

Drawing title: Tree Inventory Map

Project address: Jack Bell Building, UBC

Client: UBC



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REFERENCE DRAWINGS
1. Aerial image courtesy of VanMap.

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1 of 1

Arboricultural Inventory and Report

For:
UBC Properties Trust

Site Location:
Jack Bell Renewal Project



Submitted to:
Noel McNally
Project Manager
Infrastructure Development

Date: November 8, 2022

Submitted by:



The following Diamond Head Consulting staff either performed the site visit and/or reviewed the report.

All general and professional liability insurance and individual accreditations have been provided below for reference.



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ISA Certified Arborist (PN-1920A)

ISA Qualified Tree Risk Assessor (TRAQ)

BC Parks Wildlife and Danger Tree Assessor

If there are any questions or concerns about the contents of this report, please contact us at any time.

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Scope of Assignment:

Diamond Head Consulting Ltd. (DHC) was retained to complete an arboricultural assessment to supplement the analysis process for proposed expansion of the Jack Bell Renewal Project. This report contains an inventory of protected trees and summarizes the age, health and condition of the trees, the feasibility of transplanting them and their life expectancy. As per development guidelines, trees greater than 15cm DBH and replacement trees were inventoried. This report is produced with the following primary limitations, detailed limitations specified in Appendix 3:

- 1) Our investigation is based solely on visual inspection of the trees during our last site visit. This inspection is conducted from ground level. We do not conduct aerial inspections, soil tests or below grade root examinations to assess the condition of tree root systems unless specifically contracted to do so.
- 2) Unless otherwise stated, tree risk assessments in this report are limited to trees with a *high* or *extreme* risk rating in their current condition, and in context of their surrounding land use at the time of assessment.
- 3) The scope of work is primarily determined by site boundaries and local tree-related bylaws. Only trees specified in the scope of work were assessed.
- 4) Beyond six months from the date of this report, the client must contact DHC to confirm its validity because site base plans and tree conditions may change beyond the original report's scope. Additional site visits and report revisions may be required after this point to ensure report accuracy for the municipality's development permit application process. Site visits and reporting required after the first submission are not included within the original proposal fee and will be charged to the client at an additional cost.

The client is responsible for:

- Reviewing this report to understand and implement all tree removal and protection requirements related to the project.
- Obtaining a tree removal permit from the relevant authority prior to any tree cutting.
- Obtaining a timber mark if logs are being transported offsite.
- Ensuring the project is compliant with the tree permit conditions.
- Constructing and maintaining tree protection fencing.
- Ensuring an arborist is present onsite to supervise any works in or near tree protection zones.

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Introduction

1.1 Site Overview

The subject site is at the middle/west area of the UBC Campus, at West Mall and University Boulevard. There are trees and landscaped beds surrounding the existing building except on the eastern edge between buildings. The site was assessed by Dean Bernasch and Joey Banh of Diamond Head Consulting, November 2022.

