

ARBORIST REPORT

TREE MANAGEMENT FOR PROPOSED DEVELOPMENT

INITIAL ISSUANCE DATE: October 27, 2023 REVISION # 2, June 18, 2024

ACL FILE: 23161

ISSUED FOR: **Development Permit Application**

PREPARED FOR:

PREPARED BY:

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City of Vancouver
320 – 507 West Broadway
Vancouver, BC V5Z 0B4**

Nick McMahon
Senior Consulting Arborist

SUBJECT SITE:

**700 Block of Gore Avenue and 300 Block Union Street, Vancouver, BC
Fire Hall No. 2 Temporary Annex**

Figure 1. Aerial Photo of the Subject Site and Tree Inventory Scope (source; Google Maps, 2020).



BACKGROUND

The subject site is comprised of a city-owned un-opened road right of way which is currently managed as a park with walking paths and mature landscape trees. We understand that the project is intended to consist of the creation of a new building lot and installation of a temporary fire hall annex building, and driveway access from Gore Avenue, including related site preparation works, infrastructure, amenities, and landscape finishing. We also understand that the buildings to be installed consist of pre-assembled structures currently held in storage and were previously in use as a temporary fire hall no. 17. This office conducted a site investigation on October 4, 2023, to assess the site and the existing trees relative to the proposed development.



This report has been prepared in accordance with provisions in the City of Vancouver Tree Protection Bylaw No. 9958.

The municipal development application and tree permit processes require that existing trees be considered for preservation within the development and retained and protected to an optimal protection setbacks determined by the project arborist where possible and practical. This commitment may require consideration of strategic design of the project to achieve. Adequate protection for municipally owned trees in the street frontages as well as off-site private located in close proximity to the site is required and/or if off-site trees are proposed to be removed for the project, the tree owner cooperation is required. To assist the project in meeting the municipal requirements, this report provides a record of existing trees and a prescription for tree preservation/protection and tree removal relative to the project needs.

The tree preservation design, and any relaxations or encroachments into the arborist specified optimal tree protection zones, may be conditional to certain construction measures (arborist specified methods and materials) or arboricultural treatments being implemented during; site preparation, demolition, and construction phases. These measures or treatments will require project arborist oversight and supervision to ensure proper execution and enable the best chances for successful tree preservation. Our assistance during construction phase may include; implementing treatments and measures, performing regular scheduled inspections, providing on-call inspections or meetings, attending for on-site supervision/direction (as prescribed in our report package), to resolve unforeseen tree protection related conflicts or constructability challenges (we can offer simple and cost-effective solutions for access in some TPZ's), and to provide site review reports at appropriate construction milestones.

As a condition of development approvals, the municipality requires proof of contract between the developer and the project arborist confirming that this firm is retained to direct the tree protection compliance and proper execution of related construction measures and arboricultural treatments. This proof of contract is in the form of a Letter of Assurance – LOA. The details of construction phase measures and arboricultural treatments, and an outline of the work or supervision required of the project arborist are outlined in the LOA (see appendix E) to be signed by owner/developer and the general contractor before the city development or building permits are issued. They also require a sign off from the project arborist at completion confirming that any tree protection measures and treatments have been fully complied with throughout the life of project and that retained trees are viable and undamaged, which may also be a condition of occupancy and/or the release of any tree protection bonds or securities that may be held by the municipality.

Reference Documents relied upon by the consultant in the preparation of this report:

- Topographic and Tree Location Survey source; City of Vancouver Engineering Services, dated August, 2023
- Architectural Site Plan source; TKA and D Architecture and Design, dated rev 2, May 10, 2024
- Civil Design to be provided when available
- Construction Logistics Plan to be provided when available

NOTE: This report, including appendices, is a living document that may require updating from time to time to remain relevant and valid. If the version dates of the reference documents listed above differs from the versions being reviewed or utilized, then it is the responsibility of the client to inform us and request a review and update of our documents and drawings to suit.

METHODOLOGY

Our site and tree assessment included a review of the current site and tree conditions with an assessment and inventory of the existing trees undertaken using our visual assessment method which conforms to ANSI A300 Standards and BMP's, and includes tagging or assigning an identification number, collection of pertinent tree data such as but not limited to; species, size (i.e. trunk diameter, height and spread), the current condition (health and structure), the age class, the structural class, visual presence/absence of tree disease and site specific details.

With reference to our site and tree assessment findings and notwithstanding the project design, we have considered the general proposed land uses and the species tolerances to construction (growing site changes, environmental exposure, reduced soil moisture, etc.), we have assigned **Retention Viability Rankings** based on the following categories:

- **Good** – denotes trees in good to excellent condition, are tolerant of indirect construction impacts, and deemed by the assessor as highly valued candidates for preservation. These trees are expected to have strong long-term

prospects for survivorship if the project can reasonably accommodate the specified protection measures and treatments.

- **Fair** – denotes trees in fair condition with correctable or minor defects and/or with moderate aesthetic or functional impairments and/or have moderate tolerances for indirect construction impacts, and that present acceptable value for retention. These trees can reasonably be expected to survive the rigours of construction, conditional to compliance with protection measures and completing corrective treatments. Some priority 2 trees may be located in grove or forest stand conditions and would only be viable for preservation in conjunction with the retention of certain adjacent trees, but may not be viable for single or small grove retention.
- **Poor** – denotes trees in poor or worse condition, have significant pre-existing health or structural impairments, and/or that are intolerant of the unavoidable indirect impacts from construction in their vicinity. These trees are predictably expected to pose risks of failure or mortality relative to the general site changes from the development and have nil retention suitability. Rarely, some trees in this category may be viable for retention for instance in passive use landscape zones and in conjunction with other retained trees (i.e. if sufficient shelter is maintained and if the pre-existing defects can be reasonably treated or mitigated).

NOTE: This report is not intended as a tree risk report, however the structural form as well as the presence and severity of defects were factors in our tree assessment. If we observe any trees within the study area that are potentially posing risk to current targets in the existing land uses, they are identified in sections below for the attention of the owner, and for consideration of further arborist assessment and/or risk mitigation action.

Design development for this project included our coordination and collaboration with the project team to review opportunities for tree preservation based on our initial tree viability findings. Certain trees were able to be specified for retention based on compromises of the project and/or conditional to special measures to be implemented during construction.

The full extent of the construction requirements for the project are not known at this time, but we have utilized our experience with similar projects to predict them to the best extent possible. With strong lines of communication, this office will be able to work collaboratively with the client, the design team, and the construction team as details of the project become available in order to ensure that the most sensible, practical, cost effective and least intrusive solutions for tree preservation are achieved. Details of the type and scope of special measures will be determined prior to construction and/or as field instruction during the course of construction.

TREE PRESERVATION PLANNING AND IMPLEMENTATION

When considering the existing trees for retention on context to the project designs, the following strategies are implemented:

- Viable condition trees (Fair to Good) that are located outside of the construction envelope are generally proposed for retention and protection with the intent to minimize impacts to their growing environment.
- Trees that are unhealthy or have significant structural defects (i.e., poor to very poor condition) are recommended to be removed because they are not expected to survive the construction or may present a hazard to the site.
- Trees located within or in close proximity of areas of the site where comprehensive construction disturbance, are considered for retention via collaboration with the client and the design team based on our optimal protection setbacks.
- Any trees that cannot practically be accommodated through design revision strategies, alternative construction methods, and/or managed encroachments that result in tolerable impacts to the trees, are recommended to be removed due to the direct conflict with the construction needs.
- Trees that are specified for preservation are retained conditional to the full implementation of the protection, enhancement and other measures that are specified by this office to mitigate the direct and indirect impacts from any construction activities in their proximity, and comes with an increased duty of care by the project. We base our tree management specifications during construction on best management practices to ensure that the proposed work does not destabilize or damage the trees, and so that the form, function, and aesthetic value of the retained tree is preserved.



