



Talbot Mackenzie & Associates

Consulting Arborists

1832 Speed Ave Development, Victoria

Construction Impact Assessment & Tree Preservation Plan

Prepared For: Luke Mari
Aryze Developments
1839 Fairfield Road
Victoria BC V8S 1G9

Prepared By: Talbot, Mackenzie & Associates

Date of Issuance: TPP #1: March 15, 2019
TPP #2: May 14, 2019
TPP #3: May 15, 2019

TPP#4: July 16, 2019
(see revisions marked with an asterisk (*) within
sections #14, 15, 17, 22, 23 and TPP site plan)

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Jobsite Property: Civic addresses on Speed Ave, Victoria: #605, 607, 609, 615, 629
Civic addresses on Frances Ave, Victoria: #606, 612, 618

Date of Site Visits: March 8, 2018 - March 12, 2019

Site Conditions: Speed Ave residential lots with evidence of front yard vehicle parking (soil compaction and disturbance). Parking lot at 605 Speed Ave and on Frances Ave. Two houses have recently been demolished.

Summary: The proposal involves constructing an underground parkade on most of the property. We do not anticipate this will have an impact on the health of the London Plane trees (#2, 3, 4, or 6) on Speed Ave if excavation is limited to 5.5m from the property line. The overall canopy loss could be up to 20% from London Planes #3 and 15% from #4 if 1m of clearance is required from the front of the 6 storey building.

Municipal boulevard trees #5, 8, and 10 would be removed as part of the proposal. Municipal Hawthorn #9 could be removed or retention could be attempted; it is our understanding the city would prefer a new replacement planting instead of retention. New services are to be installed all on the Frances Ave frontage, with the exception of one storm drain within the CRZ of London Plane #6. Excavation associated with removing existing services and replacement of sidewalks, curbs and the roadway resurfacing on Speed Ave should be completed under arborist supervision and conventional depths of excavation will likely have to be minimized if the mature London Plane trees are to be retained.

6 small neighbour's trees (#13-18) will likely require removal if excavation to the property line occurs for the underground parkade.

Scope of Assignment:

- To inventory the existing bylaw protected trees and any trees on municipal or neighbouring properties that could potentially be impacted by construction or that are within three metres of the property line.
- Review the proposal to demolish the existing houses and construct one 12 storey tower and one 6 storey building. The proposal will include an underground parking structure, frontage improvements and updated services.
- Comment on how construction activity may impact existing trees
- Prepare a tree retention and construction damage mitigation plan for those trees deemed suitable to retain given the proposed impacts

Methodology:

- We visually examined the trees on the property and prepared an inventory in the attached Tree Resource Spreadsheet.
- No trees were tagged.
- Information such as tree species, DBH (1.4m), crown spread, critical root zone (CRZ), health, structure, and relative tolerance to construction impacts were included in the inventory.
- The conclusions reached were based on the information provided within the attached Landscape Plan (Keith N. Grant Landscape Architecture Ltd, dated May 17, 2019), the preliminary Servicing Plan (May 14, 2019) and the Site Plan from D'Ambrosio Architecture (dated May 17, 2019)
- A Tree Protection Site Plan was created by adding comments and fencing to the Landscape Plan provided.
- Exploratory excavations were conducted in the locations specified within the CRZs of London Planes #2-4 and #6

Limitations:

- Where trees were not surveyed on the plans provided, we have added their approximate locations. The accuracy of our estimated locations has not been verified by a professional surveyor.
- Exploratory excavations were conducted in the locations specified within the CRZs of London Planes #2-4. No other exploratory excavations have taken place within the CRZs of other trees and thus the conclusions reached are based solely on critical root zone calculations and our best judgement using our experience and expertise. The location, size and density of roots are often difficult to predict without exploratory excavations and therefore the impacts to the trees may be more or less severe than we anticipate.

Summary of Tree Resource:

Four London Plane trees are located along the south side of Speed Avenue. Three of the London Plane trees (#2,3,4) are located along the municipal frontage of 607, 609 and 615 Speed Avenue while one plane (#6) and one Birch tree (#5) located on the frontage of 643 Speed Avenue. A single bylaw-protected Weeping willow tree (#1) is located in the rear garden of the 643 Speed Avenue. Two Red maple trees (#8 and 10) and one Paul's Scarlet Hawthorn tree (#9) are located along the Frances Avenue frontage of the development.

Trees to be Removed:

1. **European Birch #5:** This municipal tree will require removal due being located within the driveway entrance for the underground parkade on Speed Ave.
2. **Western Red Cedar #7 and Douglas-fir #12:** Cedar #7 is 1cm under bylaw protected size and we believe Douglas-fir #12 (not bylaw protected) is on the subject property. Both are located within the footprint of the underground parkade.

3. **Red Maple #8:** This municipal tree will require removal due to being located within the driveway entrance on Frances Ave.
4. **Hemlocks #13 and 14:** These small trees are located in close proximity to the property line on the neighbouring property of 600 Frances St. We anticipate they will require removal for the excavation associated with constructing the underground parkade located almost to the property line in this location. The neighbour should be notified ahead of time regarding the potential impacts to their trees.
5. **Cherry #15, Sumac #16, Columnar Apple #17, Laburnum #18:** These small neighbour's trees are located within 20cm of the fence line in the front yard of #643 Speed Ave. The trees and the fence line have not been surveyed. The replacement of the storm drain within the right-of-way and excavation for the underground parking will likely result in excavation to the property line and significant impacts to these trees as a result of the root loss. The trees will either require immediate removal or their health will likely decline in the future. The neighbour should be informed of the impacts to their trees and shrubs.
6. **Red Maple #10 (38cm DBH)** - This municipal tree has poor structure as a result of pruning wounds and cavities associated with clearance pruning for the hydro lines above. It is a poor candidate for retention in our opinion.

Trees with Retention Status "To Be Determined"

7. **Hawthorn #9 (33cm DBH)** - This municipal tree is located between the proposed sanitary and water lines on the Frances Ave frontage and may be impacted depending on the extent of excavation and roots encountered. Through conversations with City Parks staff, it is our understanding that they prefer the removal of both Hawthorn #9 and Red Maple #10 in favour of new plantings. If the city decides they would prefer to retain this tree, barrier fencing should be constructed and the excavations associated with the sidewalk, curb, sewer and water supervised by the project arborist.

Potential Impacts on Trees to be Retained and Mitigation Measures

8. **Underground Parkade**

London Planes #2, 3 and 4 (126cm, 111cm, 104cm DBH, respectively)

The underground parkade wall will be 6.4m from the property line and the trunks of these three municipal boulevard trees are located 2.5 - 3m from the property line. Exploratory excavations were conducted 5.5m from the property line directly across from the trunks of London Planes #2, 3 and 4 (8 to 8.5m from each tree). The trenches were hand dug to a depth of 45-75cm, as conditions allowed. Each trench was approximately 4.5m in total length (not including walkways which prevented excavation in areas of the trenches).

The largest roots encountered within the CRZ of London Plane #2 were three roots measuring 3-4cm in diameter. Only one 2cm root and a low density of smaller roots were encountered from London Plane #3 and one 1cm root was encountered in the trenches across from London Plane #4. Pictures #1-5 of the excavation are included at the end of this report.

If shoring or sheet-piling is used to restrict the extent of excavation to 5.5m from the property line, we do not anticipate a significant health impact to these trees as a result of the underground parkade excavation.

9. Canopy Pruning of London Planes #3 and 4

The front of the 6 storey building will be located 6m from the property line. It is our understanding that balconies will not extend more than 0.5m past the facade of the building on the north side. There is a high density of foliage on the south side of the trees facing the building.

The building ends east of the trunk of London Plane #3, therefore only the south-east portion of the canopy will be impacted. If one metre of building clearance is required (5m from the property line) within the area where the building and branches conflict, we estimate four limbs measuring between 10-15cm will require pruning. This pruning could reduce the overall canopy by an estimated 15-20%.

For London Plane #4, if one metre of building clearance is required, we estimate that up to 15% of the overall canopy will be removed with the pruning cuts being 10cm or less in diameter.