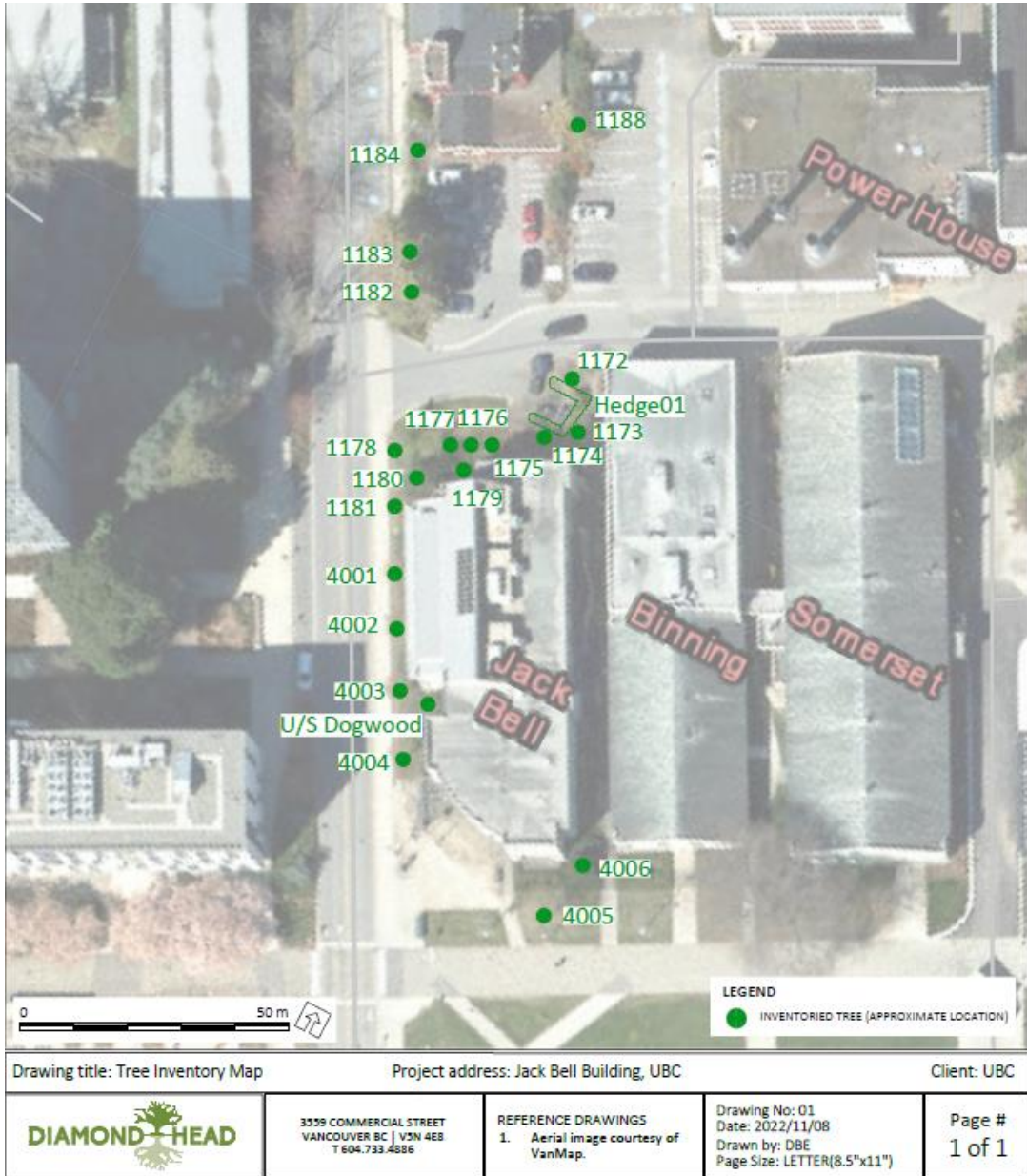


Figure 1. An air photo shows the trees inventoried in relation to the existing buildings and infrastructure.

1.2 Report Objective

This report outlines the existing condition of the trees in the assessment area and provides analysis of their life expectancy, potential for relocation and condition. Guidelines for protecting retained trees during the construction process are also provided.

2.0 Findings: Tree Inventory

2.1 Tree Inventory

A total of 22 trees (or groups of trees) were identified in the assessment area shown in Figure 1. There are some mature rhododendrons that are located adjacent to the norther corner of the Jack Bell building. Detailed assessments of individual trees can be found below in Appendix 1.

2.2 Health and Condition Rating

The following provides a description of the rating of each tree inventoried:

Excellent = Tree of possible specimen quality, unique species or size with no discernible defects. Or a heritage tree.

Normal = These trees are in fair to good condition, considering its growing environment and species.

Moderate = These trees have low vigor, with noted health and/or structural defects. This tree is starting to decline from its typical species growth habits.

Poor = These trees are in serious decline from its typical growth habits, with multiple very definable health and/or structural defects.





