Regular Council - Land Use Agenda - Addendum #1

Council Chambers
City Hall
13450 - 104 Avenue
Surrey, B.C.
Live Streamed at surrey.ca
MONDAY, NOVEMBER 18, 2024
Time: 5:30 p.m.

Live streamed via the City's website www.surrey.ca

E. OTHER BUSINESS

PERMITS - APPROVAL

1. Planning Report - Application No. 7922-0234-00
17649 and 17709 - 96 Avenue; 17710 - 97 Avenue

Owner: 1214081 B.C. Ltd. (Director Information: K. Rai)
Agent: Aplin & Martin Consultants Ltd. (M. Koka)

To permit the temporary use of the site for truck parking for a period not to exceed three years. The proposal also includes a Development Permit for Sensitive Ecosystems.

Temporary Use Permit No. 7922-0234-00

That Council authorize the issuance of Temporary Use Permit No. 7922-0234-00.

Development Permit No. 7922-0234-00

That Council authorize the issuance of Development Permit No. 7922-0234-00.

CITY OF SURREY

OTHER BUSINESS

CITY OF SURREY
the future lives here.

INTER-OFFICE MEMO

TO: **City Clerk, Legislative Services Division**

FROM: **Director of Development Planning**
Planning & Development Department

DATE: **November 18, 2024** FILE: **7922-0234-00**

RE: **Development Application No. 7922-0234-00**

ADDRESS: 17649 and 17709 - 96 Avenue
17710 - 97 Avenue

OWNER: 1214081 B C Ltd (Director Information: K. Rai)

AGENT: M. Koka of Aplin & Martin Consultants Ltd.

s. 22(1)

PROPOSAL: Temporary Use Permit and Development Permit to permit the temporary use of the site for truck parking for a period not to exceed three years.

On November 14, 2022, Council supported Temporary Use Permit No. 7922-0234-00.

All conditions of approval with respect to this permit have been met.

It is now in order for Council to issue Temporary Use Permit No. 7922-0234-00 and to authorize the Mayor and Clerk to execute the Permit.

Staff was authorized to draft Development Permit No. 7922-0234-00 on July 24, 2023.

It is now in order for Council to issue attached Development Permit No. 7922-0234-00 and to authorize the Mayor and Clerk to execute the Permit.

Note: If the Development Permit, as presented, is not acceptable to Council in relation to the protection of Sensitive Ecosystems, Council may refer the Development Permit application back to staff with direction regarding these matters.

Shawn Low, Director of Development Planning
JK8

CITY OF SURREY

(the "City")

TEMPORARY USE PERMIT

NO.: 7922-0234-00

Issued To:

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: 001-117-459
Lot 1 Except: Firstly: The East 162 Feet and Secondly: Part Subdivided
By Plan 50654; District Lot 390A Group 2 New Westminster District Plan 6711

17709 - 96 Avenue

Parcel Identifier: 004-330-307
Lot 50 District Lot 390A Group 2 New Westminster District Plan 45112

17649 - 96 Avenue

Parcel Identifier: 004-147-782
Lot 52 District Lot 390A Group 2 New Westminster District Plan 50654

17710 - 97 Avenue

(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 49 vehicles exceeding 5,000 kilograms G.V.W with the access and the location of the structures, and landscaping and fencing, substantially in compliance with Schedule A (the "Site Plan") which is attached hereto and forms part of this permit.

5. The temporary use permitted on the Land shall be in accordance with:

   (a) Trucks using the temporary truck parking facility are limited to using the route stipulated on Schedule C;

   (b) No refrigerated truck units shall park on the site at any time;

   (c) The parking area shall be designed to support the anticipated vehicle load in order to prevent dirt from being tracked onto the City roadway;

   (d) Hours of operation shall be Monday to Friday from 8:00 am to 5:00 pm with no trucks to leave or enter the site on weekends;

   (e) Adequate washroom facilities are to be provided on site to the satisfaction of the General Manager of Planning & Development with a minimum of one such facility on site; and

   (f) 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
      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.

6. The Owner covenants and agrees that the pre-servicing requirements attached as Schedule B (the "Pre-Servicing 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.

7. The temporary use shall be carried out according to the following conditions:

8. As a condition of the issuance of this temporary use permit, Council is holding security set out below (the "Security") to ensure that the temporary use is carried out in accordance with the terms and conditions of this temporary use permit. Should the Owner fail to comply with the terms and conditions of this temporary use permit within the time provided, the amount of the Security shall be forfeited to the City. The City has the option of using the Security to enter upon the Land and perform such works as is necessary to eliminate the temporary use and bring the use and occupancy of the Land into compliance with Surrey Zoning By-law, 1993, No. 12000, as amended (the "Works"). The Owner hereby authorizes the City or its agents to enter upon the Land to complete the Works. There is submitted accordingly:

Cash in the amount of $_____

An Irrevocable Letter of Credit, in a form acceptable to the City, in the amount of $10,950

The Security is for:

i. Works _____
ii. Landscaping $10,950

9. The Landscaping shall be completed prior to any trucks parking on the land.

10. 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.

11. An undertaking submitted by the Owner is attached hereto as Appendix I and forms part of this temporary use permit.

12. This temporary use permit is not transferable.

13. This temporary use permit shall lapse on or before three years from date of issuance.

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

ISSUED THIS DAY OF , 20 .

_____

Mayor

_____

City Clerk

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

K[redacted] Raw

Owner: Signature

K[redacted] RA1

Name: (Please Print)

APPENDIX I

TO THE CITY OF SURREY:

I, K[redacted] RAI (Name of Owner)

being the owner of 001-117-459 / 004-330-307 / 604-147-782
(Legal Description)

known as [redacted]
(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.

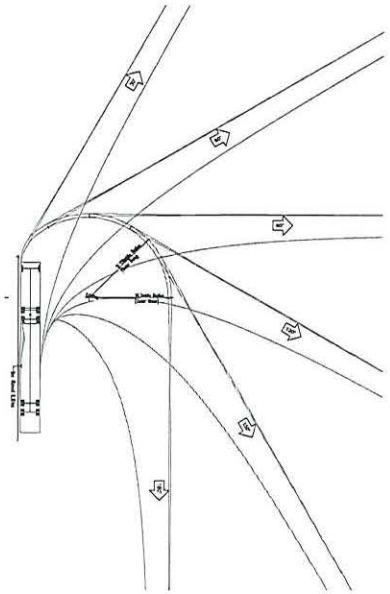
K[redacted] Rai
K[redacted] RAI
(Owner)

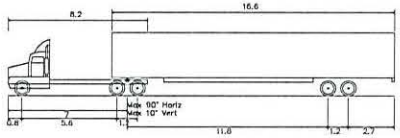
A[redacted] SHARMA
(Witness)

LEGEND

TREES TO BE RETAINED

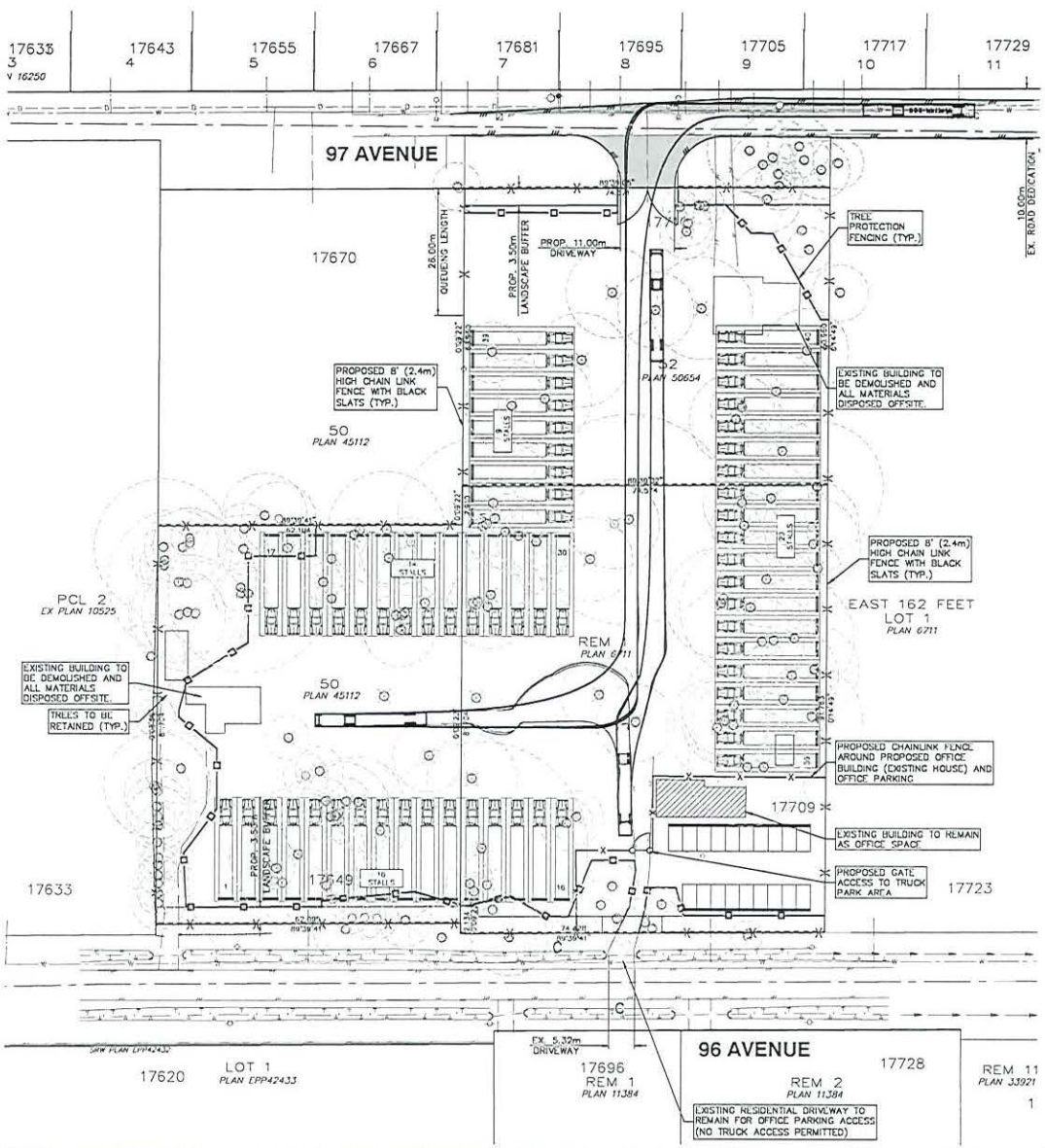
TREES TO BE REMOVED





WB-20-90 – Tractor & Semi-Trailer

Overall Length	22.700m
Overall Width	2.600m
Overall Body Height	3.730m
Min Body Ground Clearance	0.435m
Track Width	2.600m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	10.700m



LEGAL DESCRIPTION: –

B.M. MONUMENT NO. – ELEVATION: –
LOCATED AT OF STREET & AVENUE

REV. NO.	DESCRIPTION	DR	CH	DATE	APP
4	96 AVENUE SCOPE REMOVED	AP	RMS	08/24/22	JJB
3	PROPOSED COST SHARING – FOR DISCUSSION	WW	ML	08/04/22	JJB
2	UPDATED SITE PLAN	WW	RMS	07/14/22	JJB
1	TUP APPLICATION SUBMITTED	MJC	HH	05/20/22	JJB

APLIN MARTIN
ENGINEERING ARCHITECTURE PLANNING SURVEYING
EGBC Permit to Practice Number #1001858
201 - 12448 82 Avenue, Surrey, B.C. Canada V3W 3E9
Tel: (604) 597-9058, Fax: (604) 597-9061, Email: general@aplinmartin.com

DEVELOPER:
RAI EXPRESS LINES (1214081 BC LTD.)
#125 - 7475 135 STREET, SURREY, BC V3W 0M8

PROJECT:
TEMPORARY USE PERMIT
17709 / 17649 96 AVENUE, AND 17710 97 AVENUE, SURREY, BC

The location of existing underground utilities are shown in an approximate way only & have not been independently verified by the owner or its representative. The contractor shall determine the exact location of all existing utilities before commencing work, and agrees to be fully responsible for any and all damages which might be occasioned by the contractor's failure to exactly locate and preserve any and all underground utilities.

TITLE:
TUP - KEY PLAN

PROJECT NO.
7822-0234-00

SCALE :
HORZ. 1:500
VERT. N/A

DRAWING NO.
.

A & M DRAWING NO.
22-082- 02

DESIGN: HH CHECK: HH
DRAWN: MJC APPR: JJB

A & M FILE:
22-082

DRAWING DATE:
APRIL 2022

SHEET NO. 02 of 09

REV. 4

0 5 10 15m
1:500

LEGEND:

- PROPOSED GRAVEL PARKING/ STORAGE SURFACE
- PROPOSED TREE PROTECTION FENCE
- MANHOLE
- CLEANOUT
- LAWN BASIN (AS PER MMCD)
- PROPOSED SWALE
- OVERLAND FLOW ARROW
- PRE-CAST WHEEL STOP

TUP Permit 22-082
11709/17649 96 Ave and 17710 97 Ave, Surrey, BC 5-Aug-22

5 Year Peak Flow Calculations

	Tc min	Runoff coefficient %	Area Ha	Intensity mm	n	Q cms
Infiltration						0.010
Q_{Post}	15	0.90	1.64	36	0.00278	0.146

Storage Volume Required (Modified Rational Method)

Storage Volume = $T_r (Q_{p2} - Q_{rel}) + 0.5 \times T_r \times Q_{rel}^2 (1/Q_{p2} - 1/Q_{p1})$

T_r = Duration of storm, in seconds
T_c = Time to concentration, in seconds
Q_{p1} = Peak flow for storm, $T_r = T_c$, cms
Q_{p2} = Peak flow for storm specified, cms
Q_{rel} = Maximum release rate, cms = Q_{Post}

Maximum Storage Required = **416 cm**

Rainfall Duration Tr min	Rainfall Intensity I mm	Peak Flow Q_{p1} cms	Peak Flow Q_{p2} cms	Required Storage cm
60	17	0.146	0.071	220
120	12	0.146	0.049	285
180	10	0.146	0.040	326
240	8	0.146	0.034	355
300	7	0.146	0.031	376
360	7	0.146	0.028	391
420	6	0.146	0.026	401
480	6	0.146	0.024	409
540	6	0.146	0.023	413
600	5	0.146	0.021	416
660	5	0.146	0.020	416
720	5	0.146	0.019	415
780	5	0.146	0.019	413
840	4	0.146	0.018	409
900	4	0.146	0.017	404
960	4	0.146	0.017	397
1020	4	0.146	0.016	390

