

City of Surrey
PLANNING & DEVELOPMENT REPORT

Application No.: 7921-0345-00

Planning Report Date: October 3, 2022

PROPOSAL:

- **Temporary Use Permit**

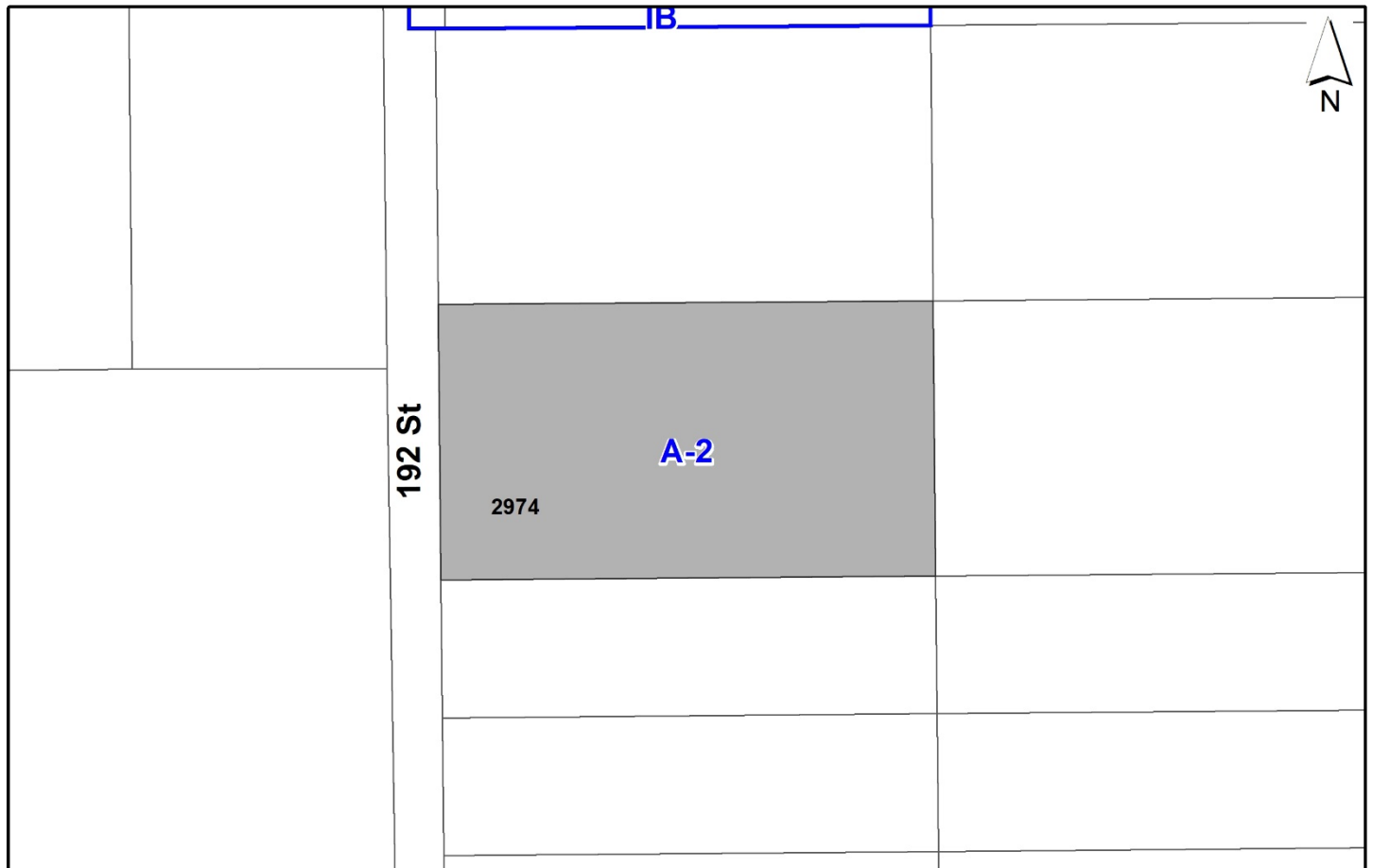
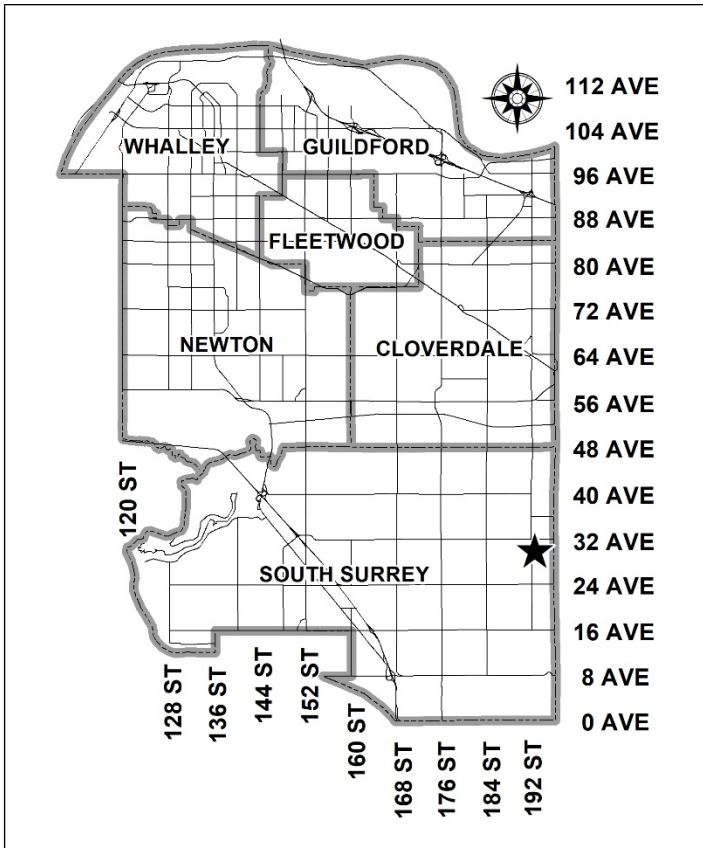
to permit the extension of an existing temporary outdoor storage facility for cargo equipment and truck parking for a period not to exceed 2 years.

LOCATION: 2974 - 192 Street

ZONING: A-2

OCP DESIGNATION: Mixed Employment

LAP DESIGNATION: Business Park and Landscaping Strips



RECOMMENDATION SUMMARY

- Approval of Temporary Use Permit No. 7921-0345-00 for a period not to exceed two years to proceed to Public Notification.

DEVIATION FROM PLANS, POLICIES OR REGULATIONS

- The proposed truck parking facility and outdoor storage of cargo equipment does not comply with the "Intensive Agriculture Zone (A-2)" or the Business Park & Landscaping Strips land use designation in the Campbell Heights Local Area Plan.

RATIONALE OF RECOMMENDATION

- At the June 29, 2020, Regular Council – Land Use meeting, staff brought forward a report recommending that a proposed Temporary Use Permit No. 7920-0106-00 for a temporary outdoor storage facility for cargo equipment and truck parking be referred back to staff to work with the applicant on achieving development that complies with the "Business Park" and "Landscaping Strips" land use designations in the Campbell Heights Local Area Plan (LAP). However, at that meeting, Council referred Development Application No. 7920-0106-00 back to staff to work with the applicant on the requirements to support a Temporary Use Permit (TUP) for a period not to exceed 1 year in duration.
- Staff brought Development Application No. 7920-0106-00 on the subject site back to Council at the July 27, 2020, Regular Council – Land Use meeting, where it was supported by Council to proceed to Public Notification. At the November 9, 2020, Regular Council – Land Use meeting, Council issued Temporary Use Permit No. 7920-0106-00 at 2974 – 192 Street for a temporary outdoor storage facility for cargo equipment and truck parking for a period not to exceed one year.
- The one-year temporary use permit has now lapsed, and the applicant requests a further extension of two years while a permanent facility is developed at another location nearby (19590 – 32 Avenue). Development of that property is under Development Application No. 7921-0247-00 which is still in initial review.
- As a temporary use permit was previously supported, and the site is already disturbed and can accommodate the use, this report outlines the requirements to support a Temporary Use Permit for a period not to exceed two years from the date of issuance.

RECOMMENDATION

The Planning & Development Department recommends that:

1. Council approve Temporary Use Permit No. 7921-0345-00 (Appendix III) to proceed to Public Notification.
2. Council instruct staff and the applicant to resolve the following issues to facilitate issuance of the Temporary Use Permit:
 - (a) ensure that all engineering requirements and issues including completion of Schedule C of the Temporary Use Permit, restrictive covenants, dedications, and rights-of-way where necessary, are addressed to the satisfaction of the General Manager, Engineering;
 - (b) removal and restoration of the existing 192 Street driveway and make improvements in the proposed 30 Avenue road allowance;
 - (c) construction of a new driveway access to 192 Street;
 - (d) submission of a finalized tree survey and a statement regarding tree preservation to the satisfaction of the City Landscape Architect;
 - (e) the applicant satisfy the deficiency in tree replacement on the site, to the satisfaction of the Planning and Development Department;
 - (f) submission of a finalized site plan demonstrating revised access to 192 street and a revised access easement granting access for 3037 – 194 Street over 2974 – 192 Street and 2999 – 194 Street, that is generally consistent with the site plan shown in Appendix I;
 - (g) completion of Development Application No. 7922-0279-00, including the registration of subdivision plans at the Land Title and Survey Authority of BC for the subdivision of 3048 and 2974 – 192 Street;
 - (h) Discharge of Easement CA8628547 and CA8628551; and
 - (i) Registration of an access easement granting access for 3037 – 194 Street to 192 Street over 2974 – 192 Street and 2999 – 194 Street.