Dead/Dying = These trees were found to be dead, and/or have severe defects and are in severe decline.


High Risk = These trees have been deemed hazardous by a Certified Tree Risk Assessor utilizing CTRA methods. They have a risk rating of high or above.

2.3 Useful Life Expectancy

The life expectancy of urban trees can be extremely variable in nature. Factors such as pollution, global temperature change, weather and future physical impacts are difficult to predict. The available soil volume, water and nutrients will also greatly impact the long-term viability of urban trees. Many species and cultivars of ornamental trees have not been planted within the Vancouver region for long enough to gather sufficient long term life expectancy data. The Safe Useful Life Expectancy (SULE) methodology is an industry standard of an estimate, by an arborist, of how long a tree is likely to be viable in the landscape based on health, amenity and risk to the community. It is a snapshot in time of the potential length of time an individual tree can be safely retained in the landscape and is related to the current health of the tree and the surrounding conditions. The average species life expectancy coupled with condition, structure and known physical root zone constraints were taken into account while approximating the life expectancy. Any changes in these variables may result in changes to the SULE estimate and therefore, the reliability of the assessment decreases over time as the potential for changes in the variables increases.

Each tree shall be assigned one of the following ULE categories:

Useful life expectancy	Typical characteristics
Easily Transplantable trees (TT)	Young trees/easily transplantable trees that are: <ul style="list-style-type: none"> • < 5 m in height and/or • <15cm dbh; and, • Exhibiting normal growth characteristics. • Note transplant cost and effort rating in conjunction with this specification.
< 1 year 	Young to mature trees that are: <ul style="list-style-type: none"> • Dead or mostly dead; or, • An imminent likelihood of failure or currently failing; or, • A high or extreme risk (TRAQ) and cannot be mitigated to moderate or lower.
1-5 years 	Young to mature trees that are: <ul style="list-style-type: none"> • Suppressed or dying; and, • Showing symptoms of severe decline with crown density <50%, epicormics growth (if relevant for species) and canopy dieback; or, • Structurally poor, but not high/extreme risk, and defects cannot be mitigated.
5-15 years 	Young to mature trees that are: <ul style="list-style-type: none"> • Over-mature so will reach the end of the life-expectancy for the species; or, • Showing symptoms of decline including below average crown density, epicormic growth (if relevant for species) and canopy dieback; or, • Structurally poor and defects can be mitigated to allow only short-term retention.
15-50 years 	Young to mature trees that are: <ul style="list-style-type: none"> • Exhibiting normal growth characteristics but growing in restricted environment (e.g. restricted soil volume, too close to buildings etc.); or • In late maturity so will reach the end of the life-expectancy for the species; or, • Structurally poor but defects can be mitigated to allow medium-term retention.
>50 years	Young to mature trees that are: <ul style="list-style-type: none"> • Exhibiting normal growth characteristics and are located in a position that can accommodate future growth; and,

Useful life expectancy	Typical characteristics
	<ul style="list-style-type: none"> Structurally sound or have defects that can be mitigated to allow long-term retention; or, Of special significance that warrants extraordinary efforts to secure long-term retention.

2.4 Tolerance to Disturbances

This rating is as defined in “Trees and Development: A technical guide to preservation of trees during land development” by Nelda Matheny and James R. Clark, 1998. It is based upon the species of the tree and is rated as Good, Moderate or Poor.

2.5 Summary of Tree Retention Value

This rating provides guidance for tree retention planning and takes into account the tree’s species profile and its growing conditions.

- **High** = Trees are worthy of consideration for retention. This includes dominant trees in a stand as well as open grown individual trees would be typically included in this category.
- **Medium** = Trees may be considered for retention with limitations and/or treatments. This may include trees growing within groves, moderately difficult topography for root system expansion, recently exposed trees or trees with minor structural defects that can be mitigated through pruning.
- **Low** = Trees with structural/health defects that are not currently high risk or imminent for failure. Trees should not be considered for retention if within striking distance of a high value target. These include poor species profiles* for long term viability. Trees growing in poor locations such as dense stands of trees with high height to diameter ratios, recently exposed edge trees or areas with high water tables leading to shallow constricted rooting.
- **Nil** = Trees should not be considered for retention due to high risk condition or extenuating circumstances that have led to the tree being at high risk of failing and dead or dying trees.