INFILTRATION RATE (I):
35 mm/hr

AREA (A):
1020 m^2

$Q_{infiltration} = I*A/1000/3600$

$Q_{infiltration}$ = 0.010 cms

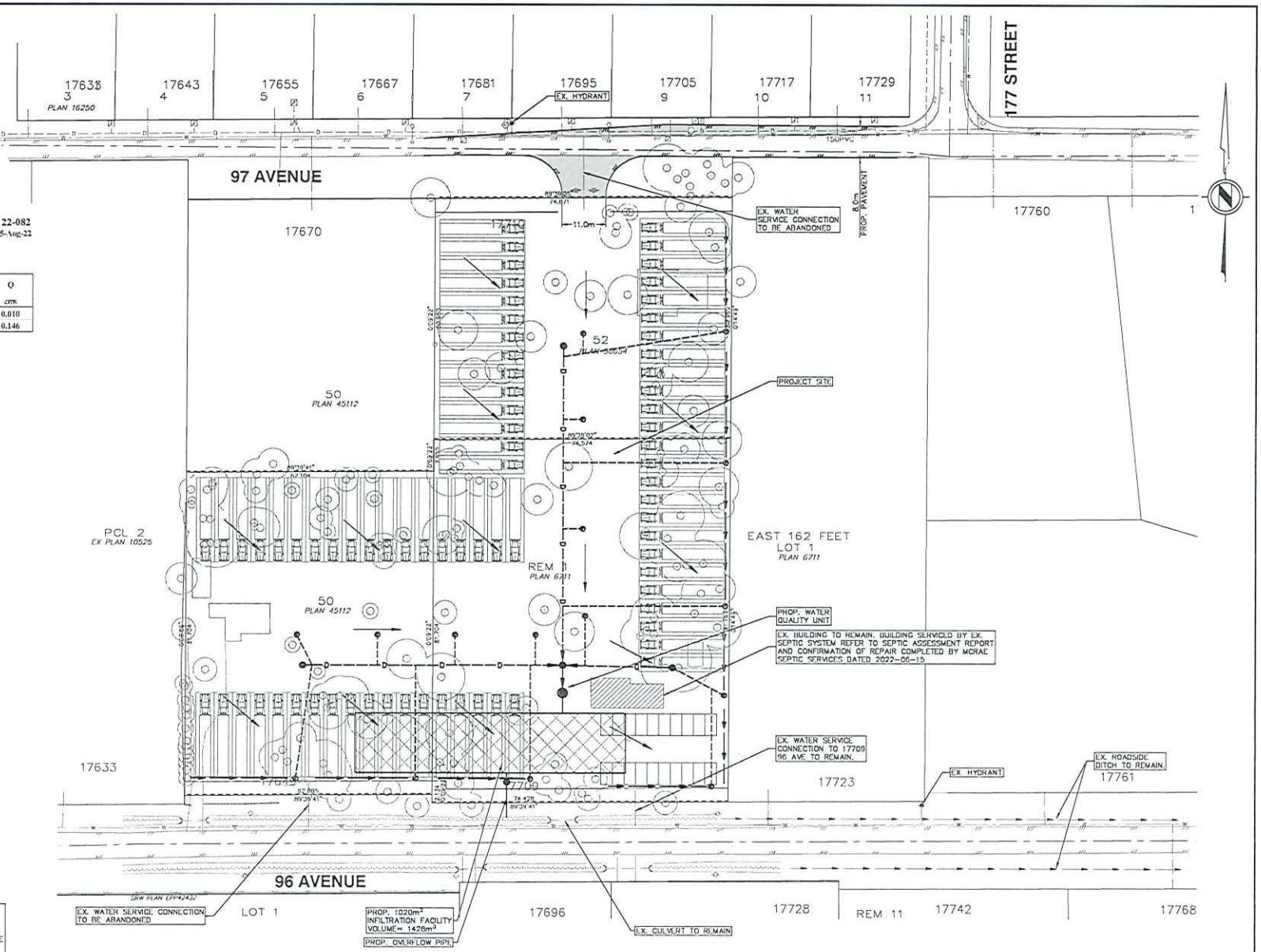
ROCK PIT VOLUME (V_{RP}):

Required Storage (S) = 416 m^3
Porosity (f) = 0.3
Required V_{RP} = S/f = 1387 m^3

V_{RP} = 15m X 68m X 1.4m = 1428 m^3

NOTICE TO CONTRACTOR

IT IS THE RESPONSIBILITY OF THE CONTRACTOR'S SURVEYOR TO VERIFY THAT ALL LEGAL SURVEY DIMENSIONS SHOWN ON THE ENGINEERS DRAWINGS AGREE WITH THOSE ON THE REGISTERED LEGAL SURVEY PLAN. SHOULD THERE BE ANY DISCREPANCIES, THEN IMMEDIATELY NOTIFY THE ENGINEER OF RECORD



LEGAL DESCRIPTION: –

B.M. – ELEVATION: –
MONUMENT NO. –
LOCATED AT OF STREET & AVENUE

REV. NO.	DESCRIPTION	DR	CH	DATE	APP
3	PROPOSED COST SHARING – FOR DISCUSSION	WW	ML	08/04/22	JJB
2	UPDATED SITE PLAN	WW	RMS	07/14/22	JJB
1	TUP APPLICATION SUBMITTED	MJC	HH	05/20/22	JJB

APLIN MARTIN
ENGINEERING ARCHITECTURE PLANNING SURVEYING
EGBC Permit to Practice Number #1001818
201 - 12448 82 Avenue, Surrey, B.C. Canada V3W 3E9
Tel: (604) 597-9058, Fax: (604) 597-9061, Email: general@aplinmartin.com

DEVELOPER:
RAI EXPRESS LINES (1214081 BC LTD.)
#125 - 7475 135 STREET, SURREY, BC V3W 0M8

PROJECT:
TEMPORARY USE PERMIT
17709 / 17649 96 AVENUE, AND 17710 97 AVENUE, SURREY, BC

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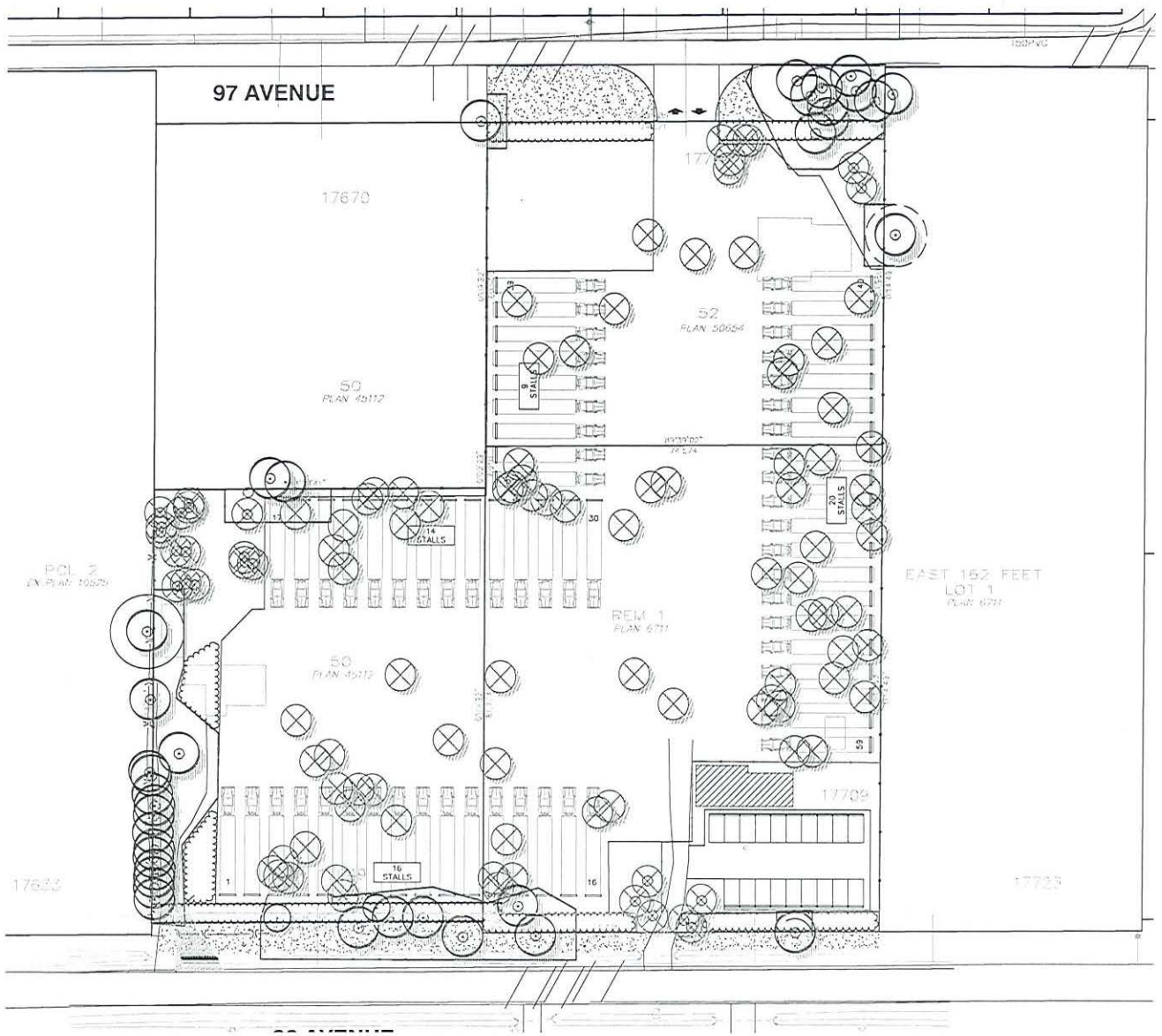
TITLE:
PRELIMINARY SERVICING PLAN

PROJECT NO. 7822-0234-00
DRAWING NO. .
SCALE: HORZ. 1:500 VERT. N/A
A & M DRAWING NO. 22-082-04

DESIGN: HH CHECK: HH
DRAWN: MJC APPR: JJB
A & M FILE: 22-082
DRAWING DATE: APRIL 2022
SHEET NO. 04 of 09 REV. 3

0 5 15/20 25m



TREE MANAGEMENT LEGEND

	TREE TO RETAIN
	TREE TO REMOVE

REFER TO ARBORIST REPORT FOR TREE PROTECTION DETAILS

pmg LANDSCAPE ARCHITECTS
Suite C100 - 4185 Still Creek Drive
Burnaby, British Columbia, V5C 6G9
p: 604 294-0011 ; f: 604 294-0022

SEAL:

NO.	DATE	REVISION DESCRIPTION	DR.
5	23 NOV 29	RESPONSE TO LANDSCAPE PLAN REVIEW	SA
4	23 NOV 10	REVISED PER CITY COMMENT	SA
3	23 OCT 27	ADD SETBACK PER RPR	SA
2	22 SEP 15	REVISE PER UPDATED ARBORIST REPORT	SA
1	22 SEP 13	REVISE PER NON-SITE PLANNER ATTENTION	SA

CLIENT:

RAI EXPRESS LINES LTD.

PROJECT:

TEMPORARY USE PERMIT

11709, 17649, 17710 - 97 AVENUE
SURREY, BC

DRAWING TITLE:

TREE MANAGEMENT PLAN

DATE:	22.JUL.14	DRAWING NUMBER:
SCALE:	1/32" = 1'-0"	L0
DRAWN:	SA	
DESIGN:	SA	
CHK'D	RK	OF 2

22095-h.ZIP PMG PROJECT NUMBER: 22-095

pmg LANDSCAPE ARCHITECTS
Suite C100 - 4185 Still Creek Drive
Burnaby, British Columbia, V5C 6G9
p: 604 294-0011 ; f: 604 294-0022

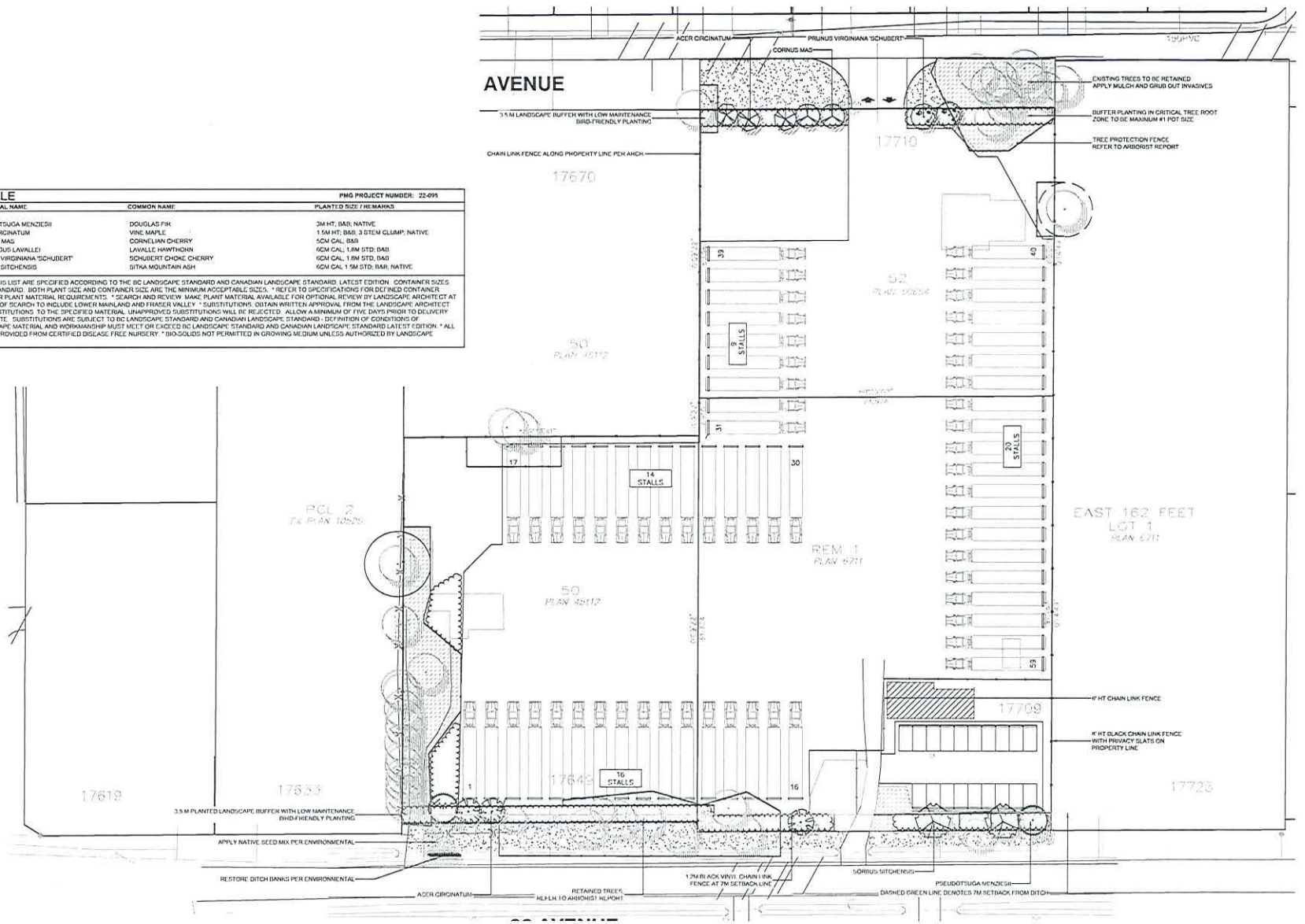
SEAL:

TREE SCHEDULE

PMG PROJECT NUMBER: 22-095

KEY	QTY	BOTANICAL NAME	COMMON NAME	PLANTED SIZE / REMARKS
TREE				
	2	PSEUDOTSUGA MENZIESII	DOUGLAS FIR	3M HT; B&B; NATIVE
	3	ACER CIRCINATUM	VINE MAPLE	1.5M HT; B&B; 3 STEM CLUMP; NATIVE
	2	CORNUS MAS	CORNELIAN CHERRY	5CM CAL; B&B
	3	CRATAEGUS LAVALLEI	LAVALLE HAWTHORN	6CM CAL; 1.8M STD; B&B
	2	PRUNUS VIRGINIANA 'SCHUBERT'	SCHUBERT CHOKE CHERRY	6CM CAL; 1.8M STD; B&B
	2	SORBUS SITCHENSIS	SITKA MOUNTAIN ASH	6CM CAL; 1.5M STD; B&B; NATIVE

NOTES: * PLANT SIZES IN THIS LIST ARE SPECIFIED ACCORDING TO THE BC LANDSCAPE STANDARD AND CANADIAN LANDSCAPE STANDARD, LATEST EDITION. CONTAINER SIZES SPECIFIED AS PER CNLA STANDARD. BOTH PLANT SIZE AND CONTAINER SIZE ARE THE MINIMUM ACCEPTABLE SIZES. * REFER TO SPECIFICATIONS FOR DEFINED CONTAINER MEASUREMENTS AND OTHER PLANT MATERIAL REQUIREMENTS. * SEARCH AND REVIEW: MAKE PLANT MATERIAL AVAILABLE FOR OPTIONAL REVIEW BY LANDSCAPE ARCHITECT AT SOURCE OF SUPPLY. AREA OF SEARCH TO INCLUDE LOWER MAINLAND AND FRASER VALLEY. * SUBSTITUTIONS: OBTAIN WRITTEN APPROVAL FROM THE LANDSCAPE ARCHITECT PRIOR TO MAKING ANY SUBSTITUTIONS. TO THE SPECIFIED MATERIAL. UNAPPROVED SUBSTITUTIONS WILL BE REJECTED. ALLOW A MINIMUM OF FIVE DAYS PRIOR TO DELIVERY FOR REQUEST TO SUBSTITUTE. SUBSTITUTIONS ARE SUBJECT TO BC LANDSCAPE STANDARD AND CANADIAN LANDSCAPE STANDARD - DEFINITION OF CONDITIONS OF AVAILABILITY. * ALL LANDSCAPE MATERIAL AND WORKMANSHIP MUST MEET OR EXCEED BC LANDSCAPE STANDARD AND CANADIAN LANDSCAPE STANDARD LATEST EDITION. * ALL PLANT MATERIAL MUST BE PROVIDED FROM CERTIFIED DISEASE FREE NURSERY. * BIO-SOLIDS NOT PERMITTED IN GROWING MEDIUM UNLESS AUTHORIZED BY LANDSCAPE ARCHITECT.