SITE CONTEXT & BACKGROUND

Direction	Existing Use	LAP Designation	Existing Zone
Subject Site	<p>Temporary Truck Parking and Outdoor Storage (TUP No. 7920-0106-00).</p> <p>The subject site, together with 3048 – 192 Street to the north, is under Development Application No. 7922-0279-00 for subdivision and a Development Variance Permit to defer works and services. The subject site is also under Development Application No. 7921-0231-00 for a proposed rezoning and Development Permit to permit the development of a multi-tenant industrial business park building.</p>	Business Park and Landscaping Strips	A-2
North:	<p>Two single family dwelling units and truck parking.</p> <p>The site, together with the subject site (2974- 192 Street) is under Development Application No. 7922-0279-00 for subdivision and a Development Variance Permit to defer works and services. The site is also under Development Application No. 7918-0051-00 for rezoning and a Development Permit to permit the development of an industrial business park building.</p>	Business Park and Landscaping Strips	A-2

Direction	Existing Use	LAP Designation	Existing Zone
East:	<p>Unauthorized Truck Parking and Outdoor Storage.</p> <p>The site is under Development Application No. 7922-0089-00 for a proposed Temporary Use Permit to allow outdoor storage of materials. The proposal is proposed to operate in conjunction with the Temporary Use Permit for the subject site (2974 – 192 Street).</p>	Business Park	A-2
South:	<p>Residential and truck parking.</p> <p>The site is under Development Application No. 7922-0259-00 for a proposed truck parking facility.</p>	Business Park and Landscaping Strips	A-2
West (Across 192 Street):	<p>Residential/agricultural uses.</p> <p>The site at 2981 – 192 Street is under Development Application No. 7922-0191-00 for a proposed rezoning and Development Permit to permit two multi-tenant industrial business park buildings.</p>	Business Park and Landscaping Strips	A-2

Context & Background

- The subject site is approximately 2 hectares in area and located on the east side of 192 Street between 28 Avenue and 32 Avenue. The property is designated "Mixed Employment" in the Official Community Plan (OCP), "Business Park" and "Landscaping Strips" in the Campbell Heights Local Area Plan (LAP), and zoned "Intensive Agriculture Zone (A-2)".
- This application is being considered in conjunction with Development Application No. 7921-0346-00, located at 3037 – 194 Street which abuts 2974 – 192 Street to the northeast. Both applications (7921-0345-00 and 7921-0346-00) propose a Temporary Use Permit for a temporary outdoor storage facility for cargo equipment and truck parking, for the applicant, Seven Horses Transport Ltd. ("Seven Horses").
- At the June 29, 2020, Regular Council – Land Use Meeting, Council referred Development Application No. 7920-0106-00 (on the subject property) back to staff to work with the applicant on the requirements in order to support a Temporary Use Permit (TUP) for a period not to exceed 1 year in duration.
- At the November 9, 2020, Regular Council – Land Use Meeting, Council issued Temporary Use Permit No. 7920-0106-00 at 2974 – 192 Street for a temporary outdoor storage facility for cargo equipment and truck parking for a period not to exceed one year.

- The one-year temporary use permit has now lapsed, and the applicant requests a further extension of two years while a permanent facility is developed at another location nearby (19590 – 32 Avenue). Development of that property is under Development Application No. 7921-0247-00 which is still in initial review.
- With the site being previously prepared to accommodate the proposed use and Council having supported a temporary use permit on the site, staff recommend support for a second a Temporary Use Permit on the subject property for a period not to exceed two years from the date of issuance. This report outlines the conditions to support Temporary Use Permit No. 7921-0345-00.
- During the processing of Temporary Use Permit No. 7920-0106-00, the applicant expanded the outdoor storage operation onto the adjacent site located at 2999 – 194 Street without any of the necessary municipal approvals. The Seven Horses cargo storage and truck parking operation now effectively operates over three properties located at 2974 – 192 Street, 3037 – 194 Street and 2999 – 194 Street and is currently operating without an authorized or active Temporary Use Permit on any of the three sites.
- The outdoor storage operation located on 3037 – 194 Street was previously approved under Temporary Use Permit No. 7920-0107-00. This TUP has also lapsed and is seeking an extension under Development Application No. 7921-0346-00. This application will also be considered at the October 3, 2022, Regular Council - Land Use Meeting.
- The applicant has submitted a TUP application under Development Application No. 7922-0089-00 to authorize the storage operation at 2999 – 194 Street. This application will also be considered at the October 3, 2022, Regular Council – Land Use Meeting, with staff recommending denial.
- The subject property is concurrently under Development Application No. 7922-0279-00, together with 3048 – 192 Street, which abuts the site to the north. The purpose of this application is to achieve road dedication for 30 Avenue and to facilitate future redevelopment of 2974 and 3048 – 192 Street independently. It is necessary for Development Application No. 7922-0279-00 to be finalized and the subdivision plans registered at the Land Title and Survey Authority of BC before final issuance of Temporary Use Permit Nos. 7921-0345-00 and 7921-0346-00.

DEVELOPMENT PROPOSAL

Planning Considerations

- The applicant (Seven Horses) proposes an extension to the Temporary Use Permit No. 7920-0106-00 (now under a new Development Application No. 7921-0345-00) for outdoor storage for cargo equipment and truck parking that lapsed on November 9, 2021. The proposed extension under the subject development application (No. 7921-0345-00) is not to exceed 2 years.

- A 2-year timeframe has been determined to be a reasonable amount of time for the applicant to complete Development Application No. 7921-0247-00 at 19590 – 32 Avenue which will allow the uses associated with their existing TUPs to be relocated to this site, thus making the subject properties available to develop to their ultimate uses.
- The Temporary Use Permit will allow a maximum of five trucks permitted to be parked on-site at any one time, as shown in Appendix I. An additional thirteen trucks are proposed to be parked on 3037 – 194 Street (Development Application No. 7921-0346-00).
- Materials to be stored on the site include:
 - Rebar
 - Steel beams
 - Steel pipes
 - Lumber
 - Galvanized posts
 - Machines and equipment.

Proposed	
Lot Area	
Gross Site Area:	2 hectares
Road Dedication:	n/a
Undevelopable Area:	n/a
Net Site Area:	n/a

Referrals

Engineering: The Engineering Department will require the completion of Engineering servicing requirements as outlined in Appendix II as a condition of the TUP issuance.

Transportation Considerations

- As a result of the road dedication for the future 30 Avenue proposed through Development Application No. 7922-0279-00, a new driveway entrance will be required as the current driveway is located in the proposed road alignment. The driveway will be required to be located near the south property line, north of the existing berm. Construction of the new driveway will be a condition of issuance for Temporary Use Permit No. 7921-0345-00.
- Bylaw protected trees are located in the vicinity of the proposed driveway. The applicant will be required to submit an arborist report to determine the number of trees proposed for removal and the number of replacement trees required for the property prior to final issuance of Temporary Use Permit No. 7921-0345-00.
- The applicant will be required to remove the existing driveway access and improvements from the proposed 30 Avenue road allowance. The applicant will be required to restore the proposed road allowance to the satisfaction of the General Manager of Engineering.

- 3037 – 194 Street, which is located to the northeast of the subject site and part of the Seven Horses outdoor storage operation, gains access to their site from 192 street via an access easement that crosses the subject property and 2999 – 194 Street. This easement was registered as a condition of approval for Temporary Use Permit No. 7920-0107-00.
- The existing access easement is located in the road dedication for the future 30 Avenue that is proposed under Development Application No. 7922-0279-00. As truck access to 194 Street from 3037 – 194 Street will not be supported by staff due to insufficient pavement, a new access easement will need to be registered as a condition of approval for Temporary Use Permit 7921-0346-00 onto 194 Street.
- Access onto 192 Street is restricted to right-in/right-out movement.

