GUIDELINES FOR TREE RISK ASSESSMENT AND MANAGEMENT ARRANGEMENT
(10th Edition)

GREENING, LANDSCAPE AND TREE MANAGEMENT SECTION
DEVELOPMENT BUREAU

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CONTENT

Part 1 - RESPONSIBILITIES OF TREE MANAGEMENT DEPARTMENTS

1.1 PURPOSE

The Guidelines for Tree Risk Assessment and Management Arrangement (TRAM Guidelines) serve to provide technical and performance guidance on tree risk assessment, management, monitoring and maintenance. The key objectives are to:

(a) Maximise public safety

(b) Establish sustainable tree care practices

The TRAM Guidelines are based on international best practices with due consideration to the circumstances in Hong Kong. They should only be applied, supervised and endorsed by qualified inspection officers when exercising their professional judgment. They should not be used in a prescriptive manner, nor inhibit the development of new techniques or approaches that aim to add value to existing tree management practices. During the process of tree risk assessment, tree maintenance departments, inspection officers should consider the life-cycle of the tree and its relationship with its surrounds.

1.2 OBJECTIVES

For Tree Maintenance Departments[1]

- Recognise your role and responsibilities in tree risk assessment and management (TRAM) for all trees within your purview.
- Understand the importance of prioritising resources for undertaking TRAM of trees within high priority areas.
- Understand the importance of quality tree maintenance and risk assessment in protecting public safety.

For TRAM Inspection Officer

- Recognise your role and responsibilities in delivering quality TRAM work.
- Follow the TRAM Guidelines.
- Demonstrate competency and professionalism in your tree risk assessment.

[1]Tree maintenance department refers to departments demarcated with tree maintenance responsibilities under DEVB TC(W) No. 6/2015 and its Appendix A.

1.3 STRUCTURE OF GUIDELINES

The Guidelines comprise the following four parts, together with a list of supplementary appendices.

Part 1 highlights the purpose and objective of the Guidelines, and the importance of adopting an integrated approach and strategic risk assessment in tree management.

Part 2 provides the overall framework and details in implementation of tree risk assessment.

Part 3 covers a set of baseline considerations to help the decision–making process in tree care.

Part 4 provides some practical checklists to facilitate tree management works.

1.4 INTEGRATED APPROACH IN TREE MANAGEMENT

The Government has adopted an 'integrated approach' in assigning responsibilities for preserving and maintaining trees on Government land among relevant departments. It is the responsibility of all tree maintenance departments to manage all assets, including trees, within areas, facilities and premises under their maintenance ambit.

A holistic process is adopted to the management of our assets. It is fundamental to understand that our trees are inextricably connected to and thus impacted by numerous bio-physical, bio-mechanical and urban conditions. Hence, the more dense and compact our urban environment, the more stress our trees will suffer. Trees grow on land that is managed by a range of responsible parties. This land may also contain soil, other vegetation and a host of other infrastructure and landscape elements that must be managed and maintained in a holistic manner.

1.5 STRATEGIC RISK ASSESSMENT IN TREE MANAGEMENT

Making reference to overseas best practices and taking into account the urban conditions in Hong Kong, the TRAM is based on a dual approach – Area Basis Assessment and Tree Basis Assessment.

Area Basis Assessment

- *Identify high priority areas where public will be affected if a tree fails.*

Tree Basis Assessment

- *Identify valuable trees (i.e. Old and Valuable Trees, stonewall trees, and Large Trees) and high risk trees within high priority areas.*
- *Assess tree conditions in accordance with a standardised format with emphasis on the risk angle.*

1.5.1 IDENTIFY YOUR HIGH PRIORITY AREAS FOR TREE RISK ASSESSMENT

Tree maintenance departments are required to identify areas where tree failure will pose a hazard to public safety, damage to property or cause disturbance to human activity and hence categorise the land under their management into tree risk management zones according to the intensity of use in target areas.

1.5.2 PRIORITISE RESOURCES FOR VALUABLE TREES AND HIGH RISK TREES

By identifying valuable trees and high risk trees, tree maintenance departments can allocate resources to conduct tree risk assessment efficiently and undertake appropriate mitigation measures as far as practicable in a timely manner to alleviate tree risk and prioritise management of these trees.

1.5.3 MITIGATE TREE RISK TO PROTECT PUBLIC SAFETY

Human safety is the most important aspect in tree risk management. Tree maintenance departments must undertake management diligence to keep trees in healthy and structurally sound conditions, identify hazardous trees and take appropriate mitigation measures as far as practicable in a timely manner to protect human safety. In case of conflict between tree preservation and public safety, the latter should be given the higher priority.

1.6 ENHANCEMENT MEASURES

The Task Force on Roadside Tree Planting and Maintenance proposed a number of improvement measures in tree management at the end of 2022, including the enhancement of TRAM guidelines. The key enhancement measures adopted in this updated version of TRAM are as follows:

1.6.1 EXPANDING THE SCOPE OF INDIVIDUAL TREE RISK ASSESSMENT

Noting that some tree failures involve relatively large trees growing at locations with stress, the scope of individual tree risk assessment (Form 2) is expanded to cover additional trees with a diameter at breast height (DBH) at 500 mm or above; or with overall height at 9 m or above; and are growing in confined areas, i.e. in tree pits or tree rings, or in unstable formation. This would help ensure that trees with potential high risk can be identified early (Part 2.4 of this guidelines refers).

1.6.2 ENHANCING IMPLEMENTATION OF RISK MITIGATION MEASURES

When a tree is identified as having health and/or structural problems, it is essential to work out appropriate mitigation measures to suitably reduce tree failure risk by specifying clearly the scope, nature and timeline of actions to be taken. An internal procedure to alert senior management of departments of delay in timely completion of necessary risk mitigation work should be put in place. (Part 2.5 of this guidelines refers).

1.6.3 MORE EXTENSIVE USE OF TECHNOLOGY IN TREE MANAGEMENT

Review of past tree incidents shows that use of suitable aid or equipment could have been very useful in providing additional information to supplement visual inspection for assessing the risk level of trees more accurately. This is particularly so for internal decay which is often not visible from the outside and defects of trees at high level which is hard to inspect from ground level. (Part 2.3.2 of this guidelines refers).

PART 2 – TREE RISK ASSESSMENT

2.1 IDENTIFY YOUR LAND ALLOCATION AND TREE STOCK

Before carrying out tree risk assessment, tree maintenance departments have to:

#	Requirements
1	Reconfirm the extent of all areas with trees under your maintenance ambit. It is recommended to refer to the Geospatial Information Hub (GIH) in the Government intranet (https://geoportal.landsd.ccgo.hksarg/geoportal/papp1/core/rgih/view/auth/landing) and check with Lands Department on the extent of all your land allocation. Reconfirm tree maintenance responsibilities demarcated under Development Bureau Technical Circulars.
2	Ensure all trees under your maintenance ambit are included in your tree risk assessment and maintenance works.

2.2 UNDERTAKE TREE RISK ASSESSMENT ON AREA BASIS

Tree maintenance departments are required to categorise all the sites under their management into tree risk management zones with reference to the intensity of use in target areas.

The tree risk assessment on an 'Area Basis' aims to:

- Identify areas where tree failure will pose a hazard to public safety or cause disruption to human activity; and
- Prioritise resources for tree risk management according to the frequency of use of the area.

Targets are people, property, or human activity that can be injured, damaged, or disrupted by a tree failure, e.g. partial or complete road closure. A tree cannot be a hazard without the presence of a target. For sites managed by departments, tree risk management zones are determined based on the intensity of use in target areas which would be affected by tree failure.

Such site categorisation also covers sites temporarily under the management of works departments during the course of public works projects. Works departments have to approach the departments that previously managed the trees, including the Maintenance Agent of SIMAR Slopes if any, to obtain the records of previous tree inspections for at least one year or as appropriate, and familiarise themselves with existing tree conditions prior to commencement of works.

2.2.1 CATEGORISATION OF TREE RISK MANAGEMENT ZONES

Categorisation of tree risk management zones is shown in the following table.

1. Intensive Use	
Definition	Areas of high traffic flow and/or high pedestrian flow, i.e. areas having traffic flow and/or pedestrian flow for at least a large portion of a day or a week.
Examples	Popular urban public parks and playgrounds, crowded streets, busy carriageways, open car parks, busy footpaths, areas adjacent to schools and buildings, popular barbecue sites in country parks, etc.
Tree Risk Management Zone	High (Category I)
Priority for Tree Risk Management	Top priority
Tree Risk Management Frequency	At least once a year before onset of wet season and when necessary (e.g. act on complaint)
2. Infrequent use	
Definition	Areas of low traffic flow and/or low pedestrian flow, i.e. target is present infrequently or irregularly within the areas.
Examples	Road verges of limited access, countryside roads, village footpaths, hiking trails, picnic sites in remote country parks, work site of a government project with hoardings and/or restricted access (except fall zone of trees, along edges of works site and abutting accessible road/ footpath, which may be classified as Zone 1 category), catchwater roads, country parks forest tracks, etc.
Tree Risk Management Zone	Medium (Category II)
Priority for Tree Risk Management	Second priority
Tree Risk Management Frequency	Every 3 to 5 years, if resources permit, and when necessary(e.g. act on complaint)
3. Rare use	
Definition	Areas of rare access such as inaccessible areas, i.e. target is not commonly present within the areas.
Examples	Remote countryside slopes, dense woodlands within water gathering grounds and/or country parks, maintenance access not open to public, etc.
Tree Risk Management Zone	Low (Category III)
Priority for Tree Risk Management	Low priority
Tree Risk Management Frequency	When necessary (e.g. act on complaint)

Appendix 1 - Working Examples of Demarcation of Tree Risk Management Zone

2.3 UNDERTAKE TREE RISK ASSESSMENT ON TREE BASIS

Once high tree risk management priority areas (i.e. Category I Zones) are identified, tree maintenance departments are required to undertake the risk assessment on tree basis for trees within Category I Zones.

#	Actions
1	Identify the valuable trees and high risk trees within Category I Zones.
2	Assess health and structural conditions of the identified trees systematically and professionally with particular emphasis on the risk perspective.
3	Use standardised forms promulgated by the DEVB to record the inspection findings.

2.3.1 TREE GROUP INSPECTION (FORM 1)

#	Objectives of Tree Group Inspection (Form 1)
1	Facilitate initial screening of trees within Category I Zones.
2	Keep records for further monitoring.
3	Make reference to the "Common Tree Problems" (https://www.greening.gov.hk/en/tree-care/common-tree-problems/index.html) and "Pictorial Guide for Tree Maintenance" (https://www.greening.gov.hk/filemanager/greening/en/content_28/Pictorial_Guide_for_Tree_Maintenance.pdf) to identify potential tree hazards for appropriate mitigation measures or for more detailed individual tree risk assessment using Form 2.

#	Actions for Undertaking Tree Group Inspection (Form 1)
1	Follow requirements for Inspection Officers in Appendix 3 to undertake Tree Group Inspection.
2	Inspect each tree in the tree group systematically.
3	Follow requirements as stipulated in Section 2.4 to undertake TRIAGE System.
4	Pay particular attention to potential tree hazards due to the health or structural conditions of each individual tree.
5	Use binoculars, or drone when applicable to obtain a closer view of the conditions of the canopy.
6	Use appropriate equipment and hand tools such as mallet, hand spade and probe, etc. for preliminary assessment of individual trees. (Please also refer to checklist 4.3.1)
7	Conduct sounding tests for trunks or accessible scaffold limbs with decay or suspected decay cavity, to assess the extent of structural problems.

#	Actions for Undertaking Tree Group Inspection (Form 1)
8	Undertake mitigation measures for trees with minor defects to mitigate tree risk.
9	Decide if an Individual Tree Risk Assessment (Form 2) will be necessary for a particular tree (Please refer to section 2.4.4).
10	Record all the findings in Form 1: Tree Group Inspection Form in Appendix 4 and upload the completed Form 1 to the TMCP.
11	Provide photo records in accordance with requirements as listed in Checklist 4.3.2 and Appendix 6.

For users with Tree Management Common Platform (TMCP) accounts, the use of Form 1 under the TMCP Windows Application is required. Departments using interface to transfer tree information shall continue to use TMIS until new interface between department and the TMCP system is established.

Appendix 2 –Landscape and Location Conditions

Appendix 3 - Requirements for Inspection Officers

Appendix 4 - Form 1: Tree Group Inspection Form

Appendix 5 - Explanatory Notes for Form 1

Appendix 6 - Photo-taking Guidelines for Tree Risk Assessment

2.3.2 INDIVIDUAL TREE RISK ASSESSMENT (FORM 2)

Form 2 is used for conducting detailed assessment of individual trees that need more attention. Using of technology in detailed assessment of individual trees (Table 2.3.2) such as aerial inspection of tree at height or checking internal conditions of trees are recommended.

#	Actions for Undertaking Individual Tree Risk Assessment (Form 2)
1	Follow requirements for Inspection Officers in Appendix 3 to undertake Individual Tree Risk Assessment.
2	Walk completely around the tree to inspect the site conditions, root collar, trunk, and branches including inspection of the tree from some distance away, as well as close up, to assess the tree condition in relation to its surroundings.
3	Use appropriate equipment and hand tools such as binoculars, mallet, hand spade and probe, etc. when required. Resistograph, tomograph or equipment for root detection should be arranged when necessary.
4	Conduct sounding tests for trunks or accessible scaffold limbs with decay or suspected decay cavity to assess the extent of structural problems.
5	Conduct root collar inspection for trees growing at confined sites or having suspected root defects which may adversely affect tree stability.
6	Conduct aerial inspection by tree climbing or drone when appropriate to assess the structural conditions for trees in areas with frequent use and suspected structural defects which are difficult to inspect at ground level.
7	Make reference to the ‘Manual of the Management of Brown Root Rot Disease’ and ‘Note on Common Wood Decay Fungi on Urban Trees of Hong Kong’ for tree inspection. Soil BRR disease and pathogen tests should be arranged when necessary.
8	Make reference to Appendix 2 - Landscape and Location Conditions for inspection of stonewall trees, trees in confined space, trees with ground disturbance and trees on slopes. Equipment for root detection can be arranged when necessary.

#	Actions for Undertaking Individual Tree Risk Assessment (Form 2)
9	Rate the tree risk rating with recommendations on follow-up mitigation actions to address the identified defects and tree problems. Please make reference to Appendix 8. Inspection Officer shall note: (a) If the tree species falls within the 20 common tree species requiring special attention or the tree has one or more major defects or health problems as shown in section 2.4.3, the rating for "Likelihood of Failure" should be duly considered to be rated at " "Probable" or "Highly Probable" depends on the severity of the defects; (b) If the "Risk Rating" is "High" or "Extreme", mitigation measures shall be recommended against the tree part with the target identified; (c) If mitigation measures is recommended, the "Residual Rating" shall be lower to "Moderate" or lower, otherwise, reconsideration of mitigation measures is required.
10	Follow the 'Management Guidelines for Mature Trees' and 'Management Guidelines for Stonewall Trees' in conducting tree inspection and formulating mitigation measures.
11	Record all the findings in Form 2: Tree Risk Assessment Form in Appendix 7 and upload the completed Form 2 report to the TMCP.
12	Provide photo records in accordance with requirements as listed in Checklist 4.3.2 and Appendix 6.

Table 2.3.2 - Examples of technology using in tree management

Technologies	Brief description	Application
1. Resistograph	Resistograph is a mechanical resistance measurement device. A long, thin needle driven to record the wood density, often to identify areas of decay. The equipment is intrusive in nature and should be used with care.	Trunk, branch and root defects

Technologies	Brief description	Application
2. Sonic Tomograph	The sonic tomograph is used for internal assessment of tree decay, measures the thickness of the residual wall of trees with internal defects such as cavities or decay non- invasively.	Internal decay, cavities or wound openings
3. Equipment for root detection, such as sonic tomograph	Sonic tomograph can detect the extent and conditions of roots under soil or pavement.	Tree root restriction in confined areas
4. Drone	Drone is unmanned aviation system that support reviewing tree conditions and defects at height.	Tree defects at branches or crown at height.

For users with TMCP accounts, the use of Form 2 under the TMCP Windows Application is required. Departments using interface to transfer tree information shall continue to use TMIS until new interface between department and the TMCP system is established.

Appendix 3 - Requirements for Inspection Officers

Appendix 6 - Photo-taking Guidelines for Tree Risk Assessment

Appendix 7 - Form 2: Tree Risk Assessment Form

Appendix 8 - Explanatory Notes for Form 2

2.4 THE TRIAGE SYSTEM

The Triage System is only for trees in Category I Zones. The purpose is to:

(i) Identify trees that require more urgent attention than others.

(ii) Prioritise these trees based on a combination of factors that impact a tree's structural health.

(iii) Prioritise mitigation works based on the TRIAGE classification of a tree.

2.4.1 TRIAGE TREES

- Dead trees
- Trees confirmed with Brown Root Rot (BRR) disease infection
- Old and Valuable Trees (OVTs)
- Stonewall trees (SWTs)
- Large trees with an individual trunk(s) DBH ≥ 500mm or overall height at 9 metres or above

2.4.2 TRIAGE CLASSIFICATION AND COLOURS

How TRIAGE System works?		
Tree maintenance departments have to classify their trees as per Section 2.4.1 within Category I Zones into the following four categories;		
Black	**= Hazardous**:	Trees programmed to be removed
Red	**= Attention:**	OVTs/SWTs and trees identified for prompt inspection and mitigation measures
Orange	**= Stressed:**	Large trees identified in confined growing environment or growing on unstable foundation that may be vulnerable to tree failure
Yellow	**= Remaining Triage Trees:**	Trees not in 'Black', 'Red' and "Orange" category

Categorisation, necessary action and monitoring requirements of Black, Red, Orange and Yellow trees are illustrated in the following tables.

Black	
Criteria	▪ Dead trees; or ▪ Non-OVTs confirmed with BRR disease infection.
Action	1. Tree removal within 4 weeks after completion of Form 1 inspection; or 2. If removal cannot be completed in 4 weeks, departments have to provide appropriate temporary mitigation measures as far as practicable to ensure public safety.
Monitoring Requirement	1. For Non-OVTs confirmed with BRR disease infection, (a) Undertake Form 2 assessment every 3 months to monitor the tree condition until the removal of the tree; and (b) Upload the completed Form 2 report to the TMCP.

RED	
Criteria	▪ OVTs / SWTs; or ▪ Large trees with individual trunk(s) DBH ≥ 500mm or overall height at 9 metres or above and with crown spread within dripline of confirmed BRR disease infected tree; or ▪ Large trees with individual trunk(s) DBH ≥ 500mm or overall height at 9 metres or above having one or more major structural defects or health problems. (please refer to 2.4.3).
Action	1. Undertake Form 2 assessment and complete appropriate mitigation measures within 6 weeks as far as practicable after completion of Form 1 inspection. 2. Upload the completed Form 1 and Form 2 reports to the TMCP.
Monitoring Requirement	1. Close monitoring by Form 2 assessment: (a) Every 3 months for BRR disease infected OVTs. (b) Every 6 months for remaining 'Red' category trees; and 2. Upload the completed Form 2 report to the TMCP; and 3. Undertake emergency inspection within 7 calendar days as far as practicable after the lowering of: (a) Typhoon Signal No. 8 or above; and

RED	
	(b) Red or Black Rainstorm Signal. The emergency inspection should focus on the damage, stability and potential hazard that the tree poses to the public.
Downgrading Mechanism	1. To downgrade a 'Red' category tree to "Orange" or 'Yellow' category, tree maintenance department needs to: (a) Undertake all the mitigation measures as recommended in Form 2 assessment to alleviate the residual risk rating to "moderate" or below. (b) Confirm the major structural defects or health problems have been mitigated. (c) Record the recommendation for downgrading the tree to "Orange" or 'Yellow' category in Form 2. (d) Upload the completed Form 2 report to the TMCP.

ORANGE	
Criteria	▪ Large trees with individual trunk(s) DBH ≥ 500mm or overall height at 9 metres or above; and ▪ Trees are growing in confined site, i.e. tree pits or tree rings or growing on unstable foundation, i.e. large rock or thin soil layer with root ball exposed; and ▪ Trees are not genera or species of the family Arecaceae (Palmae)
Action	1. Undertake Form 2 assessment and upload the completed Form 2 report to the TMCP; and 2. Undertake appropriate mitigation measures.
Monitoring Requirement	1. Undertake Form 2 assessment every 12 months; and 2. Undertake appropriate mitigation measures within 6 weeks after Form 2 assessment as far as practicable; and 3. Upload the completed Form 2 report to the TMCP.