FENCING LEGEND

- 6' HT. BLACK CHAIN LINK FENCE WITH SLATS
- 6' HT. CHAIN LINK FENCE
- 1.2M (4' HT) BLACK VINYL CHAIN LINK FENCE
- TREE PROTECTION FENCE

NO.	DATE	REVISION DESCRIPTION	DR.
7	23.NOV.28	RESPONSE TO LANDSCAPE PLAN REVIEW	SA
6	23.NOV.10	REVISE PER CITY COMMENT	SA
5	23.OCT.27	ADD SETBACK PER ENV	SA
4	22.SEP.13	REVISE PER UPDATED ARBORIST REPORT	SA
3	22.SEP.13	REVISE PER NEW SITE PLAN/TREE RETENTION	SA

CLIENT:

RAI EXPRESS LINES LTD.

PROJECT:

TEMPORARY USE PERMIT

11709, 17649, 17710 - 97 AVENUE
SURREY, BC

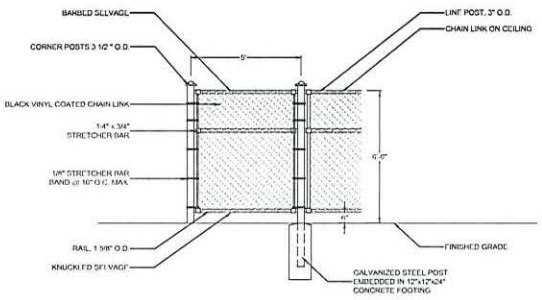
DRAWING TITLE:

LANDSCAPE PLAN

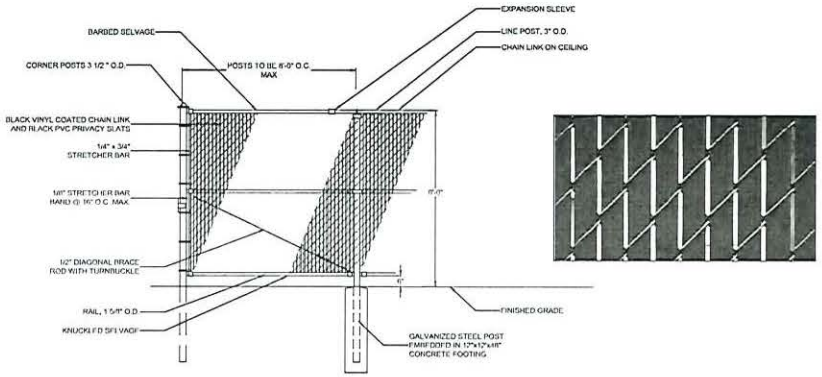
DATE:	22.JUL.14	DRAWING NUMBER:
SCALE:	1/32" = 1'-0"	L1
DRAWN:	SA	
DESIGN:	SA	
CHKD:	RK	OF 2

PMG PROJECT NUMBER: 22-095

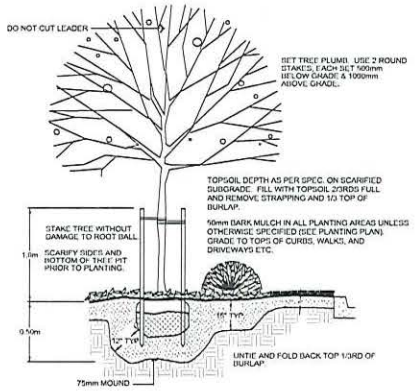
22095-ALZIP



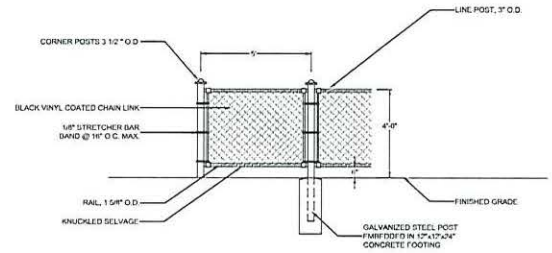
1 L1 6' HT CHAINLINK FENCE
3/4"=1'-0"



2 L1 8' HT CHAINLINK FENCE WITH PRIVACY SLATS
3/4"=1'-0"



3 L1 TREE PLANTING DETAIL
1/4"=1'-0"



4 L1 1.2M (4') HT CHAINLINK FENCE
3/8"=1'-0"

pmg LANDSCAPE ARCHITECTS
Suite C100 - 4185 Still Creek Drive
Burnaby, British Columbia, V5C 6G9
p: 604 294-0011 ; f: 604 294-0022

SEAL:

NO.	DATE	REVISION DESCRIPTION	DR.
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3	23.OCT.27	ADD SETBACK PER LRM	SA
2	22.SEP.15	REVISE PER UPDATED ARBORIST REPORT	SA
1	22.SEP.13	REVISE PER NEW SITE PLAN/ISSUE ATTENTION	SA

CLIENT

RAI EXPRESS LINES LTD.

PROJECT

TEMPORARY USE PERMIT

11709, 17649, 17710 - 97 AVENUE
SURREY, BC

DRAWING TITLE

LANDSCAPE DETAILS

DATE:	22.JUL.14	DRAWING NUMBER:
SCALE:	AS NOTED	L2
DRAWN:	SA	
DESIGN:	SA	
CHK'D:	RK	OF 2

22095-b.ZIP

PMG PROJECT NUMBER: 22-095

CITY OF SURREY
the future lives here.

INTER-OFFICE MEMO

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

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

DATE: **September 12, 2022** PROJECT FILE: **7822-0234-00**

RE: **Engineering Requirements (Commercial/Industrial)**
Location: s. 22(1) [redacted]

TEMPORARY USE PERMIT

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

- Construct 97 Ave road improvements from the site to 177A St.
- Prohibit trucks from entering 97 Ave from Hwy 15. Consult MoTI for appropriate treatment.
- Construct storm infrastructure upgrades to adequately capture increased road runoff.
- Secure applicable provincial and federal approvals for all impacted streams, as required.
- Provide an adequately sized metered water service connection from 96 Ave and abandon redundant connections.
- Construct on-site stormwater mitigation features to meet pre-development conditions up to the 100-year storm event.
- Construct on-site water quality treatment features.
- Register a restrictive covenant to restrict 97 Ave access to trucks and left-in right-out only, on-site stormwater mitigation and on-site water quality.
- Provide bonding for all Works & Services required under TUP and Servicing Agreement 7822-0147-00.

A Servicing Agreement is required prior to issuance of the Temporary Use Permit (TUP).

BUILDING PERMIT

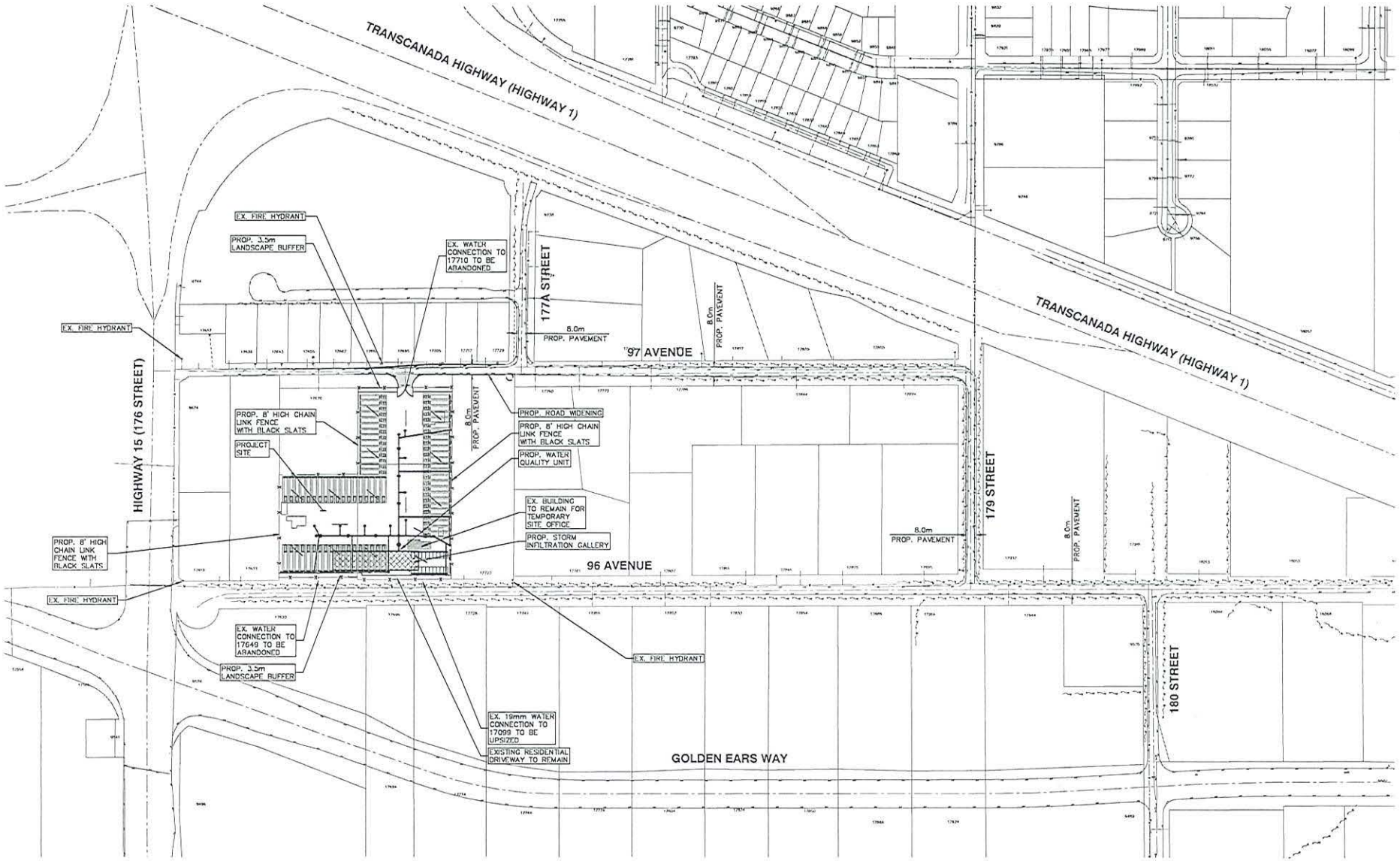
The following are to be addressed as a condition of the subsequent Building Permit:

- Any proposed on-site septic sewer system to be designed and installed in accordance with the requirements of the Fraser Health Authority. Register restrictive covenant for the protection and maintenance of the onsite septic system, along with requirement to decommission the septic tank once sanitary frontage is available. A new sanitary connection to the sanitary main will be required, and any latecomer or DWA charges, LAS or DCC fees will be applicable at time of connection.

Jeff Pang, P.Eng.
Development Services Manager

DJS

Schedule C



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B.M. MONUMENT NO. – ELEVATION: –
LOCATED AT OF STREET & AVENUE

REV. NO.	DESCRIPTION	DR	CH	DATE	APP.
4	96 AVENUE SCOPE REMOVED	AP	RMS	08/24/22	JJB
3	PROPOSED COST SHARING – FOR DISCUSSION	WW	ML	08/04/22	JJB
2	UPDATED SITE PLAN	WW	RMS	07/14/22	JJB
1	TUP APPLICATION SUBMITTED	MJC	HH	05/20/22	JJB

APLIN MARTIN
ENGINEERING ARCHITECTURE PLANNING SURVEYING
EGBC Permit to Practice Number #1001018
201 - 12448 82 Avenue, Surrey, B.C. Canada V3W 3E9
Tel: (604) 597-9058, Fax: (604) 597-9061, Email: general@aplinmartin.com

DEVELOPER: RAI EXPRESS LINES (1214081 BC LTD.)
#125 - 7475 135 STREET, SURREY, BC V3W 0M8

PROJECT: TEMPORARY USE PERMIT
17709 / 17649 96 AVENUE, AND 17710 97 AVENUE, SURREY, BC

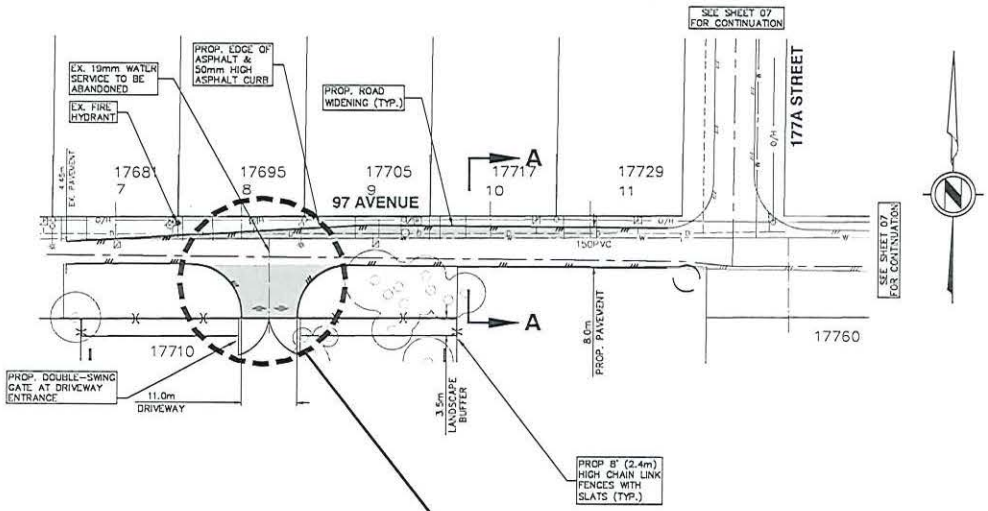
The location of existing underground utilities are shown in an approximate way only & have not been independently verified by the owner or its representative. The contractor shall determine the exact location of all existing utilities before commencing work, and agrees to be fully responsible for any and all damages which might be occasioned by the contractor's failure to exactly locate and preserve any and all underground utilities.