DISCUSSION

Temporary Use Permits for Truck Parking and Outdoor Storage in Campbell Heights

- The subject site is located within an area of Campbell Heights that is known to have vulnerable aquifers resulting from unconsolidated material, as per the Vulnerable Aquifers Map (Schedule I)" in the Zoning By-law.
- The subject site is also within the catchment area identified to be serviced by the Latimer Lake Storm Water Detention Facility. Completion of a Storm Water Management Plan and modifications to the Latimer Lake facility are required before any development within this catchment can proceed.
- The applicant is advised that the Campbell Heights Local Area Plan (LAP) has requirements for stormwater management and onsite infiltration depending on the location within the LAP. The drainage design for the temporary truck parking must continue to meet the requirements of the Kerr Wood Leidal (KWL) report dated November 20, 2019, and confirmed by KWL that the design meets the objectives. The KWL drainage report dated November 20, 2019, was prepared to determine the ultimate drainage improvements required to service this catchment area.
- While staff have generally not been supportive of Temporary Use Permits in Campbell Heights, Council did support and issue TUPs for Seven Horses on the subject site and 3037 - 194 Street in November 2020 (Temporary Use Permits Nos. 7920-0106-00 and 7921-0107-00).
- Staff are currently in discussions with the owners of the subject site and the owners of the abutting site to the north (3048 – 192 Street) about future development and the delivery of a new east-west road (30 Avenue). The ongoing discussions have delayed opportunities to advance a formal development application for the subject site and the site to the north.
- 30 Avenue is intended to be delivered through the ultimate development of the subject site and the property to the north (3048 – 192 Street), with access to the future developments from 30 Avenue rather than 192 Street. The delivery of 30 Avenue is contingent on both properties developing concurrently or under the same application.

- Since the proposed two-year extension to the Temporary Use Permit on the subject site hinders the development timing for the property to the north, Seven Horses will be required to complete a subdivision of the subject site and 3048 – 192 Street, proposed under Development Application No. 7922-0279-00. This subdivision application will provide the road dedication for 30 Avenue in advance of redevelopment and ensure that 3048 – 192 Street can pursue appropriate redevelopment of their lands independently of Seven Horses.
- The applicant is required to finalize Development Application No. 7922-0279-00, which is being considered at the October 3, 2022, Regular Council - Land Use Meeting, and register the subdivision plans at the Land Title and Survey Authority of BC prior to final issuance of Temporary Use Permit Nos. 7921-0345-00 and 7921-0346-00.

Temporary Use Permit Requirements

- Should Council continue to support the TUP in principle, staff identified the following items to be resolved prior to the issuance of a Temporary Use Permit:
 - Completion of Development Application No. 7922-0279-00 and registration of subdivision plans at the Land Title and Survey Authority of BC.
 - Discharge of the existing access easement CA8628547 and CA8628551.
 - Registration of a new access easement granting 3037 – 194 Street access to 192 Street via 2999 – 194 Street and 2974 – 192 Street.
 - Removal and restoration of the existing driveway and improvements located in the future 30 Avenue road alignment.
 - Construction of a new driveway through all necessary permits, including approval of an arborist report to determine requirements for tree removal.
 - submission of a finalized site plan.
- Once all of the above conditions are complete, staff will bring forward Temporary Use Permit No. 7921-0345-00 for issuance, should Council be supportive of the TUP.
- It is anticipated that Temporary Use Permit No. 7921-0346-00 will be issued in conjunction with the subject application.
- Provided that Temporary Use Permit No. 7921-0345-00 is issued, the applicant will be required to restore the site back to its original condition as an “Intensive Agriculture Zone (A-2)” property, following the two-year term for the TUP.

POLICY & BY-LAW CONSIDERATIONS

Zoning By-law

- The applicant proposes a Temporary Use Permit under the existing zone: "Intensive Agriculture Zone (A-2)". The proposal would permit the temporary use to operate on the property, as the proposed uses are not permitted under the A-2 Zone.

PUBLIC ENGAGEMENT

- Pre-notification letters were sent on December 1, 2021. and the Development Proposal Signs were installed on December 7, 2021. Staff received two responses from property owners in the area, including the owner to north:
 - The proposed temporary use permit will further limit/delay development in Campbell Heights and will negatively impact existing and planned developments in the area. This property is within the Latimer Storm Catchment and a Joint Venture to fund the storm upgrades in the area was undertaken. Support of this development will further delay ultimate development of these lands.

(Given the previous support for a temporary use on these lands and the fact that land is already disturbed with the temporary use, coupled with the proponent's plans for advancing a development application at 19590 – 32 Avenue, staff are presenting the requirements that must be met in order to extend the temporary use on the subject site for a further two years while the proponent works on a concurrent development application at 19590 – 32 Avenue along with the subject site. As well, the applicant is required to register a Statutory Right-of-Way for access to 192 Street for the adjacent property to the north to facilitate ultimate development of that property in the interim.)

- The subject development application was reviewed by the Little Campbell Watershed Society (LCWS). No comments were provided by the time of report writing.

Conclusion

- While staff are generally not supportive of Temporary Use Permits for temporary storage of vehicles and equipment in Campbell Heights, given the previous direction by Council to support a limited temporary use permit at this location, the acceptance by the applicant to register subdivision plans to allow the adjacent property to the north (3048 – 192 Street) to develop independently, and that the site was previously prepared for the proposed use, including all necessary drainage improvements, staff believe it is reasonable to permit the extension of the temporary storage use at this location through the issuance of Temporary Use Permit No. 7921-0345-00 for a period not to exceed two years.

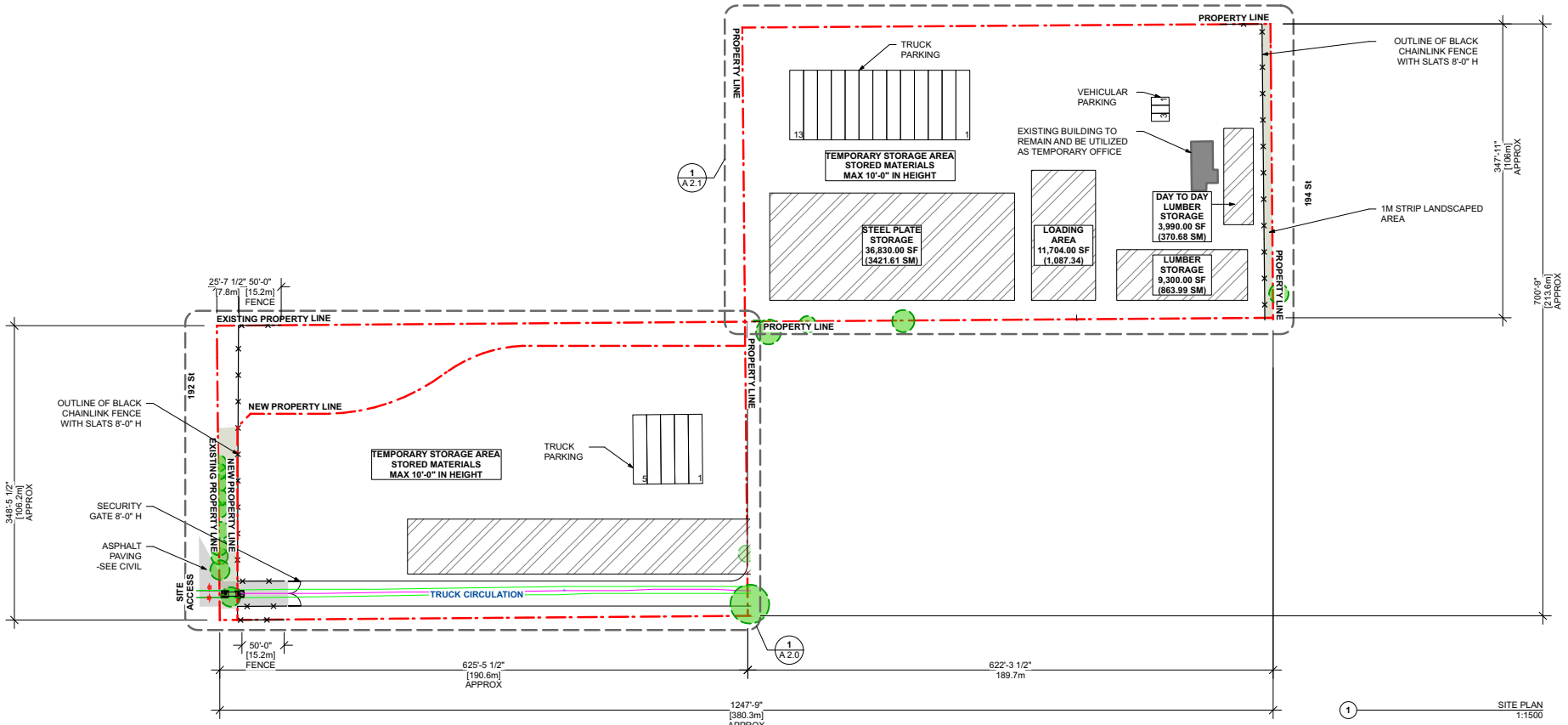
INFORMATION ATTACHED TO THIS REPORT

The following information is attached to this Report:

Appendix I.	Site Plan
Appendix II.	Engineering Summary
Appendix III.	Temporary Use Permit No. 7921-0345-00

approved by Shawn Low

Jeff Arason
Acting General Manager
Planning and Development

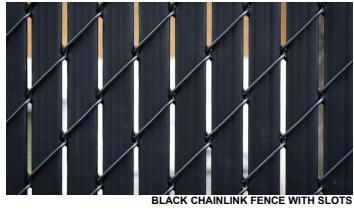


1 SITE PLAN 1:1500

- NOTES**
- SURVEY PLAN PROVIDED BY APLIN & MARTIN FILE 19-2022-01 TOPO DATED 25 05 2020
 - FOR SITE GRADING INFORMATION REFER TO CIVIL GRADING PLAN 19-2022-02 DATED 21 07 2020
 - REFER TO CIVIL KEY PLAN 19-2022-01 FOR EXISTING FENCE
 - REFER TO ARBORIST REPORT FOR TREE PROTECTION FENCE

HATCH LEGEND

	HATCH DENOTES DESIGNATED AREAS
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NO.	DATE	ISSUANCE
1	2020 06 30	ISSUED FOR COORDINATION
2	2020 07 13	ISSUED FOR COORDINATION
3	2020 07 15	ISSUED FOR TUP
4	2020 07 22	ISSUED FOR TUP
5	2022 07 18	ISSUED FOR TUP
6	2022 07 21	ISSUED FOR TUP
7	2022 09 12	ISSUED FOR TUP
8	2022 09 13	ISSUED FOR TUP



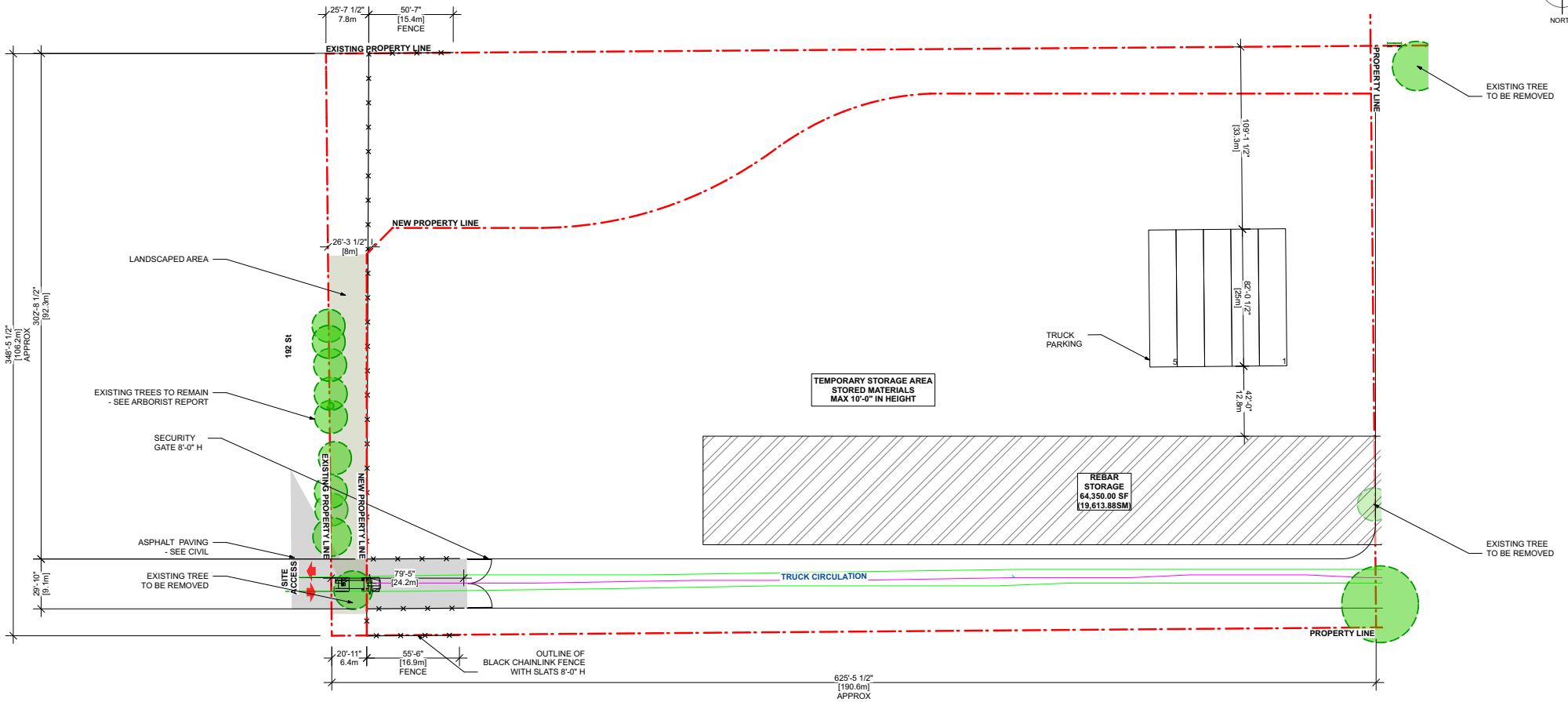
TEMPORARY STORAGE USE
2974 192 Street & 3037 194 Street
SURREY, BC

SITE PLAN + GRAPHICS A 1.0



DRAWN: GG
CHECKED: KC
SCALE: 1:1500
FILE: 2006

KCC Architecture & Design Ltd. kccarchitecture.com
Unit 600 1285 W. Broadway Vancouver BC V6H 3V8 Tel 604 909 1267



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HATCH LEGEND

HATCH DENOTES DESIGNATED AREAS

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TEMPORARY STORAGE USE
2974 192 Street & 3037 194 Street
SURREY, BC

ENLARGED SITE PLAN

A 2.0

KCC ARCHITECTURE

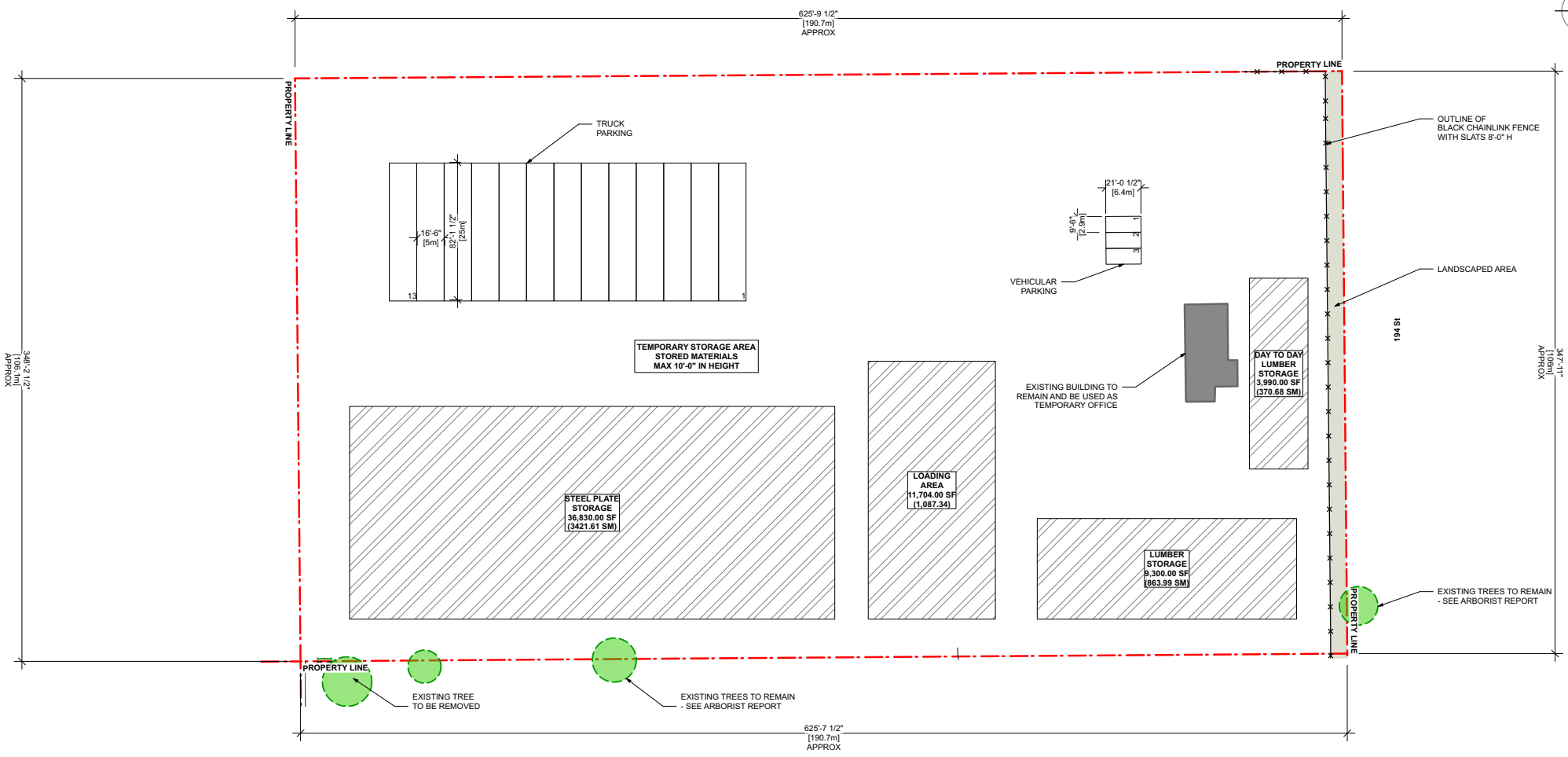
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CHECKED: KC