The main components of our tree protection prescription are as follows:

Crown Protection Zone (CPZ):

The protection of the crown is to the dripline extents, representing the current extents of the branches and foliage. Buildings should be designed so that the structure, as well as the operation of any equipment required to build and maintain the structure, do not require encroach into that aerial space. Planning for the access to construct the building, including installing building cladding and finishing, is necessary. Where possible, additional setback should be added to accommodate those needs as well as for future growth of the tree crown. In some cases, pruning can be implemented to enable construction access, for maintenance or to control the growth of the tree, but there are tree specific restrictions and limits on the scope of pruning that can be undertaken for those purposes. Any encroachments into the CPZ requires due consideration of the pruning scope required to accommodate those activities.

Root Protection Zone (RPZ):

Conditional to meeting CPZ requirements and any associated limitations on pruning, ground based disturbance may be tolerable to a reduced TPZ setback, and the tree protection barrier alignment for the construction phase can be aligned at the RPZ. An impact and mitigation analysis via detailed testing is required before confirming viability, and root mapping investigation may be needed to inform that analysis. There must be strong and defensible rationale for making such adjustments, and there are limits on the proximity to a tree relative to maintaining its health and stability. The proximity of root and soil disturbance toward a tree may differ on each side of a tree. When a setback is reduced on one side of a tree, the setbacks on other sides of the tree should be increased. Measures/treatments to enhance the soil gas exchange, percolation, and fertility as well as to moderate soil desiccation, will be a component of their management. Other construction related encroachments into the RPZ, whether temporary or permanent, are not desirable. However, when absolutely necessary and unavoidable, temporary access may be able to be accommodated via interim measures. We have a large toolbox of cost-effective solutions to consider in this regard.

Cautionary Zone – Working Space Setback (WSS):

Tree roots can extend many metres beyond the dripline of a tree. Any construction activity that will disturb the soil adjacent to a specified RPZ requires the on-site supervision by our staff to implement appropriate measures that will minimize risks that root damage will extend into the RPZ. These measures include proactive root pruning either in advance of the planned construction activities or concurrent with those works. This WSS is applicable to all aspects of the site preparation, construction and landscape finishing for the project, however once root pruning is completed along the RPZ interface, no further limitations in the WSS are required (notwithstanding CPZ requirements).

Tree protection setbacks, barriers and restrictions are specified in the Tree Management Drawing (see appendix C), Tree Protection Specifications (see appendix D) and Letter of Assurance (see appendix E). On-site field services or supervision by the project arborist from this office are required as specified on those documents.

The client is responsible to ensure comprehensive coordination of our specifications with the project team. Please note that the tree management drawing prepared by this office, and related specifications for tree protection, supersedes any drawings intended for the same purpose that are prepared by other consultants. In instances where the landscape architect is required to submit a tree management drawing as part of their design package, we encourage the client to direct them to insert our drawing and refer the reader to our report.

To avoid non-compliance issues with city bylaws, it is imperative that all contractors and trades working near trees are made aware of the restrictions and limitations related to tree protection before they proceed with any work in proximity to retained trees. Strong communication protocols between the client, the general contractor and this office is vital in order to keep the arborist apprised of progress on the site and to ensure advance notice to schedule attendance at specific times and project milestones.

The fees associated with implementing tree protection measures and treatments and for our construction phase work, including; reviews of RFI's or CCO's, inspections, supervision, site review reports, and final sign off are the responsibility of the client.

TREE PRESERVATION ANALYSIS AND FINDINGS

Pursuant to our analysis of our tree condition findings and the proposed design presented in the reference documents provided by the client, the proposed treatment of subject trees is summarized as described below. We acknowledge that all City owned trees are bylaw protected, regardless of size. For the purposes of reporting, trees are categorized as on-site if they are located within the proposed lot, and City if located within the road frontages of the site.

ON-SITE TREES:

Proposed Retention of 13 On-Site Trees:

- **Tree Tag/ID's: C02, C03, C04, C06, C07, C08, C09, C10, C11, C12, C13, C14, and C15**
- Retained trees will require protection measures implemented as specified for the duration of construction.
- Protect these trees for the duration of construction with measures as detailed and dimensioned on the Tree Management Drawing (appendix C) and as described in the Letter of Assurance (appendix E).
- Tree protection barriers should be implemented as shown to restrict site access and work to the area in the vicinity of the proposed building and driveway access.
- Coordinate with this office for any contemplated access within tree protection zones, for direction, recommendations and/or on-site supervision by the project arborist.
- Construction access is restricted from the entire south end of the site to maintain public access. Machinery, storage, laydown, trade parking etc., is not accepted within tree protection zones. If access in the area south of the construction site is requested, we will provide tree protection barrier alignments and construction impact assessments to inform further reporting, tree treatment specifications and site guidance accordingly.
 - Notable trees that have been specified for retention with project arborist approved reductions to their protection setbacks, managed encroachments of design elements and/or conditional to arboricultural measures or specific construction methods and materials, are identified as follows (also see Appendix C - Tree Management Drawing and Appendix E – Letter of Assurance:

Tree C15:

Design revisions have been made in coordination with the project arborist to mitigate impacts and facilitate preservation of the highest priority and highest contributory value trees in the landscape. Protect this tree with measures as shown on the Tree Management Drawing and as described in the Letter of Assurance.

- To the satisfaction of the protect arborist, the temporary building has been shifted to mitigate excessive crown and root loss from construction.
- Proposed hardscape features have been shifted to mitigate excessive impacts from construction. Limited encroachment within the root protection zone for installation of surface parking and garbage storage is acceptable, conditional to review of grading plans by the project arborist prior to finalizing those designs to confirm low impact methods and materials can be accommodated.
- Low impact measures must be directed on-site by the project arborist for preparation of hardscape features.
- An arboricultural aeration sub-base layer is required to accept encroachment within the root protection zone for installation of hardscape, including installation of vertical aeration undertaken by the project arborist.

Photo 1. *On-Site Tree C15 – 136 cm DBH Giant sequoia*



- The project arborist must be on-site prior to commencing with and during site preparation requiring ground disturbance within or directly adjacent to tree protection zones (TPZs) to direct low impact methods, undertake root pruning and make recommendations in accordance with arboricultural best management practices.

Proposed Removal of 5 On-Site Trees:

- Due to certain project related construction needs, the following trees are proposed to be removed.
 - **Tree ID C05:** This tree is fully dead and located within the anticipated construction area of the site.
 - **Tree ID C16:** Excessive and destabilizing root loss will result from excavation for preparation of the building site and this tree is specified for removal accordingly.
 - **Tree ID C17:** Direct conflict with the proposed building footprint. Protection measures cannot be accommodated in the current design and this tree is specified for removal accordingly.
 - **Tree ID C18:** Excessive impacts will result from excavation for preparation of the building site as well as preparation of the new driveway and related construction access. Protection measures cannot be accommodated in the current design and this tree is specified for removal accordingly.
 - **Tree ID C19:** Direct conflict with the proposed building footprint and related driveway. Protection measures cannot be accommodated in the current design and this tree is specified for removal accordingly.