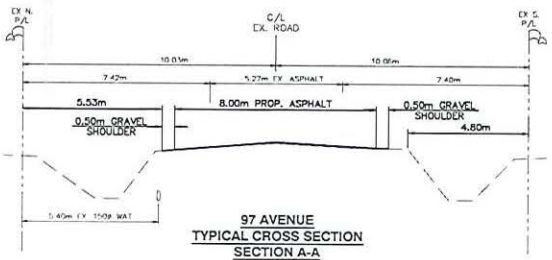
TITLE: OVERALL KEY PLAN

PROJECT NO. 7822-0234-00
SCALE: HORZ. 1:1500 VERT. N/A
DRAWING NO. -
A & M DRAWING NO. 22-082-03

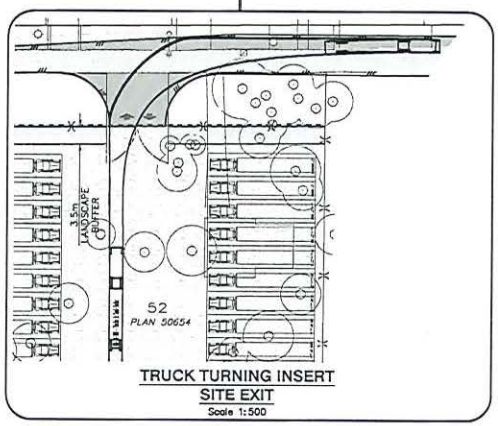
DESIGN: HH CHECK: HH
DRAWN: MJC APPR: JJB
A & M FILE: 22-082
DRAWING DATE: APRIL 2022
SHEET NO. 03 of 09 REV. 4

0 5 15 25m 1:500





97 AVENUE
TYPICAL CROSS SECTION
SECTION A-A
N.T.S.



TRUCK TURNING INSERT
SITE EXIT
Scale 1:500

PRELIMINARY

LEGAL DESCRIPTION: –

B.M. MONUMENT NO. – ELEVATION: –
LOCATED AT OF STREET & AVENUE

REV. NO.	DESCRIPTION	DR	CH	DATE	APP
4	96 AVENUE SCOPE REMOVED	AP	RMS	08/24/22	JJB
3	PROPOSED COST SHARING – FOR DISCUSSION	WW	ML	08/04/22	JJB
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DEVELOPER:
RAI EXPRESS LINES (1214081 BC LTD.)
#125 - 7475 135 STREET, SURREY, BC V3W 0M8

PROJECT:
TEMPORARY USE PERMIT
17709 / 17649 96 AVENUE, AND 17710 97 AVENUE, SURREY, BC

The location of existing underground utilities are shown in an approximate way only & have not been independently verified by the owner or its representative. The contractor shall determine the exact location of all existing utilities before commencing work, and agrees to be fully responsible for any and all damages which might be occasioned by the contractor's failure to exactly locate and preserve any and all underground utilities.

TITLE: 06 - ROADWORKS - 97 AVENUE

DESIGN: HH CHECK: HH
DRAWN: MJC APPR: JJB

A & M FILE: 22-082

PROJECT NO. 7822-0234-00

SCALE : HORZ. 1:500 VERT. N/A

DRAWING DATE: APRIL 2022

DRAWING NO. .

A & M DRAWING NO. 22-082-06

SHEET NO. 06 of 09

REV. 4

0 5 1:500 25m

CITY OF SURREY

(the "City")

DEVELOPMENT PERMIT

NO.: 7922-0234-00

Issued To:

Address of Owner:

A. General Provisions

1. This development permit is issued subject to compliance by the Owner with all statutes, by-laws, orders, regulations or agreements, except as specifically varied by this development permit.

2. This development 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: 001-117-459
Lot 1 Except: Firstly: The East 162 Feet and Secondly: Part Subdivided by Plan 50654; District Lot 390A Group 2 New Westminster District Plan 6711

17709 - 96 Avenue

Parcel Identifier: 004-330-307
Lot 50 District Lot 390A Group 2 New Westminster District Plan 45112

17649 - 96 Ave

Parcel Identifier: 004-147-782
Lot 52 District Lot 390A Group 2 New Westminster District Plan 50654

1771● - 97 Avenue

(the "Land")

3. This development permit applies to only the portion of the Land shown on page 7922-0234-00(108) which is attached to and forms part of this development permit.

4. The Land has been designated as a development permit area in Surrey Official Community Plan, 2013, No. 18020, as amended.

A. Sensitive Ecosystem

1. Development shall occur strictly in accordance with the Ecosystem Development Report dated February 2023 by Phoenix Environmental Services Ltd. attached and numbered as 7922-0234-00(1) through to and including 7922-0234-00(114).

2. The Riparian Protection Area, including the Riparian Setback Area as defined in Surrey Zoning By-law, as may be amended or replaced from time to time, shown outlined in a solid heavy line on the Explanatory Plan EPP140743, shall be established, inspected and maintained in accordance with the plans numbered 7922-0234-00(114).

3. Tree removal and vegetation disturbance shall be undertaken, monitored, inspected and maintained in accordance with the reports attached and numbered 7922-0234-00(34) through to and including 7922-0234-00(61). Tree removal and protective fencing shall be undertaken in accordance with the Arborist Report dated November 23, 2023 and prepared by Terry Thrale attached and numbered 7922-0234-00(34) through to and including 7922-0234-00(61).

4. Riparian Protection Areas shall remain free of development and left undisturbed.

5. Habitat protection, mitigation, compensation and rehabilitation works shall be completed in accordance with the Landscape Plan, prepared by PMG Landscape Architects attached as Appendix G.

6. Minor changes to the Drawings that do not affect the Riparian Protection Area or Green Infrastructure Protection Area, as identified and forming part of this development permit, site grading, soil stability, building placement, runoff or vegetation on the Land, may be permitted subject to the approval of the City.

B. Landscaping Installation and Maintenance

1. The landscaping shall be constructed, planted, installed and maintained in good order in accordance with the landscaping plans prepared by PMG Landscape Architects, and attached as Appendix G (the "Landscaping").

2. For Sensitive Ecosystem development permits, or for that portion of a development permit pertaining to a Hazard Land, Sensitive Ecosystem or Farm Protection, the Landscaping shall be completed PRIOR TO the issuance of a building permit, as identified in Development Permit Procedures and Delegation Bylaw, as may be amended or replaced from time to time.

3. For Sensitive Ecosystem development permits, or for that portion of a development permit pertaining to Sensitive Ecosystem, Landscaping shall be maintained for a minimum of five years after the date of substantial completion and shall be confirmed "free to grow" at the end of the maintenance period.

C. Security and Inspections

1. Security must be submitted to the City prior to the installation of any Landscaping.

2. For Sensitive Ecosystem development permits, security must be submitted prior to the issuance of any Development Permit, Building Permit or Tree-cutting Permit.

3. The security for plantings is to be submitted as follows:

   i. Cash in the amount of $_____
   ii. An Irrevocable Letter of Credit, in a form acceptable to the City, in the amount of $10,950 (the "Security")

4. For Sensitive Ecosystem development permits, or that portion of the development pertaining to the Sensitive Ecosystem component, the Security amount is for: $10,950.

5. Security release will only be considered once installation of the Landscaping has been completed, after final approval of the installation has been given by the City, and after the completion by the Owner of any required maintenance periods identified in this development permit, to the satisfaction of the City.

6. For Sensitive Ecosystem development permits, when Landscaping requirements and permit requirements have been substantially completed and approved by the City AND upon successful completion of the MINIMUM FIVE YEAR maintenance period, to the satisfaction of the Qualified Environmental Professional and the City, with Landscaping confirmed at the 'free to grow stage' (as confirmed and approved by the City), and without the City having to use the Security, 90% of the original Security will be returned. When the Landscaping requirements and permit requirements receive final approval from the City, the remaining 10% of the original Security will be returned.

7. For Sensitive Ecosystem development permits, when Landscaping requirements and permit requirements have been substantially completed and approved by the City, AND upon successful completion of the MINIMUM 5 YEAR maintenance period, to the satisfaction of the Qualified Environmental Professional and the City, with Landscaping confirmed at the 'free to grow stage' (as confirmed and approved by the City), and without the City having to use the Security, 90% of the original Security will be returned. When the Landscaping requirements and permit requirements receive final approval from the City, the remaining 10% of the original Security will be returned.

8. If final approval of the Landscaping installation and maintenance is not given by the City, the City has the option of using the Security to compete the Landscaping (or to hire a contractor to complete the work on the City's behalf) with any remaining money returned to the Owner. The Owner authorizes the City or its agent to enter upon the Land to complete the Landscaping.

9. If the City elects not to enter upon the Land to complete the Landscaping and the Owner does not complete the Landscaping, the Security is forfeited to the City five (5) years after the date of the provisional or final inspection of the buildings and structures referred to in the Drawings.

10. If the Owner or shared vehicle operator fails to supply the shared vehicle as required, the City has the option of using the Security to cover all costs of fulfilling the obligations of the shared vehicle agreement. The Owner authorizes the City or its agent to enter upon the Land to complete any work necessary to fulfill the obligations of the shared vehicle agreement.

D. Monitoring

1. A Qualified Environmental Professional must be retained by the Owner to ensure completion of the works in accordance with this Development Permit and shall submit monitoring reports and a completion report to the City.

2. Upon completion of the development, the Owner shall provide the City with confirmation from the Qualified Professional(s) that the development is complete in accordance with the terms of this development permit.

3. A Qualified Environmental Professional must be retained by the Owner to ensure completion of the works in accordance with this development permit and shall submit monitoring reports and a completion report to the City.

E. Administration

1. The Land shall be developed strictly in accordance with the terms and conditions and provisions of this development permit.

2. This development permit shall lapse if the Owner does not substantially start any construction with respect to which this development permit is issued within two (2) years after the date this development permit is issued. The terms and conditions of this development permit, and any amendment to it, are binding on any and all persons who acquire an interest in the Land.

3. This development permit is only valid for the development that is described in this development permit. If a change to development is considered, a new development permit or an amendment to this permit is required before any work is started.

4. All reports, documents and drawings referenced in this development permit shall be attached to and form part of this development permit.

5. In addition to this development permit, and in accordance with the Surrey Building Bylaw, as may be amended or replaced from time to time, a restrictive covenant, an easement, or both, that registration of a combined Statutory Right-of-Way / Section 219 Restrictive Covenant over the designated Streamside Protection Area for both "No Build" and conveyance access has been registered as a charge(s) on the Land.

6. This development permit is issued subject to compliance by the Owner and the Owner's employees, contractors and agents with all applicable City bylaws, including the Tree Protection Bylaw, Erosion and Sediment Control Bylaw and the Soil Removal and Deposition Bylaw, all as may be amended or replaced from time to time.

7. This development permit is NOT A BUILDING PERMIT.

AUTHORIZING RESOLUTION PASSED BY THE COUNCIL/DELEGATED OFFICIAL, THE DAY OF , 20 .

ISSUED THIS DAY OF , 20 .

Mayor

City Clerk

IN CONSIDERATION OF COUNCIL APPROVAL OF THIS DEVELOPMENT PERMIT AND OTHER GOOD AND VALUABLE CONSIDERATION, I/WE THE UNDERSIGNED AGREE TO THE TERMS AND CONDITIONS OF THIS DEVELOPMENT PERMIT AND ACKNOWLEDGE THAT WE HAVE READ AND UNDERSTOOD IT.

Authorized Agent: (Signature)

Name: (Please Print)

K[redacted]Ron

Owner: (Signature)

K[redacted] RAI

Name: (Please Print)

7922-0234-00(1)

PRELIMINARY ECOSYSTEM DEVELOPMENT PLAN

17649 & 17709 – 96 Ave. and 17110 – 97 Ave
Surrey, B.C.

Prepared for:

1214081 BC Ltd.

Prepared by:

PHOENIX ENVIRONMENTAL SERVICES LTD.

February 2023

Acronyms Defined

ALR	Agricultural Land Reserve
BCS	Biodiversity Conservation Strategy, City of Surrey, 2014
CDC	BC Conservation Data Centre
CDFxm1	Coastal Douglas Fir, Very Dry Maritime (biogeoclimatic zone)
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
COSMOS	City of Surrey Online Mapping System
CWHxm1	Coastal Western Hemlock, Very Dry Maritime (biogeoclimatic zone)
DFO	Department of Fisheries and Oceans Canada
DP3 Guidelines	Development Permit Guidelines: Sensitive Ecosystems, City of Surrey Bylaw 18020
DVP	Development Variance Permit
EDP	Ecosystem Development Plan
MOF	BC Ministry of Forest
ESA	Environmentally Sensitive Area
ESC	Erosion and Sediment Control
GIN	Green Infrastructure Area / Network
IMP	Impact Mitigation Plan
MA	Management Area
OCP	Official Community Plan
QEP	Qualified Environmental Professional
RAPR	Riparian Areas Protection Regulation, Province of BC, *Riparian Areas Protection Act*, B.C. Reg 178/2019
RC	Restrictive covenant
ROW	Right-of-way
RPBio	Registered Professional Biologist (British Columbia)
SAR	Species-At-Risk
SARA	*Species at Risk Act* (Canada)
SEA	Sensitive Ecosystem Area
SEDPA	Sensitive Ecosystem Development Permit Area (City of Surrey)
SPEA	Streamside Protection and Enhancement Area
TOB	Top of (stream) Bank
WSA	BC *Water Sustainability Act*

TABLE OF CONTENTS

LIST OF APPENDICES

Appendix G – Landscaping Plan

1. INTRODUCTION

Phoenix Environmental Services Ltd. (Phoenix) has been retained by 1214081 BC Ltd. (the "Client") to assess 17649 & 17709 – 96 Ave. and 17110 – 97 Ave in Surrey, BC (the "Site"), and to provide an Ecosystem Development Plan (EDP) in support of the associated Sensitive Ecosystem Development Permit Area application for the subject Site. The Site is 16,447 m^2 in size and currently zoned as RA (one-acre residential). This EDP pertains to development of the Site by using a temporary use permit (TUP) to create parking for large transport trucks. All properties comprising of the Site contain single-family residential homes with a couple storage sheds. The Site is dominated by manicured lawns, ornamental gardens and some mixed, isolated, second growth, forested stands. Each individual property within the Site has driveways to provide access to 96 and 97 Ave. The Site is bounded on the east by 17723 96 Ave, to the north by 97 Ave, to the south by 96 Ave and to the west by 17633 96 Ave.

No mapped streams or green infrastructure is located on the Site. Two stream (ditch) features are present on the north and south side of 96 Ave. Both streams (ditches) are within 30m of the Site. A permanent barrier to fish passage has been previously identified further downstream (intersection of 96 Ave and 179 Street). Phoenix has confirmed that the ditch fronting the Site (north side of 96 Ave.) is not a stream under the Water Sustainability Act (WSA) but is a stream (ditch) under the Riparian Areas Protection Regulation (RAPR) and is a Class B ditch under the City's Streamside Protection Bylaw.

Green infrastructure associated with Tynehead Park is about 200m west of the Site. In addition, Green Infrastructure Network (GIN) Corridor # 121 is also about 200m south of the subject property.

Due to the presence of streams (ditches) in the vicinity of the Site, an Ecosystem Development Plan (EDP) is required by the City to support the Sensitive Ecosystem Development Permit application for the proposed development.

The following EDP describes the existing environmental Site conditions and the proposed development, including discussion of measures to protect the sensitive ecosystem values. This EDP has been based on field assessment of the Site and surrounding area, review of available information resources (e.g. COSMOS), and with reference to the City's DP3 Sensitive Ecosystems Development Permits Guidelines.

In association with the development at the Site, road-widening of 97 Ave is required to allow truck access to the Site. No streams were found along 97 Ave and no net adverse environmental effects from road widening are expected.

Following the body of this report, a Construction Environmental Management Plan (CEMP; Appendix C) is attached which forms part of the EDP for the Site and proposed development. The CEMP is intended to act as a working document, to be amended as required, to provide guidance and recommended measures to protect the Streamside Protection Area (SPA) from damage or disturbance during construction activities associated with the proposed development.

1.1 SENSITIVE ECOSYSTEMS DEVELOPMENT PERMIT GUIDELINES

This Ecosystem Development Plan (EDP) has been prepared in accordance with the City of Surrey's *DP3 Development Permit Guidelines: Sensitive Ecosystems* (DP3 Guidelines). The DP3 is the third-listed item of Development Permit Areas as described in the Official Community Plan (OCP) for the City of Surrey.

In preparation of this EDP Report to satisfy DP3 Guidelines for development within a Sensitive Ecosystem Development Permit Area (SEDPA), Phoenix reviewed and considered terminology as defined in Section A, Definitions of the DP3 Guidelines. This terminology included:

- Ecosystem Development Plan (EDP);
- Green Infrastructure Areas (GIN);
- Impact Mitigation Plan (IMP);
- Sensitive Ecosystem Areas (SEA);
- Species-At-Risk (SAR);
- Stream, and
- Streamside Areas.