All pruning requirements and potential canopy loss percentages are our best estimations taken from the ground. The diameter of the cuts will depend where on the stems the reduction or removal cut is made. It is difficult to estimate the amount of canopy loss without knowing the exact laterals that will be cut back to, which we recommend be determined at the framing stage. Final pruning cuts should be made by an ISA Certified Arborist.

If scaffolding is necessary and this requires additional working room, this could result in additional canopy loss. Depending on the extent of pruning required, the project arborist may recommend that alternatives to full scaffolding be used, such as hydraulic lifts, ladders or platforms. The applicant has indicated their willingness to avoid scaffolding, if necessary. Methods to avoid soil compaction may also be recommended (see "Minimizing Soil Compaction" section).

Ideally, to prevent health stress, the canopy of mature trees should not be pruned more than 10% without justification. London Planes are a tolerant and hardy tree species and London Planes #3 and 4 are in fair to good health. Some health stress is likely if 15-20% of the canopy is removed. We do not anticipate the trees will decline as a result of this canopy loss, especially if root loss is minimal.

10. Speed Ave West Driveway & London Plane #2

The new driveway on Speed Avenue leading to above ground parking (the west driveway) will be mostly within the footprint of the existing driveway, but will be shifted west by 1-2m. Maintaining the existing driveway footprint would result in a diagonal driveway in relation to the parking lot entrance. Because the grade of the roadway and sidewalk will rise by approximately 15cm, the letdown for the new driveway will be approximately at existing grade and therefore excavation will be minimal. See “Paved Surfaces Above Tree Roots” section for recommendations within this area and within the existing driveway footprint.

11. London Plane #6 (70cm DBH)

A relatively small portion on the periphery of the CRZ of this municipal tree will be impacted by the excavation for the corner of the underground parkade designated as bicycle parking. Additional excavation within the CRZ will also be required for the storm drain replacement which will be tying into the existing manhole 4.3m south-west from the tree within the sidewalk. Considering this species’ tolerance to root loss and the remaining undisturbed CRZ, we do not anticipate a significant impact to the health or stability of the tree.

Excavation for the let-down is expected to be minimal as a result of the grade of the existing road and sidewalk being raised approximately 15cm. As per the City of Victoria’s Parks Department request, exploratory digging was conducted to determine the potential root loss as a result of the excavation for the driveway let-down, now shown as 5m west from the trunk (perpendicular to the roadway). Due to tree protection fencing installed for the demolition, access was restricted in this location. Therefore, exploratory digging was conducted slightly closer to the tree, at approximately the location of the dashed line shown on the site plan. A trench approximately 10cm in depth was hand-dug and no roots were encountered. Any roots encountered below, can be retained as per our recommendations in the “Paved Surfaces Above Tree Roots” section. Pictures #6-8 are included at the end of this report.

12. Removal of Existing Services

There are multiple existing underground services (water, storm and sanitary sewers) within the CRZs of the London Planes on Speed Ave, which will be abandoned and will require removal and/or capping. In many cases, we may recommend capping and abandoning the services instead of complete removal of the pipes, as this will result in less root loss. We recommend capping the services as far from the trees as possible. The supervising arborist may recommend the use of less invasive digging methods such as the use of a hydro-vac or hand-digging in combination with machine excavation.

If the grade of the sidewalk is raised, manholes to be retained within the sidewalk will need to be raised. It is our understanding that this will not require removal of the existing manholes, but new fittings will be installed to extend the height of the existing manholes. This will require excavation around the existing manhole cover which may result in some root loss if roots are growing in close proximity.

It is our understanding that existing overhead hydro lines and poles on both sides of the street will be removed as they are only servicing buildings on the south side of the street. We recommend this be completed under arborist direction and that the holes be backfilled with a suitable soil under arborist direction. If new lighting is installed, this should be completed in consultation with the project arborist.

13. Demolition of the Existing Buildings and Removal of Hard Surfaces:

Two houses have already been demolished. The following recommendations apply for the removal of the remaining buildings.

A pre-demolition meeting should take place between the contractor and project arborist to determine the best access points while avoiding compaction on the root systems of the London Plane trees. Where possible, machinery and trucks should be restricted to hard surfaces and building footprints within CRZs to avoid compaction. Removal of building foundations, walkways, and trees within the CRZ of the London Plane trees should be done under arborist supervision. The machine operator must be aware of the tree canopies at all times, to avoid damage during demolition.

If any excavation or machine access is required within the critical root zones of trees to be retained, it must be completed under the supervision and direction of the project arborist. Barrier fencing must be erected immediately after the supervised demolition. Barrier fencing on the boulevard should be completed prior to demolition.

We recommend certain hard surfaces such as the existing sidewalk and driveways be left in place until the end of construction or until they are removed at the same time as replacement in order to protect the root systems underneath from potential damage once exposed.

14. Road, Sidewalk and Curb Replacement

Replacement of the south side of the road, curb and sidewalk is required as part of frontage improvements on Speed Ave. The roadway on Speed Ave will be raised approximately 15cm on the south side. This will help reduce root loss from the mature London Plane trees as it will allow the new road, curb, sidewalks and driveways to be raised above roots encountered. Even so, city engineering and transportation departments should be aware that conventional specified depths for excavations will very likely have to be minimized if health and structural impacts to the trees are to be avoided.

* The consulting engineer has informed us that the road grade could be raised between 15-30cm (if large roots are encountered close to the surface of the existing roadway), but that it is more likely to be closer to 15cm. Even if the curb is raised 30cm and fill soil is placed on the boulevard between the curb and trees (so that the boulevard soil is close to the same grade as the top of the curb), minimal to no soil would touch the trunks of the trees. This is because the trees have been planted at a higher grade than the existing curb.

15. Speed Ave Front Yards: Patios, Walkways, Planters and Walls

Numerous walls are proposed in the front yards within the CRZs of the London Plane trees #2-4. These walls must be constructed in such a way that avoid root loss; excavation to bearing soil will not likely be possible in most cases. The project arborist should supervise any excavations.

We have recommended the patios and the walkways within the CRZs be constructed using permeable surfacing materials and in accordance with recommendations in the “Paved Surfaces Above Tree Roots” section. Permeable pavers in these areas have now been shown on the site plan with the exception of the walkway areas underneath overhangs, as we do not anticipate water to infiltrate within these areas.

We have also recommended the amount of paved surfaces be reduced where possible. It’s our understanding the pathway south-east of London Plane #2 is necessary in order to allow wheelchair access from the pathway on the east side of the building to the sidewalk. The ramp south-west of the tree is required for accessibility to the front entrance, which the direct pathway does not allow enough room for, with the desired slope. One pathway north of the parking lot has been removed.

*If the overhangs within the front yards cannot be constructed in such a way without significant root loss, the supervising project arborist will recommend they be redesigned to avoid excavation into existing grades or that they not be built. The largest overhangs to the main entrances are at the edge of the CRZs.

16. Speed Ave Front Yards and Boulevard: Grading

The existing road, curb and sidewalk grades will be raised approximately 15cm as explained previously. This will result in approximately 15cm of fill soil on municipal property on the boulevards and road. The existing grades slope down south from the sidewalks in the front yards, especially within the CRZ of London Plane #3, where standing water was observed during the winter in the front yard area already compacted by vehicles.

During the planning process, we recommended that fill soil be reduced in the remaining CRZs where possible and an effort was made to achieve this, while acknowledging the limitations posed by the desired ground floor elevations.

For London Plane #2, the majority of the CRZ on private property outside the parkade will be covered by approximately 40cm of fill (5.1m existing to 5.5m finished in the south and east areas). The ground floor elevation and therefore the front entrance area of the tower will be approximately 1m above existing grade (5.1m existing vs. 6.2m finished), however this area will be within the parkade excavation. In the area outside the parkade, the ramp will slope from approximately 1m of fill to 40cm of fill (6.1m to 5.5m, from an existing grade of around 5.1). There will be approximately 60cm of fill in the area underneath the overhang.