MUNICIPAL TREES:

Proposed Retention of 2 Municipal Road Frontage Trees:

- Tree Tag/ID's: C01, and C20
- Retained trees will require protection measures implemented as specified for the duration of construction.
- Coordinate with this office for any contemplated access within tree protection zones for direction, recommendations and/or on-site supervision by the project arborist.

Proposed Removal of 1 Municipal Tree:

- Due to certain project related construction needs, the following trees are proposed to be removed.
 - City Tree C21 – Seek Parks Board approval to remove this tree due to direct conflict with the proposed driveway and site access alignment. Protection measures cannot be accommodated in the current design and this tree is specified for removal accordingly.

NEIGHBOUR TREES:

Proposed Retention of 26 Neighbour Trees:

- Tree Tag/ID's: N01-N26
- Retained trees will require protection measures implemented as specified for the duration of construction.
- Any contemplated access south of the tree protection barrier delineated on the Tree Management Drawing will require coordination with the project arborist to assess construction impacts, inform updated tree treatment specifications and protection requirements in advance of construction.

TREE RETENTION AND REMOVAL QUANTITIES

Table 1. Tree Retention/Removal by Ownership

Ownership:	SubTotal:	Remove:	Retain:
<i>On-Site Trees</i>	18	5	13
<i>Municipal Trees</i>	3	1	2
<i>Neighbour Trees</i>	26	0	26
TOTALS	47	6	41

Table 2. Tree Retention/Removal of On-Site Trees by Priority Ranking

Viability Ranking:	SubTotal:	Remove:	Retain:
<i>Good</i>	14	3	11
<i>Fair</i>	2	0	2
<i>Poor</i>	2	2	0
TOTALS	18	5	13

TREE REPLACEMENT

Tree replacement requirements will be confirmed by the municipality in relation to their policies. The municipality requires one or two replacement trees for each bylaw tree to be removed (1:1 or 2:1 quota), depending on the species selected for replacement. We recommend limiting the quantity of trees to an appropriate quantity relative to the available space for planting and meeting arboricultural best management practices. The replacement trees must meet city requirements for minimum size at planting (i.e. 6 cm calliper for deciduous species and 3.5 m height for coniferous species) and other criteria.

TREE PERMIT OR REGULATORY CONSIDERATIONS

The local government may require that a valid tree permit is obtained by the tree owner (property owner) or their authorized agent in advance of the removal and/or pruning of any bylaw regulated tree. Certain conditions of the permit issuance may also include payment of application fees, submission of securities/bonds or cash-in-lieu for replacement trees and/or other requirements. The tree owner (property owner) is responsible to ensure that the tree work is conducted with adherence to the conditions of any tree permits and other related regulations, requirements, standards, and best management practices. The project should consider, among other things, the following:

- Any tree that is located on or partially on a neighbouring property will require that the joint owners both agree on its treatment before proceeding. The local government may require submittal of an authorization letter signed by both tree owners before they issue a tree permit for such trees.
- The cutting of any tree may be limited or restricted relative to Federal and Provincial Regulatory bird nesting or wildlife habitat protection. Certain types of nests or habitat are protected year-round and would be subject to special permits. Otherwise; tree removals proposed to be undertaken during the bird breeding and nesting season (approximately Mar 1 to Aug 31 annually (subject to region, seasonality, and weather) will be subject to a nesting bird survey conducted by qualified environmental professional (QEP).



STANDARDS OF WORK FOR TREE TREATMENTS

The methods to undertake any **Tree Work** (i.e., climbing the tree, accessing the tree by any means, cutting/removal and rigging operations, pruning, hardware installation, lightning protection, IPM, etc.) should conform to ANSI A300 and ANSI Z133 standards and best management practices, as well as applicable WorksafeBC regulations and standards. The scope and specifications for all tree work is to be directed by the project arborist from this office and undertaken by a crew that includes a qualified **Tree Worker** who is; an ISA Certified Arborist, TRAQ qualified and competent in assessing the structural soundness of the tree relative to the proposed tree work activities. The tree worker must be well experienced with spurless climbing and technical rigging techniques when applicable, in which case additional personnel who are trained and capable in aerial rescue in the case of an injury to the **Tree Worker** may be required to be on stand-by at the site during those activities. Operational decisions in the performance of tree work are at the sole discretion of the **Tree Worker** with their responsibilities being to, among other things, carry out those works while meeting the required standards for safety.

The recovery, reuse and/or disposal of timber or waste from the tree work is to be planned and executed by the **Tree Worker**, and in conformance with municipal and other jurisdictional regulations. Merchantable timber requires that a **Timber Mark** is first obtained by the property owner in advance of transporting such timber from the site. We encourage certain salvageable waste from the tree work to be made available for use by first nations and/or artisans wherever possible and practical.

Where overhead power lines are located near to the subject tree(s), the **Tree Worker** must consider the safety setbacks and protocols related to the conductors, as specified by the power Utility Company. If applicable, the **Tree Worker** may be required to consult with that utility company and/or a **Certified Utility Arborist** (CUA) in advance to plan and supervise the tree work.

Removals of approved trees from within the municipal road frontage, any other municipal property or a Highway may be required by the jurisdiction to be undertaken by a tree service company pre-qualified by the that jurisdiction to perform such work within lands that are under their control.

If trees located within adjacent private property require specific treatments or removal, those treatments and removals must be undertaken by a **Tree Worker** adhering with the standards for tree work as described above. If stumps are requested by the tree owner to be removed, stump grinding or extraction by machinery with root cutting and other measures may be considered via coordination and approval of the tree owner. Upon request, the project arborist from this office can provide additional advice in this regard on a tree-by-tree basis.

Certified by;

Nick McMahon, Senior Consulting Arborist

Qualifications of the Author:

ISA Board Certified Master Arborist #PN-7136B

ISA Qualified Tree Risk Assessor (TRAQ)

PNWISA Certified Tree Risk Assessor #1763

BC Certified Wildlife Dangerous Tree Assessor (Parks) # P2519

Enclosures;

APPENDIX A – PHOTOS

APPENDIX B – TREE INVENTORY LIST

APPENDIX C – TREE MANAGEMENT DRAWING

APPENDIX D – REFERENCES

APPENDIX E – ARBORISTS LETTER OF ASSURANCE

Assumptions and Limiting Conditions:

- This report was prepared for the client as addressed herein. Upon receipt of payment in full for our account, this report will become the property of the client. This report is intended for the exclusive use of our client in its entirety. Arbortech shall not accept any liability derived from partial, unintended, unauthorized, or improper use of this report.
- This report is restricted only to the subject trees as detailed herein, and no other trees were inspected or assessed, and our findings are not meant to infer that other trees are healthy and sound.
- The inner tissue of the trunk, stems, limbs and roots are hidden within the tree and the majority of a trees' root system is hidden below ground. Our tree assessments are limited to relying upon visual inspection of the tree parts and, where applicable, utilizing basic non-destructive testing methods such as probing and sounding to identify potential structural defects. Trees utilize adaptive growth strategies in response to their growing site conditions to sustain their structural integrity and their health and their response growth can compensate for structural impairments, however the results of those growth responses may mask defects from visual detection. Using



our experience and training we carefully inspect the tree for indicators of internal defect. Where applicable, subject to the discretion of the client, we may have utilized advanced and minimally invasive testing methods to determine the severity of certain observed defects to the extent possible. Our defect analysis considers the mitigating effects of response growth and common weather conditions in the region when we are rating the probabilities for tree failure.