Phoenix also reviewed and considered content as provided in Section B, *Development Restrictions* and Section C, *Development Guidelines* of the DP3 Guidelines. Sections B and C define development restrictions and guidelines pertaining to Streamside Areas and Green Infrastructure Areas/Networks (GIN).

As Section B of the DP3 Guidelines specifies, requirements for streamside protection and enhancement areas (SPEAs) under the BC provincial *Riparian Areas Protection Regulation* (RAPR) take precedence over any other requirements as presented in the DP3 Guidelines, such that the establishment of SPEAs under Part 7A of the Surrey Zoning Bylaw 12000 (*Streamside Protection*) complies with RAPR requirements (Province of BC, 2010).

Items 3 through 22 specified in Section C of the DP3 Guidelines are applicable to on-site and site-adjacent building and construction, trees and vegetation, habitat, and drainage.

Section D, *Submission Requirements – Ecosystem Development Plan* of the DP3 Guidelines outlines conditions for EDP submissions for either a Streamside Area or GIN, including the involvement and responsibilities of a Qualified Environmental Professional (QEP) in relation to an EDP. This EDP report has been organized to address each of the Submission Requirements in the order in which they are presented in the DP3 Guidelines.

2. CONSULTANT QUALIFICATIONS

Ken Lambertsen is a Registered Professional Biologist (R.P.Bio) with over 27 years of experience in conducting stream habitat assessments and environmental impact assessments, as well as other environmental consulting services. He has completed many environmental assessments entailing ecological communities, wildlife habitats, Species-at-Risk, and other ecologically sensitive features, including Green Infrastructure Areas in the City of Surrey. He has completed numerous consulting assignments for the City of Surrey entailing stream assessments, stream classification,

setback determinations, wildlife and ecological community assessments, and environmental impact assessments, including EDP reports. Ken Lambertsen is a Qualified Environmental Professional (QEP) under the B.C. Riparian Areas Protection Regulation and is recognized by the City of Surrey as a QEP with respect to the Sensitive Ecosystem Development Permit Area (DP3) Guidelines.

Alexander Drake, MSc, R.P.Bio, is a Project Biologist and has been a primary contributor to this EDP. Alexander completed his master's degree through Simon Fraser University and British Columbia Institute of Technology (BCIT). Alexander has conducted environmental impact assessments throughout the Lower Mainland including RAPR assessments as well as wetland and watercourse classifications. Alexander is a QEP under RAPR, has completed provincial and federal regulatory applications, and is experienced with instream work monitoring, aquatic restoration, and habitat assessments.

The *Tree Removal Plan* for the Site, dated July 15, 2022, was prepared by Woodridge Tree Consulting Arborists Ltd.

The *Geotechnical Investigation Report* for the Site, dated August 3, 2022, was prepared by Roberto Avendano. B.Eng., P.Eng of GeoPacific Consultants Ltd.

Further details regarding Consultant Qualifications are presented in Section 8, *Professional Statement* of this report.

3. PROTECTION AREAS

The existing mapped Sensitive Ecosystem Areas (SEA) at, and in the vicinity of, the Site comprise:

- One roadside ditch on the north side of 96 Ave.
- Another roadside ditch along the south side of 96 Ave.

The roadside ditch along and adjacent to the Site is classified as a Class B ditch (north side) while the south ditch is classified as Class A/O under the City's Streamside protection Bylaw. Both ditches are considered to be regulated under the RAPR. The roadside ditch on the north side of 96 Ave Croydon Drive is considered a RAPR stream specifically, a non-fish bearing ditch, but not a WSA stream as it doesn't have a natural source of water supply and is a corridor ditch.

3.1. STREAMSIDE

Within the DP3 Guidelines, a stream is defined as any of the following that provides fish habitat:

a) A watercourse, whether it usually contains water or not;
b) A pond, lake, river, creek, brook or a natural channelized stream;
c) A ditch, spring or wetland, that is connected by surface flow to any item referred to in a) or b) above, or
d) A channelized, connected wetland, constructed channel or ditch, lake, swamp, gulch, ravine or natural stream.

Streamside areas are defined as "existing or potential areas comprised of streambeds, water, trees, and grasses that border streams, lakes and watersheds and that link water to land and directly influence or provide fish habitat."

As per Part 7A, *Streamside Protection*, of the City of Surrey Zoning Bylaw 12000, streams are classified as per the following:

- Class A: inhabited by salmonids year-round or are potentially inhabited year-round with access enhancement;
- Class A/O: inhabited by salmonids, primarily during the overwintering period, or potentially inhabited with salmonids during the overwintering period with access to enhancement and non-salmonid species generally present year-round;
- Class B: a significant source of food and nutrient value to downstream fish populations with no documented fish presence and no reasonable potential for fish presence.

While not included in the Streamside Protection Bylaw (therefore receiving no municipal setbacks), are City of Surrey Class C watercourses. The 2021 City Environmental Review Process updated the definition of Class C watercourses as not meeting the definition of a stream under the BC *Water Sustainability Act* (WSA) and not meeting the definition of a stream under the BC Riparian Areas Protection Regulation (RAPR). Class C watercourses under this definition are generally expected to be limited to ditches that fully infiltrate.

Within the Bylaw, streams are also categorized according to Stream Type: Natural Streams, Channelized Streams, Large Ravine Streams, and Ditches. The applicable streamside setback area is determined based on the stream type and stream classification for the subject stream, and measured from the stream Top of Bank (TOB) as per Bylaw Section B.1 – Streamside Setback Areas.

The requirement for establishing a Streamside Protection Area under Part 7A of the City of Surrey's Zoning Bylaw 12000 was adopted on 12 September 2016. All development proposals must be in accordance with the streamside setbacks that apply under the Bylaw amendments; and if not, any proposed variance to the applicable streamside setback area requires a Development Variance Permit (DVP). As stated within Bylaw 12000, all lands within a streamside protection area, which includes the area of land between the stream and top of bank and the streamside setback area, are subject to the regulations set out in within the Bylaw..

3.2. Green Infrastructure

The City of Surrey's Biodiversity Conservation Strategy (BCS) is designed to preserve Surrey's biodiversity over the long term (City of Surrey [ii], 2014). Designated Management Areas (MAs) within the City delineate and describe unique conditions which influence biodiversity. The Site is located within the Tynehead MA, which is classified as Suburban North. The Suburban North area is defined as having "remnant patches of upland forests" with habitat only supporting smaller species of wildlife due to limited habitat connectivity. As of 2014 when the BCS was published, Tynehead exhibited 53% natural area and 30% protected area.

Management objectives for the Tynehead MA as outlined by the BCS include the following:

- Preserve natural and semi-natural habitat on private land during re-development;
- Establish movement corridors connecting Tynehead Park to the ALR ;
- Work with landholders to maintain and enhance natural habitat on private land;
- When development is proposed adjacent to natural areas, encourage alternative development concepts that allow for greater protection of these natural areas;
- Work with land owners to naturalize yards adjacent to the GIN;
- Increase tree cover adjacent to the ALR; and
- Increase the number of wetlands and ponds.

4. LEVELS OF SAFEGUARDING

The streamside setback area within the Site will be protected by minimum safeguarding. The streamside setback area (SPA) may be protected by having a restrictive covenant registered on the land title. In addition, a P15 planting agreement will be composed and submitted to the City. As outlined in the DP3 Guidelines, where minimum safeguarding is chosen, the applicant will be responsible for the additional ecological restoration or on-going maintenance of the Protection Area as necessary. However, as the proposed TUP is an interim use of the Site until a plan for ultimate redevelopment is defined, safeguarding of the ditch SPA on the north side of 96 Ave. may be deferred until the ultimate development plan is proposed and the possibility for maximum safeguarding by dedication of the SPA to the City can be determined.

A permanent 1.2 metre fence will be installed on Site outside of the boundary of the Streamside Protection Area (SPA) to delineate the protection areas and prevent encroachment into the sensitive ecosystem areas. Prior to any construction activities in the vicinity of the SPA, the area will be fenced off with either the permanent fencing noted above, or temporarily with orange snow fencing during construction which would be replaced by the permanent fencing following construction. The status of SPA fencing will be described in a "comfort letter" to the City prior to construction works.

5. PRE-DEVELOPMENT SITE CONDITIONS

Phoenix conducted an environmental assessment (including RAPR assessment data collection) of the Site on August 4, 2022 under overcast skies with light rain. Surrey Flowworks precipitation data (from Port Kells Pump Station) indicated 8.1 mm rainfall in the 72 hours and 2.8 mm 24 hours prior to the field assessment. Phoenix has previously conducted several other field assessments in the area, including an assessment of the streams along 96 and 97 Ave in 2006 as part of the Anniedale NCP. Phoenix has observed the roadside ditches directly associated with this application under wet and dry conditions. Existing conditions as per the field survey, plus the completed desktop review, are presented in the following sections. Select Site photos are presented in Appendix B.

5.1. BUILDING AND CONSTRUCTION

During the August 2022 field assessment, 17709 96 Ave. contained an old, slightly dilapidated two storey house and shed. 17649 96 Ave had a two storey house as well. Both properties along 96 Ave have driveways that facilitate access to 96 Ave. Similar to the other properties within the Site, 17110 – 97 Ave. had a two story house and access driveway to 97 Ave.

5.2. Soil

Surficial geology mapping from *Geological Survey of Canada Map 1484A 1:50,000* indicates that native soils at the Property and surrounding area are likely characterized as Capilano Sediments, specifically "Cd" subtype (Armstrong & Hicock, 1976). "Cd" sediments are characterised as being marine and glaciomarine silt loam to clay loam with minor sand and silt normally less than 3 m but up to 30 m thick.

According to the BC Soil Survey mapping (Luttmerding 1981a, 1981b), the Site contains soils characterised as Bose soils. Bose soils are described as 0.3-1.6 metres of rapidly pervious gravelly lag or glacial outwash deposits over slowly pervious moderately coarse textured glacial till and some moderately fine textured glaciomarine deposits. The drainage characteristics of Bose soils are described as well to moderately-well draining with telluric seepage (i.e. lateral water movement at intersection of lag and till deposits). The site is mapped as undulating to gently rolling (slope: 2 - 9 %) moderately to very stony land.

A search of the Groundwater Wells and Aquifers database found no groundwater well records for the Site.

The site geotechnical investigation by GeoPacifc involved drilling seven boreholes across the Site. The boreholes extended up to 6.1 m below the existing grade and were generally consistent with the mapped soil descriptions. A layer of topsoil up to 0.5m in depth extends across a majority of the Site. Beneath the topsoil is a layer of silty sand and gravel down to 0.9m. Beyond this layer is post glacial silty clay extending to 4.5m below grade. The majority of test pits contained a final layer of dense grey glacial till.

The static groundwater table was not encountered during test pit excavating, however some seepage occurred overlying the glacial till. Based on the onsite conditions assessed by GeoPacific, it is expected that perched groundwater will form seasonally during extended periods of rain. No steep or unstable slopes or ravines were observed on the Site.

5.3. Habitat & Sensitive Species

5.3.1 Trees, Vegetation & Wildlife

The Site is located within the Coastal Western Hemlock very dry maritime sub-zone CWHxm1 as described by the Biogeoclimatic Ecosystem Classification Program (Province of BC, 1999; Nuszdorfer, Klinka & Demarchi, 1991). The British Columbia Conservation Data Centre (CDC) has listed fourteen of fifteen forested ecological communities within the CWHxm1 as either Red (extirpated, endangered, or threatened) or Blue (special concern) (BC CDC [ii], 2019).

The Site exists in a semi-natural, disturbed state with manicured lawn areas and isolated second growth forests. The forest habitat across the Site was dominated by big leaf maple, horse chestnut, mountain ash, English oak, Western red cedar and Norway spruce. Invasive plant species were found across the Site and included species such as Himalayan blackberry (*Rubus armeniacus*) and English ivy (*Hedera helix*). This forested habitat provides limited habitat for a several wildlife species. Songbirds and woodpeckers such as American robins, bushtits, black-capped chickadees and northern flickers will likely use the canopy for breeding, while raptors may forage and roost

in the area. Bat species may use the forested and ditch riparian habitat for landscape movement, feeding and hibernating but are expected to prefer the GIN corridors in the vicinity.

Native plant species observed by Phoenix across the properties comprising of the Site included:

Vine maple	*Acer circinatum*	English Oak	*Quercus robur*
Bigleaf Maple	*Acer macrophyllum*	Western redcedar	*Thuja plicata*
Norway Spruce	*Picea abies*	Salmonberry	*Rubus spectabilis*
Mountain Ash	*Sorbus aucuparia*	Hawthorn	*Crataegus spp.*
Japanese Maple	*Acer palmatum*	Trailing Blackberry	*Rubus ursinus*
Bracken Fern	*Pteridium spp.*	Soft rush	*Juncus effusus*
White Spruce	*Picea glauca*	Thimbleberry	*Rubus parviflorus*
Black Cottonwood	*Populus trichocarpa*	European Ash	*Fraxinus excelsior*
English Oak	*Quercus robur*	Sword fern	*Polystichum munitum*
Scots Pine	*Pinus sylvestris*		

Phoenix also observed invasive plant species including:

English ivy	*Hedera helix*	Creeping buttercup	*Ranunculus repens*
English holly	*Ilex aquifolium*	Himalayan Blackberry	*Rubus armeniacus*
Daphne / Spurge-Laurel	*Daphne laureola*	St. John's wort	*Hypericum perforatum*
Reed canary grass	*Phalaris arundinacea*	Bindweed	*Convolvulus arvensis*
Common periwinkle	*Vinca minor*		

Bird species observed during the field assessment included:

Northwestern Crow	*Corvus caurinus*	Black-Capped Chickadee	*Poecile atricapillus*
Spotted Towhee	*Pipilo maculatus*	Dark-Eyed Junco	*Junco hyemalis*
Song sparrow	*Melospiza melodia*	Red-breasted Nuthatch	*Sitta canadensis*
Song Sparrow	*Melospiza melodia*		

No other wildlife was observed during the field assessment.

Arborist Report

A Tree Preservation Report and *Tree Removal Plan* for the Site, dated July 15, 2022, has been prepared by Woodridge Tree Consulting Arborists Ltd. This report describes the assessment of

existing trees including details of individually assessed tree species, trunk diameter (DBH), and tree protection zone (TPZ).

The report indicates that 99 trees are proposed for removal with the other 39 on-Site trees designated for retention. Of these, 22 are deciduous and 53 are conifers (see Table 1).

Table 1: Tree Species designated for removal by the Project Arborist.

Species	Scientific Name	Number
Alder and Cottonwood Trees		
Alder	*Alnus spp.*	9
Cottonwood	*Populus deltoides*	24
Deciduous		
Birch	*Betula spp.*	2
Big Leaf Maple	*Acer macrophyllum*	16
Cherry	*Prunus spp.*	3
Holly	*Ilex spp.*	1
Conifer		
Douglas-Fir	*Pseudotsuga menziesii* ssp. *Menziesii*	21
Spruce	*Picea spp.*	2
Western Redcedar	*Thuja plicata*	30
Grand Total (excluding Alder and Cottonwood Trees)		75

5.3.2. Species at Risk

The potential for occurrence of Species-at-Risk on, or adjacent to, to the Site was assessed using a variety of methods including:

- BC Conservation Data Center iMap tools
- BC Species and Ecosystems Explorer tools
- Sensitive Ecosystem Inventories
- SARA registry
- BC Breeding Bird Atlas
- eBird Canada
- Site assessment

Phoenix determined the reasonable potential presence for a Species-at-Risk to occur within the forested area on Site or access the Site from the GINs. This determination was reached by considering the current ecological conditions of the Site, landscape and regional context, species-specific habitat requirements and range extents, and known individual sites for Species-at-Risk previously detected in the region. These results are presented in Table 2.

