branch collar shall not be cut off, and no flush cut shall be made
 - (e) No topping (cutting off all branches to the same height) or lion tailing of the tree shall be made in any circumstances,
 - (f) No more than 20% of the live foliage of a single limb on mature trees shall be removed.

- (g) The total extend of crown thinning should be minimised and in any case, no more than 20% of the total tree live foliage on mature trees shall be removed.
 - (h) At least 50% of the foliage shall be evenly distributed in the lower 66% of the canopy on mature trees after pruning.
 - (i) Cuts shall be neatly made so that there is no splintering or tearing of bark and no snags or stumps are left behind.
 - (j) Any branch larger than 25mm diameter shall be removed in stages using a three-cut method as follows:
 - i. The first cut shall be an undercut made approximately one-third to halfway through the branch at 300mm to 400mm from the branch union,
 - ii. The second cut shall be made from the above at 50 to 75mm out past the first cut, removing the branch but preventing the weight of the branch from tearing the bark below the branch collar.
 - iii. The third cut shall be a final cut just outside the branch collar without injuring the branch collar and branch bark ridge, and
 - (k) Ragged, rough edges of bark or wood shall be trimmed clearly from around wounds with a sharp knife to the minimum extent necessary in order to hasten wound closure, and wigs less than 15mm diameter shall be cut with sharp secateurs.
- All cuts shall be made to avoid splintering or tearing of bark that would catch water and encourage rot, and any cracks, cavities or rotten wood shall be cut back with a clean, sharp implement to remove the dead, damaged and decayed tissue without damaging the living tissue.
 - Unless otherwise instructed by the Supervising Officer, any cuts or wounds shall be left uncovered and no wound dressing shall be applied.
 - Any material pruned from the trees shall be removed from the site as soon as possible, and any areas affected by the pruning work shall be reinstated.