- The client is advised that not all defects can be detected or reliably assessed through available non-destructive or minimally invasive methods, and that the forces acting upon trees during extraordinary and extreme weather are unpredictable. During uncommon storm events any tree, healthy or not, has a risk of failure. For these reasons, we do not guarantee or warrant that an assessed tree is free of defect or that it will not fail.
- The ownership of trees is determined based on the location of the trunk where it emerges from the ground relative to the property line. If a part of the trunk at ground level crosses over a property line, then it is deemed to be jointly owned by those property owners. The client is advised that the accurate determination of tree ownership may require the advice from a duly qualified professional surveyor.
- Third party information may have been relied upon in the formation of the opinion of the consultant and in the preparation of this report. We have verified that information to a reasonable extent of our capabilities to assume it to be reliable, however we do not warrant that third party information to be true and correct.
- The use of maps, sketches and diagrams (figures) are intended for reference by the reader in understanding our findings, and are not intended as a representation of fact. These figures shall not be used in determining property lines, ownership or project layout.
- Permits, approvals or authorizations from a municipality and/or a regulatory agency may be required prior to carrying out treatments that may be proposed in this report. The client is responsible for the application, related fees and costs, and meeting all requirements and conditions for the issuance of such permits, approvals or authorizations. If a tree located on or partially within adjacent lands is proposed for treatment, consent from the tree owner is required.



APPENDIX A: PHOTOS

Photo 1. Tree C1



Photo 2. Tree C2



Photo 3. Tree C3



Photo 4. Tree C4





Photo 5. Tree C5 – Dead



Photo 6. Tree C6



Photo 7. Tree C7



Photo 8. Tree C8





Photo 9. Tree C9



Photo 10. Tree C10



Photo 11. Tree C11



Photo 12. Tree C12 (right) and C13 (left)

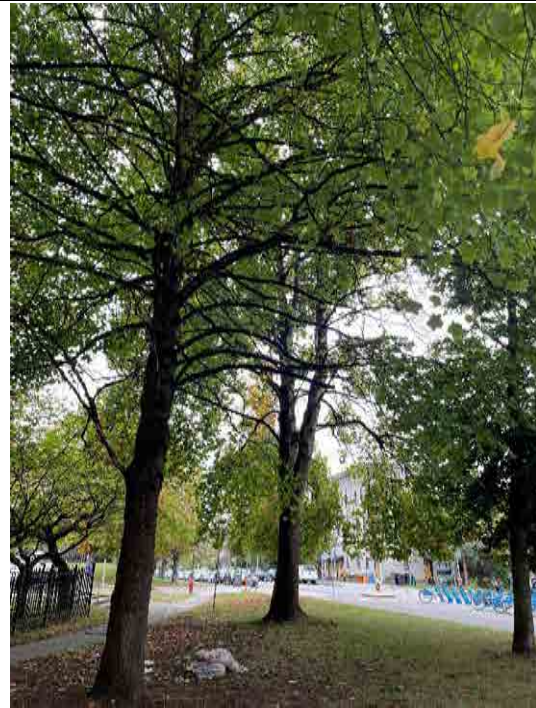




Photo 13. Tree C15



Photo 14. Tree C16



Photo 15. Tree C17



Photo 16. Tree C18

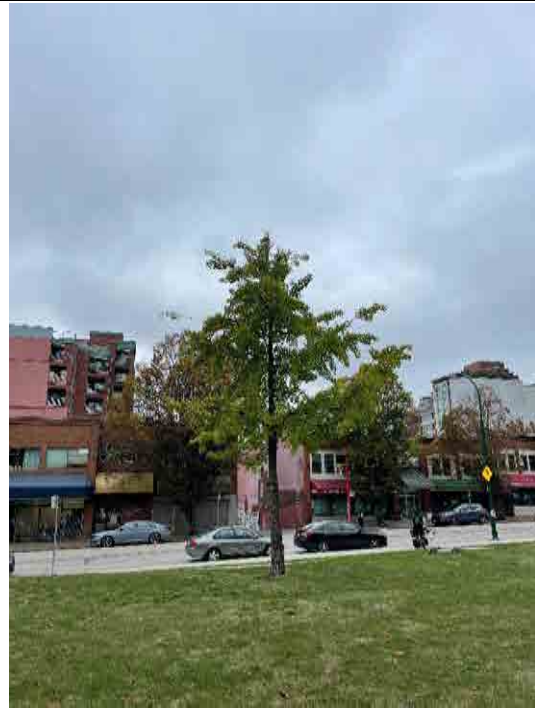




Photo 17. Tree C19



Photo 18. Tree C20



Photo 19. Tree C21



Photo 20. Tree N1 (left) and Tree N2 (right)





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Photo 21. Trees N3-N7 (left to right)



Photo 22. Trees N16-N25 (left to right)





APPENDIX B: TREE INVENTORY LIST: (all dimensions are metric)

Tag/ID denotes the arborist tag # or serial ID number as referenced in report and drawing documentation.

SURVEY/ID denotes whether the tree location is shown on the topographic survey provided by client (Y/N). If we are relying on survey tag #'s we include it for reference.

LOC denotes location as from survey; **ON** (on site), **SHARED** (straddling PL), **OFF** (off site private), **CITY** (road frontage or other), **ESA** (environmentally sensitive area), **PARK** (city park - existing or proposed)

DBH (ISA) denotes the diameter(s) of the main stems of the subject tree as measured by the arborist in accordance with arboricultural best management practices.

- This data supersedes any other data (including surveyor dimensions).

DBH BYLAW: denotes the diameter of a tree calculated by the project arborist based on municipal bylaw definitions and provisions.

DBH TPZ: denotes the diameter of a tree calculated by the project arborist using arboricultural standards and using the CTLA trunk area method to determine a single stem equivalent for multi-stem trees.

- This diameter is the basis for consideration by the project arborist in determining the tree protection setback (RPZ in particular). Measurements be estimated based on arborist observations.

Tag/ID denotes the arborist tag # or serial ID number as referenced in report and drawing documentation.

Ht denotes the height of the tree in metres as measured or estimated by the assessor.

Spr denotes the spread RADIUS of the branches and foliage (dripline) in metres as measured or estimated by the assessor.

LCR denotes the live crown ratio based on percent of live crown observed in relation to a tree of normal form and with a full crown.

Class denotes the structural class of a tree. **Landscape Trees;** considers exposure: **O** denotes open, **G** denotes Grove, **E** denotes Edge, **W** denotes Windrow

Viability rating denotes preservation ranking for consideration in tree retention planning considering multiple factors including; condition, value rating, age, species, etc.

- G** (Good), **F** (Fair) and **P** (Poor). NOTE: Individual trees within forest stands are generally deemed Poor priority for selective retention except when sufficiently large stands are protected.

Assessment Findings includes; our summary of overt defects, noteworthy growing condition factors, preservation and protection considerations and treatment rationale.

Action denotes proposed treatment in context to the project design; **RETAIN, REMOVE or PROTECT**. Removal of Shared and Off-Site trees **require owner consent**.

RPZ and CPZ; arborist setbacks for **Root Protection Zone** (measured from centre of trunk) and **Crown Protection Zone**. The **Cautionary Zone - Working Space Setback (WSS)** is additional to the RPZ (see drawing All 3 form the **Tree Protection Zone (TPZ)**).