For London Planes #3 and 4, the existing grade in the front yards is between 4.8 and 5m. The 6-storey ground floor patios located on the periphery of the CRZs will be 5.7m, which is approximately 70-90cm of fill. Stairs will quickly bring the grade to 5.4m, resulting in fill soil of approximately 40-60cm within the majority of the CRZs on private property.

17. Aeration Measures

Excessive fill soil, especially poorly draining soils high in clay content, can deprive roots of water and air. The amount of fill soil in certain areas of the CRZs is certainly more than ideal and the overhangs will redirect water away from the areas beneath. Roots within these areas will receive less water and this may cause some health stress. London Plane trees typically have aggressive and wide-spread root systems, which we have observed growing both deeply and shallowly in compacted soils underneath paved surfaces. Therefore, it is possible roots will eventually grow into the fill soil.

* To mitigate the impacts of the fill in areas below pavement, we have recommended the use of a geogrid to displace the weight of the permeable pavers and fill soil. Within the areas to be converted to landscape, in our opinion, the benefit of making this fill soil available for future root growth outweighs the displacement of weight provided by a geogrid (especially when considering the aggressive root growth of London Plane trees). Placing a geogrid within landscaping areas also prevents the planting of new trees in the future. A well-draining sandy-loam soil should be used to fill the landscape areas.

*Any existing sod and or pavement within the front yards should be removed under arborist supervision and the existing soil scarified with a metal rake or air-spade prior to the placement of sandy-loam soil or the geogrid. We have recommended that the areas already compacted in the front yards by vehicles be de-compacted prior to fill soils being placed in order to increase water infiltration within the interface between the fill soil and existing grade. Decompaction of the surface and vertical mulching can be accomplished with the use of an air-spade under arborist supervision.

*Specifications #1-3 are attached with all three being used in various locations depending on the context and amount of fill soil. We may recommend specification #3 be used between the main entrance and ramp of the west tower.

18. Above Ground Parking Lot (between London Planes #2 and 3)

We recommended the above ground parking lot, north of the footprint of the parkade be constructed using permeable surfaces and be raised above any roots encountered in accordance with recommendations in the “Paved Surfaces Above Tree Roots” section. Permeable pavers in this area have now been shown on the site plan.

19. Weeping Willow #1 (114cm DBH)

This neighbour's tree, located in the backyard of 643 Speed Ave, has significant decay within its trunk and has a high-risk of failure in our opinion. If the neighbour decides to retain the tree, root loss is expected as a result of the storm drain replacement within the right-of-way. The tree is approximately 2.5m to 3m from the fence line. It is our understanding the storm drain will not be replaced on the neighbour's portion of the right-of-way at 624 Frances Ave. We do not anticipate a significant stability impact to the tree as a result of the storm drain replacement considering the tree's current risk of failure at the trunk (which is more likely than root plate upheaval). Willows typically have a good health tolerance to root pruning.

Other Mitigations Measures:

20. Site Access: As shown in the Tree Protection Site Plan, we recommend the areas both within the boulevard and in the front yards be fenced to protect roots from the London Planes. Where possible, we recommend the majority of construction access occur off of the Frances Ave frontage.

21. Arborist Supervision: All excavation occurring within the critical root zones of protected trees should be completed under supervision by the project arborist. In particular, the following activities should be completed under the direction of the project arborist:

- a) Demolition of the existing houses and hard surfaces within the CRZs of the London Planes (including driveways)
- b) Excavation associated with the removal of any underground services and hydro poles within the CRZs of the London Planes
- c) Excavation associated with the underground parkade within the CRZs of the London Planes
- d) Removal of existing driveways and excavation associated with the two new driveways within CRZs of London Planes #2, 3 and 4
- e) Excavation associated with the above ground parking lot, north of the underground parkade footprint (within CRZs of London Planes #2 and 3)
- f) Excavation on the north and east property line for the underground parkade, within the CRZ of London Plane #6 and neighbour's trees Willow #1 and trees #15-18 (if retention is attempted)
- g) Construction of landscape walls, patios, planters and walkways in the front yards within CRZs of London Plane trees
- h) Replacement of the sidewalk, curb and roadway within the CRZs of the London Planes

22. Paved Surfaces Above Tree Roots Specifications:

The objective is to avoid root loss and to instead raise the paved surface and its base layer above the roots. This may result in the grade of the paved surface being raised above the existing grade (the amount depending on how close roots are to the surface and the depth of the paving material and base layers). Final grading plans should take this potential change into

account. This may also result in soils which are high in organic content being left intact below the paved area.

Within the CRZs, the project arborist should supervise any excavation associated with constructing these hard surfaces, including the removal of the existing paving or turf. If an excavator machine is used, the project arborist may recommend this be completed in combination with hand-digging and using a flat-edged bucket to avoid accidental root damage.

*If significant roots are encountered, excavation should be stopped and a geogrid material (such as CombiGrid 30/30 or similar) placed over the area to reduce compaction and to disperse weight over soils high in organics and roots. The base material for the paving should be placed above this material and should be well-draining (filter cloth or geotextile fabric may be recommended to separate coarse and fine layers in order to ensure this layer is well-aerated). Ultimately, a geotechnical engineer should be consulted and in consultation with the project arborist, may specify their own materials and methods that are specific to the site's grading, soil conditions and requirements, while also avoiding root loss, reducing compaction to the sub-grade and ensuring long-term permeability.

*See paving detail attached.

23. **Sidewalk:** The City of Victoria Parks department has asked for our recommendation regarding using alternative permeable paving materials on the municipal sidewalk "if needed." We generally recommended permeable materials, such as permeable paving stones, be used within the CRZs of retained trees. However, it's our understanding that Transportation and Engineering departments will not approve of any other surface materials besides concrete, except in extreme circumstances. In this case, the new sidewalk will be within the footprint of the existing concrete and asphalt sidewalk.

*A geogrid may be recommended underneath the new sidewalk, depending on the conditions below the existing sidewalk (roots observed, compaction level, existing base material etc.).

24. **Pruning Roots:** Any severed roots must be pruned back to sound tissue to reduce wound surface area and encourage rapid compartmentalization of the wound. Backfilling the excavated area around the roots should be done as soon as possible to keep the roots moist and aid in root regeneration. Exposed roots should be kept moist until the area is backfilled, especially if excavation occurs during a period of drought. This can be accomplished in a number of ways, including wrapping the roots in burlap or installing a root curtain of wire mesh lined with burlap, and keeping the area moist throughout the construction process.
25. **Barrier Fencing Specifications:** The areas surrounding the trees to be retained should be isolated from the construction activity by erecting protective barrier fencing. The barrier fencing must be a minimum of 4 feet in height, of solid frame construction that is attached to wooden or metal posts. A solid board or rail must run between the posts at the top and the bottom of the fencing. This solid frame can then be covered with plywood, or flexible snow fencing. The fencing must be erected prior to the start of any construction activity on site (i.e. demolition, excavation, construction), and remain in place through completion of the project.

Signs should be posted around the protection zone to declare it off limits to all construction related activity. The project arborist must be consulted before this fencing is removed or moved for any purpose.