*The species profile is based upon mature age and height/spread of the species, adaptability to land use changes and tree species susceptibility to diseases, pathogen and insect infestation.

2.6 Probability of Successful Relocation

The trees have been rated low, medium and high for successful relocation. This has considered size, existing topography, health and transplant cost and effort rating. Depending on the transplant methodology used trees with a medium rating can still be viable in the future landscape.

2.7 Transplant Cost and Effort Rating

Very Large = This category includes trees that have a large crown spreads and trunks that prohibit conventional transplanting methods. If transplanting is undertaken extensive preparation time (root

pruning, etc.) will be required. These trees may be transplantable, but the costs and pre planning of this undertaking may be extensive.

Large = This is a large tree with a trunk dbh of 30cm or greater, it is possible to transplant this tree using the B&B methods and large cranes. These trees may weigh more than 5000 pounds and the cost of transplant would most likely be substantial.

Medium = This tree is approximately 15cm to 30cm in diameter and would could be transplanted using a tree spade or B&B methods (discussed in detail below in Appendix 1). The success of transplanting this category of tree would be depend on the final location of the transplant and time in holding. Trees that are transplant for re-use immediately nearby would have a greater chance of survival then trees that need to be trucked to a new location or held in a temporary planting yard.

Small = This tree is approximately no larger than 15cm in diameter and would could be transplanted using a tree spade or B&B methods (discussed in detail below in Appendix 1). If a tree spade is used, a small bobcat mounted spade (44") would be appropriate. B&B method for this tree can be undertaken with 2 or 3 people and a tree-dolly.

Appendices

Appendix 1 Complete Tree Inventory Table

The complete tree inventory below contains information on tree attributes, its health and condition, useful life expectancy, tolerance to disturbance and relocation feasibility.

Tree #	Botanical Name	DBH (cm)	Ht (m)	Health and Condition Rating	Comments	Useful Life Expectancy	Tree Retention Comments	Transplant Cost and Effort	Relocation Success Rate	Tolerance to Disturbance
1172	Acer palmatum	41	8	Moderate	Multistem tree. Round spreading canopy raised to 2.5 m. Bark inclusion on major stems at base and some in smaller leaders. Old pruning wounds sealed. Canopy growing into lamp post. DBH 15+10+16.	~30-50 years	Medium	Large	Moderate - low	Moderate
1173	Acer palmatum	35	8	Moderate	Multistem tree. Wide spreading canopy raised to 2.5 m. Bark inclusion on major stems at base and some in smaller leaders. Old pruning wounds sealed. DBH 10+14+11.	~30-50 years	Medium	Large	Moderate - low	Moderate
1174	Acer palmatum	20	8	Moderate	Multistem tree. canopy raised to 2.5 m. Bark inclusion at union 1.5 m between 3 stems. Old pruning wounds sealed. UBC tree tag 9554.	~30-50 years	Medium	Medium	Moderate	Moderate
1175	Cercidiphyllum japonicum	33	8	Moderate	Multistem tree near base with bark inclusion. Asymmetrical crown. Leaves growing on trunk which may be an indication of stress. DBH 13+11+9.	>50 years	Medium	Medium	Moderate	Moderate
1176	Cercidiphyllum japonicum	28	7	Poor	Triple stem tree near base with bark inclusion. Asymmetrical crown. Some crown dieback. Leaves and epicormic shoot growing on trunk which may be an indication of stress. DBH 12+8+8.	~15 years	Low	Medium	Low	Moderate