SCALE: 1:700

FILE: 2006

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Unit 603 1285 W. Broadway Vancouver BC V6H 3V6 Tel 604 909 1267

1 ENLARGED PLAN 2974 192 ST
1:700



NOTES

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TEMPORARY STORAGE USE
2974 192 Street & 3037 194 Street
SURREY, BC

ENLARGED SITE PLAN

A 2.1



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CHECKED: KC

SCALE: 1:700

FILE: 2006

KCC Architecture & Design Ltd. kccarchitecture.com
Unit 600 1285 W. Broadway Vancouver BC V6H 3V8 Tel 604 909 1267

1 ENLARGED PLAN 3037 194 ST 1:700



INTER-OFFICE MEMO

TO: **Manager, Area Planning & Development
- South Surrey Division
Planning and Development Department**

FROM: **Development Services Manager, Engineering Department**

DATE: **September 13, 2022** PROJECT FILE: **7821-0345-00**

RE: **Engineering Requirements (Commercial/Industrial)
Location: 2974 192 St**

TEMPORARY USE PERMIT

The following issues are to be addressed as a condition of issuance of the Temporary Use Permit (TUP):

- Complete subdivision and 30 Ave dedication under file 7922-0279-00, and concurrently discharge existing access easement EPP104416.

Works and Services

- Construct a driveway complete with splitter island on 192 St to restrict access to right-in/right-out only, located as south as possible.
- Remove all existing materials, equipment, fencing, etc. located on 30 Ave road allowance.
- Remove existing accesses along 192 St and restore the boulevard to City standards.
- Maintain and keep functional, the on-site drainage systems in accordance with the engineering designs completed by Aplin & Martin under TUP 7920-0106-00 to retain all on-site runoff up to and including the 100-year storm event.

Legal Documents

- Register access easement in favour of 2999 and 3037 194 St on title.
- Ensure a restrictive covenant for right-in/right-out access is registered on title.

A Servicing Agreement is not required. An Administrative Processing Fee is required to administer the required legal documents. The applicant is required to secure all applicable permits for the required works above through the Engineering Department.

Jeff Pang, P.Eng.
Development Services Manager

DJS

CITY OF SURREY

(the "City")

TEMPORARY USE PERMIT

NO.: 7921-0345-00

Issued To:

(the "Owner")

Address of Owner:

1. This temporary use permit is issued subject to compliance by the Owner with all statutes, by-laws, orders, regulations, or agreements, except as specifically varied by this temporary use permit.
2. This temporary use permit applies to that real property including land with or without improvements located within the City of Surrey, with the legal description and civic address as follows:

Parcel Identifier: 012-217-158

Lot 6 Section 22 Township 7 New Westminster District Plan 1467

2974 - 192 Street

(the "Land")

3. The authority to issue Temporary Use Permits is granted to municipalities under Sections 492 and 493 of the *Local Government Act* R.S.B.C. 2015, c.1. Pursuant to Implementation, II(c) Implementation Instruments, Temporary Use Permits of Surrey Official Community Plan, 2013, No. 18020, as amended, the entire City of Surrey is designated a Temporary Use Permit area.
4. The temporary use permitted on the Land shall be for the storage of cargo equipment and truck parking facility, limited to five trucks, for vehicles exceeding 5,000 kilograms G.V.W.
5. The temporary use permitted on the Land shall be in accordance with:
 - (a) The appearance and location of the buildings, access and parking as shown on Schedule A (the "Drawings") which is attached hereto and forms part of this permit.
 - (b) The Kerr Wood Leidal Report, dated September 10, 2020, which is shown on Schedule B (the Report") which is attached hereto and forms part of this permit.

6. Surrey Zoning By-law, 1993, No. 12000, as amended is varied as follows:
 - (a) Section A.4 of Part 5 Off-Street Parking and Loading/Unloading, the requirement to pave the parking area with asphalt, concrete or other similar pavement, is modified to allow the use of other surfacing materials suitable for truck traffic as approved by the General Manager, Engineering.

7. The Owner covenants and agrees that the pre-servicing requirements attached as Schedule C (the "Engineering Requirements") which is attached hereto and forms part of this permit, have been completed and will be maintained for the duration of the Temporary Use Permit.

8. The temporary use shall be carried out according to the following conditions:
 - (a) the Temporary Use Permit shall be for the storage of equipment and a truck parking facility for five vehicles exceeding 5,000 kilograms G.V.W;
 - (b) the five truck parking spaces are to be visually delineated at all times to the satisfaction of the General Manager, Planning and Development so as to assist in ensuring the orderly parking of vehicles on the site at all times; and
 - (c) the following activities are prohibited on the land:
 - i. vehicle washing;
 - ii. vehicle maintenance except if it is on an asphalt or concrete pad and excludes all oil, coolant, or chemical use as per the Environmental Management Act, S.B.C. 2002 Chapter 43;
 - iii. truck fuel storage or refuelling;
 - iv. storage of waste petroleum fluids; and
 - v. parking or storage of vehicles containing Dangerous Goods as defined by the Transport of Dangerous Goods Act R.S.B.C. 1996, Chapter 458.

9. The Owner covenants and agrees as a condition of the issuance of this Temporary Use Permit to restore the Land to the condition it was prior to the storage of equipment and parking of vehicles all of which shall be done not later than the termination date set out on this Temporary Use Permit.

10. The Owner agrees that should the Owner not comply with the Temporary Use Permit, the City or its agents may enter upon the Land and perform such work as is necessary to eliminate the temporary use and bring the use and occupancy of the Land in compliance with Surrey Zoning By-law, 1993, No. 12000, as amended. These costs and expenses are recoverable by the City as a debt and may be collected in the same manner and with the same remedies as ordinary taxes on land and improvements under Section 258.1(c) of the Community Charter, S.B.C. 2003, c. 26, as amended and if it is due and payable by December 31 and unpaid on that date, the debt is deemed to be taxes in arrears.

11. The Land shall be developed strictly in accordance with the terms and conditions and provisions of this temporary use permit. This temporary use permit is not a building permit.
12. An undertaking submitted by the Owner is attached hereto as Appendix I and forms part of this temporary use permit.
13. This temporary use permit is not transferable.
14. This temporary use permit shall lapse on or before two years from date of issuance

AUTHORIZING RESOLUTION PASSED BY THE COUNCIL, THE DAY OF , 20 .

ISSUED THIS DAY OF , 20 .

Mayor - Doug McCallum

City Clerk - Jennifer Ficocelli

IN CONSIDERATION OF COUNCIL'S APPROVAL OF THIS TEMPORARY USE PERMIT AND OTHER GOOD AND VALUABLE CONSIDERATION, I/WE THE UNDERSIGNED AGREED TO THE TERMS AND CONDITIONS OF THIS TEMPORARY USE PERMIT AND ACKNOWLEDGE THAT WE HAVE READ AND UNDERSTOOD IT.

Authorized Agent: Signature

Name (Please Print)

OR

Owner: Signature

Name: (Please Print)

TO THE CITY OF SURREY:

I, _____ (Name of Owner)

being the owner of _____
(Legal Description)

known as _____
(Civic Address)

hereby undertake as a condition of issuance of my temporary use permit to:

- (a) demolish or remove all buildings and/or structures that are permitted to be constructed pursuant to the temporary use permit issued to me; and
- (b) restore the land described on the temporary use permit to a condition specified in that permit;