26. **Minimizing Soil Compaction:** In areas where construction traffic must encroach into the critical root zones of trees to be retained, efforts must be made to reduce soil compaction where possible by displacing the weight of machinery and foot traffic. This can be achieved by one of the following methods:
 - Installing a layer of hog fuel or coarse wood chips at least 20 cm in depth and maintaining it in good condition until construction is complete.
 - Placing medium weight geotextile cloth over the area to be used and installing a layer of crushed rock to a depth of 15 cm over top.
 - Placing two layers of 19mm plywood.
 - Placing steel plates.
27. **Mulching:** Mulching can be an important proactive step in maintaining the health of trees and mitigating construction related impacts and overall stress. Mulch should be made from a natural material such as wood chips or bark pieces and be 5-8cm deep. No mulch should be touching the trunk of the tree. See “methods to avoid soil compaction” if the area is to have heavy traffic.
28. **Blasting:** Care must be taken to ensure that the area of blasting does not extend beyond the necessary footprints and into the critical root zones of surrounding trees. The use of small low-concussion charges and multiple small charges designed to pre-shear the rock face will reduce fracturing, ground vibration, and overall impact on the surrounding environment. Only explosives of low phytotoxicity and techniques that minimize tree damage should be used. Provisions must be made to ensure that blasted rock and debris are stored away from the critical root zones of trees.
29. **Landscaping and Irrigation Systems:** The planting of new trees and shrubs should not damage the roots of retained trees. The installation of any in-ground irrigation system must take into account the critical root zones of the trees to be retained. Prior to installation, we recommend the irrigation technician consult with the project arborist about the most suitable locations for the irrigation lines and how best to mitigate the impacts on the trees to be retained. This may require the project arborist supervise the excavations associated with installing the irrigation system. Excessive frequent irrigation and irrigation which wets the trunks of trees can have a detrimental impact on tree health and can lead to root and trunk decay.
30. **Arborist Role:** It is the responsibility of the client or his/her representative to contact the project arborist for the purpose of:
 - Locating the barrier fencing
 - Reviewing the report with the project foreman or site supervisor
 - Locating work zones, where required
 - Supervising any excavation within the critical root zones of trees to be retained
 - Reviewing and advising of any pruning requirements for machine clearances

31. **Review and site meeting:** Once the project receives approval, it is important that the project arborist meet with the principals involved in the project to review the information contained herein. It is also important that the arborist meet with the site foreman or supervisor before any site clearing, tree removal, demolition, or other construction activity occurs and to confirm the locations of the tree protection barrier fencing.

32. **Exploratory Excavation Photos** (December 20, 2019):



Photos 1 and 2: Adjacent to London Plane #4.



Photo 3: Adjacent to London Plane #4.



Photos 4 and 5: Excavation adjacent to London Plane #3. Compaction as a result of vehicles is already present on-site.

Photos #6-8: Exploratory trench for the driveway flare adjacent to London Plane #6.



Photo #6



Photo #7

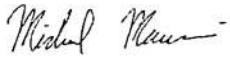


Photo #8

Talbot Mackenzie & Associates

Please do not hesitate to call us at (250) 479-8733 should you have any further questions.

Thank you,



Michael Marcucci
ISA Certified # ON-1943A
TRAQ – Qualified



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Encl. 2-page tree resource spreadsheet, 1-page Tree Protection Site Plan, 1-page Site Plan, 1-page Preliminary Servicing Plan, 1-page existing survey, 1-page Landscape Plan, 3-page Paving Above Roots diagrams, 1-page barrier fencing specifications, 2-page tree resource spreadsheet methodology and definitions

Disclosure Statement

The tree inventory attached to the Tree Preservation Plan can be characterized as a limited visual assessment from the ground and should not be interpreted as a "risk assessment" of the trees included.

Arborists are professionals who examine trees and use their training, knowledge and experience to recommend techniques and procedures that will improve their health and structure or to mitigate associated risks.

Trees are living organisms, whose health and structure change, and are influenced by age, continued growth, climate, weather conditions, and insect and disease pathogens. Indicators of structural weakness and disease are often hidden within the tree structure or beneath the ground. It is not possible for an Arborist to identify every flaw or condition that could result in failure or can he/she guarantee that the tree will remain healthy and free of risk.

Remedial care and mitigation measures recommended are based on the visible and detectable indicators present at the time of the examination and cannot be guaranteed to alleviate all symptoms or to mitigate all risk posed.

Tree ID	Common Name	Latin Name	DBH (cm) ~ approximate	Crown Spread (m)	CRZ (m)	Relative Tolerance (Good, Moderate, Poor)	Health	Structure	Remarks and Recommendations	Retention Status
1	Weeping willow	<i>Salix alba 'Tristis'</i>	114.0	16	11.5	G	Good	Poor	Neighbour's. Located in rear garden of 643 Speed Avenue. Extensive cavity and decay within main trunk. Trunk and canopy topped approximately 3 metres above base historically, to compensate for decay. Extensive canopy regrowth above cavity. Failure risk high.	Retain if desired (high likelihood of failure)
2	London plane	<i>Platanus X acerifolia</i>	126.0	22	12.5	G	Fair	Fair	Municipal. Located on municipal frontage of 607 Speed Avenue. Numerous pruning wounds with decay throughout the canopy.	Retain
3	London plane	<i>Platanus X acerifolia</i>	111.0	19	11.0	G	Fair	Fair	Municipal. Located on municipal frontage of 609 Speed Avenue. Numerous pruning wounds with decay throughout the canopy. Significant decay visible from south side between large scaffold limb and smaller 20cm limb, with horizontal crack visible. Further assessment and pruning recommended.	Retain
4	London plane	<i>Platanus X acerifolia</i>	104.0	19	10.5	G	Good	Fair	Municipal. Located on municipal frontage of 615 Speed Avenue. Some pruning wounds with decay within the canopy. Several poorly tapered stems due to shading on street side of canopy	Retain
5	European Silver Birch	<i>Betula pendula alba</i>	21.0	6	2.5	M	Fair	Fair	Municipal. Located on municipal frontage of 629 Speed Avenue. Basal injury, epicormic growth. Flat top	Removal
6	London plane	<i>Platanus X acerifolia</i>	70.0	12	7.0	G	Fair	Fair	Municipal. Located on municipal frontage of 643 Speed Avenue. Some anthracnose infection in canopy.	Retain
7	Western Red cedar	<i>Thuja plicata</i>	59.0	14	9.0	P	Good	Fair	1cm under bylaw protected size. Located in rear garden between the properties at 609 and 615 Speed Street. 1m long by 20cm wide wound on lower trunk. Likely topped at apex	Remove
8	Red Maple	<i>Acer rubrum</i>	35.0	10	5.5	P	Good	Fair	Municipal. Located along east end of Frances Street municipal frontage. Pruned below hydro primary lines.	Remove
9	Hawthorn	<i>Crataegus oxyacantha 'Paul's Scarlet'</i>	33.0	8	3.5	G	Fair	Fair	Municipal. Located near centre of Frances Street municipal frontage. Pruned below hydro lines	TBD by municipality/ Removal
10	Red Maple	<i>Acer rubrum</i>	38.0	8	5.5	P	Fair	Poor	Municipal. Located at west end of Frances Street municipal frontage. Pruned below hydro primary lines. Large pruning wound and cavity.	Removal recommended

Tree ID	Common Name	Latin Name	DBH (cm) ~ approximate	Crown Spread (m)	CRZ (m)	Relative Tolerance (Good, Moderate, Poor)	Health	Structure	Remarks and Recommendations	Retention Status
11	Purple Leaf Plum	<i>Prunus cerasifera</i>	14	6	1.5	M	Good	Fair	Municipal. Located at end of Speed Ave.	Retain
12	Douglas-fir	<i>Pseudotsuga menziesii</i>	53	13	8.0	P	Good	Fair:poor	Very likely on private property (605 Speed Ave). Not surveyed or listed as city tree on VicMap. Not bylaw protected. Codominant union at 2m	Removal
13	Western Hemlock	<i>Tsuga heterophylla</i>	17	4	2.5	P	Poor	Good	Neighbour's (600 Frances Ave). Sparse branching, 2m from building. Beside parking lot.	Removal
14	Western Hemlock	<i>Tsuga heterophylla</i>	~12	2	2.0	P	Fair	Fair	Neighbour's (600 Frances Ave), between parking lot and building.	Removal
15	Cherry	<i>Prunus spp</i>	33	6	4.0	M	Fair	Fair	Front yard of 643 Speed. Potentially shared between neighbour and municipality. Suppressed; growing underneath larger canopy of London Plane.	Removal
16	Sumac	<i>Rhus spp</i>	6, 6, 6, 6	6	2.5	P	Good	Fair	Neighbour's (643 Speed). Two stems growing through fence. Two trees.	Removal
17	Columnar Apple	<i>Malus spp</i>	15*	3	2.0	M	Good	Fair	Neighbour's (643 Speed). *Multistem, diameter measured below union, 1m AGL	Removal
18	Laburnum	<i>Laburnum x watereri</i>	12*	2	1.5	M	Fair	Fair	Neighbour's (643 Speed). *Multistem, diameter measured below union, 1m AGL	Removal
19	Hawthorn	<i>Crataegus spp</i>	35	8	3.5	G	Fair	Fair	Municipal. 4m West of WPL on boulevard	Retain