YELLOW	
Criteria	▪ Triage trees that are not classified in 'Black', 'Red' and 'Orange' categories.
Action	1. Undertake Form 2 assessment and provide appropriate mitigation measures to trees that have no visible or with minor structural defects or health problems if resources permit. 2. Upload the completed Form 2 report to the TMCP
Monitoring Requirement	1. Undertake Form 2 assessment and provide appropriate mitigation measures if resource permit; and 2. Upload the completed Form 2 report to the TMCP.

2.4.3 MAJOR DEFECTS OR HEALTH PROBLEMS OF A TREE

Examples of major structural defects or health problems are as follows:

(a) Leaning ≥ 15 degree in any direction (except stonewall tree) AND with restricted root growing / cut root on the tension side;

(b) Co-dominant trunk with splitting included bark;

(c) Large crack, split trunk or open cavity having the longest axis ≥ 1/3 of trunk diameter;

(d) Root crack or split more than 120 degree on the root flare;

(e) Root rot extended to more than 1/3 on the root flare;

(f) Root plate movement and dead root/severe root cut/restricted at the tension side;

(g) Extensive growth of fruiting bodies of wood decay fungi at trunk and root zone within dripline; and

(h) Anomaly when compared with trees of same species in the vicinity, e.g. untimely defoliation, dieback.

2.4.4 TREES NOT UNDER TRIAGE SYSTEM

For other trees in Category I Zones not assessed through TRIAGE System, tree maintenance departments are required to identify the trees with the following criteria in Tree Group Inspection for implementing proper mitigation measures and undertaking Individual Tree Risk Assessment (Form 2) if necessary.

- Trees on a complaint list with structural or health problems.
- Trees belonging to species with brittle wood structure and having

unsatisfactory health or structural conditions with failure potential.

- Trees with major defects or health problems (please refer to 2.4.3).
- Trees growing in very stressful site conditions, i.e. severe root restriction, severe headroom restriction, with failure potential.

If a detailed tree risk assessment of individual tree is required, Form 2 shall be used for assessment on the tree conditions and formulation of appropriate mitigation measures. The completed Form 2 report shall be uploaded to the TMCP.

2.5 MITIGATION MEASURES

To ensure public safety, tree maintenance departments are required to carry out necessary mitigation measures, such as tree pruning, installation of support system, pest and disease control, site condition improvement works and / or tree removal promptly to alleviate the risk of failure.

#	Requirements
1	Refer to the "Guidelines on Arboriculture Occupational Safety and Health" issued by the DEVB and ensure adequate occupational safety and health measures in carrying out the tree works.
2	Refer to the guidelines promulgated by the GLTMS on proper pruning practices, such as "Guidelines on Tree Pruning", "Do's and Don'ts in Pruning" and "Tree Management Practice Note No. 3: Tree Pruning".
3	Refer to the "Guideline on Pavement Renovation Works and Tree Stability" issued by the GLTMS for trees in stressful conditions.
4	Refer to guidelines promulgated by the GLTMS on pest and disease control, such as "Manual of the Management of Brown Root Rot Disease" and "Note on Common Wood Decay Fungi on Urban Trees of Hong Kong".
5	Refer to the "Proper Planting Practice – Staking and Guying" promulgated by the GLTMS on the installation of support system.

Please refer to GLTMS website at https://www.greening.gov.hk/en/home/index.html for the latest Guidelines or Practice Notes on tree care.

2.5.1 MITIGATION MEASURES COMMENSURATE WITH THE RISK LEVEL

For trees assessed "High" or "Extreme" on "Overall Tree Risk Rating" in individual tree risk assessment, i.e. Form 2, appropriate mitigation measure shall be recommended to lower the "Overall Residual Risk" rating to "Moderate" or lower. If the proposed mitigation measures cannot achieve the lowering of risk rating, revised mitigation measures or removal of the whole tree shall be considered. Furthermore, departments should put in place internal procedures to alert senior management of delay in timely completion of necessary risk mitigation work.

Tree maintenance departments are required to follow the requirements as stated in the Technical Circular on 'Tree Preservation' (DEVB TC(W) No. 4/2020 or its latest version) to carry out tree removal and compensatory planting. Factors, such as available growing space and soil to sustain healthy tree growth, gradient of slopes, etc. have to be considered.

2.6 SENSITIVITY ANALYSIS

Please refer to Section 3.3 for the details of Sensitivity Analysis.

2.7 RECORD KEEPING

Tree maintenance departments are required to keep retrievable and accurate records of tree risk assessments, risk mitigation measures, monitoring programme undertaken for the trees under their management and tree failure report. ALL completed Form 1 and Form 2 reports shall be submitted to the TMCP for recording within two months from date of inspection.

2.8 AUDIT INSPECTION

Tree maintenance departments are required to set up a departmental audit checking mechanism to:

(a) Ensure tree risk assessment is carried out properly and professionally.
(b) Ensure necessary mitigation measures are carried out promptly.

#	Actions
1	Refer to 'Guidelines on Audit of Tree Risk Assessment' on the GLTMS website.
2	The audit checks shall cover not less than 10% of total number of Form 1 and 10% of Form 2 carried out by in-house staff and / or tree risk assessments conducted by outsourced service providers.
3	Conduct the audit checks by qualified personnel as stipulated in 'Guidelines on Audit of Tree Risk Assessment' as soon as practicable to monitor the quality of the assessment. In-house audit should be conducted by different team to ensure the impartiality.
4	Review the accuracy and completeness of records.
5	Check for appropriateness of the mitigation measures and against the timelines for completion.
6	Follow up promptly with any irregularities identified during the audit checks.
7	Upload the "Audited" forms to the TMCP. Tree risk assessments and related procedures carried out by departments are subject to further audit checks by the GLTMS.

PART 3 – TREE CARE

Responsible tree care is a team effort. Its success is founded upon the clarity of roles, responsibilities and communication amongst internal and external personnel. The following sections provide a set of baseline considerations to help the decision–making process in delivering quality work to international best practice.

3.1 MANAGEMENT

The table below illustrates the different levels of responsibilities in the process of decision-making:

Strategic Decision (directorate)	Professional Decision (managerial)	Operational Decision (frontline)
• Establish the direction of steer. • Formulate principles of judging the alternatives. • Brainstorm and analyse the different choices. • Give steer. • Oversee outcome. • Evaluate feedback and prioritise departmental resources.	• Recognise the need for a steer. • Generate alternatives. • Evaluate the alternatives. • Green light to execute or seek steer. • Monitor outcome. • Gather feedback. • Evaluate feedback and refine work processes.	• Identify, verify and establish the tree problem. • Carry out assessment and determine the constraints. • Identify alternatives and recommend the preferred option. • Execute or seek steer. • Evaluate results and provide feedback.

Purpose
To maximise the long-term efficiency and effectiveness of tree management, maintenance, monitoring and compliance.

#	Actions
1	A robust institutional set up of qualified and trained in-house staff to undertake the required duties to meet the short, medium and long-term delivery on all aspects of tree management.
2	A strategic framework to progressively procure, train and qualify in-house staff to meet the short, medium and long-term needs.
3	Verify tree works are carried out, supervised, monitored and validated by relevant personnel.
4	Communication and consultation are efficiently and effectively undertaken to manage public expectations and sensitivities.
5	The tree management supply chain complies with all requirements at all stages of works.

#	Communication
1	Communication framework that clearly identifies the following: ▪ Chain of command;

	▪ Feedback loops; ▪ Timeframes for communicating to different parties; ▪ Consultation requirements to parties such as, but not limited to: stakeholders; local residents; District Councils; government departments, bureaux and agencies; ▪ Method of communication and consultation such as types and frequency of meetings; notifications; forums; displays.
2	A developed and tested emergency communication procedure in the event of tree failure or emergency tree removal.
3	Suite of communication templates that can be readily deployed to succinctly and factually articulate: ▪ Upcoming scheduled works; ▪ Chronology of events; ▪ Progressive updates.
4	Assigned personnel to execute the communication framework across all stages of works.

#	Documentation
1	A robust set of contract documents and technical specifications that covers all required aspects of tree care to meet the quality standards as detailed in all relevant Technical Circulars, Guidelines and Standards, the British Standards BS3998, the American National Standards ANSI Z133 and ANSI A300 as the reference.
2	Contract documents that clearly articulate the following: ▪ Defined standards-based scope of works. ▪ Required services with onus on the Contractor to deliver methodology of works; completeness of documentation; inspection points; sign-offs; regulatory approvals during all stages of works. ▪ Measurable outputs through contract enforcement procedures.
3	Verify documentation and compliance to record-keeping standards and protocols.

3.2 MAINTENANCE

Quality tree care starts when a tree is selected and planted. Good maintenance assures the tree's sound establishment and healthy growth throughout its life, minimises remedial costs and significantly contributes to tree safety.

Purpose
To instill a positive culture and quality practices toward the long-term care of your tree assets and minimise risk to 'As Low As Reasonably Practicable' (ALARP).

#	Actions
1	Confirm that the contract specifies all maintenance requirement details.
2	Make reference to prevailing technical circulars, practice notes and guidelines, such as "Tree Care" and "Resource Centre" under the Greening, Landscape and Tree Management Websites of Development Bureau (https://www.greening.gov.hk/en/home/index.html)
3	Conform to government planting guidelines and international best practices.
4	Right tree in the right place: ▪ Plant with clear objectives. Choose the right species. ▪ Procurement of quality nursery stock: Buy young, buy healthy. ▪ Thorough site and stock preparation before planting. ▪ Provide and maintain optimal environment for healthy tree growth such as but not limited to: adequate aerial and underground space for sustainable growth; fertile soil of appropriate type, well aerated, correct soil volume and optimum moisture content; proper drainage.
5	Structural training at right age and right time to achieve structural integrity for life.
6	Draw up maintenance planner to plan ahead and coordinate effectively.
7	Engage qualified professionals to assess and maintain the trees. Undertake TRAM to maximise tree safety (Part 2 refers).
8	Instill proper arboricultural practice in all facets of tree maintenance.
9	Protect trees from construction damage.
10	Build and upkeep staff knowledge, skills and quality of work through continuous training and knowledge sharing.

#	Communication
1	Proactive communication both internally and externally with suppliers and contractors for: ▪ Recognising areas for improvement for prompt follow-up; ▪ Establish feedback loop for improvement; ▪ Regular review of maintenance planner to improve workflow and better use of resources.
2	Close and constant liaison with suppliers for provision of quality stock and equipment.
3	Maintain supervisory accountability through establishing communication two-way across all levels to facilitate supervision and reflection.

#	Documentation
1	Succinct and informative maintenance manual.
2	Clear, retrievable maintenance records.
3	Up to date inventory or database of tree asset.
4	Regular | Scheduled | Programmed update of tree inventory with a particular focus on OVTs, SWTs, TRIAGE trees and trees require regular monitoring (Section 2.7 refers); Upload tree risk assessment forms to the TMCP timely.

3.3 SENSITIVITY ANALYSIS

Trees of particular interest often draw intense public attention. When removal (including dead trees) or transplanting of these particular types of trees is necessary, tree maintenance departments are required to undertake a Sensitivity Analysis to consider the potential social impact to the community for advance planning and decision-making before tree removal. The purpose of Sensitivity Analysis is to address social concern, to improve communication and prepare proactive responses to stakeholders in the community.

3.3.1 TREES FOR SENSITIVITY ANALYSIS

The objective of Sensitivity Analysis is to enhance transparency, assist in communication with the Urban Forestry Advisory Panel (UFAP) members, and address potential public concern on particular tree removal.

Tree maintenance departments shall undertake Sensitivity Analysis when considering the proposed removal (including dead tree) or transplanting of trees of particular interest under non-emergency circumstances. Examples of trees of particular interest are listed as below for reference:

(a) OVTs and trees that are potentially registerable in the Register of OVTs;
(b) Trees of 100 years old or above;
(c) Trees with trunk diameter equal to or exceeding 1.0 m (measured at 1.3m above ground level), or with height/canopy spread equal to or exceeding 25 m;
(d) Stonewall trees or trees of outstanding form (taking account of overall tree sizes, shape and any special features);
(e) Rare tree species listed in 'Rare and Precious Plants of Hong Kong' published by Agriculture, Fisheries and Conservation Department;
(f) Endangered plant species protected under the Protection of Endangered Species of Animals and Plants Ordinance (Cap 586);
(g) Tree species listed in the Forestry Regulations (Cap 96A) under the Forests and Countryside Ordinance (Cap. 96);
(h) Well-known Fung Shui trees;
(i) Landmark trees with evidential records to support the historical or cultural significance of the trees;
(j) Trees which may arouse widespread public concerns; or
(k) Trees which may be subject to strong local objections on removal.

3.3.2 CHECKLIST FOR SENSITIVITY ANALYSIS

Responsible officer of senior professional rank or equivalent is recommended to follow the checklists in Section 4.3.3 to undertake the Sensitivity Analysis.

3.4 MONITORING

Improvement in tree management performance relies on continuous monitoring and evaluation which help track work progress and facilitate decision making. Monitoring and evaluation processes can be undertaken in-house or outsourced, but independence of the monitoring team is important in ensuring credibility.

Purpose

To validate the integrity of your tree management programme and facilitate continuous feedback and improvement.

#	Actions
1	Establish clear objectives in drawing up the monitoring programme.
2	Sound, systematic and consistent monitoring methodology.
3	Compliance check against contract specifications, government guidelines and regulations.
4	Desktop review for quality of output and deliverables.
5	Site checks for accuracy against written records.
6	Track progress.
7	Promptly rectify identified anomalies. Investigate and analyse the cause.
8	Carry out regulatory actions as required.
9	Forward-looking evaluation to improve workflow and refine approaches.
10	Review effectiveness and make adjustments in future work.

#	Communication
1	Clear chain of command for effective communication and prompt follow-up.
2	Evidence based findings clearly conveyed to staff and contractors.
3	Clear time frame for reporting rectified output.
4	Inform management on systematic issues identified.

#	Documentation
1	A set of record that clearly articulate the following: ▪ Date, time, personnel involved, type of tree management work, observations, result of each monitoring event; ▪ All communications with outsourced service provider (consultants and contractors); ▪ Follow-up action of identified anomaly and / or disorder.
2	Monitoring manual with clear objectives, methodology and schedule.
3	Retrievable records of monitoring results.
4	Updated records of rectified deliverables.
5	Report on systematic issues and improvement recommendations.

3.5 COMPLIANCE

Compliance reflects competence and success of departments in meeting the required standards and delivery of quality work. It involves an ongoing process of auditing and monitoring.

Purpose
To validate the accuracy of tree management actions, communication and documentation against current internal and external policies, procedures, regulations and guidelines.

#	Actions
1	Establish systematic internal control procedures that comply with the "Guidelines on Audit of Tree Risk Assessment" (Section 2.9 refers).
2	Engage independent personnel, such as in-house audit by a different team, to achieve an objective audit as far as practicable.
3	Identify key elements for audit.
4	Review output and deliverables for evidence of non-compliance.
5	Investigate the cause of non-compliance.
6	Explore ways to rectify non-compliance.
7	Recommend improvement measures to prevent recurrence of non- compliance or non-conformity.
8	Senior management to review the need for refinement of departmental policies, strategies, regulations, guidelines, procedures and resource allocation.
9	Senior management to identify and recommend areas for long-term improvement.

#	Communication
1	Verify compliance to set communication processes.
2	Verify completeness of communication and consultation material including but not limited to: minutes of meetings; follow-up actions; confirmation of recorded information; prompt correction to inaccurate or misleading public statements.
3	Auditors to maintain constructive communication with auditees.
4	Auditees to receive feedback from auditors with openness.
5	Encourage information sharing on feedback and recommendation to bridge performance gaps across different teams of the department.

#	Documentation
1	Audit manual or guideline with clear objectives, scope and schedule.
2	Retrievable records of audit results and recommendations.
3	Retrievable records of improvement measures implemented.

PART 4 – FORMS | TEMPLATES | CHECKLISTS

Good planning and close supervision are essential to the delivery of quality tree management work. This part provides some tools including forms, templates and checklists to assist you in carrying out your work more effectively. You can customise them to suit your departmental use.

4.1 FORMS

Good forms help to define the scope and level of details of the data required, standardise the format of the acquired data to facilitate data management and analysis, and provide structured way of understanding the attributes of the tree management results so that the senior management can understand how results are reported. The Form 1 and 2 provided under this guidelines serve to list out the fundamental details that the Inspection Officer has to collect on site and any supplementary information including photos, site plans, elaborated observations, results of inspection through advanced equipment should complement the forms to give a comprehensive account of the conditions of the inspected trees.

4.2 TEMPLATES

Templates control the overall look and layout of any required messages to facilitate communication within each department and with stakeholders and interest groups. They contain essential information / elements of common interest.

4.2.1 REPORTING

From time to time, there are cases that draw media and / or public attention and written reports apart from tree inspection records are essential to enhance public understanding of the situation. Written reports produced under these situations should be comprehensive, concise, convincing and conclusive. The format of reporting should refer to the ANSI A300 (Part 9) – 2017 Tree Risk Assessment, Section 94 .6.2.1. This should be the minimum standard adopted by all inspection officers. It is the responsibility of such officers to provide a well-planned and considered report. The content should be thorough in its investigation and assessment; quantifiable in data and completeness in facts and documentation.

Identification and location of the specified tree(s);

A description of the methods used;

Tree risk assessment data;

Recommendations for mitigating risk or additional assessments; and

Recommendations for monitoring and follow-up.

4.2.2 SIGNS AND NOTICES

Display of signs and notices on site well in advance are useful for communication with the local community and enhances transparency of departments' work on specific trees. They also serve as visual reminders to the general public on hazards that may be associated with the trees. Some suggested examples are provided below:

Warning sign on pest treatment

植物噴有農藥，切勿觸摸。

Plants sprayed with pesticides / insecticides. Do not touch

負責樹木護養部門:
Responsible tree maintenance department: _____

聯絡電話:
Contact telephone number: _____

Notice on tree hazard and removal

經樹藝師詳細檢查後，確認此樹

[根系腐爛/顯著傾側/其他缺陷(請簡述)]，

並有潛在倒塌危險，此樹將於___月___日移除，

以保障公眾安全。

After detailed inspection by arborist, this tree was confirmed to have potential danger of collapse due to *(decay / leaning / other defects to be specified)*. This tree will be removed on (Date) to ensure public safety.

負責樹木護養部門:
Responsible tree maintenance department: _____

聯絡電話:
Contact telephone number: _____

4.3 CHECKLISTS

Good checklists can provide record and aid the management in ensuring that all aspects of the work and / or processes are considered comprehensively.

The following checklists are provided for reference.

#	Content
1	Basic Equipment / Tools and Personal Protective Equipment for Tree Inspection
2	Photographic Documentation for Tree Risk Assessment
3	Sensitivity Analysis
4	Tree Removal (non-emergency situation)

4.3.1 CHECKLIST: BASIC EQUIPMENT / TOOLS AND PERSONAL PROTECTIVE EQUIPMENT FOR TREE INSPECTION

Equipment / Tools and Personal Protective Equipment for Tree Inspection	
I. Basic Equipment / Tools	
Camera	☐
Mallet	☐
Binoculars	☐
Diameter tape / Tape measure / Tapeline	☐
Notepad and Stationery	☐
Hand spade (Optional)	☐
Probe (Optional)	☐
Gloves (Optional)	☐
Shoe covers (Optional)	☐
Clinometer (Optional)	☐
Magnifying glass (Optional)	☐
Portable flashlight (Optional)	☐
Note Equipment shall be kept clean and maintained in good condition. Equipment that has been in contact with confirmed / suspected Brown Root Rot infected trees should be disinfected immediately after operation. Gloves and shoe covers should be disinfected or properly disposed after use.	
II. Personal protective equipment (PPE)	
Clothing and footwear appropriate for work condition and weather	☐
Drinking water	☐
First-aid kit	☐
Hard hat / Helmet	☐
Reflective vest	☐
Sun glasses (Optional)	☐
Sun screen (Optional)	☐
Insect repellent (Optional)	☐
Responsibilities Employers have duties on guidance, training and supervision with respect to use of PPE. They should ensure that their employees know why and when PPE is used, its maintenance or replacement schedule and limitations. They should regularly monitor proper use of PPE and thoroughly investigate causes of any non-compliance in using PPE. Appropriate and regular reminder to employees to use PPE is necessary, such as job briefing, signs posted on work sites etc. **Enquiries** For enquiries about occupational health and hygiene matters, you may contact the Labour Department's Occupational Safety and Health Branch through: Telephone: 2852 4041 Fax: 2581 2049 Email: enquiry@labour.gov.hk. Information on the services offered by the Labour Department and on major labour legislation can also be found on website at http://www.labour.gov.hk.	