Table 2. BC Species and Ecosystems Explorer Search Results

Scientific Name	English Name	Status		Potential to Occur on Site
		SARA	Provincial	
Mammal				
Myotis thysanodes	Fringed Myotis	DD/ 3(2005)	Blue	Possible. No critical or exceptionally high value habitat for this species was found on Site.
Myotis lucifugus	Little Brown Myotis	E	Blue	Potential use of openings in bark in conifer trees as hibernacula, narrow riparian area may provide some habitat for landscape movement.
Myotis yumanensis	Yuma Myotis	-/-	Blue/S3 (2022)	Possible. No critical or exceptionally high value habitat for this species was found on Site.
Sorex rohweri	Olympic Shrew	-/-	Red/S2? (2015)	Unknown, data deficient species. Assumed as below, *Sorex bendirii*.
Sorex trowbridgii	Trowbridge's Shrew	-/-	Blue/S3 (2015)	Unknown: Inhabits all mature forest habitats, especially vulnerable to fragmentation. Only 18 known detections in BC though confirmed present in Surrey.
Lepus americanus washingtonii	Snowshoe Hare, washingtonii subspecies	-/-	Red	Possible. No critical or exceptionally high value habitat for this species was found on Site.
Mustela frenata altifrontalis	Long-tailed weasel, altifrontalis subspecies	-/-	Red	Possible. No critical or exceptionally high value habitat for this species was found on Site.

Bird				
Patagioenas fasciata	Band-tailed Pigeon	SC	Blue/S3S4 (2022)	Possible, Low. No critical or exceptionally high value habitat for this species was found on Site. Frequents second-growth mixed or coniferous forest, parks, yards, uses riparian habitat for landscape movement; though often prefers higher elevation.
Recurvirostra americana	American Avocet	-/-	Blue	Possible. No critical or exceptionally high value habitat for this species was found on Site.
Botaurus lentiginosus	American Bittern	-/-	Blue	Possible. No critical or exceptionally high value habitat for this species was found on Site.
Chordeiles minor	Common Nighthawk	SC	Blue/S3S5B (2022)	Possible. No critical or exceptionally high value habitat for this species was found on Site.
Icteria virens	Yellow-breasted Chat	E	Red	Possible. No critical or exceptionally high value habitat for this species was found on Site. Lower mainland habitat distribution is limited
Euphagus carolinus	Rusty Blackbird	SC	Blue/S3S4B (2015)	Possible. No critical or exceptionally high value habitat for this species was found on Site. Lower mainland habitat distribution is limited
Branta bernicla	Brant	-/-	Blue	Possible. No critical or exceptionally high value habitat for this species was found on Site.
Falco mexicanus	Prairie Falcon	-/-	Red	Low: No critical or exceptionally high value habitat for this species was found on Site. Has been found locally in Surrey. Possible foraging.
Cypseloides niger	Black Swift	E	Blue	Possible foraging. Nesting unlikely (prefers cliffs/ waterfalls/ caves).
Megascops kennicottii kennicottii	Western Screech-Owl, (*kennicottii* subspecies)	T	Blue	Low Potential. Fairly tolerant of people and may be found in suburbs or parks.
Falco peregrinus	Peregrine Falcon	SC	-/-	Potential foraging. No critical or exceptionally high value habitat for this species was found on Site. Has been found locally.
Melanerpes lewis	Lewis's Woodpecker	T	Blue/ S2S3B (2022)	Low- prefers open ponderosa pine at high elevations and open riparian forests at lower elevations. No critical or exceptionally high value habitat for this species was found on Site.
Coccothraustes vespertinus	Evening Grosbeak	SC	Yellow	Potential foraging. No critical or exceptionally high value habitat for this species was found on Site. Has been found locally.
Larus californicus	California Gull	-/-	Red	Possible. No critical or exceptionally high value habitat for this species was found on Site. Has been found regionally.
Nycticorax nycticorax	Black-crowned Night-heron	-/-	Red	Possible. No critical or exceptionally high value habitat for this species was found on Site. Has been found regionally.

Amphibians				
Rana aurora	Northern red-legged frog	1-SC (2005)/SC	Blue	Low potential use of the south ditch along 96 Ave. Lacks slow water or pools for breeding. Some associated riparian and upland forest habitat available on Site and near by.
Invertebrates				
Allogona townsendiana	Oregon Forestnail	1-E (2005)/E	Red	Unlikely. Sapling bigleaf maples were detected but a lack of mature trees and stinging nettle to provide preferred habitat.
Omus audouini	Audouin's Night-stalking Tiger Beetle	1-T (2018)/T	Red	Unknown. Uses low elevation coastal forest edge habitat, including riparian habitat adjacent to open meadow/field. Appears to prefer sandy habitat and Garry Oak forests, though previously detected in Surrey.
Euphyes vestris	Dun Skipper	T	Blue	Possible, no critical or exceptionally high value habitat for this species was found on Site. Has been found regionally.
Argia emma	Emma's Dancer	-/-	Blue/S3S4 (2015)	Very Low: prefers montane habitat with rocky streams and woody debris.
Ophiogomphus occidentis	Sinuous Snaketail	-/-	Blue	Possible, no critical or exceptionally high value habitat for this species was found on Site. Has been found regionally.
Pachydiplax longipennis	Blue Dasher	-/-	Blue	Possible, no critical or exceptionally high value habitat for this species was found on Site. Has been found regionally.
Sympetrum vicinum	Autumn Meadowhawk	-/-	Blue	Possible, no critical or exceptionally high value habitat for this species was found on Site. Has been found regionally.
Sphaerium patella	Rocky Mountain Fingernailclam	-/-	Red	Possible, no critical or exceptionally high value habitat for this species was found on Site. Has been found regionally.
Plants				
Brotherella roellii	Roell's brotherella	1-E (20818)/E	Red	Low. Forms on logs, stumps and tree bases in mats in mixed forests, but thinned riparian area has woody debris removed.
Callitriche heterophylla var. heterophylla	Two-edged water-starwort	-/-	Blue	Low: Is an aquatic to semi-aquatic perennial plant found in shallow ponds, slow-moving streams and shorelines.
Lupinus rivularis	Streambank lupine	E	Red	Low: Occurs along streams, creek banks and tidal sloughs. This species can be found in sandy to gravelly substrate which periodically flood. It can also be found along railway lines and dykes as long at moist conditions are stable.
Veronica catenata	pink water speedwell	-/-	Blue/S3 (2019)	Moderate-no critical or exceptionally high value habitat for this species was found on Site. Has been found locally.

Notes:
E = ENDANGERED: A species facing imminent extirpation or extinction.
T = THREATENED: A species that is likely to become endangered if limiting factors are not reversed.
SC = SPECIAL CONCERN: A species of special concern because of characteristics that make it is particularly sensitive to human activities or natural events.

5.3.3 Green Infrastructure Network

No GIN or other City specific green infrastructure is located on or within 50m of the Site.

5.4. DRAINAGE

Streamside Protection Areas

Streams at or adjacent to the Site consist of two roadside ditches along the 96 Avenue roadway. Drainage catch basins along Highway 15 capture and funnel stormwater into a 375 mm storm pipe that daylights and drains into the north ditch, adjacent to the Site. Another roadside ditch exists along the south side of 96 Ave and only receives inputs from along 96 Avenue.

The roadside ditches are referred to as Ditch 1 on the northside of 96 Avenue and Ditch 2 on the southside of 96 Avenue. A site visit was conducted on August 4, 2022 with the weather overcast with light rain. -.

Ditch 1, when assessed on August 4, 2022 was dry with no signs of scour or flow in and around the Site. Ditch 2 had water present with slight flows. Please see the attached Streamside Setback Map in Appendix A for locations of streams and the extents of protection areas.

Fish Presence and Movement

The primary stream feature on and adjacent to the Site, Ditch 1, is deemed to be non-fish-bearing. A perched culvert along Ditch 1 at the intersection of 96 Ave and 179 Street acts as a barrier to upstream fish passage. In addition, based on scour marks and signs of flow, there is not anticipated to be enough water flow to allow fish to overcome this perched culvert.

The BC Habitat Wizard database contains no records of fish presence in Ditch 1 or Ditch 2 upstream of 18087 96 Ave, but notes presence of cutthroat trout, just downstream.

Ditch 1

During the assessment Ditch 1 had damp soil in the bottom during light rain. The ditch slopes slightly to the east, beginning at 17619 96 Ave, directing flows east to Highway 1. The ditch was dry and grass lined. The ditch enters an enclosed culvert east of 17811 to the east side of 17895 driveway. At the 17895 driveway water began flowing in Ditch 1 and the substrate changes to sand and gravel.

The riparian vegetation along the north ditch in and adjacent to the Site, consisted of the following tree species: English Oak, Scots pine and black cottonwood. The shrub layer was comprised of Himalayan blackberry, thimbleberry, European ash, English ivy, soft rush and hawthorn. The herbaceous layer was made of St Johns wart, grasses, yellow hawkweed, buttercup and reed canary grass. Ditch 1 had an average width of 1.22m and was too shallow to intercept groundwater. The section of Ditch 1 adjacent to the Site The ditch likely only convey stormwater for short durations, predominantly from the roadway.

Ditch 1 is classified under the Streamside Protection Bylaw and DP3 Guidelines as a Class B ditchThis ditch is a constructed ditch that conveys stormwater into fish habitat. Based on multiple field observations, Ditch 1 does not exhibit indications of the channel being maintained by flowing

water with sufficient frequency and duration to be a significant source of water. As such, Ditch 1 is considered to be a "stream" under RAPR but not a "stream" as defined under the Water Sustainability Act (WSA). There is no possibility for fish access due to barriers to fish passage at the intersection of 96 Ave and 179 Street. The lack of scour on the ditch banks indicates that flows would not likely be regular or sufficient in volume and depth to sustain any fish.

Ditch 2

The ditch on the south side of 96 Ave (South Ditch) had water in it and was flowing. Water in the south ditch travels east to 18068 96 Ave where it enters a culvert and flows into the North Ditch. Once flows enter the north ditch water continues into Leoran Brook and the Fraser River.

The South Ditch had signs of more regular flows with aquatic vegetation (duck weed, sedges, rushes) present. The riparian area was comprised of a manicured lawn on either side of the South Ditch.

Other riparian vegetation adjacent to the south ditch included thimbleberry, vine maple, buttercup, Himalayan blackberry, bracken fern, grasses, salmonberry, Japanese maple and white spruce.

No fish were observed during the field assessment in either roadside ditch.

The average width of the south ditch was 1.1m with water found in the entire length of the ditch. Ditch 2 likely receives a steady, consistent supply of water from a drainage basin under the road at 96 Ave and Highway 15. The ditch is considered too shallow to intercept the groundwater table. It is likely that the flows observed during the field assessment in August are sourced from storage in the drainage basin considering the lack of precipitation in the month proceeding the field visit.

Ditch 2 would not be considered a WSA stream as it meets the exception as a "corridor ditch" under the latest guidance from the province. However, its connection to the drainage basin, depth of water and lack of barriers would classify the south ditch as a Class A/O ditch under the City's Streamside Protection Bylaw.

No unmapped streams were present on the Site, nor any areas with an abundance of hydrophytic vegetation.

5.4.1 Watercourse Classifications and Streamside Setback Areas

Streamside setback areas are based on the City of Surrey Zoning Bylaw Schedule 7A and RAPR SPEA widths, with the greater of the two taking precedence, as displayed in Table 3. Data has been collected to complete a formal RAPR assessment but no report has been prepared or submitted.

Table 3 Watercourse Classification and Setback Areas

	Classifications			
Watercourse	**WSA Stream**	**RAPR**	**Surrey**	**Setback Width**
Ditch 1; North of 96 Avenue	No	2 m (Non-fish-bearing)	Class B Ditch	7 m from top of bank

Ditch 2; South of 96 Avenue	No	Ditch (5m SPEA from top of bank)	Class A/O Ditch	10 m from top of bank

* Note that ditches that do not contain fish nor convey a significant source of food and nutrient value to downstream fish populations (i.e. are not Class A or B ditches as defined in the Bylaw), may be considered RAPR ditches due to their connection to other fish habitat. Such ditches are not Class C under the recent municipal definition so are referred to as unclassified. The RAPR SPEA is considered an appropriate setback to protect these non-fish-bearing ditches that do not convey a significant source of food or nutrients to fish habitat (based on lack of groundwater flows, lack of multi-canopied forest and ground cover, etc.)

Stormwater Runoff

The area of the Site comprises predominantly permeable surfaces (vegetation, gravel driveways). Based on the mapped soils and geotechnical investigation, it is expected that rainfall falling on the site would infiltrate within the vegetated areas.

6. PROPOSED DEVELOPMENT CONDITIONS & SPECIFICATIONS

6.1 BUILDING AND CONSTRUCTION

The proposed development involves clearing of almost all existing structures, on site vegetation, including 99 on-Site trees, the construction of a gravel parking lot and road widening along 97 Avenue. The SPEA along the north ditch including the SPA will remain protected and unimpacted by the development. The building, near the southeast corner of 17709 96 Ave is to be retained.

6.1.1 Instream Works

No instream works are anticipated for the Site. The Streamside Protection Area along the north ditch (Ditch 1) will be protected though signs and fencing as stipulated under the City's bylaw.

6.2 SOIL

No unstable slopes are present at the Site based on visual assessments and the geotechnical report by GeoPacific Consultants Ltd. GeoPacific is to be notified to conduct field reviews ensuring that stripping, excavation and grading etc. are conducted consistent with recommendations of the geotechnical investigation report. Topsoil and existing fill is to be removed to expose the compact subgrade layer.

Reuse of topsoil stripped from Site is not recommended due to the presence of invasive species including Himalayan blackberry, St. John's wort, etc.. Soils removed from Site should be disposed of at a location permitted to handle invasive weeds.

A QEP will work with the project engineer to prepare a site-specific erosion and sediment control (ESC) plan and monitor the implementation and effectiveness of the ESC plan. ESC measures will be implemented and monitored during land clearing, grading, and building construction phases of development, including final landscaping. Silt fence (keyed-in to the ground) with crushed rock berm as required, will be installed as necessary. All sediment and turbid water will be collected and treated within the development envelope such that no turbid water is discharged from the construction site.

6.3 Trees and Vegetation

6.3.1 Tree Management

Most trees within the proposed development area (99) are to be removed to accommodate the development (see Arborist Report, Appendix D). No City trees have been identified as requiring removal. The removed bylaw sized trees on Site will be replaced at the appropriate ratios (or cash-in-lieu will be provided to the City).

The project arborist and City of Surrey Parks Department arborist will be required to attend the Site at the time of land clearing to mitigate risk to the subject site and neighbouring properties. As per City request, a 1.2 metre black vinyl chain-link fence (specifications as per the City) will be installed just inside the development area at the Site along the boundary of the streamside setback area to delineate the protection area and prevent encroachment into the sensitive ecosystem area which will help protect trees and vegetation in those areas.

6.3.2 Invasive Vegetation Species

Invasive plant species on the Site will be removed and/or managed in association with the development. It is expected that invasive plants will be removed from the Site during stripping of the topsoil and fill material. The SPA will not be conveyed to the City (ie. minimum safeguarding) and as such the proponent is required to provide and implement an invasive species management plan for these areas pursuant to the DP3 Safeguarding guidelines.

Invasive plants and soils containing invasive plant material are to be securely transported and disposed of at facilities that are capable of properly disposing or destroying the plant material. Soils are to be contained and covered during transport and shipped to an authorised facility for deep burial. Due to the potential for spread of invasive vegetation via equipment, clothing, and machinery, cleaning protocols as detailed in the CEMP are to be adopted.

6.4 Habitat and Wildlife

There forested area on site, located predominantly in the center of the Site will be cleared and replaced with a gravel parking lot. The understory of the forested section was entirely dominated by Himalayan blackberry during the field assessment.