6X Dbh is an arbitrary city guideline for minimum root protection, not a specification. The calculation includes radius of the trunk and is dimensioned relative to the center of trunk. **Use RPZ plus WSS.**

Reference Bylaw: VANCOUVER PROTECTION OF TREES BYLAW NO. 9958, AMENDED JUNE 2022

Minimum Bylaw Protected Tree Size: 20 cm DBH ; and Multi-stem trees with a cumulative diameter of the largest three stems equal to or > 20 cm.

Tag/ID	Survey ID	Loc	# of Trees	Common name, (Botanical)	DBH ISA	DBH BYLAW	DBH TPZ	Bylaw Y/N	Ht (m)	Spr (m)	LCR (%)	Class	Assessment Findings:	Viability	ACTION	RPZ (m)	CPZ (m)
C01	Y	CITY	1	European beech (Fagus sylvatica)	34	34	34	Y	16	6	90	C	• No significant visual defects	G	PROTECT	3.0	6.0
C02	Y	ON	1	Flowering cherry (Prunus serrulata)	42	42	42	Y	12	5.0	70	C	• No significant visual defects	G	PROTECT	3.0	5.0
C03	Y	ON	1	European beech (Fagus sylvatica)	30	30	30	Y	16	4.5	90	C	• Asymmetrical crown weighted south • Small deadwood throughout the crown	G	PROTECT	3.0	4.5
C04	Y	ON	1	Flowering cherry (Prunus serrulata)	37	37	37	Y	12	5.0	70	C	• Asymmetrical crown weighted south • Small deadwood throughout the crown	G	PROTECT	3.0	5.0

Tag/ID	Survey ID	Loc	# of Trees	Common name, (Botanical)	DBH ISA	DBH BYLAW	DBH TPZ	Bylaw Y/N	Ht (m)	Spr (m)	LCR (%)	Class	Assessment Findings:	Viability	ACTION	RPZ (m)	CPZ (m)
C05	Y	ON	1	Flowering cherry (Prunus serrulata)	32	32	32	Y	8	0.0			<ul style="list-style-type: none"> Dead-standing, approximately dead for the past year RATIONALE: <ul style="list-style-type: none"> DIRECT CONFLICT WITH PREPARATION OF SURFACE PARKING WILL RESULT IN EXCESSIVE ROOT LOSS. FOR MANAGEMENT OF OF THE EXISTING LANDSCAPE AS WELL AS RISK MITIGATION DURING CONSTRUCTION, THIS DEAD IS RECOMMENDED FOR REMOVAL CONCURRENTLY WITH CONSTRUCTION. 	P	REMOVE		
C06	Y	ON	1	Maidenhair tree (Ginkgo biloba)	19	19	19	N	10	3.0	80	S	<ul style="list-style-type: none"> Vandalism injury on the mid stem on the east side 	F	PROTECT	1.5	3.0
C07	Y	ON	1	Japanese maple (Acer palmatum)	20,15 ,16	51	20	Y	8	5.0	90	C	<ul style="list-style-type: none"> DBH is representative of the largest of measured stems (20,15,16cmø) at 1.4m above grade for protection setback calculation purposes. Co-dominant at base, forks into a tri-stem at 1.5m 	G	PROTECT	3.0	5.0
C08	Y	ON	1	European beech (Fagus sylvatica)	34	34	34	Y	16	5.5	90	C	<ul style="list-style-type: none"> Hydro line clearance pruned on the south side 	G	PROTECT	3.0	5.5
C09	Y	ON	1	Tuliptree (Liriodendron tulipifera)	64	64	64	Y	24	6.5	80	D	<ul style="list-style-type: none"> Overextended limb on the east side of the crown Co-dominant top at 12m height 	G	PROTECT	5.0	6.5
C10	Y	ON	1	European beech (Fagus sylvatica)	35	35	35	Y	22	5	80	C	<ul style="list-style-type: none"> Leans 10 degrees south at base and does not self-correct 	G	PROTECT	3.0	5.0
C11	Y	ON	1	European beech (Fagus sylvatica)	36	36	36	Y	20	5	60	C	<ul style="list-style-type: none"> Heading cuts done to the top for hydro line clearance 	F	PROTECT	3.0	5.0
C12	Y	ON	1	Tuliptree (Liriodendron tulipifera)	71	71	71	Y	24	6.5	80	D	<ul style="list-style-type: none"> Co-dominant top starts at 4m height 	G	PROTECT	5.5	6.5
C13	Y	ON	1	Tuliptree (Liriodendron tulipifera)	51	51	51	Y	22	5.5	80	C	<ul style="list-style-type: none"> No significant visual defects 	G	PROTECT	4.5	5.5
C14	N	ON	1	Tuliptree (Liriodendron tulipifera)	77	77	77	Y	24	6.5	80	D	<ul style="list-style-type: none"> Bark has been stripped off around the base Large girdling roots on the south side of base 	G	PROTECT	6.0	6.5
C15	Y	ON	1	Giant sequoia (Sequoiadendron giganteum)	136	136	136	Y	26	6.5	90	C	<ul style="list-style-type: none"> No significant visual defects MITIGATION: <ul style="list-style-type: none"> Low impact methods and materials are required for surface parking encroachment in the root protection zone. 	G	PROTECT	8.0	6.5

Tag/ID	Survey ID	Loc	# of Trees	Common name, (Botanical)	DBH ISA	DBH BYLAW	DBH TPZ	Bylaw Y/N	Ht (m)	Spr (m)	LCR (%)	Class	Assessment Findings:	Viability	ACTION	RPZ (m)	CPZ (m)
C16	Y	ON	1	Katsuratree (Cercidiphyllum japonicum)	29	29	29	Y	12	5	90	C	<ul style="list-style-type: none"> No significant visual defects RATIONALE: <ul style="list-style-type: none"> DIRECT CONFLICT WITH THE PROPOSED BUILDING. PROTECTION MEASURES CANNOT BE ACCOMMODATED IN THE CURRENT DESIGN AND THIS TREE IS SPECIFIED FOR REMOVAL ACCORDINGLY. 	G	REMOVE		
C17	Y	ON	1	Maidenhair tree (Ginkgo biloba)	22	22	22	Y	10	3	80	C	<ul style="list-style-type: none"> No significant visual defects RATIONALE: <ul style="list-style-type: none"> DIRECT CONFLICT WITH THE PROPOSED BUILDING. PROTECTION MEASURES CANNOT BE ACCOMMODATED IN THE CURRENT DESIGN AND THIS TREE IS SPECIFIED FOR REMOVAL ACCORDINGLY. 	G	REMOVE		
C18	Y	ON	1	Maidenhair tree (Ginkgo biloba)	25	25	25	Y	10	3	80	C	<ul style="list-style-type: none"> Asymmetrical crown weighted northwest RATIONALE: <ul style="list-style-type: none"> DIRECT CONFLICT WITH THE BUILDING STRUCTURE AND SITE PREPARATION WILL RESULT IN EXCESSIVE ROOT LOSS. PROTECTION MEASURES CANNOT BE ACCOMMODATED IN THE CURRENT DESIGN AND THIS TREE IS SPECIFIED FOR REMOVAL ACCORDINGLY. 	G	REMOVE		
C19	Y	ON	1	Red horsechestnut (Aesculus x carnea)	21	21	21	Y	8	4	70	C	<ul style="list-style-type: none"> Stick nest in the upper crown Vertical frost cracks on the mid-stem RATIONALE: <ul style="list-style-type: none"> DIRECT CONFLICT WITH THE BUILDING AND DRIVEWAY ACCESS. 	P	REMOVE		
C20	Y	CITY	1	London plane (Platanus x acerifolia)	88	88	88	Y	24	9	70	D	<ul style="list-style-type: none"> Asymmetrical crown weighted west Slight phototropic lean west 	G	PROTECT	7.0	9.0
C21	Y	CITY	1	Horsechestnut (Aesculus hippocastanum)	12	12	12	Y	8	3	10	C	<ul style="list-style-type: none"> Deep stem injury created with a sharp edge (vandalism) Dieback and small diameter deadwood in the upper crown Remaining crown is wilting RATIONALE: <ul style="list-style-type: none"> DIRECT CONFLICT WITH THE DRIVEWAY AND SITE ACCESS. 	P	REMOVE		
N01	Y	OFF	1	London plane (Platanus x acerifolia)	42	42	42	Y	24	6.5	70	D	<ul style="list-style-type: none"> Pollarded upper crown MITIGATION: <ul style="list-style-type: none"> This tree is located sufficiently distant from construction and barriers are not required within the site for its protection 	G	PROTECT	3.5	6.5