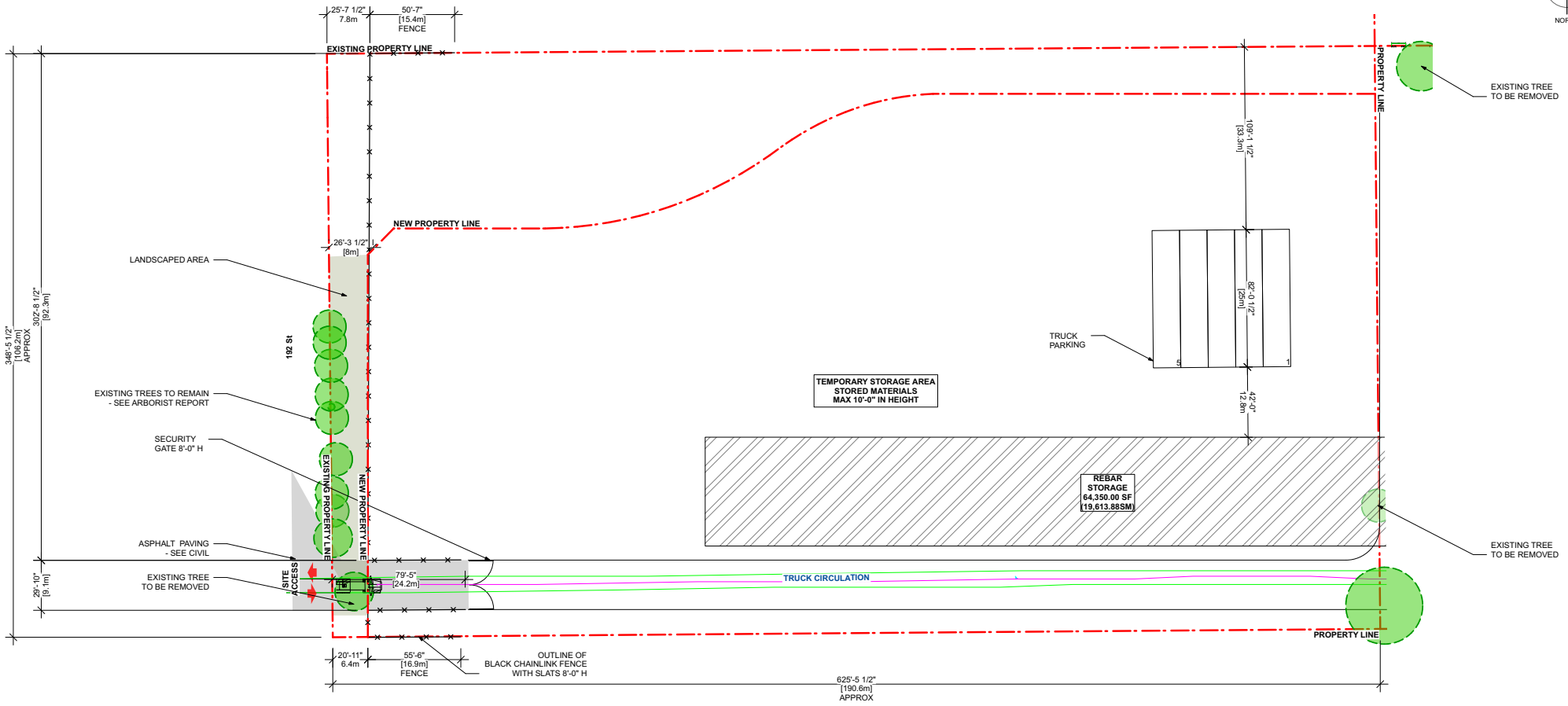
all of which shall be done not later than the termination date set out on the temporary use permit.

I further understand that should I not fulfill the undertaking described herein, the City or its agents may enter upon the land described on the temporary use permit and perform such work as is necessary to eliminate the temporary use and bring the use and occupancy of the land in compliance with Surrey Zoning By-law, 1993, No. 12000, as amended, and that any securities submitted by me to the City pursuant to the temporary use permit shall be forfeited and applied to the cost of restoration of my land as herein set out.

This undertaking is attached hereto and forms part of the temporary use permit.

(Owner)

(Witness)



- NOTES**
- SURVEY PLAN PROVIDED BY AFLIN & MARTIN FILE 19-2022-01 TOPO DATED 25.05.2020
 - FOR SITE GRADING INFORMATION REFER TO CIVIL GRADING PLAN 19-2022-02 DATED 21.07.2020
 - REFER TO CIVIL KEY PLAN 19-2022-01 FOR EXISTING FENCE
 - REFER TO ARBORIST REPORT FOR TREE PROTECTION FENCE

HATCH LEGEND

	HATCH DENOTES DESIGNATED AREAS
--	--------------------------------

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NO.	DATE	ISSUANCE
1	2020 06 30	ISSUED FOR COORDINATION
2	2020 07 13	ISSUED FOR COORDINATION
3	2020 07 15	ISSUED FOR TUP
4	2020 07 22	ISSUED FOR TUP
5	2022 07 18	ISSUED FOR TUP
6	2022 07 21	ISSUED FOR TUP
7	2022 09 12	ISSUED FOR TUP



TEMPORARY STORAGE USE
2974 192 Street & 3037 194 Street
SURREY, BC

ENLARGED SITE PLAN

A 2.0



DRAWN: GG
CHECKED: KC
SCALE: 1/200
FILE: 2006

KCC Architecture & Design Ltd. kccarchitecture.com
Unit 603 1285 W. Broadway Vancouver BC V6H 3V8 Tel 604 909 1267

1 ENLARGED PLAN 2974 192 ST 1/700



Greater Vancouver
200 - 4185A Still Creek Drive
Burnaby, BC V5C 6G9
T 604 294 2088
F 604 294 2090

Technical Memorandum

DATE: September 10, 2020

TO: Anya Paskovic, MCIP, RPP
Aplin & Martin Consulting Ltd.

FROM: Jeff Marvin, P.Eng.
Laurel Morgan, P. Eng.

RE: **Surface Hydrology Assessment for Temporary Use Permit
at 2974-192 St. and 3037-194 St., Surrey, BC
Our File 2191.031-300**

1. Introduction

This memorandum provides a surface hydrology assessment for 2974-192 Street and 3037-194 Street in Surrey, BC, including recommendations for site stormwater management measures to be implemented on the two properties while they are being used for interim truck parking and material storage activities prior to their proposed future development.

The assessment and recommendations presented herein addresses the following Temporary Use Permit (TUP) requirements for the two properties issued by the City of Surrey on July 21, 2020¹:

“Provide on-site infiltration and water quality treatment for any stormwater. The plan should overlay a proposed truck park design. A grading plan needs to be established in conjunction with the stormwater management plan to ensure there is proper grading to infiltration galleries. This TUP truck park must manage 100% stormwater onsite.”

The purpose of this assessment is to review the existing surface flow conditions of the two properties and to provide recommendations for design of stormwater management measures to maintain pre-disturbance hydrological conditions during the interim use of the site by the current tenant, Seven Horses Transport Ltd. (Seven Horses).

It is KWL’s understanding, based on discussions with Aplin & Martin, that the planned usage of the site under the TUP is expected to be in place for approximately 1 year. The recommendations in this memorandum are based on the usage under the TUP not exceeding 2 years duration.

¹ City of Surrey. “Engineering Requirements (Commercial/Industrial). Location: 2974-192 Street. TEMPORARY USE PERMIT.” July 21, 2020.



2. Site Background and Supporting Information

Site information discussed throughout this memorandum is based on the following reports and information:

- Geotechnical investigations of the site issued by GeoPacific Consulting Ltd. (GeoPacific) on June 29, 2020 in relation to the proposed future development^{2,3};
- A geotechnical investigation of the area issued by Tetra Tech Canada Inc. (Tetra Tech) on June 18, 2018 in relation to the rezoning of 3037 194 St.⁴;
- A hydrogeological investigation of the site issued by Piteau Associates Engineering Ltd. (Piteau) on July 22, 2020 in relation to the proposed interim site activities⁵;
- A hydrogeological investigation of nearby properties 19437 32 Ave. and 3338 194 St. issued by Piteau on June 15, 2018⁶;
- A surface hydrologic assessment of nearby properties 19363/19437 32 Ave. and 3338 194 St. issued by Kerr Wood Leidal Associates Ltd. (KWL) on November 20, 2019 for similar interim site usage by Seven Horses⁷; and
- A site visit by KWL carried out on August 12, 2020.

3. Description of Site Hydrology

The study area consists of two neighbouring properties, 2974-192 St. and 3037-194 St., and is currently zoned as intensive agricultural (A-2). While the two properties do not share a common boundary, the northeast corner of 2974-192 St. is shared with the southwest corner of 3037-194 St, and a temporary unpaved roadway currently connects the two properties at this corner. Based on historical aerial imagery and a recent site visit, approximately 25% of the 3037-194 St. property was stripped in 2016 and 2017 to create a truck parking area and access road, and perimeter berms were installed along the parking area using the stripped topsoil. The remainder of the site is generally vegetated with fields and treed areas. A single-family dwelling on 2974-192 St. was demolished in 2018, and the asphalt driveway access to this dwelling remains. A single-family dwelling, garage and shed remain on 3037-194 St., and foundation remnants of a former structure remain in the northeast region of the property.

² GeoPacific Consulting Ltd. "Geotechnical Investigation Report – Proposed Commercial Building, 2974 192 Street, Surrey, BC". June 29, 2020.

³ GeoPacific Consulting Ltd. "Geotechnical Investigation Report – Proposed Commercial Building, 3037 194 Street, Surrey, BC". June 29, 2020.

⁴ Tetra Tech Canada Inc. "Geotechnical Engineer Report for 3037 194th Street, Surrey, BC." June 18, 2018.

⁵ Piteau Associates Engineering Ltd. "Hydrogeology Assessment for Aquifer Protection, 2974 – 192 Street and 3037 – 194 Street, Surrey, B.C." July 22, 2020.

⁶ Piteau Associates Engineering Ltd. "Groundwater Level Assessment, 3333 – 194th Street and 19437 – 32nd Avenue, Surrey, BC". June 15, 2018.

⁷ Kerr Wood Leidal Associates Ltd. "Seven Horses Transport Site Stormwater and Surface Hydrology Technical Assistance for Bylaw Compliance (Draft)". November 20, 2019.