Tree #	Botanical Name	DBH (cm)	Ht (m)	Health and Condition Rating	Comments	Useful Life Expectancy	Tree Retention Comments	Transplant Cost and Effort	Relocation Success Rate	Tolerance to Disturbance
1177	<i>Cercidiphyllum japonicum</i>	23	7	Poor	Triple stem tree at 0.6 m. Asymmetrical crown. Some crown dieback. Leaves and epicormic shoots growing on trunk which may be an indication of stress. DBH 7+6+10.	~15 years	Low	Medium	Low	Moderate
1178	<i>Acer pseudoplatanus</i>	18	13	Moderate	Single stem tree. Growing in columnar shape. Bark inclusion with branches.	>50 years	Medium	Low to Moderate	Moderate to High	Moderate
1179	<i>Acer circinatum</i>	20	7	Moderate	Multistem tree at base with bark inclusion. Growing in retaining wall planter. Canopy raised to 3 m. Old pruning wounds sealed. Growing in close proximity to buildings. UBC tree tag 9558. Crown suppressed by adjacent trees and rhodos. DBH 7+7+6.	>50 years	Medium	Low to Moderate	Moderate to High	Moderate
1180	<i>Pinus sylvestris</i>	40	15	Moderate	Tree growing behind retainer wall of the Jack Bell Building for the School of Social Work. Asymmetrical crown with kinks at various parts of trunk phototrophically growing NW. Untagged and DBH estimated as there is no access outside of building.	>50 years	Medium	Large	Moderate - low	Moderate
1181	<i>Acer pseudoplatanus</i>	18	13	Moderate	Single stem tree. Growing in columnar shape. Acute bark inclusion with branches.	>50 years	Medium	Medium	Low	Moderate
1182	<i>Chamaecyparis pisifera</i>	80	18	Poor	Codominant stem tree at 1 m with acute bark inclusion. Seam from acute union to base of tree. Triple leaders. Experiencing crown dieback. Evident girdling roots. UBC tree tag 4837.	~15 years	Low	Large	Low	Moderate

Tree #	Botanical Name	DBH (cm)	Ht (m)	Health and Condition Rating	Comments	Useful Life Expectancy	Tree Retention Comments	Transplant Cost and Effort	Relocation Success Rate	Tolerance to Disturbance
1183	<i>Chamaecyparis pisifera</i>	103	18	Poor	Codominant stem tree at 1 m with acute bark inclusion. Seam from union to base of tree. Triple leaders with SWleaders having acute bark inclusion and seam running down trunk. Experiencing crown dieback. Evident girdling roots. UBC tree tag 4838. DBH 59+44.	~15 years	Low	Large	Low	Moderate
1184	<i>Fraxinus americana</i>	23	14	Moderate	Single stem tree. Open crown. Asymmetrical crown. Minor deadwood. Decent vigour. UBC tree tag 9551 being consumed into trunk.	>50 years	Medium	Medium	Moderate	Moderate
1188	<i>Chamaecyparis lawsoniana</i>	52	16	Poor	Codominant leader at 0.7 m. Evident crown dieback. Potentially suffering from drought. UBC tree tag 4840. DBH 34+18.	~15 years	Low	Large	Low	Low
4001	<i>Acer pseudoplatanus</i>	19	10	Good	Previously tagged 9562 by others. Single stem tree. Growing in columnar shape. Growing in lawned boulevard between sidewalk and building, retaining wall for window well.	>50 years	High	Medium	Moderate	Moderate
4002	<i>Acer pseudoplatanus</i>	17	10	Moderate	Previously tagged 9563 by others. Single stem tree. Growing in columnar shape. Growing in lawned boulevard between sidewalk and building, retaining wall for window well. Wound at base of tree on NE side of trunk.	~30-50 years	Medium	Medium	Moderate	Moderate
4003	<i>Acer pseudoplatanus</i>	20	10	Good	Single stem tree. Growing in columnar shape. Growing in lawned boulevard between sidewalk and building.	>50 years	High	Medium	Moderate	Moderate