Tag/ID	Survey ID	Loc	# of Trees	Common name, (Botanical)	DBH ISA	DBH BYLAW	DBH TPZ	Bylaw Y/N	Ht (m)	Spr (m)	LCR (%)	Class	Assessment Findings:	Viability	ACTION	RPZ (m)	CPZ (m)
N02	Y	OFF	1	Austrian pine (Pinus nigra)	53	53	53	Y	22	6	70	D	<ul style="list-style-type: none"> Co-dominant top starts at 2m height <p>MITIGATION:</p> <ul style="list-style-type: none"> This tree is located sufficiently distant from construction and barriers are not required within the site for its protection 	G	PROTECT	4.5	6.0
N03	Y	OFF	1	Flowering cherry (Prunus serrulata)	31	31	31	Y	8	5	80	C	<ul style="list-style-type: none"> Multi-stem top; assymetrical crown weighted west 	G	PROTECT	3.0	5.0
N04	Y	OFF	1	Flowering cherry (Prunus serrulata)	35	35	35	Y	8	5	80	C	<ul style="list-style-type: none"> Multi-stem top; assymetrical crown weighted west 	G	PROTECT	3.0	5.0
N05	Y	OFF	1	Flowering cherry (Prunus serrulata)	32	32	32	Y	8	5	80	C	<ul style="list-style-type: none"> Multi-stem top; assymetrical crown weighted west 	G	PROTECT	3.0	5.0
N06	Y	OFF	1	Flowering cherry (Prunus serrulata)	32	32	32	Y	8	5	80	C	<ul style="list-style-type: none"> Multi-stem top; assymetrical crown weighted west 	G	PROTECT	3.0	5.0
N07	Y	OFF	1	Flowering cherry (Prunus serrulata)	39	39	39	Y	8	5	80	C	<ul style="list-style-type: none"> Multi-stem top; assymetrical crown weighted west 	G	PROTECT	3.0	5.0
N08	Y	OFF	1	London plane (Platanus x acerifolia)	41	41	41	Y	22	6	70	C	<ul style="list-style-type: none"> Pollarded upper crown 	G	PROTECT	3.0	6.0
N09	Y	OFF	1	Scots pine (Pinus sylvestris)	39	39	39	Y	20	5	70	C	<ul style="list-style-type: none"> Co-dominant top starts at 8m height 	G	PROTECT	3.0	5.0
N10	Y	OFF	1	Flowering cherry (Prunus serrulata)	40	40	40	Y	8	5	80	C	<ul style="list-style-type: none"> Multi-stem top; assymetrical crown weighted west 	G	PROTECT	3.0	5.0
N11	Y	OFF	1	Flowering cherry (Prunus serrulata)	38	38	38	Y	8	5	80	C	<ul style="list-style-type: none"> Multi-stem top; assymetrical crown weighted west 	G	PROTECT	3.0	5.0



**ARBORTECH
CONSULTING**

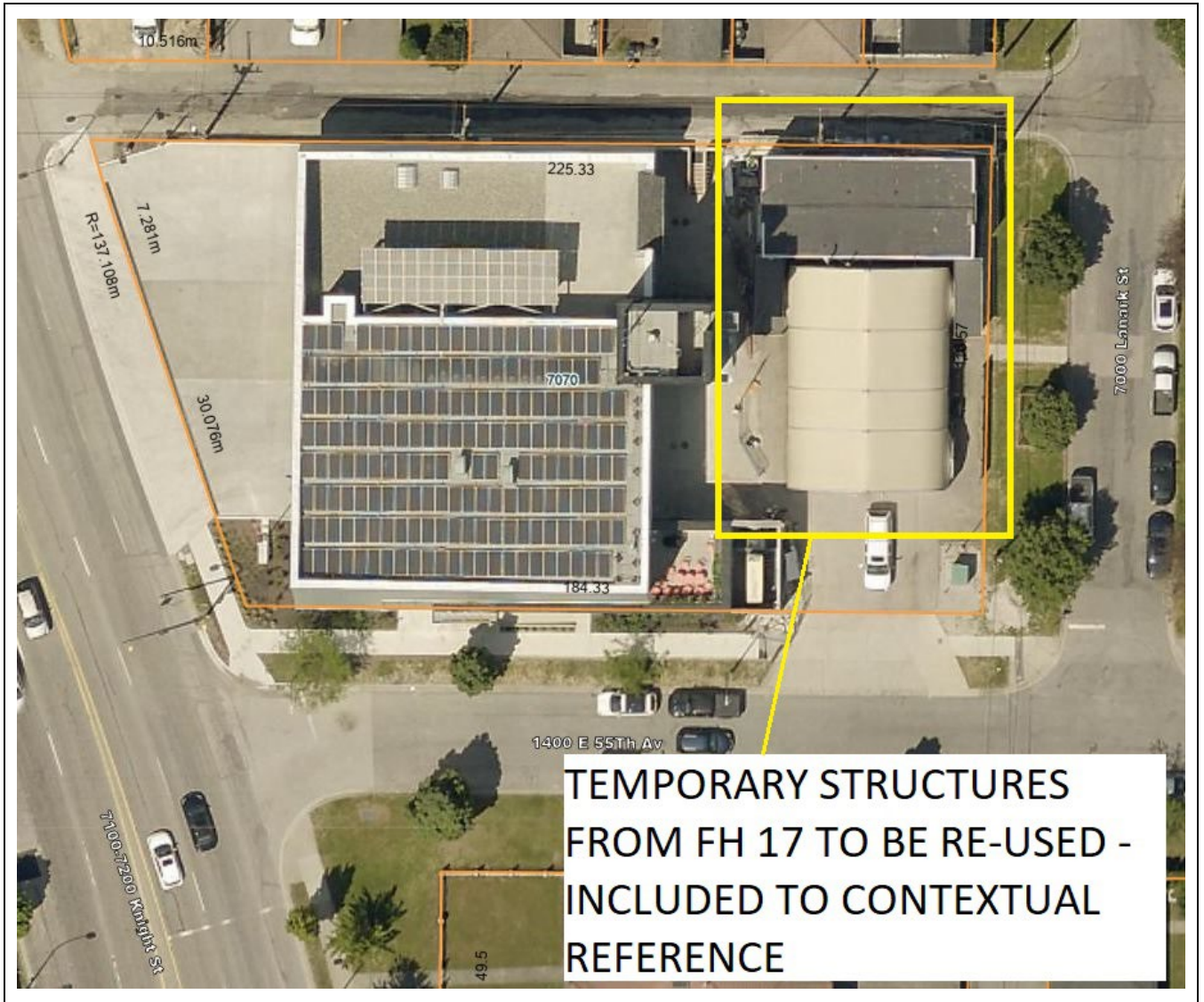
APPENDIX D: REFERENCES

D1: Architectural Site Plan





D2: Van Map 2022 Aerial Imagery showing Fire Hall No. 17 Temporary Annex – shown for reference - structures to be re-used on FH No. 2