3.1 Existing Surface Drainage

The two properties are located near the top of the Little Campbell River catchment area upstream of Latimer Pond, which is a groundwater fed pond. Based on the 2018 lidar, both properties are relatively flat with an overall slope from east to west of less than 0.1%. No watercourses or notable drainage routes exist at or near the properties. Adjacent roadside ditches that receive roadway runoff are highly vegetated and show no signs of previously conveyed flow. Most precipitation that lands on the two properties is therefore expected to infiltrate onsite, although some runoff may be generated during extreme rainfall events. Runoff collected by the roadside ditches during larger rainfall events may pond within the ditches and then infiltrate into the ground.

3.2 Surficial Geology

The two properties reside on raised pro-glacial deltaic sediments from the Sumas Drift⁵, and the soil profile generally consists of a 0.3 m topsoil layer overlaid on a deep layer of compact to dense gravelly sand to sand with gravel^{2,3,4}. The topsoil was observed during the KWL site visit to be a sandy silt material with low cohesion. Where this topsoil was stripped, the exposed sands and gravels were observed to be dense and compacted.

Measured infiltration rates of the subsurface soils range from 550 mm/hr to 580 mm/hr at 2974-192 St.², and from 440 mm/hr to 675 mm/hr at 3037-194 St.³. Other infiltration rates measured on 3037-194 St. and within the region vary from 900 mm/hr to 1580 mm/hr, which are characteristic of free-draining sand⁴. The high infiltration rates of the native soil support the claim that the properties generate little to no runoff in the pre-development condition.

3.3 Groundwater

The two properties are located above a shallow and unconfirmed aquifer (Brookwood Aquifer) close to its groundwater divide⁵. The water table was measured by Tetra Tech on April 11, 2018 at 3037-194 St. to be 1.5 m below ground elevation⁴. Nearby monitoring wells at 19437 32 Ave. and 3338 194 St. indicate that the 2018 peak winter water level could have been approximately 0.6 m higher, or at 0.9 m (1.5 m - 0.6 m) below ground elevation. The 2018 peak water level from the monitoring wells was approximately 0.6 m below the historical maximum water level based on provincial monitoring well OBS 353⁶. Therefore, an extreme groundwater level at the site could potentially reach 0.3 m (1.5 m - 0.6 m - 0.6 m) below the existing ground elevation (including the 0.3 m of topsoil).

The risk of extreme rainfall events occurring at the same time as an extreme winter groundwater level is relatively low, particularly over the short timeframe of the interim conditions of the proposed TUP. For the purpose of designing interim infiltration systems at the site with a short lifespan, depths for infiltration facilities should be limited to 0.5 m below the existing ground elevation. Additional investigation of groundwater levels should be carried out to determine the design high groundwater level for any future permanent infiltration systems.

Groundwater levels are expected to be at much greater depths throughout the remainder of the year. Groundwater levels were measured at the site on June 5, 2020 to be between 2.4 m and 2.5 m below ground elevation in locations where the topsoil remained in place^{2,3}, and regional groundwater trends indicate that these levels will continue to drop until approximately November.



Since the site resides on an aquifer that is shallow, unconfined and below fast draining soils, the groundwater below the site is highly vulnerable to contamination from surface sources⁵. Proper management of site activities and treatment of runoff will be needed to prevent groundwater contamination (further discussed below).

3.4 Pre-Disturbance Conditions

For design of stormwater management features, pre-disturbance conditions have been defined as the original intensive agricultural (A-2) site usage prior to any stripping for truck access or building demolition. While the site would likely have been fully treed under natural pre-development conditions, the agricultural site conditions can be used as the basis for stormwater design, as these agricultural conditions have been present over the past several decades.

3.5 Post-Disturbance Interim Conditions

It is understood that the TUP for the site will allow for temporary modifications to be made that accommodate truck parking and material storage while the site undergoes planning for future development. These interim conditions will generally consist of clearing trees and vegetation, topsoil stripping, placing road base materials throughout most of the site, new driveway access for trucks, and constructing perimeter berms along the property boundaries from the stripped topsoil. The existing house at 3037-194 St. will remain and will be converted into a temporary office.

While the level of compaction of the planned road base layer will vary due to differences in traffic and site activities, it is likely that the road surface will become essentially impervious over time, due to compaction and clogging. Native soils below the fill layers are not prone to compaction due to the lack of fines in their mixtures. Infiltration rates within the native subgrade soils are therefore expected to remain unchanged by current site activities, provided they are not contaminated with significant amounts of fines. Precipitation is also expected to infiltrate through the berms provided they are constructed with topsoil from the site and installed on native soil.

4. Hydrologic Modelling

A PCSWMM hydrologic model of the two properties was developed to estimate peak flows and runoff volumes during pre-disturbance and post-disturbance conditions, and to provide conceptual sizing for runoff control measures on the site such as infiltration systems. A summary of the hydrological parameters used in the model and a description of their assumptions and sources are provided in Table 1. The variation in hydrological parameters between the two properties is minor under both pre-disturbance and post-disturbance conditions, and both properties have a similar area of 2 ha. Thus, model calculations were carried out for one property and the results were applied to both properties.

According to the City of Surrey's 2016 Design Criteria Manual, pre-disturbance peak flows must be maintained under post-disturbance conditions for the 5-year storm event. In addition, site runoff during 100-year flow conditions should also be safely conveyed to the downstream drainage system. As there is no known drainage outlet for the two properties and the City has indicated that the properties must manage all stormwater onsite, all runoff must be contained within the site up to the 100-year return period.



Design storms for the 5-year and 100-year rainfall events were developed for the model by prorating the Kwantlen Park rain gauge design storms provided by the City of Surrey’s 2016 Design Criteria Manual to the Old Municipal Hall rain gauge based on rainfall amount. Storm durations of 24-hours were selected in lieu of shorter duration storms, as the purpose of the design storms for this assessment are to evaluate storage volumes for runoff.

A summary of the peak flows and runoff volumes estimated using the model during the 5-year and 100-year storms for pre-disturbance and post-disturbance conditions is presented in Table 2. As shown in the table, no runoff was predicted by the simulation during pre-disturbance conditions as a result of the flat grades and high infiltration properties of the soils. A total runoff volume of 3,500 m³ generated per property during the 5-year storm must, therefore, be controlled and infiltrated on site.

Table 1: Summary of PCSWMM Model Parameters (Per Property)

Parameter	Pre-Disturbance Conditions	Post-Disturbance Conditions	Assumptions and Sources
Surface area (ha)	2.02	2.02	Total lot area for three properties based on City of Surrey lot boundaries.
Impervious Percentage (%)	5	75	Pre-disturbance impervious areas measured using aerial photography from 2001 to 2015. Post-disturbance impervious areas estimated based on site plans by Seven Horses where road mulch areas are assumed to ultimately become impervious and berms are assumed to be pervious.
Maximum Overland Flow Length (m)	220	220	Length measured from the northeast corner to the southwest corner of each site.
Average Slope (%)	0.1	0.1	Slope measured along maximum overland flow path.
Impervious Roughness (Manning’s n)	0.02	0.02	Typical value for gravels and rougher paved surfaces.
Pervious Roughness (Manning’s n)	0.25	0.25	Typical value for dense grasses.
Impervious Depression Storage (mm)	1.5	1.5	Typical value for paved gravel surfaces.
Pervious Depression Storage (mm)	5	1	Typical value for dense grasses (pre-disturbance). Reduced for post-disturbance conditions due to lack of storage on berms.
Saturated Hydraulic Conductivity (mm/hr)	30	30	Typical value for sandy silt (topsoil).



Parameter	Pre-Disturbance Conditions	Post-Disturbance Conditions	Assumptions and Sources
Capillary Suction Head (mm)	60	60	Typical value for sandy silt (topsoil).
Initial Moisture Deficit (fraction)	0.01	0.01	Assumed soil conditions are initially wet.
Subarea Routing	100% impervious to pervious	100% surfaces flow to infiltration facility	All runoff from impervious areas during pre-disturbance conditions (roadways and structures) flows onto the pervious areas (grass). All runoff from pervious and impervious areas during post-disturbance conditions flow to infiltration facilities.

Table 2: Hydrologic Model Results (Per Property)

Design Storm	Parameter	Pre-Disturbance Conditions	Post-Disturbance Conditions		
			No Infiltration System	Rock Infiltration Trenches	Bioswales
5-Year, 24-Hour	Peak Flow Rate (m ³ /s)	0	0.10	0	0
	Total Runoff Volume (m ³)	0	3,500	0	0
	Runoff Coefficient (fraction)	0	0.75	0	0
100-Year, 24-Hour	Peak Flow Rate (m ³ /s)	0	0.17	0.07	0.13
	Total Runoff Volume (m ³)	0	5,600	400	1,600
	Runoff Coefficient (fraction)	0	0.75	0.05	0.21

5. Conceptual Sizing of Infiltration Systems

5.1 Infiltration Facility Concept

All runoff generated from the site during post-disturbance conditions up to the 5-year storm will need to be infiltrated into the native soils such that pre-disturbance conditions are maintained. This would be best achieved by installing linear infiltration systems along the inside of the proposed perimeter berms and ensuring all areas are graded towards these locations. This configuration will result in runoff being directed into the infiltration systems as sheet flow. The linear infiltration systems should have a zero or minimal (< 0.1%) slope to maximize runoff storage and infiltration.