Tree #	Botanical Name	DBH (cm)	Ht (m)	Health and Condition Rating	Comments	Useful Life Expectancy	Tree Retention Comments	Transplant Cost and Effort	Relocation Success Rate	Tolerance to Disturbance
4004	Acer pseudoplatanus	16	8	Good	Previously tagged 9565 by others. Single stem tree. Growing in columnar shape. Growing in lawned boulevard between sidewalk and building.	>50 years	Medium	Low to Moderate	Moderate to High	Moderate
4005	Platanus x acerifolia	27	10	Good	Tree growing in lawn area near building along pathway. Good branching structure and appears healthy overall.	>50 years	High	Medium	Moderate	Moderate
4006	Magnolia grandiflora 'Little Gem'	17	5	Good	Tree growing in landscape bed near corner of building. Some branches broken near top of crown and hanging in crown. Otherwise appears healthy overall.	>50 years	High	Low to Moderate	Moderate to High	Moderate
Hedge01	Thuja occidentalis	5	2	Moderate	Hedge on curb line in front of Japanese maples. Surrounding waste bins.	~30-50 years	Medium	Low	Moderate to High	Moderate
U/S Dogwood	Cornus kousa	6	3	Good	Note below 15cm DBH but possible replacement tree. To be confirmed. Currently included as part of counts. Growing in centre of building walls in landscape area. Previously pruned. Some suckers at base and some watersprouts in crown. Vigour appears good, hard to fully assess due to time of year.	~30-50 years	Medium	Low	High	Moderate