In association with the development, there is expected to be a reduction in movement and foraging habitat through the clearing of the manicured lawns and forest area. This might affect the presence of raptors and other species within the local landscape which feed on the small mammals residing within the area. Although the Site is near (~200m away) existing City green infrastructure, the barriers posed by the surrounding subdivision and roads likely limit movement and foraging habitat already.

6.5 Drainage

Servicing for the Site will include a drainage network through the south and east quadrants of the Site. The drainage network, comprising of a series of lawn basins will direct flows to a water quality unit on 17709 96 Ave.

Much of the Site will be covered with pervious gravel parking which is not expected to negatively impact infiltration. No stormwater will discharge into any of the adjacent ditches.

As outlined in the Integrated Stormwater Management Plan (ISMP) for the Bon Accord North Slope (East) area the following recommendations for industrial development and road expansion works will be implemented where possible.

- Absorbent soils to capture and attenuate runoff.
- Pervious pavements for walkways, parking areas and storage pads.
- Bioswales, rather than below-grade piped systems to drain parking lots.
- Green roofs to attenuate runoff.
- Rain gardens to collect, treat and attenuate runoff.
- Absorbent soils and landscaping trees to intercept, capture and attenuate runoff.
- Pervious pavements for sidewalks and low-traffic parking areas.
- Rain gardens to capture, treat and attenuate runoff.
- Bioswales / enhanced ditches.

In addition, the QEP recommends that green infrastructure is incorporated as much of the site as possible.

7. CONCLUSION

The Site currently consists of residential buildings, access driveways and a small stand of trees which will mainly be cleared. No streams are on Site. Two (2) streams (ditches) were identified along 96 Ave. Ditch 1 on the north side of 96 Ave. is classified as a Class B ditch under the City's Streamside Protection Bylaw. Ditch 2 on the south side is classified as a Clads A/O ditch. The proposed development will not involve any changes or modifications to these ditches.

Proposed development involves demolishing most existing structures and building a gravel lot for truck storage. Limited impact to habitat and wildlife is expected due to the urbanized nature of the existing area.

There was no GIN with in 50m of the Site.

No significant adverse environmental impacts are expected with the proposed development if recommendations contained within this report are followed. The proposed development is considered to protect the on-site Streamside Areas in compliance with the DP3 Guidelines.

For further detail regarding guidance and recommended measures to protect the Streamside Protection Area (SPA) from damage or disturbance during construction activities associated with the proposed development, refer to the Construction Environmental Management Plan (CEMP) for the Site which is included as Appendix C.

8. PROFESSIONAL STATEMENT

This Ecosystem Development Plan (EDP) report has been prepared in accordance with all requirements in the City of Surrey Sensitive Ecosystem Development Permits Guidelines, and the undersigned certifies that he has demonstrated education, expertise, accreditation and knowledge relevant to sensitive environments, ecosystems and streamside management. Alexander Drake, M.Sc., RPBio has been the primary Qualified Environmental Professional (QEP) for this Ecosystem Development Plan. He has been assisted Ken Lambertsen, R.P.Bio. and Senior Biologist and by environmental technicians employed by Phoenix Environmental Services Ltd. who have education and experience in conducting field assessments and relevant research and preparing reports and maps consistent with the requirements for assessing sensitive environments, ecosystems and streamside management. The other Phoenix contributors to this Ecosystem Development Plan include: Neil Lambertsen, CAN-CISEC, and Erik Lee, A.Ag., both AutoCAD Technicians.

This Ecosystem Development Plan has taken into account work performed and reports provided by other qualified professionals involved in the development proposal addressed by this report. These include Woodridge Tree Consulting Arborists Ltd. and GeoPacific Consultants.

Alexander Drake, MSc, RPBio
Project Biologist (604) 446-6128

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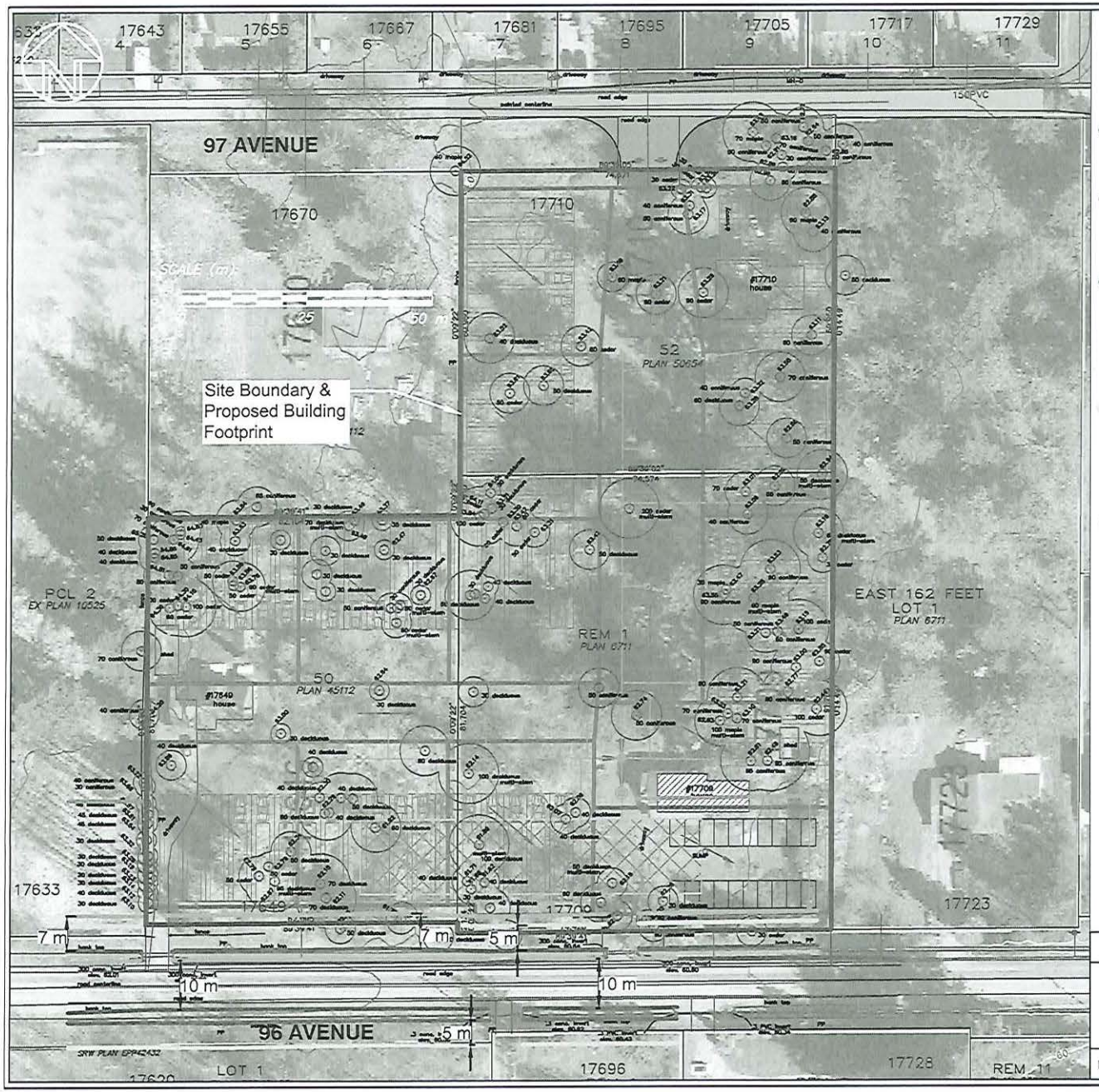
APPENDIX A

Setback Map

Phoenix Environmental Services Ltd.

7922-0234-00(24)



LEGEND

- Site Boundary
- Surveyed Watercourse
- Surveyed Top of Bank (TOB)
- Streamside Protection & Enhancement Area (SPEA) 5 m from TOB
- City Setback

Setback Map

1214081 BC LTD.
Proposed Development
17649 - 17709 96 Ave, Surrey, BC

PHOENIX
ENVIRONMENTAL SERVICES LTD.
505 - 1755 W. Broadway, Vancouver V6J 1R3
tel. 604.689.3888 fax. 604.689.3880

DATE: 15 FEB 2023	DRAWN BY: NL/EL	SCALE: As Shown	DWG: Setback Map_17649 96 Ave.dwg

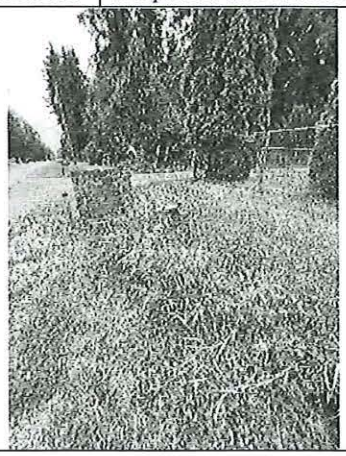
APPENDIX B

Site Photos

Phoenix Environmental Services Ltd.

Site Photos

17649 & 17709 – 96 Ave. and 17110 – 97 Ave , Surrey	
General Comments:	All photos are from 2022



August 4th 2022- Looking downstream. Ditch on South Side of 96 Ave just past the Site

August 4 2022-Looking downstream at the south ditch on 96 Ave adjacent to the Site.

August 4 2022 – Looking downstream at the north ditch along 96 Ave next to the Site.

August 4 2022-Property located along 97 Ave

August 4, 2022- Structure located on one of the properties of the Site along 96 Ave

August 4, 2022- Lawn and forested section on Site

APPENDIX C

Construction Environmental Management Plan
Phoenix Environmental Services Ltd.

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

17649 & 17709 – 96 Ave. and 17110 – 97 Ave, Surrey, BC.

Feb 2023

1. OVERVIEW

Phoenix Environmental Services Ltd. (Phoenix) has been retained by 1214081 BC Ltd (the "Client") to assess 17649 & 17709 – 96 Ave. and 17110 – 97 Ave in Surrey, BC (the Site), and to provide an Ecosystem Development Plan (EDP) in support of the associated Sensitive Ecosystem Development Permit application for the proposed development at the subject Site. This Construction Environmental Management Plan (CEMP) forms part of the Ecosystem Development Plan for the Site and proposed developments.

There are two regulated watercourse features within 50m of the Site. Both are roadside ditches along 96 Ave. The north ditch is considered non-fish bearing while the south ditch is fish bearing. The two watercourses meet the definition of streams under RAPR. All ditch watercourse features meet WSA exemptions under recent technical guidance from the Province dated January 2022.

No works are proposed to take place within the watercourses or their protected areas.

The proposed development involves clearing of all vegetation within the development envelope. The temporary use permit (TUP) will involve building a gravel parking lot for temporary truck storage.

This Construction Environmental Management Plan (CEMP) is intended to act as a working document to provide guidance and recommendations to protect the SPA from damage or disturbance during construction activities for the proposed development.

2. ENVIRONMENTAL PROTECTION REQUIREMENTS

This CEMP describes measures to protect the Streamside Protection Areas (SPA) that may be impacted by the proposed development, as well as the roles and responsibilities for implementing the protection measures specified in this CEMP.

2.1. Tree Protection Fencing

An Arborist Report dated July 15, 2022, was prepared by, Woodridge Tree Consulting Arborists Ltd. Refer to the arborist report for further tree protection / retention details.

Tree protection fencing will be erected around any trees retained trees on Site. The Project Arborist is to monitor the installation of tree protection / exclusion fencing and where necessary make recommendations for tree protection with regards to construction works in the vicinity of protected trees. Any excavation or placement of fill materials within 3 m of tree protection fencing (or the SPA where trees are present) will be supervised by the project arborist, and additional measures (e.g. manual root pruning, more frequent irrigation) as recommended by the arborist will be implemented.

Arborist supervision will be required for any stormwater outflow works in or near the SPEA that occur outside the tree protection fence to ensure protection of the retained trees.

2.2. Erosion and Sediment Control

An Erosion and Sediment Control (ESC) Plan will be prepared for the proposed development at the Site. As a minimum, the ESC Plan will include:

- Erosion prevention measures (e.g. minimising areas of exposed soil through phasing, dense straw or poly cover);
- Installing keyed-in silt fence along the SPA boundaries at the Site;
- Inlet control devices (silt sacs) installed in catch basins; and
- A temporary construction Site access pad.

ESC monitoring will be required to confirm the ESC plan is implemented and functioning as intended during the construction works. An ESC monitor (TBD) will be selected to assess the Site prior to commencing construction activities. This CEMP is intended as a working document and can be amended with further ESC details and responsibilities as the plans are finalized and an ESC monitor is determined. The Environmental Monitor is to inspect the silt fence prior to construction of the exclusion fence commencing. Further ESC details will be forthcoming as a full-scale ESC plan is developed for the Site.

2.3. Works within the Streamside Protection Areas (SPA)

No works are proposed to occur within the SPA.

2.4. Breeding Birds & Wildlife

Tree removals including land clearing and stripping should be completed outside of the migratory bird breeding season (i.e., should not be conducted between March 1 and August 31) to avoid any incidental disturbance or destruction of any active bird nests (containing eggs or young). If clearing or grubbing is required during the breeding bird period, a Breeding Bird Survey will be conducted by Phoenix in the three days prior to scheduled clearing works. Should the works require tree removal during the breeding season, a tree cutting permit is required by the City and the Phoenix breeding bird survey report must be reviewed and approved by the City before the tree cutting permit is issued.

2.5. Invasive Species

Invasive plant species on the Site should be removed and/or managed in association with the development. It is expected that invasive plants will be removed from the Site during stripping of the topsoil and fill material.

Invasive plants and soils containing invasive plant material must be bagged prior to transport and disposed of at facilities that are capable of properly disposing or destroying the plant material.

Soils are to be contained and covered during transport, and shipped to an authorised facility for deep burial.

Due to the potential for spread of invasive and noxious vegetation via equipment, clothing, and machinery, the following cleaning protocols are recommended:

CLEANING PROTOCOLS PERTAINING TO WORKS ASSOCIATED WITH ANY INVASIVE SPECIES REMOVAL

The following list includes work activities/items that have the potential to spread invasive plant species to uncontaminated areas:

- Machinery contaminated with fragments of plant material (leaves, stalks, roots/rhizomes);
- Contaminated soils;
- Hand tools (e.g. shovels) used to work in invasive species infested areas or contaminated soils;
- Clothing (e.g. boots, gloves)

Prior to moving from an area with a known invasive species presence to another area within the Site or offsite, the following cleaning protocols should be followed to prevent the spread of invasive species:

- Wash with 180 °F water at 6 gpm, 2000 psi, with a contact time of ≥ 10 seconds on all surfaces to remove contaminated soils and organic matter such as vegetation or seeds. Pay special attention to undercarriages, chassis, wheel-wells, radiators, grills, tracks, buckets, chip-boxes, blades, and flail-mowing chains.
- Use compressed air to remove vegetation from grills and radiators.
- Sweep/vacuum interior of vehicles paying special attention to floor mats, pedals, and seats.
- Run air intake fans in reverse where possible.
- Steam clean poor access areas (for example inside trailer tubes) – 200 psi @ 300 °F.
- Fully rinse detergent residue from equipment prior to leaving the facility.
- Brush off all clothing paying attention to gloves if used to handle plants or plant fragments.
- Wash off footwear as it may spread contaminated soils to other areas.

3. ENVIRONMENTAL MANAGEMENT TEAM AND COMMUNICATION

The Environmental Management Team will include the QEP and Environmental Monitor (EM) from Phoenix Environmental, 1214081 BC Ltd (Owner), the Project Arborist from Woodridge Tree Consulting Arborists Ltd, the Civil Engineering design team from Aplin Martin, the Contractor (to be determined - TBD) and the ESC Monitor (TBD). A brief description of key team members, their general roles and responsibilities, and lines of communication (to be amended as team details are determined), is as follows:

1214081 BC Ltd

- Owner of the Site with overall responsibility for environmental compliance and supervision of General Contractor's performance in achieving and maintaining environmental compliance.