Two types of linear infiltration systems are recommended for interim stormwater management at the site: (1) rock infiltration trenches, and (2) bioswales. A combination of both types of infiltration systems is also acceptable.



Maximum Depth

The depth of an infiltration system should be limited to approximately 0.5 m below the pre-disturbance surface grade to avoid interaction with groundwater for an interim installation. Assuming topsoil will be stripped to a depth of 0.3 m and a 0.15 m thick road base is installed, the remaining depth available for the infiltration system would be approximately 0.35 m. Note that this depth is not intended to be used for design of permanent infiltration facilities.

Base Layer

A typical infiltration system should consist of an area excavated to the desired depth with a flat bottom or 'base' area of the required size. The excavated area may be whatever length or width is suitable for receiving the desired overland flow. The bottom and sides of the excavation must be protected with non-woven geotextile fabric, and a 0.05 m minimum depth of clean washed sand must be placed on top of the fabric in the base of the facility. No underdrain should be installed within the infiltration system, as all runoff must be infiltrated on site.

1) Rock Infiltration Trench

For rock infiltration trenches, a 0.25 m layer of clean washed stone should be placed on top of the sand 0.05 m base layer, which shall consist of 20 mm clear drain rock. As the shallow unconfined aquifer below is vulnerable to surface contaminants, any rock infiltration trench will require additional pre-treatment measures intended to minimize groundwater contamination from soluble pollutants. For interim conditions, one pre-treatment option would be to install compost filter socks along the upstream edges of the infiltration trenches to collect fine sediments and provide some level of pollutant removal. However, these are acceptable on a temporary basis only and additional pre-treatment measures would be needed for any permanent installation of a rock infiltration trench to minimize groundwater contamination.

2) Bioswale

For bioswales, a growing media layer with a minimum infiltration rate of 100 mm/hr and a minimum depth of 0.15 m should be installed on top of the base layer. The native topsoil onsite is likely not suitable for the bioswale media due to its concentration of fine sediment, although mixing of this topsoil with clean sand or a coarser topsoil mixture may be possible provided that the infiltration rate remains above 100 mm/hr. A soil physicist should be consulted to recommend soil mixing fractions if the existing native topsoil is to be used. For interim conditions, vegetation for the bioswale can consist of sodded grass provided that the infiltration rate of the sod is above 100 mm/hr. The bioswales should allow for surface ponding using a minimum 0.15 m depression with maximum 2H:1V side slopes. Note: grass is highly efficient at filtering sediments. After two years, the sediment will begin to aggrade (build up) in the grass preventing runoff from entering; therefore, this is an interim strategy.

Sediment Pre-Treatment and Lifespan

Pre-treatment devices such as forebays or traps are typically installed at inlets of infiltration facilities to capture sediments and prevent the facilities from clogging. However, the intent of the proposed infiltration facilities is to support the temporary use of the site for approximately one year, and some degree of clogging will be expected and is acceptable. If ponding is observed above the infiltration facilities 24 hours following a rainfall event, the clogged areas should be investigated and remedied by replacing with new materials. The interim infiltration systems are not intended to remain as permanent features on the site and should be removed when the site is developed for other uses.



Site Activity Management

Groundwater contamination is best mitigated by proper management of site activities, as the temporary infiltration facilities will provide limited treatment of soluble contaminants that can enter into the aquifer. According to Piteau⁵, trucks and other vehicles should not be fueled or serviced onsite, and onsite equipment should be fuelled only in designated areas that are equipped with spill response materials. Bulk liquids, leachable materials and waste materials should not be stored onsite unless their risks to the groundwater are assessed.

5.2 Infiltration Facility Sizing

Conceptual sizing for the rock infiltration trenches and bioswales was carried out using the hydrologic model by routing the post-disturbance 5-year hydrograph through the proposed infiltration systems. Infiltration systems were assumed to be installed to a depth of 0.35 m and have a porosity of 0.4. Native soil infiltration rates below the infiltration systems were assumed to be 440 mm/hr, corresponding to the lowest infiltration rate recorded by the GeoPacific infiltration tests^{2,3}. Rock infiltration trenches are not expected to limit the infiltration rate unless they become severely clogged. For bioswales, an infiltration rate of 50 mm/hr was assumed for the media, representing partially clogged conditions. Additional infiltration tests should be carried out at the location of any future infiltration system prior to construction to establish design infiltration rates.

Based on the model calculations, the total area needed to fully infiltrate the 5-year storm using a 0.35 m deep rock infiltration trench was estimated to be 800 m² per property, which corresponds to 4% of the total property area. Expressed differently, there needs to be 1 square metre of infiltration trench for every 25 square metres of total property area. For bioswales, the total area needed to fully infiltrate the 5-year storm was estimated to be 3,200 m² per property, which corresponds to 16% of the total property area, or 1 square metre of infiltration trench for every 6.25 square metres of total property area.

The large difference in area needed for the two types of infiltration facilities relates to the lower infiltration rate of the surface of the bioswales. However, bioswales will provide additional treatment of potential groundwater contaminants compared to rock infiltration trenches.

5.3 On-Site Management for 100-year Storm

Flows and runoff volumes exceeding the capacity of the infiltration systems during the 100-year storm were estimated using the model and are presented in Table 2. Since no runoff occurs during the 100-year storm under pre-disturbance conditions, the remaining runoff volume of 400 m³ for rock infiltration trenches and 1,600 m³ for bioswales will need to be stored on site for eventual infiltration. This can be accomplished by constructing a perimeter berm around the site.

Perimeter Berm Concept

Perimeter berms are already planned for the site to stockpile stripped topsoil, and these berms can be used in combination with smaller berms and high points along the roads to contain the 100-year storm. Topsoil would be adequate for berm material, whereas sand or gravel would be too permeable and should not be used. All berms, whether used for storage or for stockpiling stripped materials, should be hydroseeded or an erosion control mat should be installed, as the onsite topsoil was found to contain fine silts and can be very dusty during dry periods. If not properly managed, these fine particles can clog the infiltration facilities.



TECHNICAL MEMORANDUM

Surface Hydrology Assessment for Temporary Use Permit
at 2974-192 St. and 3037-194 St., Surrey, BC
September 10, 2020

Perimeter Berm Sizing

A storage volume of 1,600 m³ would result in a ponding depth of 0.16 m, assuming that 50% of the site is available for ponding. Regardless of the infiltration facility selected, the berm should provide a continuous barrier such that a minimum depth of 0.3 m (including freeboard above the ponding depth) is available across the entire site for each property. As the site is not perfectly flat, some portions of the berm must be higher than 0.3 m to achieve this. A lower berm or edge height around the site is needed for the infiltration trench option as only 400 m³ storage volume must be provided.

Roadway Crests

Particular consideration should be given to the southwest corner of 3037-194 St. where a new roadway is proposed to connect the two properties. A high point in the roadway will be needed here to prevent runoff generated on 3037-194 St. from being discharged to the adjacent properties. Similarly, a high point in the new driveway of 2974-192 St. near its entrance at 192 St. will be needed to prevent runoff from being discharged to the roadway ditches. The grading plan for the site should be revised to incorporate the recommended high points.

Driveway Culverts

While the above measures will result in all runoff being contained within the site, as it had been under pre-disturbance conditions, any new driveway access to the properties from 192 St. and 194 St. will require a culvert crossing in accordance with the City's requirements to ensure that off-site drainage in the ditches is not impeded.

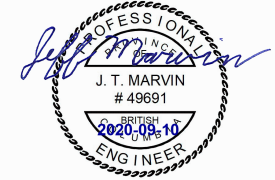
6. Conclusions

This work has assessed the pre-disturbance and post-disturbance site conditions at 2974-192 St. and 3037-194 St. and provides recommendations and conceptual sizing for infiltration systems that maintain pre-disturbance hydrological conditions to the 5-year return period level of service. It was estimated that 0.35 m deep infiltration systems would require 4% of the total site area if rock infiltration trenches are selected, or 16% of the total site area if bioswales are selected. A combination of the rock infiltration trenches and bioswales would also be acceptable. The excess runoff volume during the 100-year storm of up to 1,600 m³ would then need to be safely stored on the site for eventual infiltration.



KERR WOOD LEIDAL ASSOCIATES LTD.

Prepared by:



Reviewed by:



Jeffrey Marvin, M.A.Sc., P.Eng.
 Project Engineer

Chris Johnston, P.Eng.,
 Technical Reviewer

Statement of Limitations

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This document represents KWL's best professional judgement based on the information available at the time of its completion and as appropriate for the project scope of work. Services performed in developing the content of this document have been conducted in a manner consistent with that level and skill ordinarily exercised by members of the engineering profession currently practising under similar conditions. No warranty, express or implied, is made.

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Revision History

Revision #	Date	Status	Revision Description	Author
0	September 10, 2020	Final		JTM