4.3.2 CHECKLIST: PHOTOGRAPHIC DOCUMENTATION FOR TREE RISK ASSESSMENT

Photographic Documentation for Tree Risk Assessment	
I. General	
All photos are illustrated with dates and time.	☐
All photos are coloured.	☐
Proper annotations and descriptions are provided.	☐
For record of remedial measures, photos should be taken from similar view angles and clearly show the tree condition before and after the operation.	☐
All photos are taken in a specific manner to reflect the change of the tree groups or the individual trees when comparing to the relevant and retrievable records.	☐
II. Form 1	
Overall views showing the tree group and its adjacent site conditions.	☐
All trees should be clearly seen in photos, though a photo can cover more than one tree. Closer views of the tree group from different angles clearly showing its conditions.	☐
Views showing site conditions or changes that may have an impact on tree health or structural conditions.	☐
Views showing the potential impact on targets / sensitivity in case of tree failure.	☐
Views clearly showing tree health and structural conditions, in particular for stand-alone trees and street trees, are captured as far as practicable.	☐
Close-up views clearly showing trees having notable arboricultural defects, disorders or anomalies (if any).	☐

Photographic Documentation for Tree Risk Assessment	
III. Form 2	
A. Overall Condition	
Overall views showing the tree from different angles, its adjacent site condition and extent of leaning (if applicable).	☐
Views showing site conditions or changes that may have an impact on tree health or structural conditions.	☐
Views showing the potential impact on targets / sensitivity in case of tree failure.	☐
B. Crown Condition	
Views showing general conditions of the crown to illustrate the vigour, foliage density and colour.	☐
Close up views for crown defects.	☐
C. Trunk and Branch Condition	
Views showing general conditions of the trunk(s) and major branches illustrating the structural integrity.	☐
Close up views for trunk and / or branch defects.	☐
D. Lower Trunk / Root Condition	
Views showing general conditions of the root flare and disturbance that may damage the root zone.	☐
Close up views of lower trunk and / or root defects.	☐

4.3.3 CHECKLIST: SENSITIVITY ANALYSIS

Responsible officer of senior professional rank or equivalent is recommended to follow the checklists to undertake the Sensitivity Analysis.

Sensitivity Analysis	
I. Actions	
Report to the departmental directorate level of the tree maintenance department on the proposed removal of tree.	☐
Explore alternative options of mitigation measures.	☐
Directorate level officer to validate tree removal proposal and options of mitigation measures; and evaluate reporting requirements to address public concern on the tree removal proposal.	☐
Consult GLTMS on the proposed mitigation measures and the UFAP when necessary.	☐
Seek appropriate approval of the tree removal proposal.	☐
II. Communication	
Involve other relevant professionals for further site inspection or review alternative mitigation measures if necessary.	☐
If tree removal is still considered necessary, engage concerned stakeholders in communication prior to commencement of any tree works.	☐
Prepare proactive responses to stakeholders in the community.	☐
Identifying the parties, key opinion leaders and community personalities in the community (e.g. District Council (DC), local organisations, local residents, relevant concern groups, etc. to be consulted and the likely responses of these parties.	☐
Appropriate initiatives (e.g. community involvement event, memorabilia, replanting, etc.) in commemoration of the tree should also be considered and included in the community engagement plan.	☐
All consultation should be undertaken with clarity of risk rationale in conjunction with the landscape enhancement plan.	☐
III. Documentation	
Tree Risk Assessment Forms (i.e. Form 1 and 2).	☐
Tree Risk Assessment reports, e.g. tree inspection reports by resistography or sonic tomography.	☐
Records of mitigation measures.	☐
Previous maintenance records.	☐

4.3.4 CHECKLIST: TREE REMOVAL (NON-EMERGENCY SITUATION)

Tree Removal (non-emergency situation)	
A. Actions	
Department to prepare Tree Preservation and Removal Proposal (TPRP) for TWVP approval as appropriate; or check for blanket approval from LandsD to process TPRP.	☐
Check if trees of particular interest, irrespective living or dead, are involved, conduct Sensitivity Analysis when necessary.	☐
B. Relevant Documentation	
TPRP as required by relevant DEVB's technical circular.	☐
C. Signs and Notices	
Display of signs and notices well in advance of proposed tree works	☐

Appendix 1 - Work Examples of Demarcation of Tree Risk Management Zone

1. Example One: Shing Mun Country Park

Step 1: Desktop Demarcation

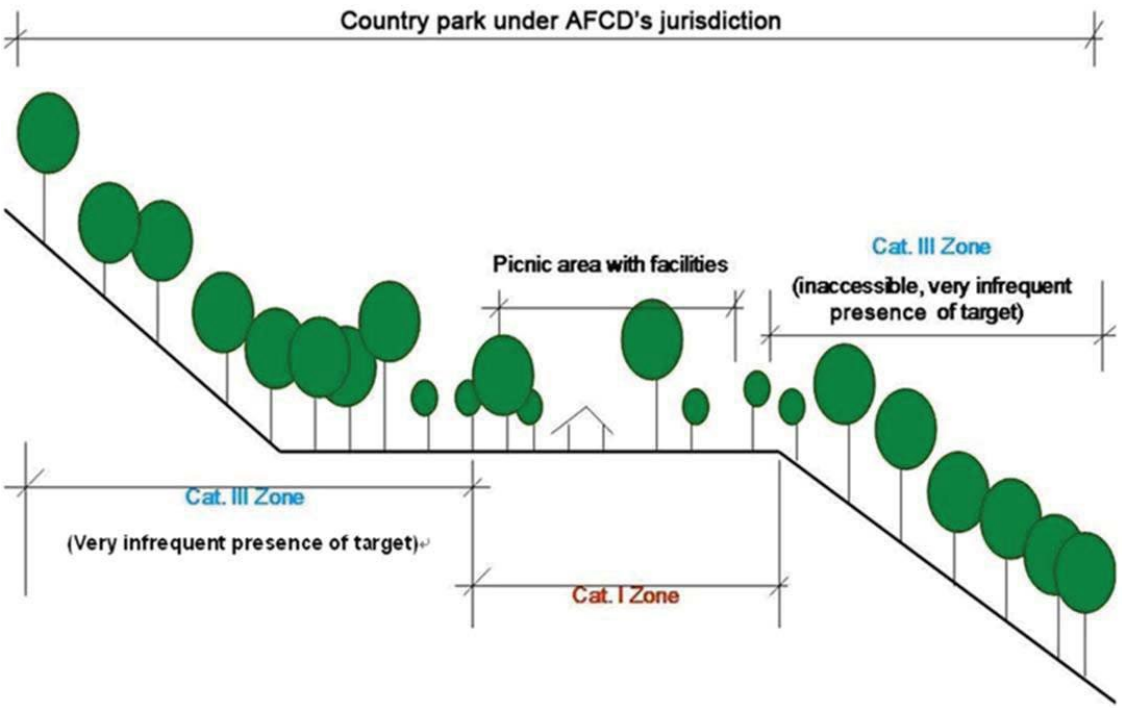
Step 2

Step 3

Step 4


Trees in Cat.I zone,
(source of photo: AFCD)

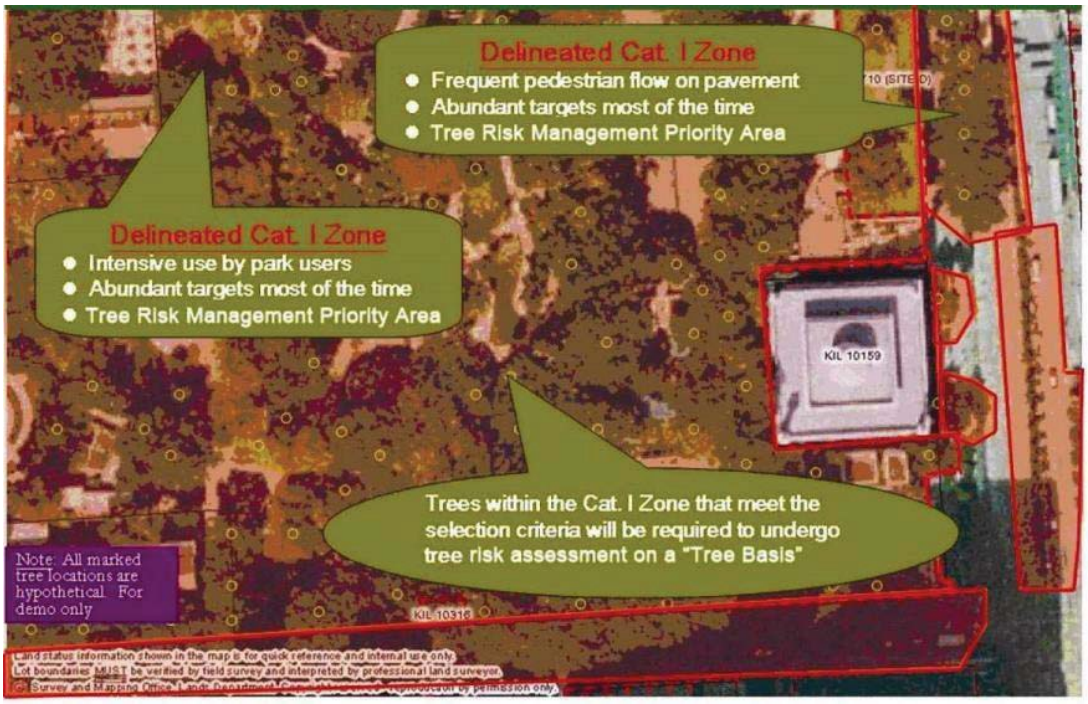
Step 5


Country park under AFCD's jurisdiction
Picnic area with facilities
Cat. III Zone
(inaccessible, very infrequent presence of target)
Cat. III Zone
(Very infrequent presence of target)
Cat. I Zone

2. Example Two: Kowloon Park and pavements along Nathan Road, Tsim Sha Tsui

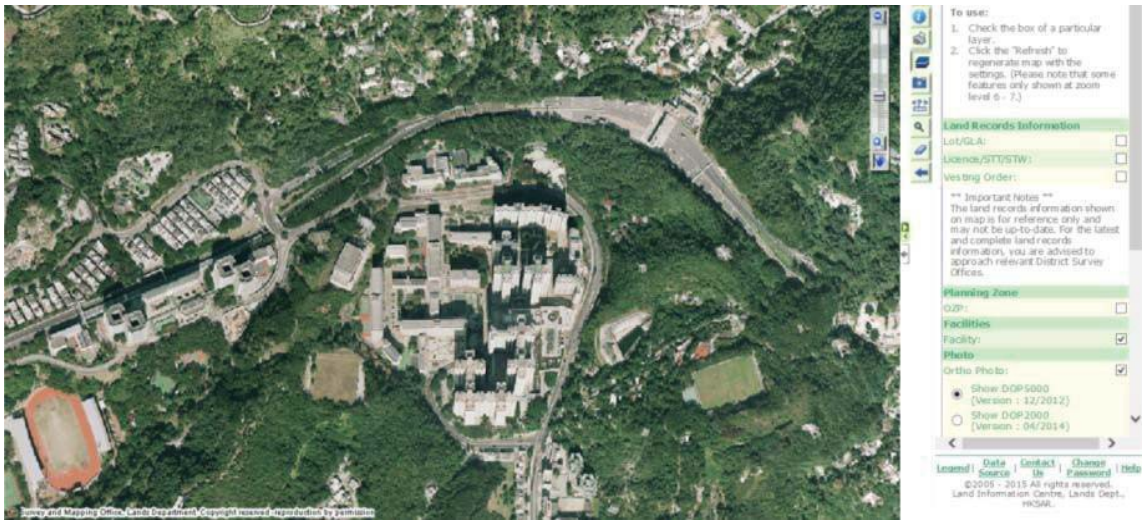
Step 1: Desktop Demarcation

Step 2



3. Example Three: Lei Muk Shu Estate, Kwai Chung

Step 1: Desktop Demarcation

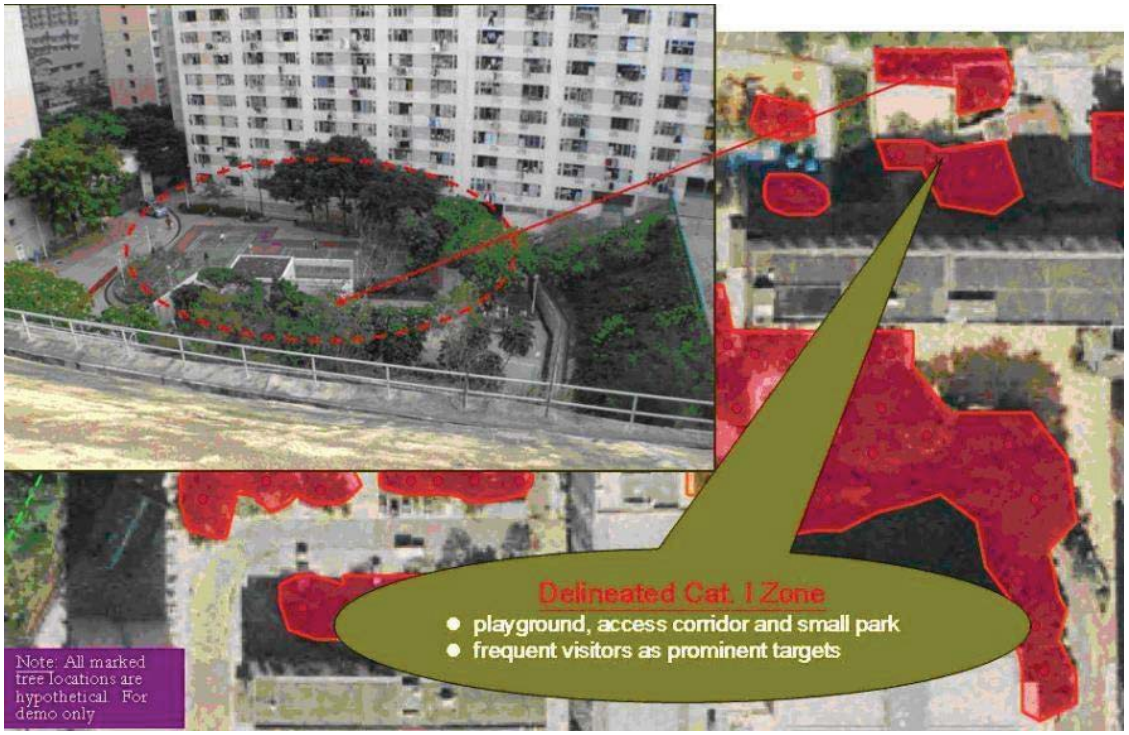


Step 2

Step 3

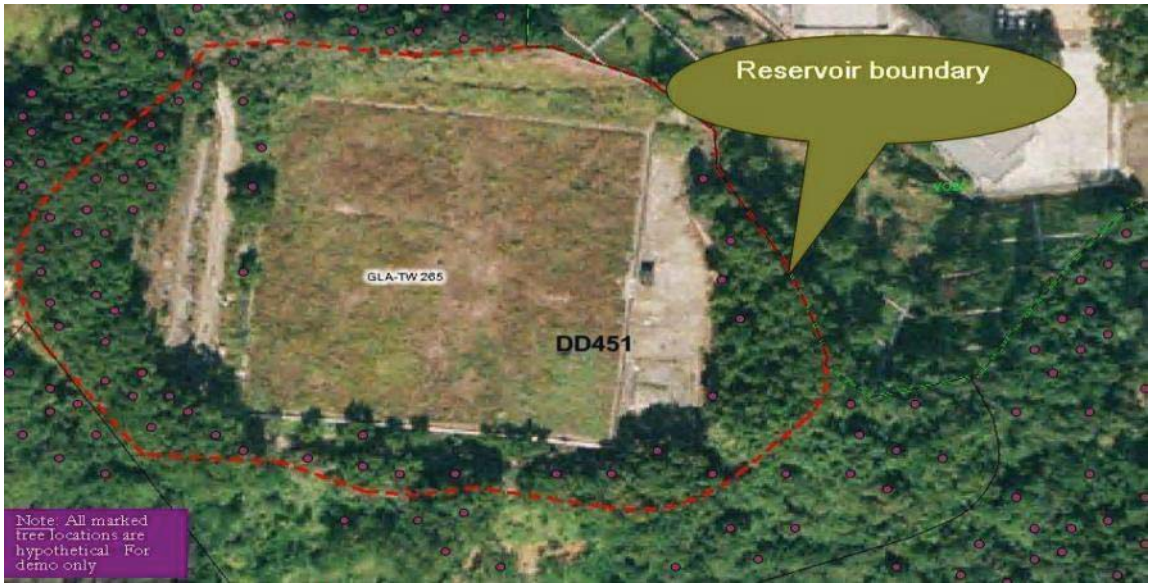

Delineated Cat. III Zone
slope within the estate boundary
rare access to the slope edge
to monitor during course of duty or deal with complaints on receipt
Note: All marked tree locations are hypothetical. For demo only

Step 4

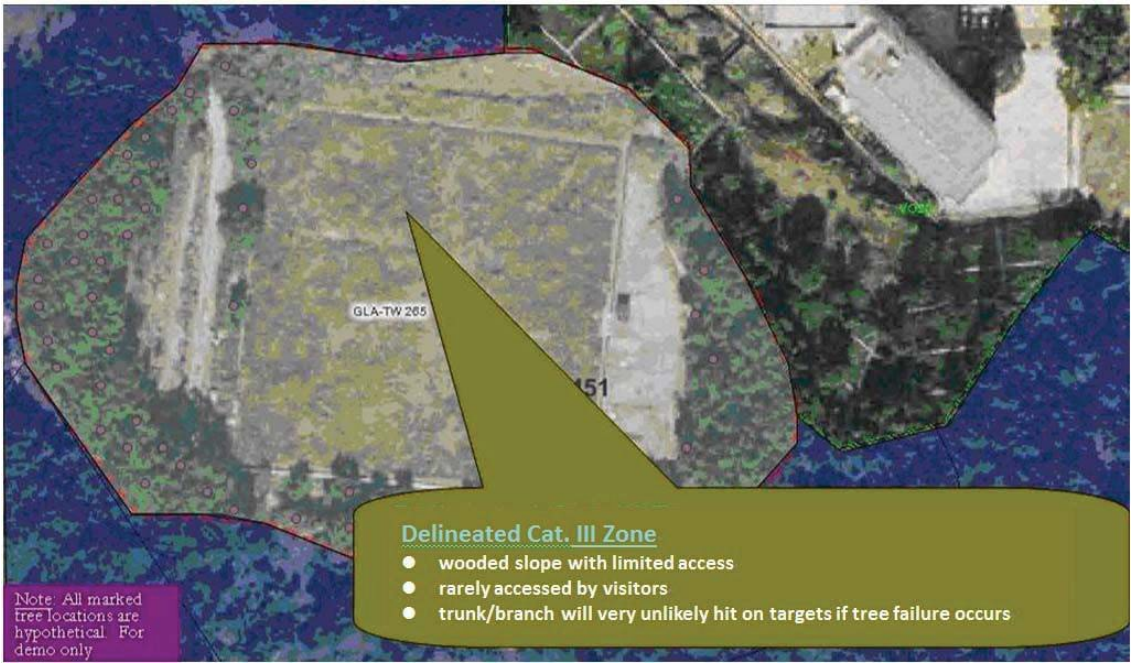

Delineated Cat. I Zone
playground, access corridor and small park
frequent visitors as prominent targets
Note: All marked tree locations are hypothetical. For demo only