DEVELOPMENT PERMIT
APPLICATION REVISIONS

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- [illegible]

References

[illegible]

	#	AP Application - Research Area	AP Score (%)
	0	25-30 Applications	98.27%
		Applications	Score

Other statements by the two companies indicated that the paper was a temporary expedient to facilitate the strike. The union did not believe the Chinese could sustain such a strike.

project name
Speed/Francis Redevelopment
405 & 615 Speed Ave. Victoria

Site Plan

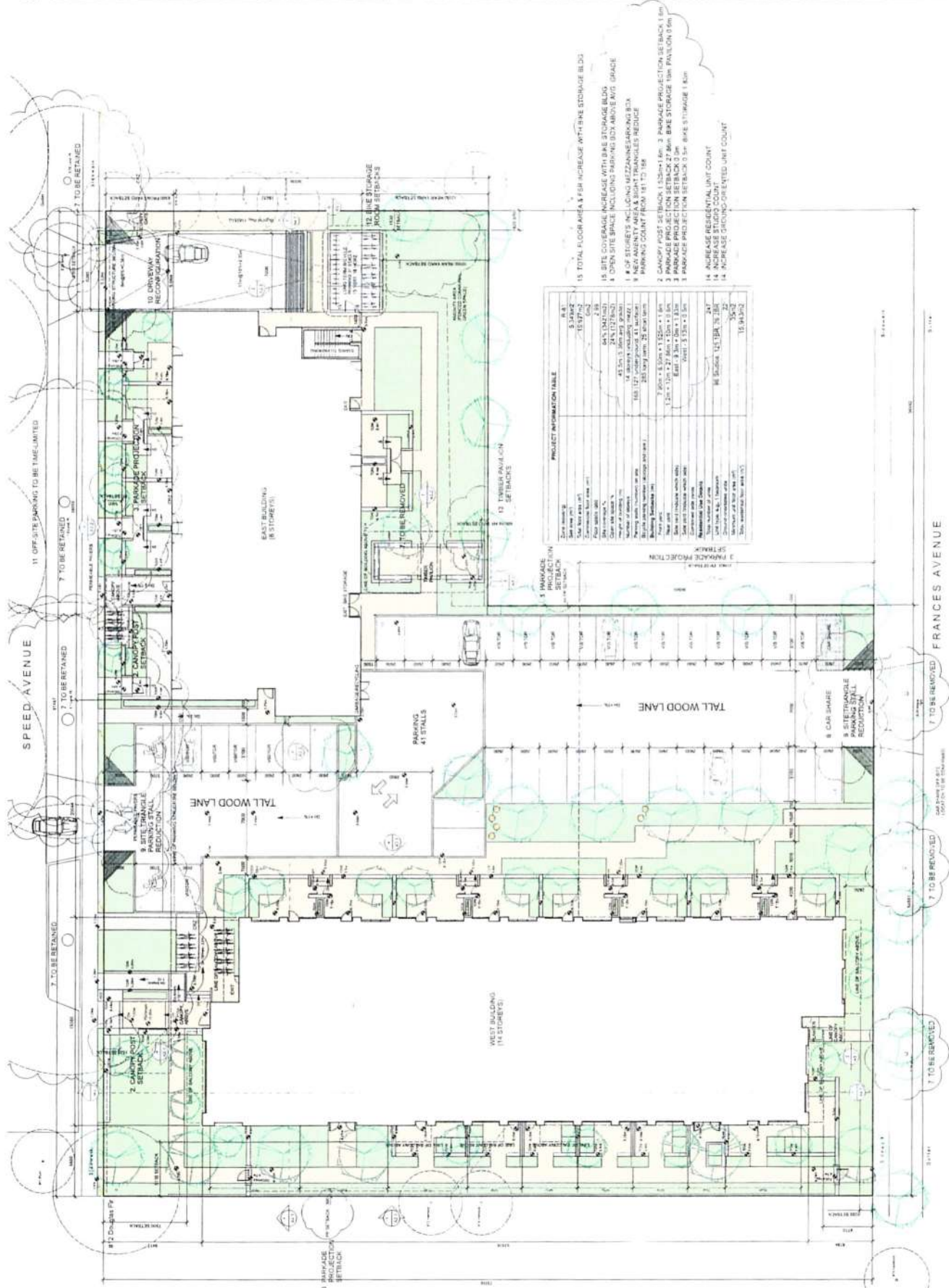
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Drawing No.	1832 Speed Base Plan
Date	10.05.17

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FRANCES AVENUE

**SITE PLAN OF LOT 16, 17, 18, 19, 20, 21,
LOT 22 EXCEPT THE WESTERLY 10 FEET,
THE WESTERLY 10 FEET OF LOT 22, AND
LOT 23, ALL IN SECTION 4, VICTORIA
DISTRICT, PLAN 358.**

SCALE=1:400 All distances are in metres
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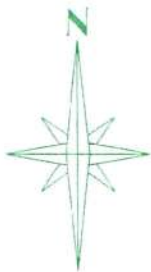
NOTE: Lot dimensions and areas shown may vary upon completion of a comprehensive Legal Survey. Elevations shown are based upon geodetic datum.

LEGEND

- ⊙ Denotes utility pole
- + Denotes anchor
- WM Denotes water meter
- WV Denotes water valve
- ⊙ Denotes fire hydrant
- ⊙ Denotes catch basin
- ⊙ Denotes storm drain manhole
- ⊙ Denotes sewer manhole
- ⊙ Denotes sign
- Denotes driveway
- Denotes tree location, diameter and species
- 0.25 Birch
- Denotes ground elevation

Field survey dated September 24 and 29, 2010

- Lot 16 is subject to charges:
 - Covenant P101490 & R24969
- Lot 18 is subject to charge:
 - Easement 1106690
- Lot 23 is subject to charge:
 - Right of Way 108241G

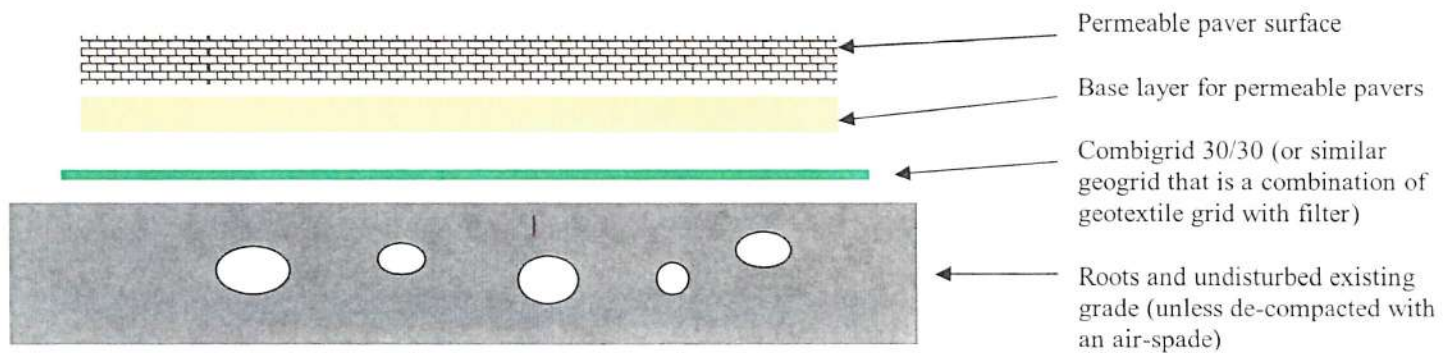


File: 33-MARTIN-SP
Date: October 1, 2010
Inland Land Surveying Ltd.
1-15 Cadillac Avenue
Victoria, B.C. V8Z 1T3
Tel: 250 475 1515 Fax: 250 475 1516
www.inlandsurveying.ca