Appendix 2 Site Photographs

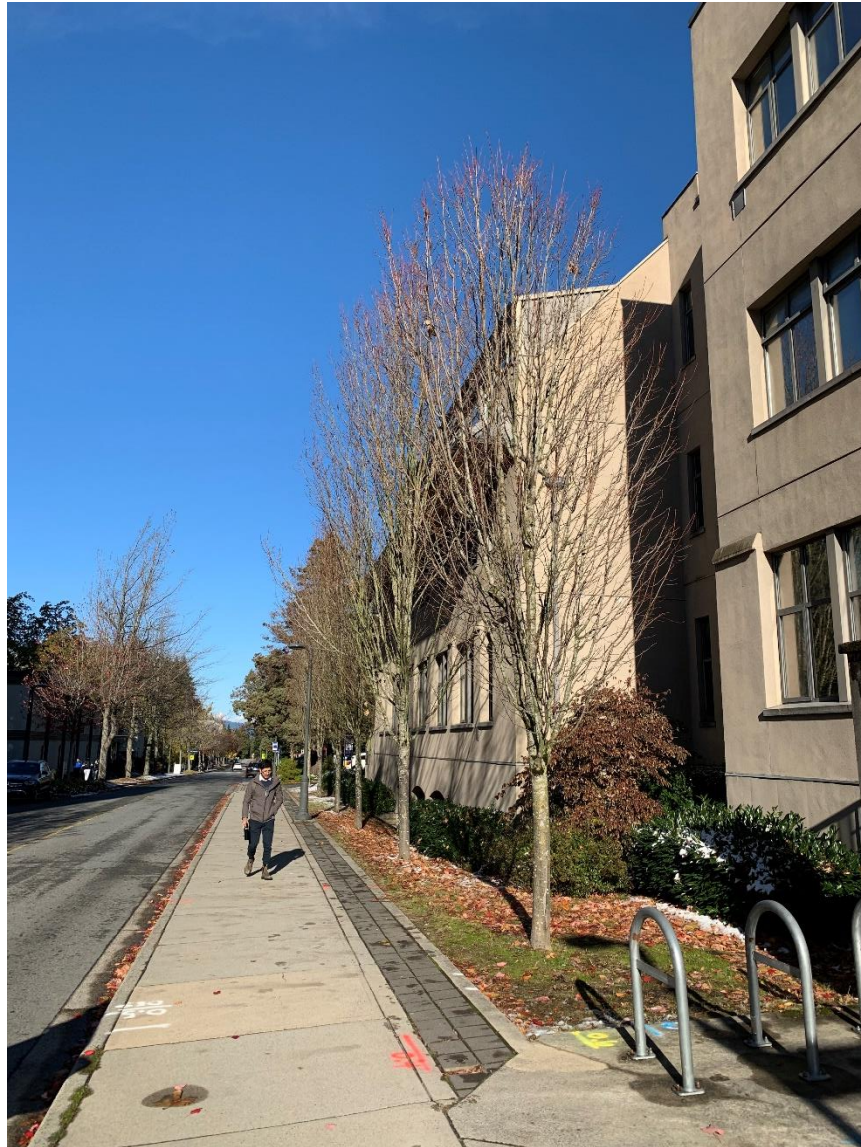


Photo 1. Looking north along East Mall.



Photo 2: Looking at tree 1174 and Hedge 01.



Photo 3. Looking north-east at trees 1182 and 1183.



Photo 4. Looking at tree 1184.



Photo 5. Looking at the smokebush and other shrubs contained in the landscape bed near tree 4003.



Photo 6. Looking east at trees 4005 and 4006.

Appendix 3 Report Assumptions and Limiting Conditions

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- 3) The findings, conclusions and recommendations made in this report reflect Diamond Head’s best professional judgment given the information available at the time of preparation. This report has been prepared in a manner consistent with the level of care and skill normally exercised by arborists currently practicing under similar conditions in a similar geographic area and for specific application to the trees subject to this report on the date of this report. Except as expressly stated in this report, the findings, conclusions and recommendations it sets out are valid for the day on which the assessment leading to such findings, conclusions and recommendations was conducted. If generally accepted assessment techniques or prevailing professional standards and best practices change at a future date, modifications to the findings, conclusions, and recommendations in this report may be necessary. Diamond Head expressly excludes any duty to provide any such modification if generally accepted assessment techniques and prevailing professional standards and best practices change.
- 4) Conditions affecting the trees subject to this report (the “Conditions”, include without limitation, structural defects, scars, decay, fungal fruiting bodies, evidence of insect attack, discoloured foliage, condition of root structures, the degree and direction of lean, the general condition of the tree(s) and the surrounding site, and the proximity of property and people) other than those expressly addressed in this report may exist. Unless otherwise stated information contained in this report covers only those Conditions and trees at the time of inspection. The inspection is limited to visual examination of such Conditions and trees without dissection, excavation, probing or coring. While every effort has been made to ensure that any trees recommended for retention are both healthy and safe, no guarantees, representations or warranties are made (express or implied) that those

trees will not be subject to structural failure or decline. The Client acknowledges that it is both professionally and practically impossible to predict with absolute certainty the behavior of any single tree, or groups of trees, in all given circumstances. Inevitably, a standing tree will always pose some risk. Most trees have the potential for failure and this risk can only be eliminated if the risk is removed. If Conditions change or if additional information becomes available at a future date, modifications to the findings, conclusions, and recommendations in this report may be necessary. Diamond Head expressly excludes any duty to provide any such modification of Conditions change or additional information becomes available.

- 5) Nothing in this report is intended to constitute or provide a legal opinion and Diamond Head expressly disclaims any responsibility for matters legal in nature (including, without limitation, matters relating to title and ownership of real or personal property and matters relating to cultural and heritage values). Diamond Head makes no guarantee, representation or warranty (express or implied) as to the requirements of or compliance with applicable laws, rules, regulations, or policies established by federal, provincial, local government or First Nations bodies (collectively, "Government Bodies") or as to the availability of licenses, permits or authorizations of any Government Body. Revisions to any regulatory standards (including by-laws, policies, guidelines and any similar directions of a Government Bodies in effect from time to time) referred to in this report may be expected over time. As a result, modifications to the findings, conclusions and recommendations in this report may be necessary. Diamond Head expressly excludes any duty to provide any such modification if any such regulatory standard is revised.
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