4. Example Four: Tsuen Wan No. 2 Fresh Water Service Reservoir, Kwai Chung

Step 1: Desktop Demarcation



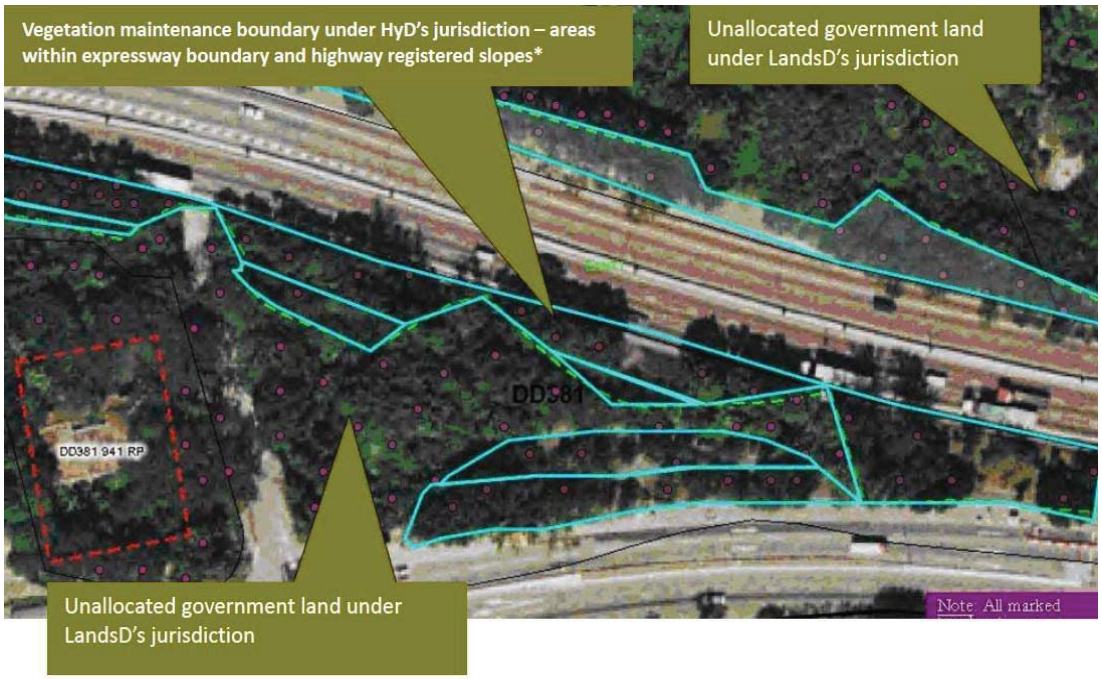
Step 2



5. Example Five: A site along Tuen Mun Road

Step 1: Desktop Demarcation

Step 2

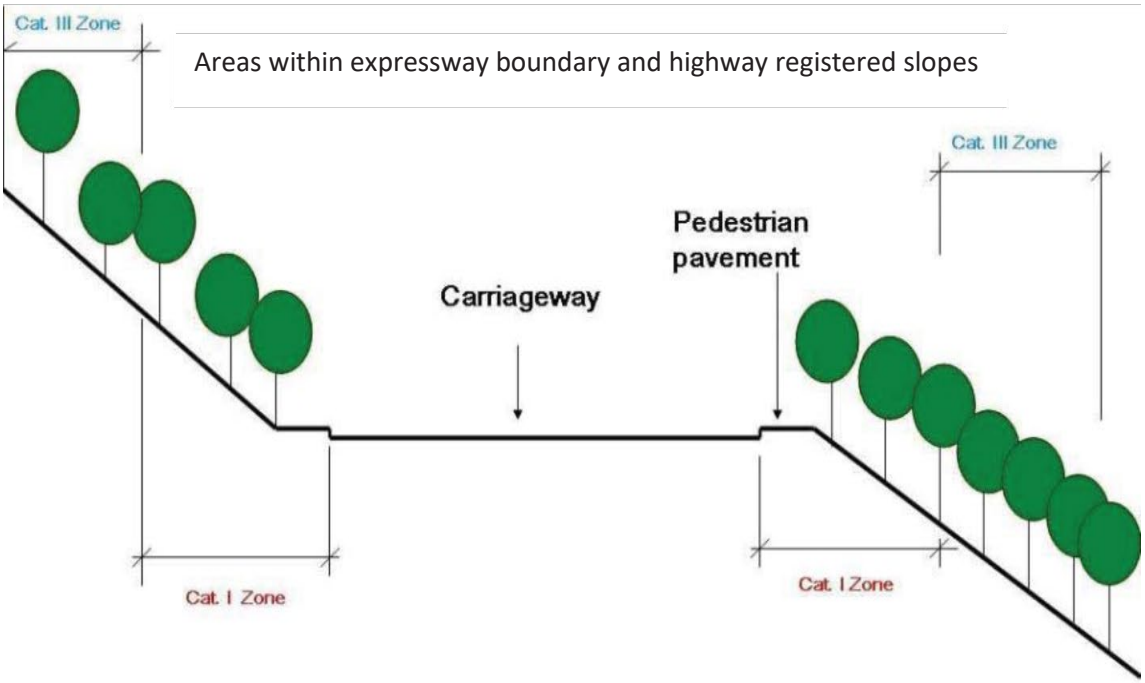


*highway registered slopes mean slopes maintained by HyD as registered in the Slope Maintenance Responsibility Information System (SMRIS) of LandsD

Step 3


Delineated Cat. I Zone
trees next to busy expressway
prominent targets due to busy traffic
DD381
Delineated Cat. III Zone
trees far away from carriageway
limited access
trunk/branch will very unlikely hit on targets if tree failure occurs
Note: All marked tree locations are hypothetical. For demo only

Step 4


Cat. III Zone
Areas within expressway boundary and highway registered slopes
Cat. III Zone
Pedestrian pavement
Carriageway
Cat. I Zone
Cat. I Zone

6. Example Six: A construction site

As a general principle, the party maintaining the tree when risk assessment is required should be responsible for undertaking the tree risk assessment. Therefore, the party being either the project proponent or its works agent of a construction site, which should be responsible for the maintenance of the trees located within the Works Site no matter whether there are Temporary Government Land Allocation or not, should also be responsible for undertaking tree risk assessment of these trees. After construction, if a works department is still maintaining a tree during the establishment period or the aftercare period for OVTs, the works department concerned should be responsible for the tree risk assessment. If a tree has been handed over to the maintenance department for long-term maintenance after construction, the maintenance department concerned should then be responsible for the tree risk assessment.

Trees in construction sites may be subject to higher stress than normal due to changes in their environmental conditions (e.g. dust, vibration, soil compaction, changes in underground water table levels, damages to feeder and/or anchor roots, etc.). Therefore, more tree inspections in accordance with the advice from Inspection Officer should be conducted timely upon the commencement of construction/site works and at a time of major changes in site circumstances of the development/project/works site.

Appendix 2

LANDSCAPE AND LOCATION CONDITONS

OBJECTIVES

Healthy trees with sound structure are valuable assets to the community. Very often, trees are confronted with various environmental stresses such as space limitation, soil compaction, lack of nutrients, abnormal soil pH, damage by construction and roadwork activities, etc. where restricted root growth, root damage and soil disturbance leading to poor root anchorage are major factors causing tree decline thus affecting stability.

A series of location types of trees highlighting unfavourable tree growth conditions affecting tree stability, such as trees on stonewalls, in confined space, with ground disturbance and on slopes are identified to draw special attention when undertaking the tree risk assessment in order to minimise the potential tree risk.

Figure 1 - Location Types of Stonewall Trees (SWT) with Surface Attachment on Stonewall

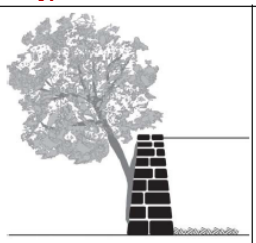
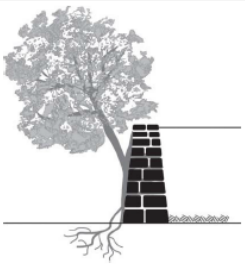
Root spread on masonry wall	 (a) Surface attachment only	 (b) Surface attachment and ground roots at toe	 (c) Surface attachment and ground roots at crest	 (d) Surface attachment and ground roots at crest and toe
Structural condition of tree anchorage	• Support solely by the surface root mass on wall with unknown amount of root penetration • Roots are mostly confined within masonry wall only	• Support by the surface root mass on wall with unknown amount of root penetration and additional ground roots protruded to the wall toe • Only limited physical support could be provided by roots at toe	• Support by the surface root mass on wall with unknown amount of root penetration and additional ground roots protruded to the wall crest • Provides additional strength on the tension side of SWT for anchorage	• Support by the surface root mass on wall with unknown amount of root penetration and additional ground roots protruded to both wall crest and toe • Provides additional strength on the tension side of SWT for anchorage
Health Condition	• Nutrient / water uptake limited to confined space behind the masonry wall	• Nutrient / water uptake would be facilitated by the extended ground roots at wall toe	• Nutrient / water uptake would be facilitated by the extended ground roots at wall crest	• Nutrient / water uptake would be facilitated bythe extended ground roots at both wall crest and toe
Attention on tree anchorage (among stonewall trees)	High	High	Low	Low

Figure 2 - Stonewall Trees (Modes of Failure)

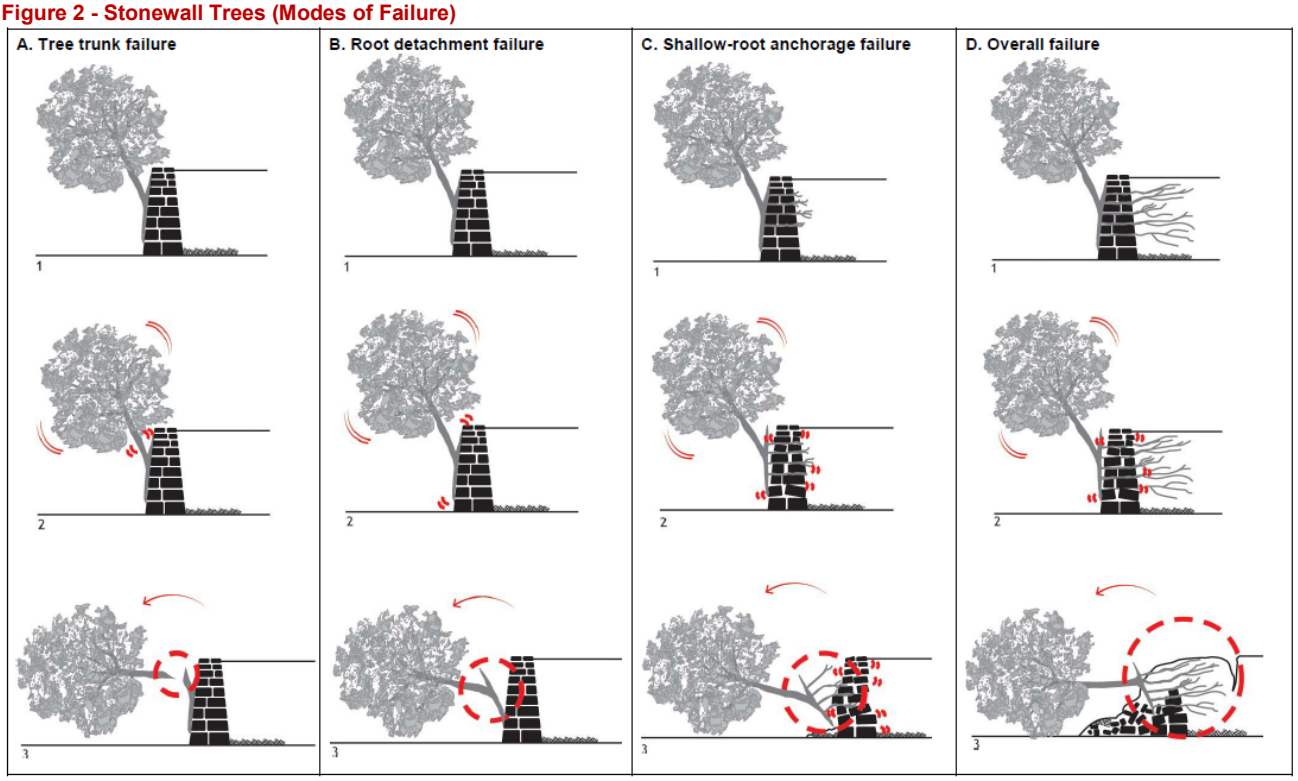


Figure 3 - Location Types of Trees in Confined Space

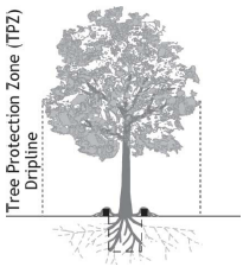
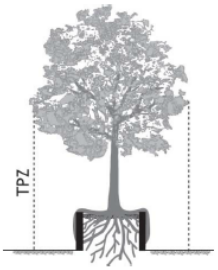
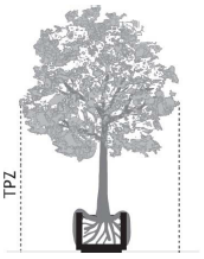
Trees grown in confined space	 **(a) Tree Pit**	 **(b) Small (Raised) Planter**	 **(c) Planter Box**
Structural condition on tree anchorage	• Open bottom planter • Typical tree pit size is around 1.2 m (L) x 1.2 m (W) x 1.0 m (D) • Extent of root spread outside the tree pit is uncertain as most of the surrounding soil is generally compacted or ground surface paved	• Open bottom planter • Sinker root could be developed for tree anchorage • Extent of root spread depends on the planter size and relative size of the tree	• Closed bottom planter • Roots confined within planter box • Tree anchorage depends on the size of planter box and relative size of the tree
Health condition	• Nutrient / water uptake would highly depend on maintenance	• Nutrient / water uptake would highly depend on maintenance	• Nutrient / water uptake would highly depend on maintenance
Attention on tree anchorage	Medium to Low (depending on extent of paving around tree pit)	Medium to Low (depending on the planter size)	High

Figure 4 - Location Types of Trees with Ground Disturbance

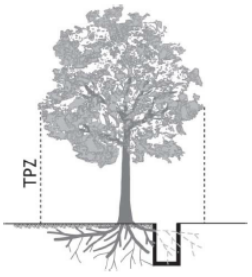
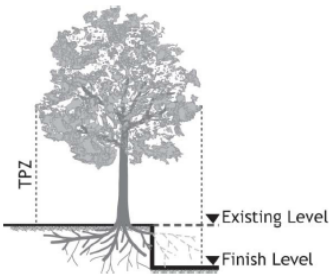
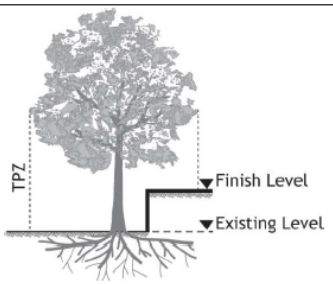
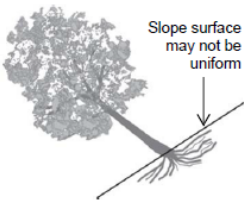
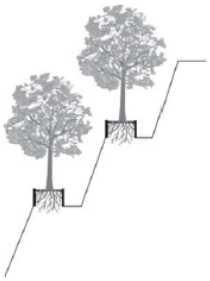
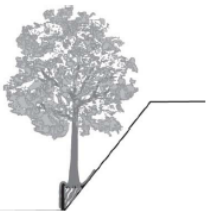
Trees with ground disturbance	 **(a) Trenching**	 **(b) Cutting (lowering of level)**	 **(c) Filling (raising of level)**
Structural condition on tree anchorage	• Poor root anchorage due to imbalanced root system caused by removal of roots within the dripline • No further trenching / cutting of roots should be allowed • Large roots cut from trenching may easily be infected by decay organisms and extended to lower trunk over time	• Poor root anchorage due to imbalanced root system caused by removal of roots within the dripline • No further cutting of roots should be allowed • Large roots cut from lowering of level may easily be infected by decay organisms and extended to lower trunk over time	• Existing root system would become stressed and suffocated, and the tree may eventually die • No soil filling should be allowed within dripline to the trunk and above root flares
Health condition	• Nutrient / water uptake would be affected by the physical root loss • Crown dieback on the trenching side would be obvious in the first year after trenching	• Nutrient / water uptake would be affected by the physical root loss • Crown dieback in the cutting side would be obvious in the first year after cutting	• Tree health may decline over time due to lack of oxygen, inadequate soil aeration and poor drainage • Health decline may not immediately become obvious
Attention on tree anchorage	High	High	Low

Figure 5 - Location Types of Trees on Slopes

	Trees on Slopes (natural or man-made slopes)	**Trees on Hard Surfaced Slopes (shotcreted and/or with granite stone facing)**		
Trees grown on slopes	Leaning tree with no sign of self-correction 	 **(a) Trees in tree rings**	 **(b) Trees in berm planters**	 **(c) Trees in toe wall planters**
Tree Risk Assessment Considerations (tree leaning and root anchorage)	• Extent of root development on tension side • Defects in roots on tension side • Root anchorage (loosen / cracked / uneven soil within root zone) • Extent of leaning versus height of tree • Sign of increased extent of leaning when compared with previous inspection • Condition of reaction wood on tension side	• Site history (condition of site under hard paved surface) • Extent of roots that are visible on the slope • Conditions of roots that are visible • Position of tree on slope • Extent of leaning / falling zone • Anomalies of slope surface around tree	• Exposed roots spill over planter edge • Aggressive root growth causing damage to planter wall • Refer to items (b) in Figure 3.2 "Trees in Confined Space"	• Exposed roots spill over planter edge • Aggressive root growth causing damage to planter wall • Refer to items (b) or (c) in Figure 3.2 "Trees in Confined Space"
Modes of failure	• Root failure (e.g. root decay, poor attachment)	• Root failure (e.g. root decay, poor attachment, girdling roots)	• Root failure (poor root anchorage, exposed roots, girdling roots)	• Root failure (root decay, poor root anchorage, exposed roots, girdling roots)
Attention on tree anchorage	High	High	Medium	High

Appendix 3 - Requirements for Inspection Officers for Form 1 - Tree Group Inspection and Form 2 - Individual Tree Risk Assessment.

"Inspection Officers" for Form 1 tree group inspection and Form 2 individual tree risk assessment shall fulfil either Section A or B.

A. meet the following minimum requirements on academic, professional and training qualifications as well as work experience:-

Academic Qualifications*	• Certificate / diploma or above qualifications in arboriculture, tree management, tree risk assessment, landscape management up to or above the standard of Level 3 in the Hong Kong Qualifications Framework, or equivalent in an appropriate discipline. Examples of relevant programmes at QF Level 3 or above are listed on GLTMS Website for reference: https://www.greening.gov.hk/en/resource-centre/relevant-organisations-qualification-and-training/index.html.

AND

Professional Qualifications*	• Certified Arborist, Certified Arborist Utility Specialist, Certified Arborist Municipal Specialist or Board Certified Master Arborist of the International Society of Arboriculture; or • Technician Member, Professional Member, Fellow or above qualifications of the Arboricultural Association of the United Kingdom; or • European Tree Worker or European Tree Technician of the European Arboricultural Council; or • General Member of the National Arborists Association of Australia (issued on or before 31 Dec 2010); or • Registered Qualified Arborist, Registered Practicing Arborist, Registered Consulting Arborist, Registered Consulting & Practicing Arborist of Arboriculture Australia; or • Accredited Arborist of the Hong Kong Institute of Landscape Architects; or • equivalent to the above.

AND

Training Qualifications*	• Completed and passed Comprehensive Tree Risk Assessment and Management Training Course with assessment or Refresher Course with assessment organised by the Tree Management Office (TMO); or • Completed and passed equivalent departmental training recognised by the TMO; or • Completed and passed training programmes in tree risk assessment recognised by the TMO as listed on GLTMS Website: https://www.greening.gov.hk/en/resource-centre/relevant-organisations-qualification-and-training/index.html.

AND

Work Experience	• Has at least 3 years of work experience in tree care and is familiar with tree risk assessment /management.

** Field Assistant Grade and Field Officer Grade staff in the Agriculture, Fisheries and Conservation Department and Amenities Assistant Grade and Leisure Services Manager Grade staff in the Leisure and Cultural Services Department who have completed the recognised vocational training offered by the respective departments are considered meeting the minimum requirements on the academic, professional and training qualifications for Inspection Officers.*

B. (i) "Arborist" under the Registration Scheme for Tree Management Personnel maintained by the GLTMS;or

(ii) "Tree Risk Assessor" under the Registration Scheme for Tree Management Personnel maintained by the GLTMS and meets the minimum requirement in Section A above with valid registration.