Talbot Mackenzie & Associates

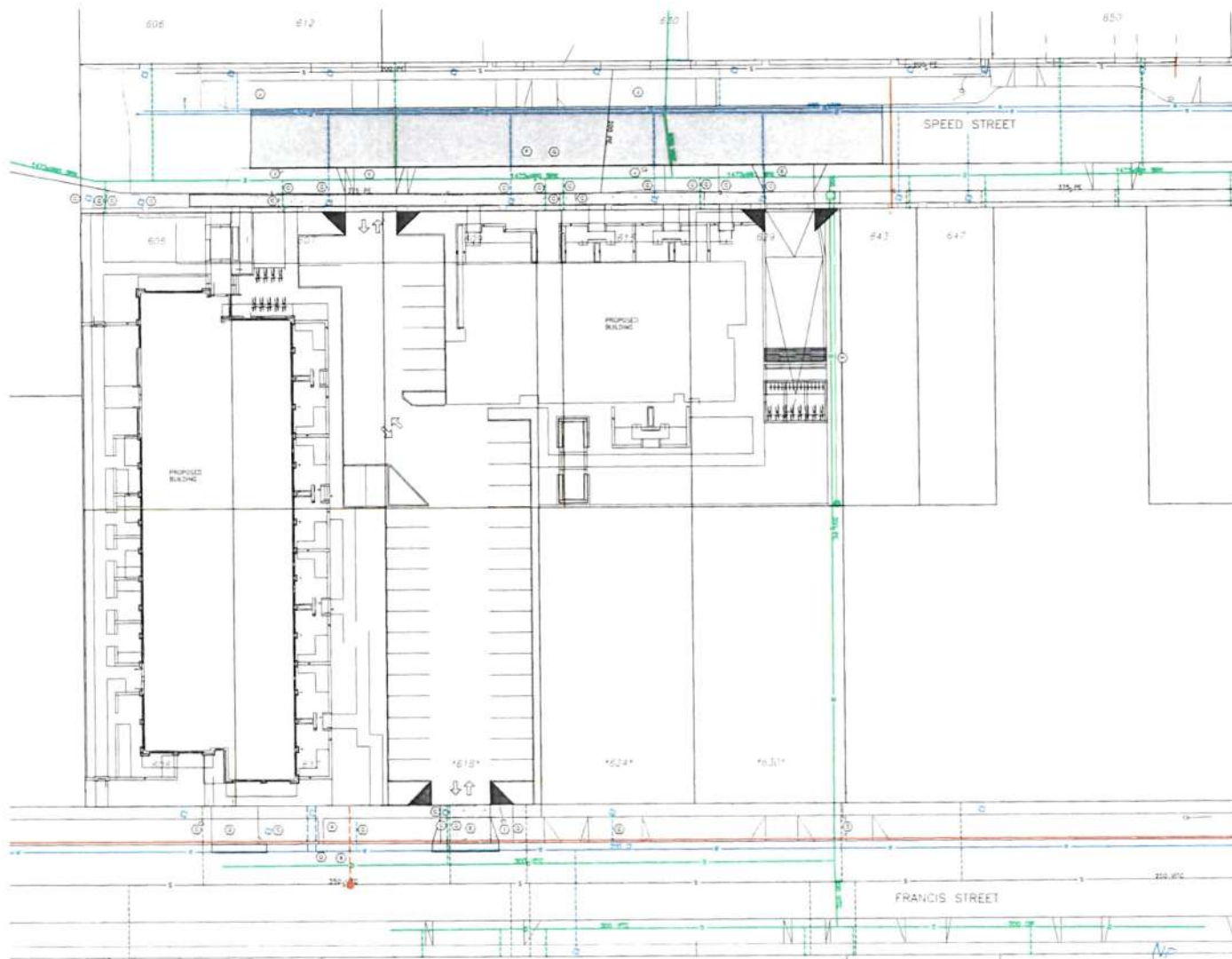
Consulting Arborists

Diagram – Permeable paver surface crossing over Critical Root Zone



Specification #1 for Paved Surfaces Over Critical Root Zones (driveway, parking or walkway areas)

1. Minimal excavation to remove turf and loose soil for the required permeable surface, under the supervision of the project arborist. Root loss to be avoided.
2. A layer of Combigrd 30/30 geotextile is to be installed over the existing grade.
3. Construct base layer of well-draining material and permeable surface over geogrid layer to required grade.



CONCEPTUAL WORKS AND SERVICING PLAN NOTES

- ① CITY OF VICTORIA TO INSTALL 150mm FIRE AND 150mm DOMESTIC WATER SERVICES TO PROPERTY LINE AT DEVELOPER'S EXPENSE. SIZES TO BE CONFIRMED.
- ② CITY OF VICTORIA TO INSTALL 300mm SEWER SERVICES TO PROPERTY LINE AT DEVELOPER'S EXPENSE.
- ③ CITY OF VICTORIA TO CAP AND MENDON EXISTING SERVICES AT DEVELOPER'S EXPENSE.
- ④ CONTRACTOR TO REMOVE EXISTING DRIVEWAYS AND REINSTATE DRIVEWAYS.
- ⑤ CONTRACTOR TO RECONSTRUCT ENTIRE FRONTAGE OF SPEED STREET PAVING TO NORTH CURB CURB AND GUTTER, BELLEVUE AND SIDEWALKS.
- ⑥ SPEED STREET ROAD CROWN TO BE REPLACED WITH FULL CROSS FALL TO NORTH SIDE. RE DRAINAGE WILL ALLOW FOR MINIMAL IMPACT TO LARGE TREES ALONG FRONTAGE AND INCREASE COVER OVER HEAVY ROOT SYSTEMS THROUGHOUT THE ROAD CORRIDOR. 3m WIDE PAVING SHOWN.
- ⑦ STORM MAIN IN USE TO BE PROTECTED DURING CONSTRUCTION AND REPLACED WITH NEW SECTION DURING CONSTRUCTION. SIZE TO BE DETERMINED.
- ⑧ NO HYDRO PILE TO BE RELOCATED OUT OF POTENTIAL CONFLICT WITH DRIVEWAY. PREFERRED LOCATION FOR HYDRO PILE TO BE DETERMINED.
- ⑨ EXISTING HYDRO PILE TO BE COME REDUNDANT AND REMOVED.



SPEED STREET / FRANCIS STREET REDEVELOPMENT SERVICING CONCEPT

Scale: 1:250
 Sheet: 1 of 1
 City Project No: 31734

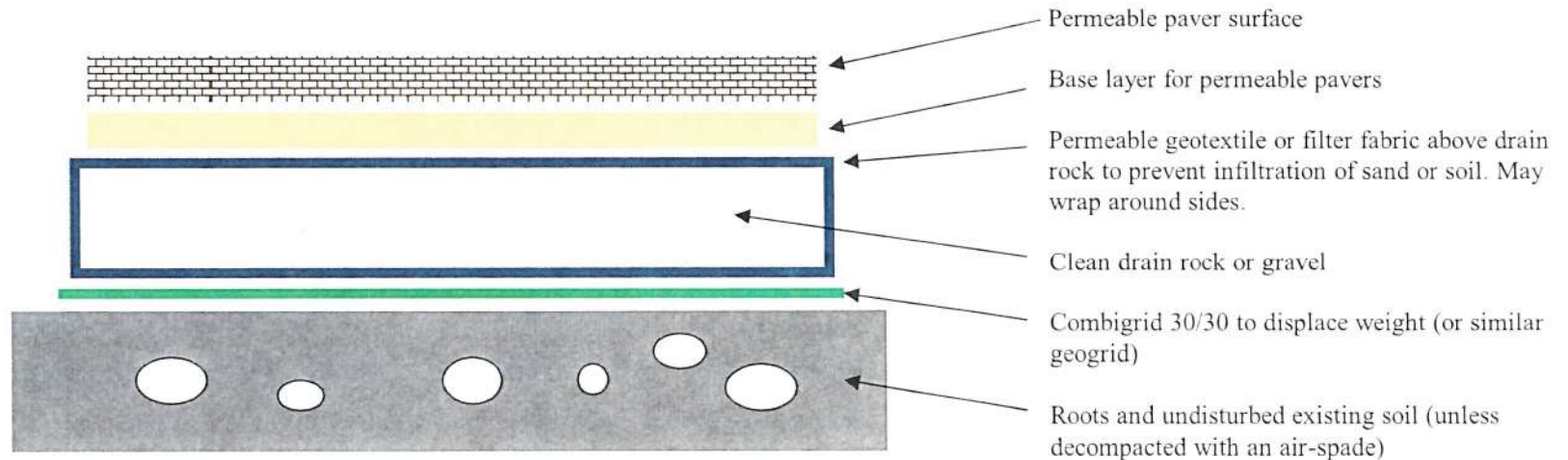
JEA J E ANDERSON & ASSOCIATES
 SURVEYORS ENGINEERS
 VICTORIA NANAIMO PARKSVILLE
 PHONE: 250-727-0214 FAX: 250-727-3355