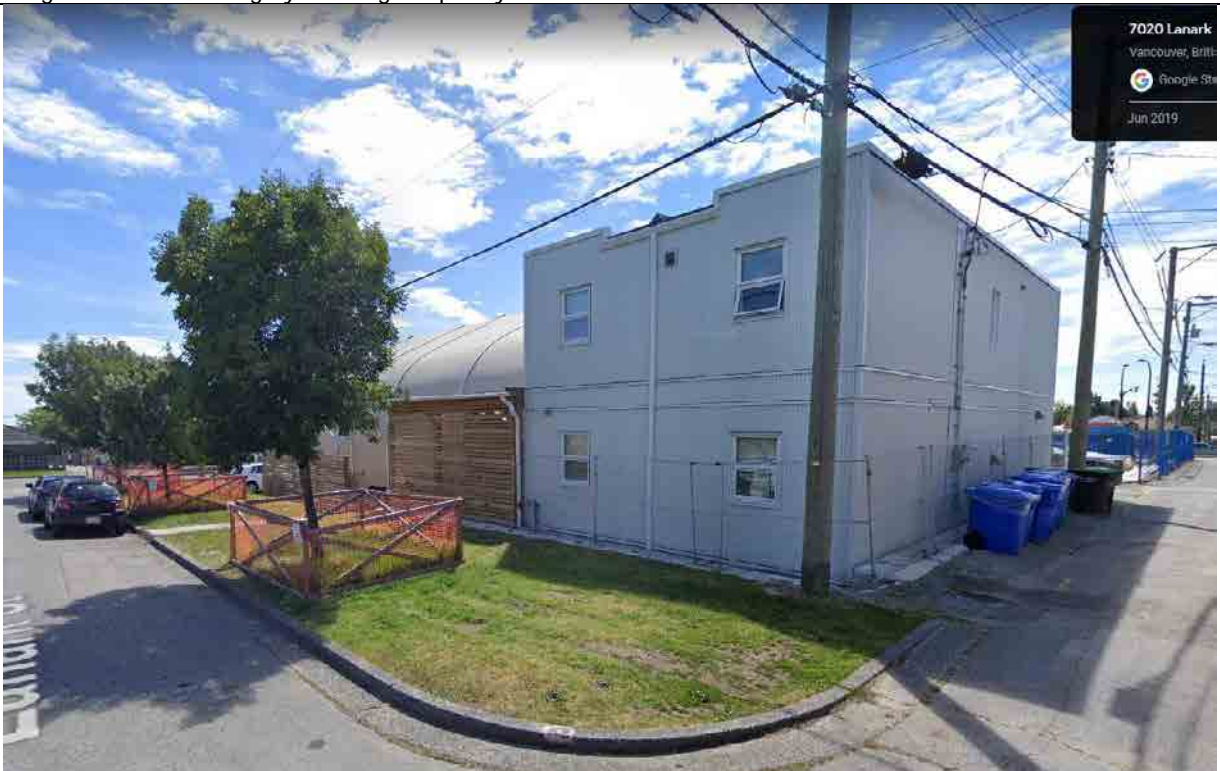




D3: Google Street View Imagery showing temporary structures to be re-used and installed for Fire Hall No. 2



D4: Google Street View Imagery showing temporary structures to be re-used and installed for Fire Hall No. 2





APPENDIX E: LETTER OF ASSURANCE

PROOF OF CONTRACT FOR ARBORIST ASSISTANCE DURING CONSTRUCTION

ISSUANCE DATE: June 18, 2024

ACL FILE: 23161

ISSUED TO: **Behnaz Sherkat – City of Vancouver**

SUBJECT SITE: **Gore Avenue and Union Street, Vancouver
Fire Hall 2 Temporary Annex**

REF DOC.'S: **Tree Management Report and Drawing Package (including all appendices)
prepared by this office, Rev 1, dated June 18, 2024 (or the most current version)**

Pursuant to municipal bylaws and/or policies a duly executed copy of this Letter of Assurance (LOA) is required to be submitted and approved to serve as confirmation that ACL Group Enterprises Ltd (the "Consultant"), is retained under contract to the **Owner** (the "Client") as **Project Arborists** (the "PA") to provide arboricultural consulting and field services for the duration of the project to assist the project in maintaining compliance with tree protection.


By signing below, the owner and their contractor agree to the responsibilities associated with fully implementing the Tree Protection Zones (TPZ) restrictions and limitations, and related standard and specific measures, and to;

- furnish this office with IFC drawings and the construction logistics plan for pre-mobilization review,
- notify the PA of any mobilizations to the site with a minimum of two weeks advance notice,
- notify the PA in advance of any potential tree protection conflicts with construction work to resolve those proactively,
- ensure that the PA is provided 3 business days advance notice for attendance by the PA at required times,
- facilitate the completion of any proactive or remedial treatments that may be prescribed or required by the PA,
- implement any PA specified measures for the construction work, including low impact materials and methods, and conformance with arboricultural standards and best management practices,
- pay all costs associated with tree protection compliance measures or treatments, including any non-compliance penalties and remediation treatments required thereof,
- schedule an inspection by the PA at substantial completion of the project to enable final signoff of tree protection compliance (required for final or occupation permits to be issued by city and for tree protection bond release), and
- pay all fees of the Consultant for the related work at the current applicable hourly rates, including portal to portal travel, on net 30 terms;

Owner:

Prime or General Contractor:

Project Arborist:

Authorized Signature:			
Date Signed:			June 18, 2024
Name:			Nick McMahon
Company:			ACL Group
Phone:			General: 604-275-3484 ext 101
Email:			General: trees@aclgroup.ca



TREE PROTECTION – GENERAL LIMITATIONS:

Retained and protected trees must have measures in place to prevent damage being incurred to those trees from site works during all phases of the project. Any access within a TPZ requires advance approval and on-site direction/supervision by the PA, and implementation of measures to be specified by the PA. Except where permitted with advance approval from the PA, and conditional to PA specified measures or low impact methods being implemented, the project shall ensure that there is:

- No excavation, trenching, grade changes or other soil disturbance of any scope or to any depth,
- No passage or operation of personnel, equipment, machinery, trucks, vehicles of any size or type (whether on tracks or tires),
- No storage of soil, gravel, construction supplies, materials, excavation spoil, waste, etc.,
- No accumulation of storm water or standing water conditions,
- No washing of concrete, stucco, drywall, paint, or other chemicals or materials that may be deleterious to soil or roots,
- No placement of temporary structures, services or utilities,
- No affixing lights, signs, cables, cameras or any other devices to trees (i.e. trunk or branches),
- No pruning or cutting of any part of a retained tree (trunk, crown or roots),
- No landscape finishing – except certain landscape works that have prior approval and scheduled supervision by the PA.