Tree Risk Assessment Form 1 : Tree Group Inspection
樹木風險評估表格1 : 樹群檢查表

General Information 基本資料

				Form 1 Ref. No.: 表格1編號:	
Dept. 部門/ Agency 機構:		Inspection Officer 巡查人員:		Post 職位:	
Project 工程/ Contract No. 合約編號:				File Ref. 檔案編號:	
Date of Inspection 巡查日期:	*(dd/mm/yyyy)*	Last Inspection Date 上次巡查日期:	*(dd/mm/yyyy)*	Inspection Frequency 巡查週期:	

Location Information 位置資料

Masterzone Ref.主區編號:		Subzone Ref. 副區編號:	
English Location 英文地點:		Chinese Location 中文地點:	District 地區:
Tree Risk Management Zone 樹木風險管理地點類別:			

Location Types 地點類別: (multiple selections allowed 可選多於一項)

- ☐ Roadside Landscaped Area 路旁綠化地區
- ☐ Public Park/Recreation Venue 公園/康樂場地
- ☐ Planter box 花盆
- ☐ Tree Pit/Tree Ring 樹穴/樹圈
- ☐ Housing Estate 屋邨
- ☐ Central Divider 中央分隔帶
- ☐ Others (please specify) 其他 (請說明):
- ☐ Government Compound 政府建築物
- ☐ Unleased/Unallocated Government Land 未批租/未撥用的政府土地
- ☐ Recreational Site/Facility inside Country Park 郊野公園內康樂用地或設施
- ☐ SIMAR Slopes 系統性鑑辨維修責任的斜坡
  SIMAR Slope Ref:

Nearest lamp pole number 最接近的燈柱編號:	

Tree Information 樹木基本資料

The size of a tree group should be defined by location types, such as public park, SIMAR slopes, tree pits, etc. with due consideration given to the limitations of visual tree assessment. No more than 50 trees shall be included in a Tree Group.
在決定樹群的大小時，應參照地點類別，如公園、系統性鑑辨維修責任的斜坡、樹穴等，並需考慮目測法的局限，每個樹群不可多於50棵樹。

(A) Triage Trees and Trees required Remedial Actions or Form 2 Assessment
分流樹木及需要進行緩減措施 / 表格 2 評估的樹木

TMCP Tree ID 樹木編號	Dept. Tree ID 部門樹木編號	Tree Species 樹種	DBH (mm) 胸徑 (毫米)	Estimated Tree Height (m) 大約樹高 (米)	Estimated Crown Spread (m) 大約樹冠闊度 (米)	Tree Status 樹木類別	Overall Tree Conditions 整體樹木狀況	Triage Colour 分流顏色	Remedial Action / Form 2 Assessment 緩減措施 / 表格2評估	Anticipated Completion Date 預計完成日期 (dd/mm/yyyy)	Reference Coordinates of Tree 樹木參考座標	
											東 X	北 Y

(B) Other Trees (Non-Triage trees - trees do not need further actions)
其他樹木 (非分流樹木 - 無需進一步行動的樹木)

Tree Species 樹種	App. Quantity of Trees 大約樹木數量	Range of Tree Height 樹高範圍		Overall Tree Conditions 整體樹木狀況
		Form (m) 由 (米)	To (m) 至 (米)	

Overall Remarks 整體評語

Sub-total No. of Trees in Table (A): (A) 表樹木數量小結:	0	Sub-total No. of Trees in Table (B): (B) 表樹木數量小結:	0	Total No. of Trees (A + B) : 樹木總數 (A + B):	0

Summary of TRIAGE Trees 分流樹木總結

Black 黑	Red 紅	Orange 橙	Yellow 黃	No Triage colouring 無
0	0	0	0	0

Attached Information 附夾資料

Attachment Type	Attacement File Name	Description

Declaration 聲明

I, the Inspection Officer for the above TRA Form 1, confirm that I have inspected the tree group(s) at the specified date with due diligence, and the information given in the Form(s) is truly reflecting what I observed on site.

本人作為以上樹群檢查表格1的巡查人員，確認本人已在本表格所列日期，謹慎小心完成有關樹群的檢查，而本表格上填入的資料均真確無訛地反映本人在現場觀察所得。

My academic, professional, training records and work experience met the requirements of Inspection Officer specified in the TRAM Guidelines.

本人的學術、專業、培訓紀錄及相關工作經驗均符合「樹木風險評估及管理安排」指引中對巡查人員的要求。

Name of Inspection Officer: _____

巡查人員姓名 *(請以英文正楷書寫)*

(If more than one Inspection Officer involved in the same Tree Group Inspection, each Inspection Officer should submit individual Form 1 containing the trees inspected by him/her.
如多於一位巡查人員負責同一樹群檢查，個別巡查人員應將其檢查的樹木以另一表格1填報。)

Date of Form Completion: _____

完成表格日期 (dd/mm/yyyy)

(If Form 1 is submitted in paper form 若以文本形式遞交表格1)

Signature of Inspection Officer: _____

巡查人員簽署：

Appendix 5 - Explanatory Notes for Form 1: Tree Group Inspection

This Form 1 is provided with the *Guidelines for Tree Risk Assessment and Management Arrangement (TRAM Guidelines)* (10th Edition) for tree group inspection. It intends to act as a template for Inspection Officers to collect and record tree information and facilitate a meaningful tree group inspection as well as identification of individual tree(s) under the Triage System for individual tree risk assessment (Form 2) or immediate remedial actions. For individual tree risk assessment, the Inspection Officers should refer to the guidelines for individual tree risk assessment (Form 2) in the TRAM Guidelines.

Box(es) and Space(s) are provided on the Form 1 for Inspection Officers to record/write descriptions and estimated measurements, or check box(es) for selected options, in field investigation. The Inspection Officers are also required to provide their observations, suggestions and/or recommendations on tree remedial actions in space under "Overall Remarks" when necessary. It is not necessary to check every box or to fill in every space provided on this Form. Only information relevant to the tree group inspection should be collected.

Section 1 – General Information

This Section intends to identify the responsible department, the Inspection Officer and a brief history of the tree group inspection.

Form 1 Ref. No.: Reference number of the Form 1 in the format: [XXX]-[20XX]-[000]-[9999]-[0], where

XXX	20XX	000	999	0
First 3 character of department's abbreviated name, i.e. AFC for AFCD, LAN for LandsD, etc.	*Year of TRAM Exercise, i.e. 2019/2020 TRAM Exercise, use 2019.*	*Project code or contract code assigned by departments . If no subdivided project or contract, please input "000"*	*Serial number of Form 1 report in one TRAM Exercise. For each project or contract in the dept., new set of serial number from 0001 to 9999 can be used.*	*Part number of the Form 1 report. If only one Inspection Officer conducted the Form 1 inspection in a tree group, use "0"; If more than one Inspection Officers and more Form 1 reports for one tree group, use "1" for the 1st report and "2" for the second report, and so on.*

Department/Agency: name of the responsible Department or Agency of the tree group inspection.

Inspection Officer: name of the Inspection Officer (to be automatic filled in TMCP system) who met the qualification requirements on academic / professional / training, and work experience as specified in 'Requirements for Inspection Officers' in Appendix 3 of the TRAM Guidelines. The qualifications of Inspection Officer should be vetted by relevant tree maintenance department and a name list of vetted Inspection Officers should be provided to GLTMS/TMCP for verification.

Post: post title of the Inspection Officer in the Department/Agency.

Project/Contract No.: project/contract reference number of the tree inspection works, where applicable.

File Ref.: File reference no. in the Department/Agency that keeps the tree inspection reports, where applicable.

Date of Inspection: date of inspection in the format of dd/mm/yyyy. If the inspection lasts for more than one day, it is the commencement date of the inspection.

Last Inspection Date: date of last inspection of the subject tree group in the format of dd/mm/yyyy. If the inspection lasts for more than one day, it is the commencement date of the inspection. If it is the first time inspection of the subject tree group, please set it to the "Date of Inspection".

Inspection Frequency: The frequency of inspection, i.e. once per 6 months marked as '6 months', once per year marked as '12 months', etc. Mark '***ad hoc'*** if the inspection is on need basis.

Section 2 – Location Information

This Section provides background information of the location of tree group to be inspected.

Masterzone Ref. & **Subzone Ref.**: provides Masterzone reference and Subzone reference, if applicable, of the tree group inspected. Fill in "NIL" in space provided after "Subzone" if no Subzone. Details of the zoning for Masterzone and Subzone are specified in the Tree Management Common Platform (TMCP) manual in the Cyber Manual for Greening (http://devb.host.ccgo.hksarg). The zoning is assigned by the responsible tree maintenance department.

Chinese Location and **English Location**: Chinese and English name of the tree group location, please refer the location/street name to the latest version of "*Hong Kong Guide*" published by the Lands Department.

District: use district categorisation in 18 District Councils.

Tree Risk Management Zone: the category of Tree Risk Management Zone (TRMZ) as specified in the TRAM Guidelines. Select 'Category I', 'Category II' or 'Category III' if the tree group falls into relevant Category zone. The Inspection Officer shall confine the tree group to one TRMZ category. For example, a roadside landscaped area has about 20 metres width with one side along a public road of high pedestrians and/or high traffic flow, but with another side inaccessible by the public or vehicles. According to TRMZ definition, the landscaped area beside the public road of high pedestrians and/or high traffic shall be classified as Cat. I but the rest areas shall be classified as Cat. II/III subject to the fall zone of trees. In this case, the Master Zone would be divided into two Master Zones, or if a single Master Zone should be maintained, the landscaped areas with different TRMZ classification could be divided into two Subzones.

Location Type: check the box for "Location Type" as appropriate; mark SIMAR Slope reference number in the space provided if SIMAR Slope is identified. For trees within a tree ring on a shotcrete slope, check "Tree Pit/ Tree Ring". Provide location information in space in 'Others' if the subject tree group does not fall into the boxes provided. **Check more than one box if the subject tree falls into more than one location type.**

Nearby Utility Post No.: The nearby public utility post number, such as Lamp pole number. Mark the utility on the location map with clear denoted reference number.

Section 3 – Tree Information

Inspection Officer shall define the size of a tree group by location types, such as public park, SIMAR slopes, landscaped area, etc. with due consideration given to the limitations of visual tree assessment. **For easy recognition of tree conditions in a tree group under inspection, the tree group inspected shall not contain more than 50 trees.**

Table (A): Triage Trees and Trees Require Remedial Actions or From 2 Assessment:

Triage Trees and Trees Require Remedial Actions or Form 2 Assessment:
Table (A) is designed for trees in the tree group inspected including:

1. Triage Trees, the specific tree categories require Triage Classification including:
   - Dead trees
   - Trees confirmed with Brown Root Rot (BRR) disease infection
   - Old and Valuable Trees (OVTs)
   - Stonewall trees (SWTs)
   - Large trees with an individual trunk(s) DBH ≥ 500mm or overall tree height at 9 metres or above
2. Trees in the tree group that require remedial actions; and
3. Trees in the tree group that require Form 2 assessment.

Individual tree information is required in Table (A).

TMCP ID: A system generated ID to give a unique reference number to trees in the TMCP tree database. Inspection Officers are not required to fill in this TMCP ID.

Departmental Tree ID: the departmental identification number of each tree inspected. If the tree inspected has more than one tree ID, use the latest departmental tree ID.

Tree Species: use the scientific names and the preferred Chinese and English common name (i.e. the first name if more than one name) listed in the *Check List of Hong Kong Plants* (latest version) published by the AFCD.

DBH: Diameter at breast height (DBH). The measurement of DBH shall follow the Practice Notes on measurement of diameter at breast height promulgated by the AFCD. Departments may use Mobile Mapping System (MMS) / Lidar scanning to survey the tree locations and DBH if the site is too large or inaccessible. For use of MMS, please refer to "Tree Management" section in Cyber Manual for Greening.

Estimated Tree Height: estimate the total height of the tree inspected above ground level to top of tree crown, measured in meter (m). For better estimation, making use of clinometer / range pole.

Estimated Crown Spread: estimate the diameter of crown spread in meter (m). For asymmetric tree crown, the longest axis should be measured.

Tree Status: status of the tree inspected, namely

- OVTs
- SWTs
- Large Tree with an individual trunk(s) DBH ≥ 500 mm or overall tree height at 9 metres or above
- Other Trees: trees does not fall within the above four status

BRR Disease infected: Check the box **"BRRD confirmed"** if the tree is confirmed infected by BRRD; Check the box **"BRRD in vicinity"** if BRRD confirmed case occurred within driplines of the tree crown.

Overall Conditions: estimate the overall health and structural conditions of the tree inspected and select an appropriate condition in the following categories:

- **Normal**: tree health and structural conditions are similar to other healthy tree of the same species in the area, for example, leaf size and

color, crown density, tree height and crown spread. The growth of the tree inspected is in general vigor in comparison to a healthy tree of the same species in the area and no significant defects were identified.

- **Fair**: Health and structural conditions of the tree inspected is considered not as vigor as a normal tree by comparison to a healthy tree of the same species in the area; plus, either one of the follows:
  (1) one or two health or structural defects were observed in crown, branches, trunk or root zone (i.e. old wounds, cavity with entire defensive wood, etc.),
  (2) minor dieback twigs (less than 5%), or
  (3) signs of pest and/or disease etc., but no actual pest or disease could be identified.

  and such health and structural problem(s) can be mitigated by pruning or other tree treatments, tree failure is not foreseeable.

- **Poor**: Health and structural conditions of the tree inspected are significantly poor than a normal tree of the same species in the area, plus either one of the follows:
  (1) more than 3 significant health or structural defects were observed on crown, branch, trunk or root zone, including large old wounds with signs of decay, large cavities with signs of decay, dead branches, hanging branches, etc.,
  (2) dieback twigs over 25% of total canopy,
  (3) minor pest and/or disease infestations are observed, but not detrimental to overall health and structural conditions of the tree inspected, or
  (4) Tree growth was considered adversely restricted by health or structural defects or other environmental conditions.

  Mitigation measures is considered cannot completely remedies the health and structural defects. Tree failure is expected in the long-run. Removal of the tree is recommended.

- **Very poor**: The tree is considered under a very poor condition if either one of the following is observed:
  (1) many (5 or more) significant health and structural defects are observed, including old wounds with significant decay, large cavity with significant decay, etc., where mitigation measures cannot stop

deterioration of tree health from curing the defects,

(2) fallen leaves or die back twigs over 50% of total canopy (except deciduous trees and semi-deciduous trees), broken of main branches,

(3) large portion of tear off tree barks in main trunk (over 50%), or

(4) severe pest infestation and/or disease infection that existing pest and disease control measures are considered ineffective to the infestation, tree health conditions is continuously deteriorating. These health and structural defects are detrimental to the tree inspected and tree removal is recommended to be conducted as soon as practicable.

- **Dead:** Dead tree. The dead tree shall be removed within 4 weeks after inspection or as soon as practicable. Appropriate warning signs shall be installed and/or condor-off the site shall be arranged when necessary.

Triage Colour: assess the tree under the Triage system in accordance to the TRAM Guidelines, i.e. Black, Red, Orange or Yellow. Fill in the Triage colour category in the space provided. Please note that Triage classification may change in each assessment due to change of tree conditions and mitigations works done. If the tree is "Other Trees" in Zone I or trees in other zoning, no classification under the Triage system is necessary, please mark 'NIL'.

Remedial Actions/Form 2 Inspection: Fill in the remedial actions or individual tree risk assessment (Form 2) is considered necessary, leave the space empty if no further action is required. If this column is checked, please provide anticipated completion date, tree reference coordinates and reference number of tree photos showing the defects identified or spot of mitigation required in the following columns. Examples of remedial actions include:

- Remove the whole tree;
- Crown reduction to reduce crown load;
- Crown cleaning to remove dead/diseased branches/twigs;
- Crown lifting to remove lower branches;
- Structural pruning to modify tree form;
- Form 2 individual tree risk assessment; or
- Others: please specify in space provided or use separate information sheet.

Anticipated Completion Date: the date that Inspection Officer anticipates the remedial actions or Form 2 assessment should be completed, in the format of dd/mm/yyyy. Consult tree works agent when necessary.

Tree Reference Coordinates: provides reference coordinates of the tree inspected at the tree center by x-axis and y-axis reading (HK1980 Grid Coordinates) up to 3 decimal places for reference in TMCP. The reference coordinates could be a reference location of the tree inspected measured by common GPS instruments or plotted on location plan with estimated reference co-ordinates.

Add Rows: check this box if more row is required.

Delete Rows: check this box to delete row.

Table (B): Other Trees (Non-Triage Trees - trees do not need further actions)

Other Trees (Non-Triage Trees - trees do not need further actions): Table (B) is designed for "Other Trees" in the tree group that do not fall into Table (A): the categories of Triage trees, trees do not need further actions or Form 2 assessment. **Only tree group information is required in Table (B).**

App. Quantity of Trees: Approximated quantity of trees, as far as practicable, in the same species in the tree group falls into the definition of "Other trees". For tree species cannot be identified during the tree group inspection, mark "unidentified" on the **Tree Species** column. Same tree species may appear in Table (A) and Table (B), please avoid duplicated counting.

Range of Height: the range of tree height in the same species of tree in Table (B). Please mark the tree height from the lowest to the highest in meter.

Overall Remarks: Inspection Officer may provide his/her observations, suggestions and recommendations on tree remedial actions in the space provided under the "Overall Remarks" when necessary. The overall remarks shall also include limitations and restrictions in the site, the need of further assessment on particular tree (individual tree risk assessment by Form 2) in the

tree group assessed, as well as other information did not cover in the above-mentioned items.

Sub-total No. of Trees in Table (A): Total number of trees in Table (A).

Sub-total No. of Trees in Table (B): Total number of trees in Table (B).

Total No. of Trees: the total number of trees in the tree group inspected, i.e. total number of trees in Table (A) + Total number of trees in Table (B).

Summary of Triage Trees: give total number of trees of each Triage colour in the tree group inspected.

Attached Information: use this section to attach photos, map, and other information.

Add Tree Photos: provide tree group photos taken on the inspection day. The picture of tree group inspected shall be taken from at least two different directions; individual tree photos should be provided for tree health or structural conditions classified as "Very Poor" and recommended for tree removal; and tree(s) recommended for remedial actions or further assessment (individual tree risk assessment (Form 2)). All photos provided shall follows the photographs requirements set out in Appendix 6 – Photo-taking Guidelines for Tree Risk Assessment specified in TRAM Guidelines. All photographs should be stamped with date and time of photo taken.

Add Map: add tree location map of the tree group assessed. The map shall show the location of the tree group, the relevant land status, major check points (i.e. Lamp pole number, SIMAR slope number, etc.). **All trees listed on Table (A) in the Form 1 report should be marked on the tree location map with the Departmental Tree ID.**

Add Other Information: add other information related to the inspection, i.e. future development project, land sales information, etc., that the Inspection Officer considers necessary further describe the site conditions and the tree group inspected.

Appendix 6 - Photo-taking Guidelines for Tree Risk Assessment

1. General

- All photographs should be illustrated with the dates and time of the photographs were taken.
- The photo records should be coloured photos clearly showing the tree conditions.
- Proper annotations and descriptions should be provided to illustrate the conditions of trees.
- For record of remedial mitigation measures, photos showing the conditions before and after the operations should be taken from similar view angles as far as possible to facilitate comparison.
- All photographs should be taken in a specific manner so as to provide a fair comparison and clear illustration to reflect the change of the tree groups or the individual trees when compared to the relevant and retrievable records.

2. Photo Records in Form 1

2.1 Overall condition

- All trees should be clearly seen in photos record through a photo can cover more than one tree if it can capture the general conditions of individual trees.
- Overall view showing the tree group and its adjacent site conditions.
- Close views of the tree group from different angles clearly showing its condition.
- Views showing site conditions or changes that may have an impact on tree health or structural conditions.
- Views showing the potential impact on targets / sensitivity in case of tree failure.
- Views clearly showing tree health and structural conditions, in particular for stand-alone trees and street trees, should be captured as far as practicable unless tree parts are obscured due to site constraints (such as those on steep slopes or trees in clusters).
- Close-up views clearly showing trees having notable arboricultural defects, disorders or anomalies (if any).

3. Photo Records in Form 2

3.1 Overall Condition

- Overall views showing the tree from different angles, its adjacent site condition and extent of leaning (if applicable).
- Views showing site conditions or changes that may have an impact on tree health or structural conditions.
- Views showing the potential impact on targets / sensitivity in case of tree failure.

3.2 Crown Condition

- Views showing general condition of the crown to illustrate the vigor, foliage density and colour.
- Close up views for the following features (if any):
  - abnormal leaf size with reference scale;
  - dieback twigs;
  - epicormics;
  - signs of pest or disease; and
  - other notable arboricultural defects or disorders.

3.3 Trunk and Branch Conditions

- Views showing general conditions of the trunk(s) and major branches illustrating the structural integrity.
- Close up views for the following features (if any):
  - co-dominant trunks or branches;
  - poor taper;
  - included bark or weak attachment;
  - decay or cavity;
  - cracks or splits;
  - wounds and wound wood development;
  - dead branches or hangers;
  - crook or abrupt bends;
  - crossed branches;
  - heavy lateral limb;
  - lion tailing;
  - bleeding or sap flow;
  - fungal fruiting bodies;

- parasitic plants;
- signs of pests and diseases; and
- other notable arboricultural defects or disorders.