PRELIMINARY ONLY

Talbot Mackenzie & Associates

Consulting Arborists

Diagram – Paved surfaces with aeration layer over Critical Root Zone



Specification #2 for Paved Surfaces Over Critical Root Zone (Driveway, Parking and Walkway areas)

1. Minimal excavation to remove turf and loose soil for the required permeable surface, under the supervision of the project arborist. Root loss to be avoided.
2. A layer of Combigrid 30/30 geotextile is to be installed over the existing grade.
3. If necessary, geotextile fabric to be used above drain layer to prevent infiltration of fines into drainage and aeration layer.
4. Construct base layer of well-draining material and permeable surface over geogrid layer to required grade.
5. A geotechnical engineer can also be consulted and in consultation with the project arborist may specify their own materials and methods that are specific to the site's soil conditions and requirements, while also avoiding root loss and reducing compaction to the sub-grade.

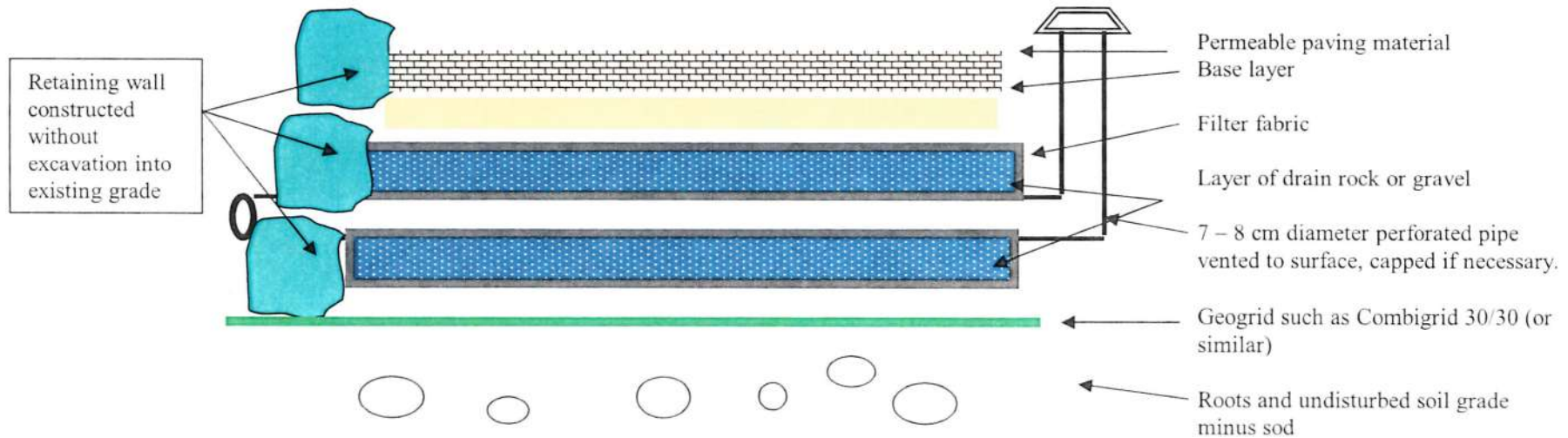
Talbot Mackenzie & Associates

Consulting Arborists

Talbot Mackenzie & Associates

Consulting Arborists

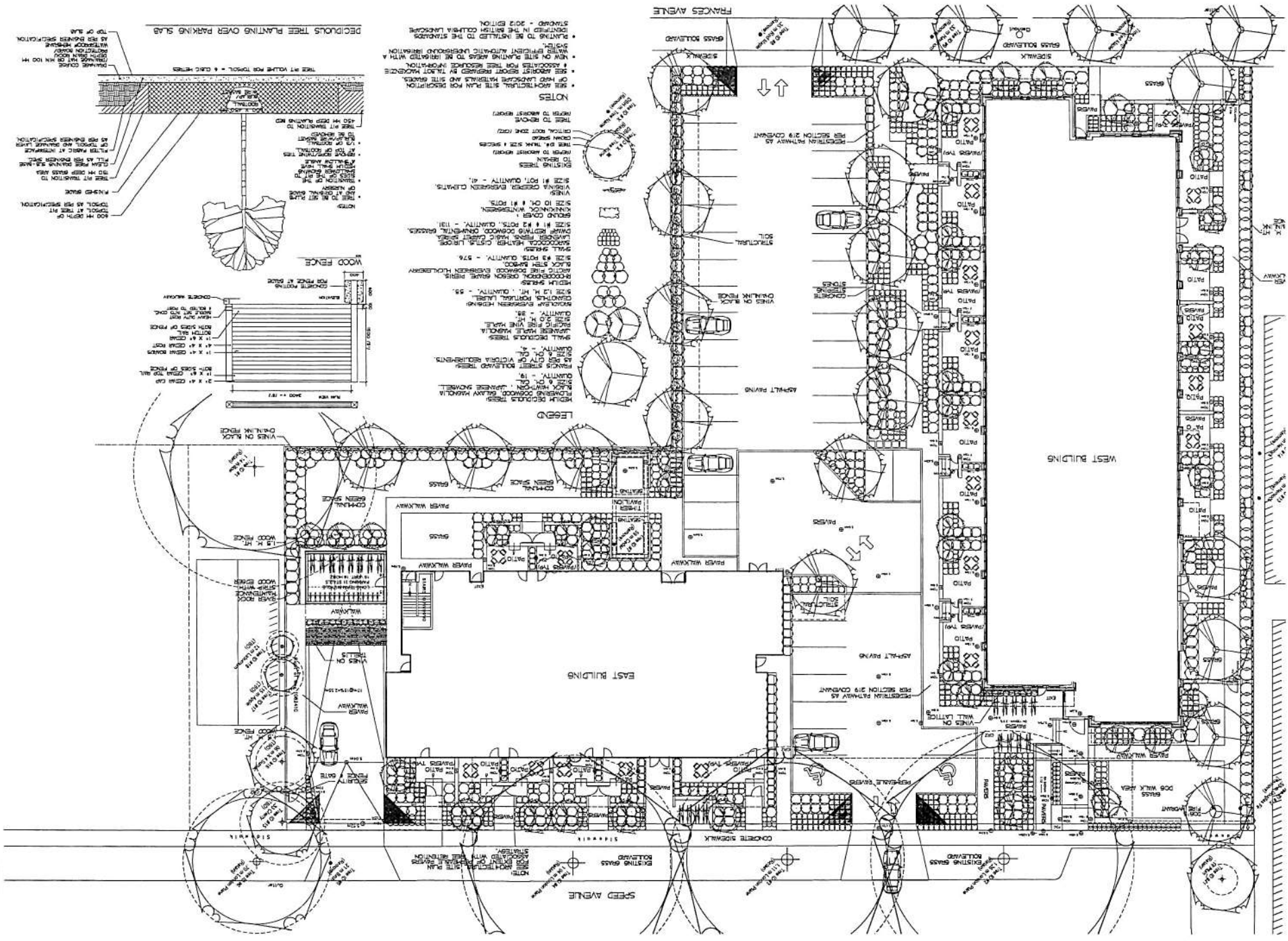
Diagram – Paved Surface with Aeration Pipes