TREE PROTECTION – STANDARD MEASURES:

The Client and their Contractor(s) are responsible to maintain the tree protection compliance through the entire construction term, and to arrange attendance of the PA to the site for the following:

A. Barrier Installation:

To direct and inspect the tree protection barrier installation to our specifications, troubleshoot alignment and installation challenges, document revisions and provide a barrier sign-off report for project reference and submittal to municipality.

B. Pre-Treatment of Trees:

To undertake, supervise or direct arboricultural treatments (i.e. pruning, soil renovation or enhancements, interim watering program and other specific measures) to prepare the trees to sustain and adapt to the construction impacts, such as but not limited to:

- Pruning for risk mitigation, crown restoration, form, building or overhead clearance, and/or sight lines,
- Pre-treatments such as root mapping, vertical aeration, advance root pruning, conversion to soft landscape, etc,
- Installation of soil amender (i.e. mulch) within the RPZ to mitigate soil desiccation and to improve soil fertility,
- Interim supplemental watering to compensate for soil hydrology changes,
- Low impact removal of plants or stumps located within a TPZ (i.e. stump grinding or cutting with PA supervision),
- Installation of drainage infrastructure along the perimeter of the TPZ to prevent storm water accumulation within,
- Windfirming treatments of new forest edges created by clearing of the development lands, including; re-assessment, tree removals, pruning, modification to wildlife tree, or other treatments as specified by the PA, and
- Installation of interim soil protection and load distribution measures for personnel or equipment access, where feasible.

C. Pre-Con for Demolition and Pre-Construction:

To plan and implement a schedule to direct/supervise works in and around TPZ's, such as but not limited to:

- site access and egress,
- service and utility decommissioning,
- invasive plant controls, treatments or management,
- demolition of structures or hardscapes,
- site clearing and tree removal including identification of retention trees and direction of low impact removal of trees, vegetation and stumps within the TPZ's as well as to reinspect retained trees after clearing for condition,
- preloading or site stripping/grading (as applicable),
- installation of temporary power, site hoarding, site office or other infrastructure, and
- installation of ESC or stormwater management infrastructure.

D. Pre-Con for Construction Phase:

To plan and implement a schedule to direct/supervise works in and around TPZ's, such as but not limited to:

- on a regular monthly schedule as per municipal requirements or at an interval determined by the PA relative to the construction schedule and activities,



- at any time when access within a TPZ (TPB, RPZ or CPZ) is planned, to proactively determine feasibility and to provide specifications for cost effective solutions,
- excavation/shoring, site grading (cuts or fills) or other ground disturbances,
- trenching or overhead works related to services and utility installation,
- forming and concrete placing,
- craning, scaffolding, machinery, or other equipment mobilizations or operation,
- framing and building envelope finishing,
- all landscape works (see below), and
- at certain times as identified in the Specific Measures section (see below).

E. PRIOR TO REMOVING BARRIERS – Landscape Finishing:

To review landscape drawings and the landscape work plan including limitations on methods and materials in advance of commencing those works and to provide on-site direction and guidance for the associated preparation works and construction of PA approved hardscape and soft landscape elements. including but not limited to:

- sidewalks/paths,
- patios/decks/benches,
- retaining walls,
- fencing,
- irrigation/electrical conduit
- soil placement/plantings, mulching and grass/turf installation.

NO LANDSCAPE FABRIC IS PERMITTED TO BE PLACED WITHIN a TPZ

Note that and certain landscape features may be excluded, may require an arboricultural aeration system, or may be limited to specific materials and methods that meet PA requirements. Planting of any plants, shrubs or hedges within a TPZ is restricted to “4 inch” and “# 1” nursery pot sizes, but these may vary depending on retention tree species and proximity. A “pocket planting” standard applies in order to minimize the planting hole size and limiting digging into existing grade to avoid damage to woody tree roots, and to backfill with minimal addition of growing medium.

F. Documentation:

To provide site review reports to the project at certain milestones. Note that if non-compliance to tree protection is observed, the PA is required by the municipality to report the non-compliance to them in the form of an impact and mitigation assessment which may require investigative as well as remedial work by the PA. A final sign off at substantial completion of the project is required to confirm project compliance to all tree protection specifications and measures.

TREE PROTECTION – SPECIFIC MEASURES:

The following items within a TPZ require PA direction, treatment or supervision/monitoring. See the Tree Management Drawing for additional references to locations where special measures are required.

1. STREET TREE #'s C01, C02, C03, C04, C08, C09, C10, C11, C12, and C20 – Sidewalk and Road Frontage Works: Root protection zones extend below existing hardscapes adjacent to street trees and all restrictions and limitations for tree protection are applicable in those zones. However, street tree protection barriers cannot impede vehicular and pedestrian uses and are to be aligned:
 - a - In the case of sidewalk planters or grates, at edges of the planter/hardscape, hardscape zones adjacent to the barriers are to remain intact and/or subject to limitations on treatments as per below.
 - b - In the case of soft landscape planting strips or boulevards, at setbacks as dimensioned and at an offset 0.6m from curb and 0.3m from sidewalk edge.
 - Restrictions on disturbance within and access to these soft landscape zones and hardscapes within the dripline extents are to remain compliant with the tree protection restrictions and limitations noted herein.
 - Any site hoarding, site office, temporary pedestrian protection measures and other works planned within the road frontage areas will require consideration of the protection of roots and crowns of the street trees.
 - Any pruning of the street trees that may be required for the project will be limited in scope to be compliant with ANSI A300 standards. All pruning requests should be coordinated with the project arborist who will provide guidance to the project team and also liaise with the park board arborist. Pruning is to be performed by park board crews at the developers cost (or as otherwise directed by park board).
 - If city sidewalks or road infrastructure are proposed to be renovated, realigned, removed and/or replaced, low impact methods are required relative to street tree protection. Project arborist to be consulted to review the design and in advance of undertaking those works so that we can provide an impact and mitigation assessment, advise on root protection, plan root pruning or other treatments, and liaise with the city park board arborist for approvals of the work plan. Additional measures for tree protection (crown, soil and roots) will be specified by the project arborist and must be implemented before demolition or removal of sidewalk or curbs is permitted.



- Alignments for underground service connections should be designed such that the construction can avoid conflict with the tree protection zones to the fullest extent possible. If services or utilities are required to pass through a RPZ or WSS, then low impact methods prescribed by the project arborist must be implemented.
 - If tree protection measures for street trees cannot be adequately implemented, approval for removal will be at the discretion of the city (via park board) and subject to compensation and other fees to be paid by the developer to the city, amounts to be determined by park board.
2. TREE # N03, N04, N05, N06, N07, N08, N09, N10, N11, N12, N13, and N14 and C15 – Root Pruning for Site Excavation:
The PA must be on site concurrently with the excavation adjacent to the tree protection zone to identify tree roots, provide root protection measures and/or undertake root pruning treatments as necessary.
 3. Tree C15 – Low Impact Preparation for Installation of Hardscape:
Encroachment within the root protection zone for installation of surface parking and garbage storage is acceptable – conditional to low impact methods and materials as approved and directed by the project arborist. The design details and grading drawings must be reviewed by the project arborist prior to finalizing those plans to confirm tree protection measures are accommodated. Low impact methods include a 'no-excavation' and no-compaction preparation of existing soils to protect roots. An arboricultural aeration sub-base is required, including installation of vertical aeration by the project arborist. See Tree Management Drawing for additional details.