3.4 Lower Trunk / Root Condition

- Stressful site conditions, including construction activities within the tree protection zones and any other activities or restrictions that may damage the root system and the overall structural stability of the trees. Views showing general conditions of the root flare and disturbance that may damage the root zone.
- Close up views of the following features (if any):
  - root rot;
  - exposed roots;
  - girdling roots;
  - cracks or splits;
  - mechanical damage;
  - root-plate movement;
  - soil cracks or other cracks;
  - fruiting bodies;
  - signs of pests and disease; and
  - other notable arboricultural defects or disorders

Tree Risk Assessment Form 2 Individual Tree Risk Assessment
樹木風險評估表格2 個別樹木風險評估

General Information 基本資料

Dept. / Agency 部門 / 機構		Inspection Officer 巡查人員		Post 職位	
Project/Contract No. 工程/合約編號				File Ref. 檔案編號	
Date and Time of Inspection 巡查日期及時間	*(dd/mm/yyyy)* *(hr)* *(min)*	Last Inspection Date 上次巡查日期	*(dd/mm/yyyy)*	Inspection Time Spent 是次巡查所用時間 Inspection Frequency 巡查週期	

Tree Information 樹木資料

TMCP Tree ID TMCP 樹木編號		Dept. Tree ID 部門樹木編號		Tree Species 樹種			Triage Colour 分流顏色		
Tree Height(m) 樹高(米)		Crown Spread(m) 樹冠闊度(米)				No. of Trunk(s) 樹幹數目			
DBH of tree trunk(s)(mm) 每枝主幹胸徑(毫米)	1	2	3	4	5	Aggregated DBH (mm) 總胸徑(毫米)			

Tree Status 樹木類別	☐ Old and Valuable Tree 古樹名木 (OVT No. 古樹名木登記冊編號:)	☐ Other tree 其他樹木
	☐ Stonewall Tree 石牆樹 (Tree Register No. 樹木登記編號:)	☐ Brown Root Rot Disease Infected 受褐根病感染
	☐ Large Tree(DBH ≥ 500mm or overall height ≥ 9m) 大樹(胸徑≥500毫米或高度≥9米)	☐ Tree in Confined Site 擠迫地點的樹木

Location Information 位置資料

Masterzone Ref. 主區編號		Location (Chinese) 地點 (中文)	
Subzone Ref. 副區編號		Location (English) 地點 (英文)	
Coordinates 座標	X: Y:		
Tree Risk Management Zone Category 樹木風險管理地區類別		District 地區	

Location Type 地點類別	☐ Roadside landscaped area 路旁綠化地區	☐ Tree pit/Tree ring 樹穴/樹圈	☐ Central divider 中央分隔帶
	☐ Public park or recreation venue 公園或康樂場地	☐ Housing estate 屋邨	☐ Government compound 政府建築物
	☐ Planter box 花盆	☐ SIMAR slopes 系統性鑑辨維修責任的斜坡	
	☐ Recreational site/facility inside country parks 郊野公園內康樂用地或設施		
	☐ Unleased or unallocated government land 未批租或未撥用政府土地	☐ Other 其他	
Nearby Utility Post No. 就近公用設施編號:			

Target Assessment 目標物評估
(Please identify no more than five (5) potential Target(s) in the sequence of severity of consequence 請依後果的嚴重性次序選取不多於五個目標物)

Target No. 目標物編號	Target Description 目標物的描述	Target Zone 目標物範圍	Occupancy rate 佔用率	Remove target? 可否移除目標物?	Restrict usage? 可否限制使用?
1					
2					
3					
4					
5					

Site Conditions 場地狀況

Topography 地勢	☐ Flat 平地 ☐ Natural terrain 天然山坡 ☐ Man-made slope 人造斜坡 ☐ Retaining wall 擋土牆 ☐ Stonewall 石牆 ☐ Others 其他:
Site changes 場地改變	☐ None 沒有 ☐ Grade change 地表改變 ☐ Site clearing 場地平整 ☐ Others 其他 _____
Soil conditions 土壤情況	☐ Normal 正常 ☐ Compacted 土壤被擠壓 ☐ Water Logging 積水 ☐ Hard Paved 硬地鋪面 ☐ Others 其他 _____
Soil crack or crack behind lean 土壤裂縫或裂縫於傾斜部位背後 #	○ None 沒有 ○ Yes 有 _____
Restriction within dripline 滴水線範圍內有限制 @	○ None 沒有 ○ <25% ○ 25-50% ○ 51-75% ○ >75%
Tree failure record 樹木倒塌記錄 #	○ None 沒有 ○ Yes 有
Brown Root Rot disease record 褐根病記錄 ✗	○ None 沒有 ○ Yes 有
If these items are checked, further assessment by resistograph or tomograph(#), equipment for tree root detection(@) and/or BRRD/pathogen tests(✗) should be arranged when necessary. 若選擇此項，應視乎情況考慮應用微鑽探、聲納探測(#)、樹根探測工具(@) 及/或褐根病/病源檢測(✗)。	
Other observations 其他觀察	

General Conditions 總體概況

Tree vigor 茁壯程度	○ Low 低 # ○ Normal 正常 ○ High 高
Lean 傾斜	○ No 沒有 ○ Yes 有 Angle from vertical 傾斜角度 #(> 15°) ☐ ☐ Natural due to phototropism 趨光性 ☐ Self-corrected 已自然修正 ☐ Recent Tilt 新近傾斜# ☐ Response growth 反應生長 _____
Wind exposure 受風情況	○ Protected 受遮擋 ○ Partial 部份 ○ Exposed 暴露 ○ Wind funneling 風洞 ○ Others 其他 _____
Wildlife or nesting site 野生動物或鳥巢	○ None 沒有 ○ Yes 有
Cable or brace 鋼索或支架	○ None 沒有 ○ Yes 有
Pruning history 修剪歷史	☐ Cleaned 清理樹冠 ☐ Thinned 疏減樹冠 ☐ Raised 提升樹冠 ☐ Reduced 縮減樹冠 ☐ Structural pruning 結構修剪 ☐ Topped 削頂 ☐ Lion-tailed 獅尾 ☐ Others 其他
If these items are checked, further assessment by resistograph or tomograph(#) should be arranged when necessary. 若選擇此項，應視乎情況考慮應用微鑽探、聲納探測(#)。	
Other observations 其他觀察	

Crown Conditions 樹冠狀況

Crown density 樹冠密度	○ Normal 正常 ○ Sparse 稀疏 (○ <25% # ○ 25% - <50% # ○ 50% <75%)		☐ Imbalanced crown 樹冠不對稱
Live crown ratio 活冠比	○ <40% # @ ○ 41 - 70% ○ >70%	Crown load 樹冠負荷	○ Normal 正常 ○ Heavy 過重 ○ Declined 衰弱 #@
Foliage 葉片	○ Fallen leaf (Seasonal) 落葉(季節性) ○ Defoliation (Withered) 落葉 (枯萎) ○ Normal 正常 ○ Chlorotic 萎黃 % ○ Necrotic 壞死 %		
Leaf size 葉片大小	○ Normal 正常 ○ Smaller than normal 比正常細小		
Dieback twigs 枯枝	○ <5% ○ 5 - <25% ○ 25 - 50% ○ >50%	☐ Epicormics 水橫枝 ☐ Hanger 懸吊斷枝 ☐ Pest and disease 病蟲害 ✗ _____ Defoliation Percentage 落葉百分比	
If these items are checked, further assessment by resistograph or tomograph(#), equipment for tree root detection(@) and/or BRRD/pathogen tests(✗) should be arranged when necessary. 若選擇此項，應視乎情況考慮應用微鑽探、聲納探測(#)、樹根探測工具(@) 及/或褐根病/病源檢測(✗)。			
Other observations 其他觀察			

Branch Conditions 樹枝狀況

☐ Co-dominant branches 等勢枝	☐ Included bark 內夾樹皮	☐ Cross branches 疊枝	☐ Crooks or abrupt bends 不常規彎曲	☐ Sap flow 滲液
☐ Cracks or splits 裂縫或裂開	☐ Decay or cavity 腐爛或樹洞 #	☐ Heavy lateral limb 重側枝	☐ Deadwood 枯木	
☐ Canker 潰瘍	☐ Galls 腫瘤	☐ Burls 節瘤	☐ Wounds or mechanical injury 傷痕或機械破損	
☐ Pest and disease 病蟲害 :		☐ Parasitic or epiphytic plants 寄生或附生植物 :		
☐ Fungal fruiting bodies 真菌子實體 : ✗		☐ Response growth 反應生長 :		

If these items are checked, further assessment by resistograph or tomograph(#), equipment for tree root detection(@) and/or BRRD/pathogen tests(✗) should be arranged when necessary.
若選擇此項，應視乎情況考慮應用微鑽探、聲納探測(#)、樹根探測工具(@) 及/或褐根病/病源檢測(✗)。

Other observations 其他觀察	

Trunk Conditions 主幹狀況

☐ Cavity 樹洞 #(Width of cavity opening over 1/3 of trunk diameter 樹洞洞口闊度大於主幹直徑1/3)	#1 L 長	(mm)	W 闊	(mm)	D 深	(mm)	Direction 方向		Height above ground 離地面高度	
	#2 L 長	(mm)	W 闊	(mm)	D 深	(mm)	Direction 方向		Height above ground 離地面高度	
	#3 L 長	(mm)	W 闊	(mm)	D 深	(mm)	Direction 方向		Height above ground 離地面高度	
	#4 L 長	(mm)	W 闊	(mm)	D 深	(mm)	Direction 方向		Height above ground 離地面高度	

☐ Co-dominant stems 等勢幹 #	☐ Included bark 內夾樹皮 #	☐ Poor taper 不良漸尖生長	☐ Crooks or abrupt bends 不常規彎曲
☐ Cracks or splits 裂縫或裂開	☐ Abnormal bark crack 不正常樹皮裂紋	☐ Sap flow 滲液	
☐ Canker 潰瘍	☐ Galls 腫瘤	☐ Burls 節瘤	☐ Wounds or mechanical injury 傷痕或機械破損
☐ Pest and disease 病蟲害 :		☐ Parasitic or epiphytic plants 寄生或附生植物 :	
☐ Fungal fruiting bodies 真菌子實體 : ✗		☐ Response growth 反應生長 :	

If these items are checked, further assessment by resistograph or tomograph(#), equipment for tree root detection(@) and/or BRRD/pathogen tests(✗) should be arranged when necessary.
若選擇此項，應視乎情況考慮應用微鑽探、聲納探測(#)、樹根探測工具(@) 及/或褐根病/病源檢測(✗)。

Other observations 其他觀察	

Root Conditions 根部狀況

☐ Root collar not visible 根脊不現	☐ Cracks or splits 裂縫或裂開	☐ Exposed root根部外露	☐ Root rot 根部腐壞 # @
☐ Cut or pruned roots 根部經切割或截根	☐ Trunk girdling 纏繞樹幹	☐ Girdling root 纏繞根	☐ Dead surface roots 表根枯萎
☐ Root-plate movement 根基移位 # @	☐ Wounds or mechanical injury 傷痕或機械破損		
☐ Pest and disease 病蟲害 :		☐ Parasitic or epiphytic plants 寄生或附生植物 :	
☐ Fungal fruiting bodies 真菌子實體 : ✗		☐ Response growth 反應生長 :	

If these items are checked, further assessment by resistograph or tomograph(#), equipment for tree root detection(@) and/or BRRD/pathogen tests(✗) should be arranged when necessary.
若選擇此項，應視乎情況考慮應用微鑽探、聲納探測(#)、樹根探測工具(@) 及/或褐根病/病源檢測(✗)。

Other observations 其他觀察	

Risk Categorisation 風險類別 (*Please identify no more than three (3) important Target(s) for no more than three (3) Tree Part*
請就不多於三個樹木部份選取不多於三個目標物)

Target No. 目標物編號	Tree Part 樹木部分	Condition(s) of Concern 關注狀況	Part Size (mm) 部位大小 (毫米)	Fall Distance (m) 下墜距離 (米)	Likelihood 可能性			Consequences 後果	Risk rating* 風險評級* (*Matrix 2: Risk rating matrix 風險評級組合*)
					Failure 倒塌	Impact 影響	Failure and Impact 倒塌並影響 (*Matrix 1 : Likelihood matrix 可能性組合*)		

*For tree obtained "High" or "Extreme" risk rating after assessment, appropriate mitigation measures should be followed.
*當風險評級組合的結果為"高"或"極高"時，需要安排適當的緩減措施。

Matrix 1: Likelihood matrix 可能性組合

Likelihood of Failure 倒塌的可能性	**Likelihood of Impacting Target 影響目標的可能性**			
	Very Low 非常低	**Low 低**	**Medium 中等**	**High 高**
Highly Probable 非常可能	Unlikely 很低機會	Somewhat likely 有機會	Likely 較大機會	Very likely 很大機會
Probable 相當可能	Unlikely 很低機會	Unlikely 很低機會	Somewhat likely 有機會	Likely 較大機會
Possible 有可能	Unlikely 很低機會	Unlikely 很低機會	Unlikely 很低機會	Somewhat likely 有機會
Improbable 不太可能	Unlikely 很低機會	Unlikely 很低機會	Unlikely 很低機會	Unlikely 很低機會

Matrix 2: Risk rating matrix 風險評級組合

Likelihood of Failure and Impact 倒塌並影響的可能性	**Consequences of Failure 倒塌後果**			
	Negligible 微小	**Minor 較小**	**Significant 重大**	**Severe 嚴重**
Very likely 很大機會	Low 低	Moderate 中	High 高	Extreme 極高
Likely 較大機會	Low 低	Moderate 中	High 高	High 高
Somewhat likely 有機會	Low 低	Low 低	Moderate 中	Moderate 中
Unlikely 很低機會	Low 低	Low 低	Low 低	Low 低

* 20 Common Tree Species requiring special attention should be duly considered to be rated at "Probable" or "Highly Probable" depends on the severity of the defects
* 20種需特別注意的常見樹種應視乎缺陷的嚴重性而盡量評為"相當可能"或"非常可能"

Mitigation Measures 緩減措施

Target No. 目標物編號	Tree Part 樹木部分	Mitigation Measures 緩減措施	Anticipated Completion Date 預算完成日期 (dd/mm/yyyy)	Residual Risk* 剩餘風險*

*The level of "Residual Risk" after proposed mitigation measures against "High" or "Extreme" risking rating shall be lowered to "Moderate" or below, otherwise, the proposed mitigation measures shall be reviewed.
*當執行針對"高"或"極高"水平風險評級的緩減措施後，有關的"剩餘風險"水平必需降至"中"或以下。否則，有關的緩減措施需要檢討。

Notes, explanations, descriptions and supplmentary Information 說明、註解、描述及補充資料

Overall tree risk rating 綜合樹木風險	Overall residual risk 綜合剩餘風險		
		Advanced assessment 進一步檢查	○ No 否 ○ Yes 是 Please describe 請描述
		Inspection limitations 檢查限制	☐ None 沒有 ☐ Inaccessible 難以接近 ☐ Climbers 攀緣植物 ☐ Root collar buried 根脊被埋 ☐ Others 其他 _____
		Next inspection date 下次檢查日期	_____

Attached Information 附夾資料

Attachment Type	Attachment File Name	Description

Declaration 聲明

I, the Inspection Officer for the above TRA Form 2, confirm that I have inspected the tree(s) at the specified date and time with due diligence, and the information given in the Form(s) is truly reflecting what I observed on site.

本人作為以上個別樹木風險評估(表格2)的巡查人員，確認本人已在本表格所列日期及時間，謹慎小心完成有關樹木的風險評估，而本表格上填入的資料均真確無訛地反映本人在現場觀察所得。

My academic, professional, training records and work experience met the requirements of Inspection Officer (Form 2) in the TRAM Guidelines.

本人的學術、專業、培訓紀錄及相關工作經驗均符合「樹木風險評估及管理安排」指引中對巡查人員的要求。

Name of Inspection Officer:

巡查人員姓名 *(請以英文正楷書寫。)*

Date of Form 2 Completed:

完成表格2日期 *(dd/mm/yyyy)*

(Please sign on the space provided if the Form 2 is submitted in paper form 若以文本形式遞交表格2, 請於以下空位簽名)

Signature of Inspection Officer:
巡查人員簽署

Appendix 8 – Explanatory Notes for Form 2 – Individual Tree Risk Assessment

This Form 2 is provided with the *Guidelines for Tree Risk Assessment and Management Arrangement (TRAM Guidelines)* (10th Edition) and aligns with the latest tree risk assessment methods promulgated by the International Society of Arboriculture (ISA) and other overseas professional organisations. It intends to serve as a template for Inspection Officer to collect and record tree information and facilitate a meaningful individual tree basis risk assessment. For an advanced tree risk assessment, the Inspection Officer or arborist concerned shall submit a separate written report including but not be limited to the detailed assessment results on the risks of the tree or the tree part assessed. For further information on the requirements of the written report, the Inspection Officer may refer to the latest version of the ANSI A300 standards and the ISA Best Management Practice – Tree Risk Assessment or other relevant publications, such as BS 3998:2010 – *Tree Work - Recommendations* by the British Standards Institute.

Box(es) and space(s) are provided in the Form for collation of the right information. Please check the box(es) that reflect the observations. More than one box may be checked. Please also write comments and notes that are not covered elsewhere in the Form or for points that need additional explanation in the space(s) provided or under the "Other Observations" section. *It is not necessary to check every box or to fill in every space provided in this Form*. Only information relevant to the tree risk assessment should be collected.

Section 1 – General Information

This Section records the background information of the responsible department and the Inspection Officer who undertakes the individual tree risk assessment.
Department/Agency: name of the department or agency responsible for the tree risk assessment.

Inspection Officer: name of the Inspection Officer (automatic filled after login) who meets the academic, professional and training qualifications as well as work experience as specified in the 'Requirements for Inspection Officers' in the TRAM Guidelines. The qualifications of the Inspection Officer should be vetted by the responsible tree maintenance department and each department shall provide a list of accepted Inspection Officers to Greening, Landscape and Tree Management Section (GLTMS) of the Development Bureau forverification.

Post: post title of the Inspection Officer in the responsible department or agency.

Project/Contract No.: Project/Contract reference number in which the tree risk assessment is undertaken (if applicable).

File Ref.: file reference no. in the responsible department or agency that keeps the tree risk assessment reports, if applicable.

Date and Time of Inspection: date and time of the inspection in the format of dd/mm/yyyy and hr:min. If the inspection lasts for more than one day, the inspection date refers to the commencement date of the inspection.

Last Inspection Date: date of last inspection of the subject tree in the format of dd/mm/yyyy. If the inspection lasts for more than one day, the last inspection date refers to the commencement date of the last inspection. If it is the first-time inspection of the subject tree, please set it to the Date of Inspection.

Inspection Time Spent: the time spent in the field inspection of the subject tree to the nearest 0.5 hour. Travelling time should not be included.

Inspection Frequency: the frequency of inspection, for example, if the subject tree is inspected every six months, please mark '6 months' or if the subject tree is inspected every year, please mark '12 months', etc. Please mark '***ad hoc'*** if the tree risk assessment is undertaken on a need basis.

Section 2 – Tree Information

This Section provides background information of the tree assessed.

TMCP ID: A system generated ID to give a unique reference number to the trees in the new tree database, Tree Management Common Platform (TMCP). Please be alerted that if Inspection Officer input more than one departmental tree ID to an individual tree, different TMCP Tree IDs will be generated, hence, Inspection Officer should be aware of using a unique Departmental Tree ID for an individual tree. If the tree was transferred to other department/third party, original department shall follow **"Tree Transfer"** procedures to update the Departmental Tree ID accordingly.

Departmental Tree ID: the departmental identification number of each tree inspected. Department shall decide a **unique Departmental Tree ID** for an individual tree and ensure all Inspection Officer followed.

Tree Species: the botanical name of the subject tree. Please also include the preferred Chinese common name (generally the first name listed is the preferred

common name) listed in the *Check List of Hong Kong Plants* (latest version) published by the Agriculture, Fisheries and Conservation Department (AFCD).

Triage Colour: the classification under the Triage System in the TRAM Guidelines. Please indicate the triage colour in the space provided. Please note that the triage classification may change in each assessment due to a change of the tree conditions and mitigation works completed. If the tree is one of the "Other Trees" in Zone I or one of the trees in other zones, no classification under the Triage System is necessary. Please mark 'NIL' in this situation.

Tree Height: estimated height of the subject tree from the existing ground level to the top of the tree crown measured to the nearest meter. For better estimation, please use a clinometer and/or range pole.

Crown Spread: diameter of the spread of the tree crown measured to the nearest meter. For asymmetric tree crown, the crown spread along the longest axis should be measured.