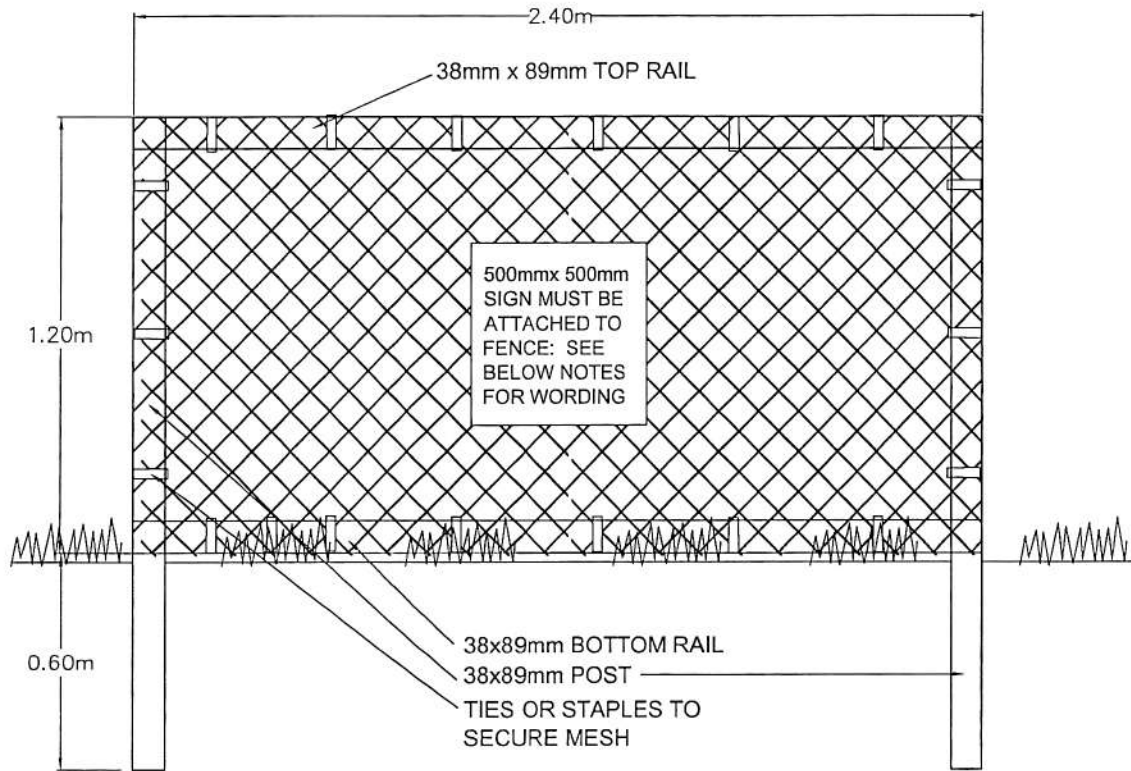


Specification #3 for Aerated Fill Area with Pipes

1. Minimal excavation to remove turf and loose soil for the required permeable surface, under the supervision of the project arborist. Root loss to be avoided.
2. Layer of Combigrid 30/30 geotextile is to be installed over the existing grade.
3. Lengths of 7 to 8 cm diameter perforated pipe must be installed across the width of the fill at 2-metre intervals. An aeration layer of drain rock or gravel, to be used to cover the perforated pipe. The pipe must be vented at either end to allow air exchange within this aeration layer and one end must be tilted and able to drain water away from the fill layer.
4. A layer of felted filter fabric is to be installed over the aeration layer to prevent fine particles of sand and soil from infiltrating this layer.
5. The base layer and permeable paving material can be installed directly on top of this aeration layer
6. If applicable, a rock wall that does not require excavation into the existing grade, should be constructed to prevent fill soil from touching the trunk of the tree.

revision no.	1
checked by	
drawn by	
scale	
date	
drawing #	1022 Speed B
project no.	





TREE PROTECTION FENCING

1. FENCE WILL BE CONSTRUCTED USING 38 mm X 89mm WOOD FRAME: TOP, BOTTOM AND POSTS * USE ORANGE SNOW-FENCING MESH AND SECURE THE WOOD FRAME WITH "ZIP" TIES OR GALVANIZED STAPLES.
 2. ATTACH A 500mm X 500mm SIGN WITH THE FOLLOWING WORDING: WARNING- TREE PROTECTION AREA. THIS SIGN MUST BE AFFIXED ON EVERY FENCE OR AT LEAST EVERY 10 LINEAR METERS.
- * IN ROCKY AREAS, METAL POSTS (T-BAR OR REBAR) DRILLED INTO ROCK WILL BE ACCEPTED



Talbot Mackenzie & Associates

Consulting Arborists

Box 48153 RPO - Uptown Victoria, BC V8Z 7H6

Ph: (250) 479-8733

Fax: (250) 479-7050

Email: tmtreehelp@gmail.com

Tree Resource Spreadsheet Methodology and Definitions

Tag: Tree identification number on a metal tag attached to tree with nail or wire, generally at eye level. Trees on municipal or neighboring properties are not tagged.

NT: No tag due to inaccessibility or ownership by municipality or neighbour.

DBH: Diameter at breast height – diameter of trunk, measured in centimetres at 1.4m above ground level. For trees on a slope, it is taken at the average point between the high and low side of the slope.

* Measured over ivy

~ Approximate due to inaccessibility or on neighbouring property

Crown Spread: Indicates the diameter of the crown spread measured in metres to the dripline of the longest limbs.

Relative Tolerance Rating: Relative tolerance of the tree species to construction related impacts such as root pruning, crown pruning, soil compaction, hydrology changes, grade changes, and other soil disturbance. This rating does not take into account individual tree characteristics, such as health and vigour. Three ratings are assigned based on our knowledge and experience with the tree species: Poor (P), Moderate (M) or Good (G).

Critical Root Zone: A calculated radial measurement in metres from the trunk of the tree. It is the optimal size of tree protection zone and is calculated by multiplying the DBH of the tree by 10, 12 or 15 depending on the tree's Relative Tolerance Rating. This methodology is based on the methodology used by Nelda Matheny and James R. Clark in their book "Trees and Development: A Technical Guide to Preservation of Trees During Land Development."

- 15 x DBH = Poor Tolerance of Construction
- 12 x DBH = Moderate
- 10 x DBH = Good

To calculate the critical root zone, the DBH of multiple stems is considered the sum of 100% of the diameter of the largest stem and 60% of the diameter of the next two largest stems. It should be noted that these measures are solely mathematical calculations that do not consider factors such as restricted root growth, limited soil volumes, age, crown spread, health, or structure (such as a lean).

Health Condition:

- Poor - significant signs of visible stress and/or decline that threaten the long-term survival of the specimen
- Fair - signs of stress
- Good - no visible signs of significant stress and/or only minor aesthetic issues

Structural Condition:

- Poor - Structural defects that have been in place for a long period of time to the point that mitigation measures are limited
- Fair - Structural concerns that are possible to mitigate through pruning
- Good - No visible or only minor structural flaws that require no to very little pruning

Retention Status:

- X - Not possible to retain given proposed construction plans
- Retain - It is possible to retain this tree in the long-term given the proposed plans and information available. This is assuming our **recommended mitigation measures are followed**
- Retain * - See report for more information regarding potential impacts
- TBD (To Be Determined) - The impacts on the tree could be significant. However, in the absence of exploratory excavations and in an effort to retain as many trees as possible, we recommend that the final determination be made by the supervising project arborist at the time of excavation. The tree might be possible to retain depending on the location of roots and the resulting impacts, but concerned parties should be aware that the tree may require removal.
- NS - Not suitable to retain due to health or structural concerns