DBH of Tree Trunk: diameter of the tree trunk at breast height (1.3 meter above ground) measured to the nearest millimeter in accordance with AFCD's Nature Conservation Practice Note No. 2 '*Measurement of Diameter at Breast Height (DBH)*'' (2006 or its latest version). For measurement of trees with multiple trunks, please input the individual trunk diameters in the boxes provided and then calculate the aggregate DBH in accordance with AFCD's Practice Note No. 2. The tree risk assessment report should include photographic records showing the multiple trunks and each trunk numbered in sequence (i.e. #1, #2…etc.). If there are more than five individual trunks, please provide the individual trunk diameters in a separate sheet but the aggregate DBH should cover all individual trunks.

Tree Status: tree status in the Tree Register. Please indicate whether the subject tree is an Old and Valuable Tree (OVT), a Stonewall Tree (SWT), Large Tree (with an individual trunk(s) DBH ≥ 500 mm or overall height at 9 metres or above), a Brown Root Rot (BRR) disease infected tree or other trees. If applicable, please fill in the OVT Register No. and Tree Register No. for OVT and SWT respectively in the space provided. Please check more than one box if applicable.

Section 3 – Location Information

This Section provides location information of the subject tree.

Masterzone Ref. & **Subzone Ref.**: Masterzone reference number and Subzone reference number in the Tree Management Common Platform (TMCP) for the subject tree. Please fill in "NIL" if there is no Subzone. Details for the zoning of Masterzones and Subzones are specified in the TMCP Manual which can be viewed and/or downloaded from the Cyber Manual for Greening (http://devb.host.ccgo.hksarg). The zones are determined by the responsible department.

Chinese Location and **English Location**: Chinese and English names of the tree location. Please refer to the location/street names in the latest version of the '*Hong Kong Guide*' published by the Lands Department.

District: use district categorisation in 18 District Councils.

Tree Risk Management Zone Category: category of Tree Risk Management Zone as specified in the TRAM Guidelines. Please check the 'Category I' box if the tree falls into Category I zone; check the 'Category II' box if the tree falls into Category II zone; and check the 'Category III' box if the tree falls into Category III zone.

Co-ordinates: x- and y-coordinates of the tree at the centre of the tree trunk according to the HK1980 Grid Coordinates up to 3 decimal places. The coordinates can be measured by common GPS devices.

Location Type: venue or particular area that the subject tree is located. Please mark SIMAR Slope Number in the space provided if the subject tree is within a SIMAR slope. Please check "Others" if none of the venues or areas is applicable. For trees within a tree ring on a shotcrete slope, check "Tree Pit/Tree Ring". Please check more than one box if more than one location type apply, for example, if the tree is growing in a tree pit in a housing estate, please check "Tree Pit" and "Housing Estates", etc. Provide location information in space in 'Others' if the subject tree group does not fall into the boxes provided.

Nearby Utility Reference No.: nearby public utility reference number, such as lamp post number. Please mark the utility on the location map with its reference number clearly indicated.

Section 4 – Target Assessment

This Section provides information on the potential targets affected by the subject

tree. One individual tree or a tree part may affect one or more potential targets. The assessment of each potential target facilitates a better assessment of the likely consequence of a potential tree failure.

Target Number: the potential targets in priority according to the severity of consequence. People is always the most critical target with the most severe consequence.

Target Description: brief description of the target identified, for example, 'pedestrians', 'people in leisure/amenity area', 'occupied resident house', 'cars in carpark', 'school', 'play area', 'low-traffic street', or 'high-traffic street', etc.

Target Zone: location at which the target would likely be present the most. Please check the box if the target would likely be:

- Within dripline – the target is within the dripline of the subject tree; or
- Within 1.5 x Ht. – the target is outside the dripline but within the striking distance, i.e. 1.5 times of the total tree height.

Occupancy Rate: estimated amount of time in a day or a week that the target would likely be present within the Target Zone.

- Rare – the target is not commonly within the Target Zone.
- Occasional – the target is present within the Target Zone infrequently or irregularly.
- Frequent – the target uses or performs activity within the Target Zone for a large portion of a day or a week.
- Constant – the target is present within the Target Zone at nearly all times, 24 hours a day, 7 days a week.

Remove Target: remove the target as far as possible to eliminate the risk. Please check the box 'Yes' if the target can be removed; otherwise, please check the box 'No'.

Restrict Usage: restrict usage to eliminate the risk if possible. Please check the box "Yes" if access to the Target Zone can be restricted; otherwise, please check the box 'No'.

<u>Section 5 – Site Conditions</u>

This Section provides background information of the site that may affect the likelihood of tree failure.

Topography: topography of the site where the tree is growing. Please check the box "flat", "natural terrain", "man-made slope", "retaining wall" or "stonewall" where

applicable and specify other site observations in the box "Other". For example, if the tree is a stonewall tree and cracks on the stonewall is observed, more information shall be provided in the "Other" box. Please check more than one box to fully describe the site setting.

Site Changes: site factors affecting the root system of the subject tree or site factors that may affect the wind exposure of the subject tree:

- None – no soil changes observed.
- Grade change – soil was added or removed from the site.
- Site clearing – adjacent tree(s) had been removed or significantly reduced, which may cause the assessed tree to become exposed to wind.
- Others – other necessary information or further description of site change.

Soil Conditions: factors that may affect the health and/or vitality of the tree assessed, or the ability of the assessed tree's root system to provide sufficient mechanical support.

- Normal – normal soil conditions.
- Compacted – soil is severely compacted, limiting the depth, spread, and distribution of the root system.
- Water logging – water-logged due to poor drainage, high water table, excessive irrigation or assessed tree grows in a low area.
- Others – conditions that has not been covered in the boxes provided or further descriptions of soil conditions is considered necessary.

Soil Crack or Crack behind Lean: Please check the box if soil crack or crack behind lean was observed. Give more descriptions in the space provided when necessary. Root detection and mapping survey should be arranged when necessary to confirm if root system is damaged if resource permit.

Restriction within the Dripline: Please check the box and estimate the percentage restriction observed within the dripline of the tree assessed. Restriction refers to building, pavement, roads, hard landscape features, retaining wall, planter boundary or drainage channels etc. Root detection and mapping survey should be arranged when necessary to confirm if root development is restricted too.

Tree Failure Record: Please check the box if whole-tree failure(s) at the site of the tree assessed was reported in the past 12 months of the site inspection, saving for the trees that have failed during typhoons. Please give more

information including the estimated time of the tree failures and the reasons for the failures, etc., if possible. Particular attention shall be drawn if branch failure of the same tree was recorded in the past 6 months.

Brown Root Rot Disease Record: Please check the box if Brown Root Rot Disease (BRRD) infected tree(s) was previously identified within the dripline of the assessed tree (Distribution of BRRD infected tree location can be viewed on TMCP web layer). Please give detailed descriptions including the estimated time of disease identification, treatment applied, etc., if possible. Soil pathogen test, including BRRD, should be conducted if necessary.

Other Observations: Please provide other observations that have not been covered in this Section.

Section 6 - General conditions

This Section provides general conditions of the tree assessed.

Tree Vigor: the overall health conditions of the tree assessed. Please indicate:

- Low – tree growth is restricted or stunted, smaller than normal size, leaf density below average and/or abnormal epicormics. If tree vigor is Low, further checking on trunk internal decay or root system defects/damages occurred by resistograph, tomograph or soil pathogen test should be arranged when necessary.
- Normal – tree growth is in similar size of a typical/average sample tree for its species in the area, leaf conditions and branching show no significant defects. Root growth is in normal conditions, no restriction.
- High – tree is growing well and appears to be of a size above a typical/average sample tree for its species in the area. It is also free from any restriction, diseases or pests infestation.

Lean: angle of the trunk measured from vertical line. Please indicate:

- No – no leaning observed.
- Yes – measure the angle from vertical line and record in the space provided. If the tilt angle is larger than 15 degrees, tree stability shall be assessed.
- Recent Tilt – tilting was first identified in the current inspection or the leaning angle has continued, active leaning by more than five (5) degrees in the past 12 months, root system and trunk decay should be assessed. Root plate lifting, root breaking or soil cracks shall be carefully checked. Root detection and mapping survey should be arranged when necessary to confirm if the tree root grows healthy or restricted, if resource permit.

- Natural due to phototropism – leaning due to phototropism.
- Self-corrected – leaning of tree corrected due to self-correction mechanism.
- Response growth – reaction wood or additional wood has grown to increase the structural strength of the trunk/branches; describes location and extent of response growth observed.

Wind Exposure: factors that affect wind load of the tree assessed.

- Protected – other trees, structures or buildings in the area significantly reduce wind velocity or the exposure of the assessed tree to wind.
- Partial – other trees, structures or buildings near the tree moderately reduce the impact of wind on the assessed tree.
- Exposed – the assessed tree is fully exposed to wind, e.g. standalone tree, tree at the edge of a forest/plantation, etc. If the tree is identified exposed to wind direction, crown loading and imbalance crown shall be assessed and necessary crown reduction shall be considered to reduce crown loading.
- Wind funneling – wind may be 'funneled' or 'tunneled' (by buildings, canyons, large stands of trees) towards the assessed tree so that wind velocity experienced by the assessed tree is increased dramatically. If the tree is identified located at "Wind Funneling" site, crown loading and imbalance crown shall be assessed and necessary crown reduction shall be considered to reduce crown loading. More thorough crown inspection shall also be conducted to remove dead branches or hanging branch on the tree crown.

Wildlife or Nesting Site: wild birds or other wildlife including bats, squirrels, etc. may use the branches or cavity of the assessed tree for nesting. Please indicate:

- None – no nesting activity is observed.
- Yes – nesting activity is observed. Please record on-site observations in the space provided (if available), including the name of the wildlife (if known), quantity, and location of nests, etc.

Cable or Brace: presence of cable or brace installed to provide additional support to the assessed tree. Please indicate:

- None – no cable or brace system was installed.
- Yes – cable or brace system was installed. Please provide more information if possible, including the type of cables or braces, conditions of cables or braces, effectiveness, maintenance requirement, etc., in the space provided.

Pruning History: maintenance/pruning record of the assessed tree in the past 12 months or the latest tree assessment. Please indicate:

- Cleaned – crown cleaning was conducted.
- Thinned – crown thinning was conducted.
- Raised – crown raising was conducted.
- Reduced – crown reduction was conducted.
- Structural pruning – structural pruning was conducted, normally for young trees.
- Topped – inappropriate pruning technique used to reduce tree size; characterized by inter-nodal cuts.
- Lion-tailed – inappropriate pruning practice used to remove an excessive number of inner and/or lower lateral branches.
- Others: give detailed descriptions on the items checked, last pruning date and other pruning records not covered above.

Other Observations: Please provide other observations that have not been covered in this Section.

Section 7 – Crown Conditions

This Section provides information on the crown conditions of the assessed tree.

Crown Density: the branches, foliage and other reproductive parts of a tree forming the tree crown that blocked light visibility or penetration through the crown. Crown density can be estimated by using the crown density – foliage transparency card or electronic densitometers. Please indicate:

- Normal – crown density is similar to a typical/average sample tree for its species in the area.
- Sparse – crown density is lower than a typical/average sample tree for its species in the area that allows a large degree of wind and light penetration. Please estimate the percentage of crown density in <25%, 25% - <50%, or 50% - <75% by comparing to a typical/average sample tree for its species in the area and fill in the space provided. Over 75% is considered "Normal". If crown density is lower than 50%, assessment on root development (by root detection and mapping survey) and trunk decay assessment by resistograph or tomograph should be arranged when necessary to check the reasons of the sparse crown

Imbalanced Crown: Please check the box if the canopy is not uniformly formed. Please counter check the tree stability if the heavy side of the tree crown falls to a busy traffic road, school, playground or gathering place. Crown reduction shall be conducted to reduce crown load and rectify the imbalance crown.

Live Crown Ratio (LCR): the ratio of the height of the live crown to the total height of entire tree [(crown height/tree height) × 100%]. Please check the appropriate box for the estimated range of LCR. If live Crown Ratio is lower than 40%, further assessment on trunk or root internal decay by resistograph or tomograph, or root system defects/damages by equipment for root detection and mapping, should be arranged when necessary to identify cause of low crown ratio. Pruning history shall also be counter-checked to identify if any unnecessary pruning was conducted.

Crown Load: the estimated overall loading at tree crown of the assessed tree. This may vary with the density of foliage and other reproductive parts, canopy architecture, etc.

- Normal – crown load is similar to a typical/average sample tree for its species in the area.
- Heavy – crown load is much higher than a typical/average sample tree for its species in the area. If heavy load of crown is identified, crown reduction shall be considered to reduce crown loading.
- Declined – crown load is lower than a typical/average sample tree for its species in the area. If crown load is identified "declined", assessment on trunk internal decay by resistograph or tomograph, or thorough assessment on root development by equipment for root detection and mapping, should be arranged when necessary, or soil pathogen test as required. Although most of the nutrient deficiency symptoms can be observed by experienced inspection officers, soil nutrient content test should be considered to check if any nutrient deficiency in the planting soil, however, application of fertilizers shall be carefully planned as over fertilization will also damage the root system and the tree health. Departments shall also be aware of the restriction on the application of fertilizers at Water Gathering Ground and Country Parks.

Foliage: an important indicator of tree health based on the comparison with a healthy specimen of the same species in the area. Please indicate:

- Fallen leaf (seasonal) – fallen leaf observed on the tree, check if the tree is a deciduous tree and leaves shed in winter.
- Defoliation (withered) – defoliation observed on the tree, check if the tree is withered and leaves shed before it is dead. Check if internal trunk decay or root system damages caused the defoliation. Soil nutrient content test should be considered to check if any nutrient deficiency in the planting soil, however, application of fertilizers shall be carefully planned as over fertilization will also damage the root system and the tree health. Departments shall also be aware of the restriction on the application of fertilizers at Water Gathering Ground and Country Parks.
- Normal - foliage color is similar to a typical/average sample tree for its

species in the area.

- Chlorotic – leaves become yellowish-green to yellow, estimate the percentage of chlorotic foliage in the canopy and fill in the space provided. Check if the planting site is water-logged or insufficient of water. Soil nutrient content test shall be considered to check if any nutrient deficiency in the planting soil, however, application of fertilizers shall be carefully planned as over fertilization will also damage the root system and the tree health.
- Necrotic – dead leaves remained in the tree crown, estimate the percentage of necrotic in the tree crown and fill in the space provided. Check if the planting site is water- logged or insufficient of water. Check if internal trunk decay or root system damages caused the defoliation. Soil nutrient content test should be considered to check if any nutrient deficiency in the planting soil, however, application of fertilizers shall be carefully planned as over fertilization will also damage the root system and the tree health. Departments shall also be aware of the restriction on the application of fertilizers at Water Gathering Ground and Country Parks.

Leaf Size: size of leaves in the mature part of the assessed tree.

- Normal – leaf size in mature part of the assessed tree is similar to a typical/average sample tree for its species in the area.
- Smaller than normal – leaf size in mature part of the tree is smaller than leaves in a sample species in the area. Soil nutrient content test should be considered to check if any nutrient deficiency in the planting soil, however, application of fertilizers shall be carefully planned as over fertilization will also damage the root system and the tree health. Departments shall also be aware of the restriction on the application of fertilizers at Water Gathering Ground and Country Parks.

Dieback Twigs: progressive death of twigs starting at the tips of shoots or branches. The percentage of dieback twigs can be estimated by comparing the portion of dieback twigs to the entire tree crown. Please indicate:

- <5% – less than 5% of dieback twigs was observed.
- 5% – <25% - dieback appeared on about 5% to less than 25 % of canopy
- 25% – 50% - dieback appeared about 25% to 50% of the canopy
- >50% – dieback extended to over 50% of the canopy.

If the dieback twigs is more than 25%, assessment on trunk internal decay by resistograph or tomograph, or thorough assessment on root development by equipment for root detection and mapping should be arranged when necessary, or soil pathogen test as required.

Epicormics: Please check the box if epicormics, which are shoots sprouting vigorously from damaged bark/wounds on trunk or branch of a tree, are present.

Extensive growth of epicormics always indicates poor health conditions or wound damages, thorough check of tree health conditions, in particular internal decay at old wounds or cavity, shall be conducted.

Hanger(s): Please check the box if hanger(s), which is a broken part of trunk or branch that remains or hangs up in the tree crown. This hanger may impose high potential risk to the target(s), especially unprotected target(s), present underneath the canopy of the tree. Removal of hanger should be conducted as soon as practicable.

Pest and Disease: Please check the box if pest(s) or disease(s) was observed on the assessed tree. Please try to identify the pest(s) or disease(s) detected on the assessed tree such as Brown Root Rot Disease and decay caused by *Ganoderma* spp. and termites (use termite detector if necessary), for better pest/disease control. If the pests/fungi cannot be identified on site, please collect samples to the TMO for further identification. For *Phauda flammans* infestation, TMO has collected departments' information and created a distribution layer on TMCP map for departments to view.

Other Observations: Please provide other observations that have not been covered in this Section.

Section 8 – Branch Conditions

This Section provides information on the branch conditions of the assessed tree. Please check the appropriate box(es) if the following branch conditions are observed:

Co-dominant Branches: branches of nearly equal diameter arising from a common junction, from apical buds at the tip of the same stem and lacking normal branch union or collar. Co-dominant branches in combination with other defects, such as acute angle attachment, included bark and high aspect ratio, may increase potential of branch failure. Thorough inspection shall be conducted to identify if any other structural defects had been associated with the co-dominant branches. The inspection can be conducted by aerial inspection (tree climbing), binocular or Drone inspection as required.

Included Bark: bark that embedded in a union of two or more branches or between branch and trunk, resulting a weakened structure or source of decay to core wood. Included bark in combination with other defects, such as low live crown ratio, and/or high aspect ratio, may increase risk of branch failure, mitigation measures including pruning of defective branch shall be conducted as far as practicable.

Cross Branches: crossing, rubbing or upright branches that may cause damage to tree bark or resulted in weakened structure. Cross-branching contributes weak point to branch failure, mitigation measures shall be conducted timely to prune the defective branch as far as practicable.

Crooks or Abrupt Bends: abnormal bending of tree branch. The crooks or bends may result in weak point on branch(es), mitigation measures shall be conducted timely to prune the defective branch as far as practicable.

Sap Flow: oozing of liquid that may result from infections or infestations under the bark. The presence of sap flow may or may not be a structural defect or stability weakness. Internal decay assessment shall be considered to check the health and structural conditions of the branch as required.

Cracks or Splits: separation in the wood in either a longitudinal (radial, in the plane of ray cells) or transverse (across the stem) direction. If the conditions of cracks or splits is significant and may affect the structural safety of the branch, mitigation measures including removal of the defective branch shall be arranged as far as practicable.

Decay or Cavity: decay and cavity in a branch may be caused by mechanical injury or fungal damage or wildlife nesting, resulting in weakened structure on the branch. Internal decay assessment shall be conducted to assess the sound wood percentage and the extent of decay. Necessary mitigation measures shall be conducted to remove the defective branch as far as practicable. As tree has self-defense mechanism, no particular treatment, including applying protective reagents/resin or covering the opening of the wound/cavity is required.

Heavy Lateral Limb: leaves clustered at tip of a long branch. Heavy lateral limb (Lion Tail) may contribute high branch failure rate, removal of the Lion-tailed branch or mitigation measures to enhance lateral growth of the Lion-tailed branch shall be considered. Counter check the pruning history is required to identify mal-practice of pruning.

Dead Wood: dead wood may be resulted from poor pruning or remains of hangers. Mitigation measures shall be arranged to remove the dead wood as soon as practicable.

Cankers or Galls or Burls: cankers are localised diseased areas (lesions) on the trunk, branch or even roots; often sunken or discolored; galls are abnormal swellings of tissue caused by pests; may or may not be a defect; burls are outgrowth on the branch; not usually considered a defect. Resistograph or

tomograph should be arranged when necessary to identify if any internal decay was caused and the percentage of sound wood remained as far as practicable.

Wound or Mechanical Injury: wound or mechanical injury observed on branch. Wound is an opening that is created when the bark of a live branch is cut, penetrated, damaged, or removed. Please provide more descriptions if necessary. Internal decay assessment shall be conducted to assess the sound wood percentage and the extent of decay if resources permit. Necessary mitigation measures shall be conducted to remove the defective branch as soon as practicable. As tree has self-defense mechanism, no particular treatment, including applying protective reagents/resin or covering the opening of the wound/cavity is required.

Pest and Disease: Please check the box if pest(s) or disease(s) was observed on the assessed tree. Please try to identify the pest(s) or disease(s) detected on the assessed tree such as Brown Root Rot Disease and decay caused by *Ganoderma* spp. and termites (use termite detector if necessary), for better pest/disease control. If the pests/fungi cannot be identified on site, please collect samples the TMO for further identification. Mitigation measures including application of pesticides or fungicides should be considered as appropriate. If application of fungicides is required, prior advice from a qualified pathologist or specialist shall be sought.

Parasitic or Epiphytic Plants: parasitic or epiphytic plants grow on branches. The presence of parasitic or epiphytic plants may or may not affect health or structure of the tree. Please try to identify the parasitic or epiphytic plants observed and provide details in the space provided. Mitigation measures to remove the parasitic or epiphytic plants shall be arranged as appropriate. For removal of Mikania, technical notes issued by the AFCD on removal of Mikania shall be observed.

Fungal Fruiting Bodies: fungal fruiting bodies or mycelia present at decayed part of the assessed tree. Please try to identify the common wood decay fungi such as Brown Root Rot Disease and decay caused by *Ganoderma* spp. as far as possible. Close-up photographs showing the key features of the fungi should be included to aid subsequent identification. Soil pathogen test should be arranged when necessary to identify possible species of pathogenic fungi and appropriate mitigation measures including application of fungicides should be considered when necessary. If application of fungicides is required, prior advice from a qualified pathologist or specialist shall be sought.

Response Growth: reaction wood or additional wood that has grown to increase the structural strength of the branch. Please indicate the location(s) and extent.

Other Observation: Please provide other observations that have not been covered in this Section.

Section 9 – Trunk Conditions

This Section provides information on the trunk conditions of the assessed tree.

Cavity: Please measure and input the dimensions of cavity on tree trunk. The direction of cavity opening and height of cavity (measured at the center of the opening above ground level) should be measured and marked in the space provided. Internal decay assessment shall be conducted to assess the sound wood percentage and the extent of decay. Necessary mitigations measures shall be conducted to remove the defective trunk or the whole tree as soon as practicable. As tree has self-defense mechanism, no particular treatment, including applying protective reagents/resin or covering the opening of the wound/cavity is required.

Please check the appropriate box(es) if the following trunk conditions are observed:

Co-dominant Stems: trunks of nearly equal diameter arising from a common junction and lacking a normal union or collar. Co-dominant stems in combination with other defects, such as acute angle attachment, included bark and high aspect ratio, may increase potential of failure. Thorough inspection shall be conducted to identify if any other structural defects had been associated with the co-dominant stems. The inspection can be conducted by aerial inspection (tree climbing), binocular or Drone inspection as required. If the situation threatened the safety of the tree, removal of the defective stem or the whole tree shall be considered as soon as practicable.

Included Bark: bark that embedded in a union of two or more trunks, causing a weakened structure at the trunk. Included bark in combination with other defects, such as low live crown ratio, and/or high aspect ratio, may increase the likelihood of failure. If the situation threatened the safety of the tree, removal of the defective stem or the whole tree shall be considered as soon as practicable.

Poor Taper: the decrease in diameter over the height of tree trunk. New exposure of poor taper tree may result in higher possibility of failure. Structural stability of the tree with poor taper shall be further assessed. If the tree failure risk rating is “High” or “Extreme”, tree removal shall be considered as soon as practicable.

Crooks or Abrupt Bends: abnormal bending of tree trunk(s), new exposure of

trees with crooks or bends may result in weak point on the trunk(s) and is a significant contributor to likelihood of failure. Mitigation measures shall be conducted timely to remove the defective stem or removal the whole tree as far as practicable.

Cracks or Splits: separation in the wood in either a longitudinal (radial, in the plane of ray cells) or transverse (across the stem) direction. If the conditions of cracks or splits is significant and may affect the structural safety of the tree, mitigation measures including removal of the defective stem shall be arranged as far as practicable.

Abnormal Bark Crack: bark cracks may be a common character on tree trunk. It would be useful to compare with other trees of the same species in the area to identify abnormal bark cracks. New exposure of abnormal bark crack may contribute to higher likelihood of failure. Mitigation measures including removal of the defective stem or removal of the whole tree shall be considered.

Sap Flow: oozing of liquid that may result from infections or infestations under the bark. The presence of sap flow may or may not be a structural defect or stability weakness. Resistograph or tomograph should be arranged when necessary to identify if any internal decay was caused and the percentage of sound wood remained if resource permit. If the situation threatened the safety of the tree, removal of the defective part or the whole tree shall be considered as soon as practicable.

Cankers or Galls or Burls: cankers are localised diseased areas (lesion) on the trunk, branch or even roots; often sunken or discolored; Galls are abnormal swellings of tissue caused by pests; may or may not be a defect; Burls are outgrowth on the trunks; not usually considered a defect. Resistograph or tomograph should be arranged when necessary to identify if any internal decay was caused and the percentage of sound wood remained if resource permit.

Wounds or Mechanical Injury: wound or mechanical injury observed on tree trunk. Please give more descriptions if necessary. Internal decay assessment shall be conducted to assess the sound wood percentage and the extent of decay. Necessary mitigation measures shall be conducted to remove the defective part or the whole tree as far as practicable. As tree has self-defense mechanism, no particular treatment, including applying protective reagents/resin or covering the opening of the wound/cavity is required.

Pest and Disease: pest and disease that may significantly affect tree health or stability. Please try to identify the pest or disease detected on the assessed tree, such as termites (use termite detector if necessary), for better pest/disease

control. If the pests/fungi cannot be identified on site, please collect samples to the TMO for further identification. Mitigation measures including application of pesticides or fungicides should be considered as required. If application of fungicides is required, prior advice from a qualified pathologist or specialist shall be sought.

Parasitic or Epiphytic Plants: parasitic or epiphytic plants grow on tree trunk(s). The presence of parasitic or epiphytic plants may or may not affect health or structure of the tree. Please try to identify the parasitic or epiphytic plants observed on the tree and fill in the space provided. Mitigation measures to remove the parasitic or epiphytic plants shall be arranged as appropriate. For removal of Mikania, technical notes issued by the AFCD on removal of Mikania shall be observed.

Fungal Fruiting Bodies: fungal fruiting bodies or mycelia present at decayed parts of the tree. Please try to identify common wood decay fungi, such as Brown Root Rot Disease and decay caused by *Ganoderma* spp., as far as possible. Close-up photographs showing the key features of the fungi should be included to aid subsequent identification. Soil pathogen test should be arranged when necessary to identify possible species of pathogenic fungi and appropriate mitigation measure including application of fungicides shall be arranged. If application of fungicides shall be undertaken, prior advice from a qualified pathologist or specialist shall be sought.

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Response Growth: reaction wood or additional wood that has grown to increase the structural strength of the trunk. Please note location(s) and extent.

Other Observation: Please provide other observations that have not been covered in this Section.

<u>Section 10 – Root Conditions</u>

This Section provides information on the root conditions of the tree assessed. Please check the appropriate box(es) if the following root conditions are observed:

Root Collar not Visible: if possible, please determine and note the depth of root collar below ground. Mitigation measures including the removal of top soil to expose the root collar, application mulching to improve soil conditions should be considered

Cracks or Splits: separation in the wood in either a longitudinal (radial, in the plane of ray cells) or transverse (across the root) direction. Mitigation measures including removal of the defective roots is required as soon as practicable.

Root detection and mapping should be arranged when necessary to counter-check the health root distributions if resource permit.

Exposed Root: roots exposed, curling or snaking around a tree. Root exposure may be caused by erosion of top-soil, lack of soil space for root growth or over trampling. Mitigation measures including application of mulching and replacement of top soil should be considered. If the exposed root has damaged the pavement nearby, elevated walkway or other site improvement work shall be considered.

Root Rot: root rot is a common root disease. Please try to identify the type of root rot and provide close-up photographs of the rotted areas for further identification. Mitigation measures including application of fungicides, removal of defective roots or removal of the whole tree should be considered as appropriate. If application of fungicides is required, prior advice from a qualified pathologist or specialist shall be sought.

Cut or Pruned Roots: roots cut or pruned may truncate the transmission path of water and nutrients to the trunk and leaves. Root detection and mapping survey should be arranged when necessary to counter check the distributions of healthy roots. Mitigation measures including application of mulching to reduce compaction should be considered to improve the soil conditions to promote new root development. If the root damages is assessed threatening to the stability of the whole tree, tree removal shall be considered.

Trunk Girdling: roots girdled the tree trunk may cause restriction to trunk growth. Resistograph or tomograph should be arranged when necessary to assess if internal decay and percentage of sound wood remained if resource permit. If the situation has threatened the safety of the whole tree, tree removal shall be considered.

Girdling Root: roots circles the tree base or below surface soil. The root girdling restricted or destructed the development of both trunk and roots, and may cause tree failure in extreme case. Root detection and mapping survey should be arranged when necessary to check the distributions of healthy roots if resource permit. If the root damages is assessed causing defective to the whole tree, tree removal shall be considered.

Dead Surface Roots: dead surface roots may indicate structural instability, check this box if dead surface root is observed. Root detection and mapping survey should be arranged when necessary to counter check the distributions of healthy roots if resource permit. Mitigation measures including application of mulching to improve soil conditions should be considered. If the root damage is

assessed causing defective to the whole tree, tree removal shall be considered.

Root-plate Movement: root plate may be affected by strong gust wind or soil erosion; root- plate movement may severely affect the stability of the tree. Mitigation measures including installing staking should be considered to maintain the stability for small trees. If root damage is serious or the tree is unstable after staking, tree removal shall be considered.

Wounds or Mechanical Injury: wounds or mechanical injury observed on the roots, in particular the exposed roots. As tree has self-defense mechanism, no particular treatment, including applying protective reagents/resin or covering the opening of the wound is required. If the root damages is assessed causing defective to the whole tree, tree removal shall be considered.

Pest and Disease: pest and disease that may significantly affect tree health or stability. Please try to identify the pest or disease detected on the assessed tree, such as termites (use termite detector if necessary), for better pest/disease control. If the pests/fungi cannot be identified on site, please collect samples to the TMO for further identification. Mitigation measures including application of pesticides or fungicides should be considered as required. If application of fungicides is required, prior advice from a qualified pathologist or specialist shall be sought.

Parasitic or Epiphytic Plants: parasitic or epiphytic plants grow on roots exposed. The presence of parasitic or epiphytic plants may or may not affect health or structure of the tree. Please try to identify the parasitic or epiphytic plants observed on the tree and provide details in the space provided. Mitigation measures to removal the parasitic or epiphytic plants shall be arranged as appropriate.

Fungal Fruiting Bodies: fungal fruiting bodies or mycelia present at decayed parts of the roots. Please try to identify common wood decay fungi, such as Brown Root Rot Disease and decay caused by *Ganoderma* spp., as far as possible. Close-up photographs showing the key features of the fungi should be included to aid subsequent identification. Soil pathogen test should be arranged when necessary to identify possible species of pathogenic fungi and appropriate mitigation measures including application of fungicides should be arranged when necessary. If application of fungicides is required, prior advice from a qualified pathologist or specialist shall be sought.

Response Growth: reaction wood or additional wood that has grown to increase the structural strength of the roots or root collar. Please note location(s) and extent.

Other Observations: Please provide other observations that have not been covered in this Section.

Section 11 – Risk Categorisation

This Section on risk categorisation follows the tree risk assessment method promulgated by the ISA, and the method is described in the "*Best Management Practice – Tree Risk Assessment*" (2011) published by the ISA.

Target Number: reference number of the targets in priority according to the severity of consequence as given in Section 4 – Target Assessment. **Please list a maximum of three most important targets on each tree part identified.**

Tree Part: the concerned part of the tree. It could be the whole tree, one or more branch(es), main trunk, or root, which might lead to damages of the target(s). A category of tree part may lead to one or more 'Condition(s) of Concern'.

Condition(s) of Concern: the condition(s) of tree or tree part that affect the likelihood of failure and may lead to damages to target, e.g. 'large, dead branch over a car parking space.', 'root plate movement observed at a tree near a residential house', 'trunk decay identified at a tree nearly a children playground' etc.

Part Size: the size of the tree or tree part concerned. Please estimate the diameter of the tree part concerned; if whole tree is concerned, measure the DBH of the tree trunk.

Fall Distance: the fall distance of the tree part or the whole tree against the target concerned. The longer the fall distance, the larger the extent of damage.

Likelihood of Failure and Impact

According to ISA's risk categorisation, 'likelihood of failure and impact' can be selected from a Likelihood Matrix – Likelihood of Failure x Likelihood of Impact, using the Likelihood Matrix table (Matrix 1).

The likelihood of failure can be categorized using the following guidelines:

- Improbable – failure of the tree or tree part concerned is not likely under normal weather conditions and may not fail under extreme weather conditions including red/black rainstorm, typhoon signal No. 8, or extreme winter monsoon, within a specified timeframe. According to the ISA guidelines, the 'specified timeframe' for estimating likelihood of

tree failure is between one to five years.

- Possible – failure of the tree or tree part concerned could occur under extreme weather conditions within a specified timeframe but would unlikely fail during normal weather conditions.

- Probable – failure of the tree or tree part concerned is expected under normal weather conditions within the specified timeframe.
  Highly probable – the tree or tree part concerned has started falling or failure is most likely to occur in the near future under normal weather condition. If this situation is encountered, the Inspection Officer is required to take immediate action(s) to protect public safety.

If the species of tree falls with the "List of 20 Common Tree Species Requiring Special Attention" as reported by the TMO before commencement of TRAM Cycle every year, the rating of "Likelihood of Failure" should be duly considered to be rated at "Probable" or "Highly Probable" depends on the severity of the defects. Furthermore, tree defects including hanging branch, severe branch/trunk/root decay, and other major defects and health problems as stated in paragraph 2.4.4 in the TRAM Guidelines were observed, the "Likelihood of Failure" should also be rated at "Probable" or "Highly Probable" depends on the severity of the defects.

Regarding the likelihood of impacting target, it can be categorised in four levels:

- Very low - the chance of a tree or tree part failure impacting the target concerned is very low, for example, a rarely used site, an occasionally used site that is partially protected by shelter/cover/structure, or a rarely used trail, etc.

- Low - it is not likely that a tree or tree part failure will impact the target concerned, for example, an occasionally used site that is fully exposed to the tree concerned, a frequently used site that is partially exposed to the tree concerned, or a constant target that is well protected from the tree concerned.

- Medium - a tree or tree part failed may or may not impact the target, with nearly equal likelihood, for example, a frequently used site that is fully exposed to the tree concerned, a constantly used site that is partially protected from the tree concerned.

- High - A tree or tree part failure will most likely impact the target, for example, a fixed target is fully exposed to the tree concerned, high-use road or walkway adjacent to the tree concerned.

Risk Rating

According to ISA's risk categorisation, the risk rating of a specific tree part to a specified target can be selected from the Risk Rating Matrix – Likelihood of Failure and Impact x Consequence of Failure, by using the Risk Rating Matrix table (Matrix 2).

The consequence of failure can be categorised using the following guidelines:

- Negligible – no personal injury, low value property damage, or minor or no disruption to traffic or human activities will be involved. For example, the tree is located at remote location that almost no human activity or vehicular traffic, the failure of tree very unlikely to cause any human injury or property damages.
- Minor – very minor personal injury may or may not require simple first aid treatment, low to moderate property damage, or small disruptions to traffic or human activities will be involved. For example, the tree or tree part in question is relative small in size or the fall distance is low and the failure of the tree part of the whole tree is less chance to cause serious human injury or big damages to property or disruption to traffic.
- Significant – personal injury may result in hospitalization, moderate to high property damage, or considerable disruption to traffic or human activities will be involved. For example, the tree or tree part is relative large in size or the fall distance is medium, the tree failure may cause minor injury to human or minor damages to property or disrupted certain traffic circulation but would not close total blockage of traffic.
- Severe – serious personal injury or death, high value property damage, or major disruption to traffic and/or important human activities will be involved. For example, the tree or tree part involved is large in size or the fall distance is high, the failure of the tree may cause serious human injury or death, major damages to property or cause total blockage of traffic.

The Risk Rating, after using the Risk Rating Matrix table (Matrix 2), is further categorized into four categories:

- Low - the consequence of failure is "Negligible" or the likelihood of failure and impact is "Unlikely" or the likelihood of failure and impact is "Somewhat Likely" when the consequence of failure is "Minor", the risk rating is "Low". Routine mitigation measures or "No Further Action" shall

be applied to maintain the health and structural conditions of the tree assessed.

- Moderate - the consequence of failure is “Minor” when the likelihood of failure and impact is “Likely” or “Very Likely” or the likelihood of failure and impact is “Somewhat Likely” when the consequence of failure is “Significant” of “Severe”, the risk rating is “Moderate”. Routine mitigation measures shall be applied to maintain the health and structural conditions of the tree assessed.

- High - the consequence of failure is “Significant” when the likelihood of failure and impact is “Likely” or “Very Likely” or the likelihood of failure and impact is “Likely” when the consequence of failure is “Severe”, the risk rating is “High”. Mitigation measures shall be applied to alleviate the risk rating of particular target and tree part involved to lower the residual rating to “Moderate” or lower. If the proposed mitigation measure cannot achieve the lowering of risk rating, revised the mitigation measure shall be considered.

- Extreme - the consequence of failure is “Severe” when the likelihood of failure and impact is “Very Likely”, the risk rating is “Extreme”. Timely mitigation measures shall be applied to alleviate the risk rating of particular target and tree part involved to lower the residual rating to “Moderate” or lower as soon as practicable. If the proposed mitigation measures cannot achieve the lowering of risk rating, revised mitigation measure or remove the whole tree shall be considered. Measures to cordon-off the tree location and notice shall be posted around the tree assessed to avoid people passing-by or staying near the tree.

Section 12 – Mitigation Measures

This Section requires the Inspection Officer to make recommendations on mitigation measures based on the results of the tree risk assessment. Mitigation measures should be prioritised according to their urgency in terms of protecting public safety. The residual risk of the tree or individual tree part upon completion of the recommended mitigation measures should be estimated at the time of the inspection to evaluate if the recommended mitigation measures are implemented adequately.

Target No.: reference number of the targets in priority according to the severity of consequence given in Section 4 – Target Assessment.

Tree Part: the target tree or tree part that requires mitigation measures.

Mitigation Measures: the recommended mitigation measures to reduce the tree risk. For each target identified, appropriate mitigation measures shall be applied timely. Inspection Officer shall advise the completion date of the mitigation works after consulting department and tree works agent.

Anticipated Completion Date: the expected completion date of the recommended mitigation measures in the format of dd/mm/yyyy.

Residual Risk: estimated risk level upon completion of the recommended mitigation measures. For trees assessed in "High" or "Extreme" risk rating, appropriate mitigation measure shall be recommended to lower the risk rating to "Moderate" or lower. If the proposed mitigation measures cannot achieve the lowering of risk rating, revised mitigation measure or remove the whole tree shall beconsidered.

Section 13 – Notes, Explanations, Descriptions and Supplementary Information

Notes, Explanations, Descriptions and Supplementary Information: Please include any conditions or factors or observations that have not been well described elsewhere in the form, including additional notes of the Inspection Officer that are used as the basis for making decisions on the hazard, impact and risk levels in the riskassessment.

Overall Tree Risk Rating: the highest risk rating determined among the different problematic tree parts identified.

Overall Residual Risk: the highest residual risk upon completion of the mitigation measures for all the problematic tree parts identified. For trees assessed "High" or "Extreme" on "Overall Tree Risk Rating", appropriate mitigation measures shall be recommended to lower the "Overall Residual Risk" rating to "Moderate" or lower. If the proposed mitigation measures cannot achieve the lowering of risk rating, revised mitigation measures or remove the whole tree shall be considered.

Advanced Assessment: The Inspection Officer needs to advise if advanced assessments for the tree concerned is required. Please check the box 'Yes' if required and provide detail of the advanced assessments recommended, including but not be limited to:

- Drill resistance(resistograph);
- Sonic tomography;

- Aerial inspection by tree climbing or Drone;
- Equipment for root detection and mapping; or
- Slope/stonewall stability analysis, etc.

Inspection Limitations: the possible limitations of the tree risk assessment. Additional information may be provided in the space 'Others'.

Attached Information: Please provide photos, map, measurements, drawings, figures, etc. relevant to the assessment.

Add Site Plan: relevant site plan should be uploaded. The site plan should show the location of the tree and targets concerned, the dripline, Target Zone boundary and relevant land status information.

Add Tree Photo: relevant photos including but not be limited to site photos, whole tree photos in different directions, close-up photos showing the defects with illustrations and denotes should be uploaded. All photos provided shall follows the photograph requirements set out in Appendix 6 – Photo-taking Guidelines for Tree Risk Assessment specified in the TRAM Guidelines. All photographs should be stamped with date and time at which the photo is taken.

Add Other Information: other relevant information that would help describe, illustrate and/or explain the tree risk assessment, mitigation measures and others should be included

References:

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