- Point of contact for General Contractor, Environmental Monitor, Project Arborist, Civil Engineering team and ESC Monitor
- Reviews and retains monitoring and/or construction inspection reports from Environmental Monitor, ESC Monitor, Project Arborist and Civil Engineer and provides summaries to the City, as required.

Civil Engineer (Aplin Martin.)

- Responsible for designing engineered utilities, and overall site servicing requirements.
- Coordinates and communicates with General Contractor, Environmental Monitor, Project Arborist, ESC Monitor and 1214081 BC Ltd on construction of civil utilities and associated infrastructure.
- Reports directly to 1214081 BC Ltd.

General Contractor (to be determined)

- Responsible for implementing environmental protection measures on-site (directly and indirectly through supervision designated sub-contractors), as recommended and directed by Environmental Monitor, Project Arborist, and ESC Monitor.
- Coordinates and communicates with Environmental Monitor, Project Arborist and ESC Monitor on implementation of environmental protection measures and provides recommendation on improving implementation.
- Reports directly to 1214081 BC Ltd.

Environmental Monitor (Phoenix Environmental Services Ltd. Alexander Drake, R.P.Bio. [QEP])

- Provide a QEP Comfort Letter to the City prior to commencement of construction activities.
- Monitor construction of exclusion fencing in conjunction with the Project Arborist.
- As a minimum, environmental monitoring will include a pre-construction and post-construction visit to evaluate compliance with the City's environmental requirements.
- Provide advice on best management practices for the mitigation and prevention of environmental impacts (e.g. songbird nesting surveys prior to land clearing between March 1 – August 15).
- Facilitate compliance with City Streamside Protection and Sensitive Ecosystem Development Permit conditions and requirements.
- Prepare and submit environmental approval applications to senior governments (i.e. WSA notifications and approvals, DFO requests for review).

- Monitor in-stream works or works within SPAs, as authorised by senior governments and the City of Surrey.
- Reports directly to 1214081 BC Ltd

Project Arborist (Woodridge Tree Consulting Arborists Ltd, TBD)

- Designate and inspect the construction of Tree Protection fencing by the General Contractor.
- Work with the Environmental Monitor and General Contractor to avoid damage to existing tree root zones around trees to be retained inside the SPA during construction of the exclusion fence.
- Reports directly to 1214081 BC Ltd

ESC Monitor (ESC Monitor to be designated)

- Prepare a phased ESC Plan for the proposed development.
- Oversee and inspect the implementation of the ESC Plan.
- Prepare ESC Monitoring reports to upload to the City's online portal and provide copies to 1214081 BC Ltd
- Work with the General Contractor to respond to any appropriate changes or refinements to the ESC Plan and its implementation as construction proceeds
- Reports directly to 1214081 BC Ltd

The table below summarizes contact information for the Environmental Management Team. The table is to be amended as further team details are determined.

Environmental Management Team Contacts

Organization	Team Member	Phone	Email
Owner/1214081 BC Ltd	**1214081 BC Ltd**		
General Contractor	**TBD**	TBD	TBD
Phoenix Environmental Services Ltd. (Environmental Monitor)	**Alexander Drake**	(604) 689-3888 (office) (604) 880-6002 (mobile)	alex@phoenixenvironmental.com
Woodridge Tree Consulting Arborists Ltd. **(Project Arborist)**	**TBD**	TBD	TBD
Aplin Martin. **(Civil Engineering)**	**TBD**		
ESC Monitor	**TBD**	TBD	TBD

APPENDIX D

Arborist Report
Woodridge Tree Consulting Arborists Ltd.

7922-0234-00(35)

WOODRIDGE TREE
CONSULTING ARBORISTS LTD

Arborist Report

Inventory and Assessment of Trees Associated with TUP at 17649, 17709 96 Avenue & 17710 97 Avenue Surrey

July 15, 2022
Revision #0

Hanah Dhanani, Bachelor of Urban Forestry
ISA Certified Arborist PN 9275A

Adrian Szabunio, Diploma in Civil Engineering Technology
ISA Certified Arborist and Tree Risk Assessor PR 5079A

Prepared in the office of Woodridge Tree Consulting Arborists Ltd. at 13026 Crescent Road, Surrey. Business License 148843
Prepared for Rai Express Lines Ltd., 604-503-6900, kal@raiexpresslines.com

Assignment and Methodology

Woodridge Tree has been retained to undertake an inventory and assessment of trees associated with development of at 17649, 17709 96 Avenue & 17710, 17670 97 Avenue. The objective is to make tree preservation and protection recommendations in the context of municipal permits, rules and regulations for development.

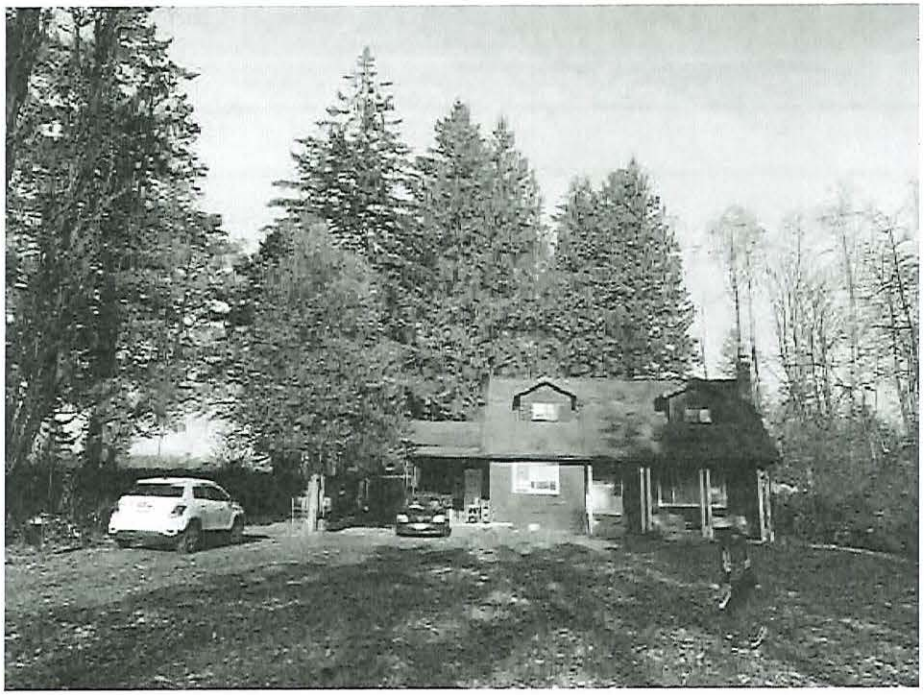
Associated trees were visually assessed to determine species, diameter at breast height (dbh) and characteristic description. Tree diameters were measured at 1.4 meters height with a diameter tape. Protection areas were calculated for all trees within range of the property. Tree hazards were assessed according to International Society of Arboriculture standards using the TRAQ (Tree Risk Assessment Qualification) method. Recommendations for removal or retention are based on assessment outcome and proximity of trees to structure and infrastructure. Soil testing, root exploration and internal probing of tissue have not been incorporated in the findings.

The observations recorded are based on inspections performed on December 3, 2021. The weather at that time was partly cloudy and 8 degrees Celsius.

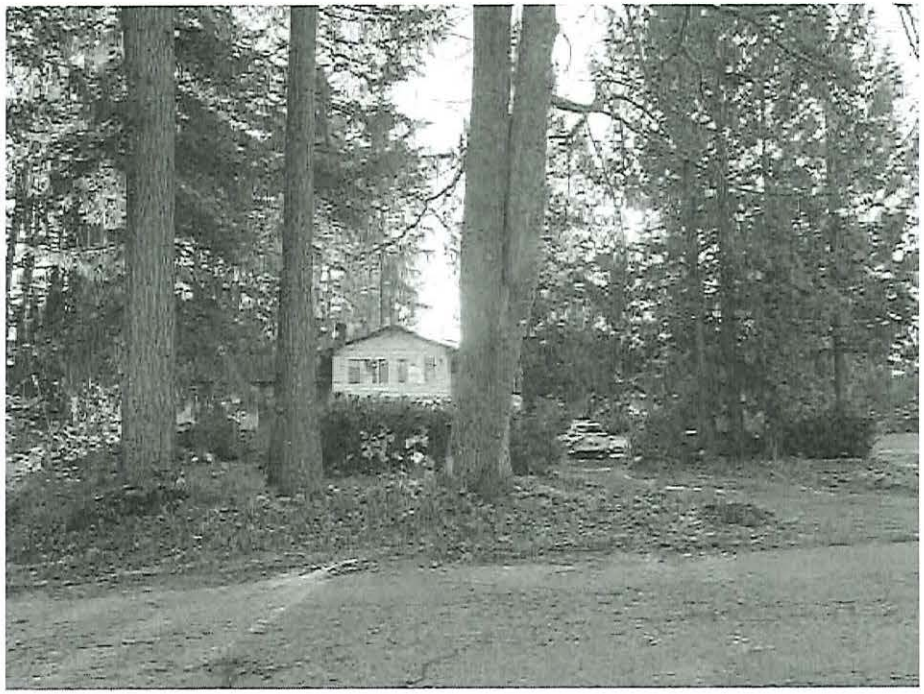
aerial image of property

Findings

The properties at 17649, 17709 96 Avenue & 17710 97 Avenue, are located on the North side of 96 Avenue, and south of 97 Avenue, near the intersection of 96 Avenue and 179 Street. At the time of observation a residential house stood on each lot. Associated trees were comprised of native conifers and deciduous species. Trees located on the subject property, and neighbours' trees close to the property lines are considered in the findings of this report. The observations recorded are based on inspections performed on November 3, 2021. Weather was sunny, approximately 8 degrees Celsius, and the arrival time was approximately 10:00 a.m.



17649 96 Avenue



17710 97 Avenue

image of property from street at time of field data collection

Tree Inventory and Assessment

- **dbh** - Diameter at 1.4m height measured in centimeters
  - on trees with multiple stems the 3 largest sections measured at 1.4m are combined to make up the total.
  -
- **critical root zone** = dbh x 6 unless otherwise specified
- **ci** - City owned tree
- **LCR** = live crown ratio, percentage of live crown remaining
- **os** - off site tree

ID#	Surveyed	Common Name	Botanical Name	DBH (cm)	LCR (%)	Canopy rad. (m)	Condition & Comments	Retention Suitability	Action	TPZ (m)
1-601	Y	Lombardy Poplar	*Populus nigra*	50	70	2	Straight trunk, in row of trees with other Lombardy poplars. Some deadwood in canopy, moss covered. Gravel parking surface to be applied over portion of the TPZ.	Moderate	Retain Arborist to supervise parking surface prep	3.00
2-602	Y	Lombardy Poplar	*Populus nigra*	40	65	1	Straight trunk, moss covered. Some deadwood in canopy. In row of trees with other Lombardy poplars. Gravel parking surface to be applied over portion of the TPZ.	Moderate	Retain Arborist to supervise parking surface prep	2.40
3-603	Y	Lombardy Poplar	*Populus nigra*	47	65	1	Straight trunk, moss covered. Some deadwood in canopy. In row of trees with other Lombardy poplars. Gravel parking surface to be applied over portion of the TPZ.	Moderate	Retain Arborist to supervise parking surface prep	2.82
4-604	Y	Lombardy Poplar	*Populus nigra*	38	70	1	Straight trunk, moss covered. Some deadwood in canopy. In row of trees with other Lombardy poplars. Gravel parking surface to be applied over portion of	Moderate	Retain Arborist to supervise	2.28

							the TPZ.		parking surface prep	
5-605	Y	Lombardy Poplar	*Populus nigra*	35	70	1	Straight trunk, moss covered. Some deadwood in canopy. In row of trees with other Lombardy poplars. Gravel parking surface to be applied over portion of the TPZ.	Moderate	Retain Arborist to supervise parking surface prep	2.10
6-606	Y	Lombardy Poplar	*Populus nigra*	38	70	0.5	Straight trunk, moss covered. Some deadwood in canopy. In row of trees with other Lombardy poplars. Large dead stub at 2m. Gravel parking surface to be applied over portion of the TPZ.	moderate	Retain Arborist to supervise parking surface prep	2.28
7-607	Y	Lombardy Poplar	*Populus nigra*	40	70	0.5	Straight trunk, moss covered. Some deadwood in canopy. In row of trees with other Lombardy poplars. Gravel parking surface to be applied over portion of the TPZ.	moderate	Retain Arborist to supervise parking surface prep	2.40
8-608	Y	Lombardy Poplar	*Populus nigra*	38	70	0.5	Moss covered. Some deadwood in canopy. In row of trees with other Lombardy poplars. Topped at 5m, trunk has slight bow with correction. Gravel parking surface to be applied over portion of the TPZ.	moderate	Retain Arborist to supervise parking surface prep	2.28
9-609	Y	Lombardy Poplar	*Populus nigra*	60	65	1	Straight trunk, moss covered. Some deadwood in canopy. In row of trees with other Lombardy poplars. Gravel parking surface to be applied over portion of the TPZ.	moderate	Retain Arborist to supervise parking surface prep	3.60
10-610	Y	Lombardy Poplar	*Populus nigra*	60	65	1	Straight trunk, moss covered. Some deadwood in canopy. In row of trees with other Lombardy poplars.	moderate	Retain Arborist to	3.60

							Gravel parking surface to be applied over portion of the TPZ.		supervise parking surface prep	
11-611	Y	Lombardy Poplar	*Populus nigra*	62	80	2	Straight trunk, moss covered. Some deadwood in canopy. In row of trees with other Lombardy poplars. Gravel parking surface to be applied over portion of the TPZ.	moderate	Retain Arborist to supervise parking surface prep	3.72
12-612	Y	Cypress	*Chamaecyparis spp.*	30+35+35=100	60	2	Triple stem from base with some included bark between stems. Low vigor with significant amount of deadwood. Poor condition. Gravel parking surface to be applied over portion of the TPZ.	poor	Retain Arborist to supervise parking surface prep	6.00
13-613	Y	Holly	*Ilex aquifolium*	23+25+19=67	65	3	Four stems originating at base with some included bark. Some deadwood in canopy, raised crown over service wires.	poor	remove	4.02
14-614	Y	Blue spruce	*Picea pungens*	37	70	3	Twin stems starting at 5m. A Lot of deadwood in lower canopy. Poor condition. Gravel parking surface to be applied over portion of the TPZ.	poor	Retain Arborist to supervise parking surface prep	2.22
15-615	Y	Western Red Cedar	*Thuja plicata*	45+70+45=160	90	3	Mature triple stem originating at base of tree. Some deadwood in canopy with large deadwood in lower canopy. One limb has a large crack near base. Good condition.	good	remove	9.60
16-616	Y	Cherry	*Prunus spp.*	18+20=38	65	3	Double stem with slight lean to the west. Good condition.	good	remove	2.28
17-617	Y	Black	*Populus*	90	65	5	Double stem starting at 2.4m with included bark.	moderate	remove	5.40

		Cottonwood	*trichocarpa*				Some Ivy on stem leans to the West.			
18-618	Y	Black Cottonwood	*Populus trichocarpa*	30	40	1	Slender forest grown tree with dead top. Poor condition.	poor	remove	1.80
19-619	Y	Black Cottonwood	*Populus trichocarpa*	55	55	5	Mature forest grown some deadwood in canopy. Leans slightly to the West.	moderate	remove	3.30
20-620	N	Scots Pine	*Pinus sylvestris*	30	65	3	Sapsucker holes on trunk, crooked top that leans West with self correction. Good condition. Gravel parking surface to be applied over portion of the TPZ.	good	Retain Arborist to supervise parking surface prep	1.80
21-621	N	Scots Pine	*Pinus sylvestris*	40	33	3	Deadwood in canopy, some crooks and bows in trunk with self correction. Good condition. Gravel parking surface to be applied over portion of the TPZ.	good	Retain Arborist to supervise parking surface prep	2.40
22-622	N	Scots Pine	*Pinus sylvestris*	40	30	6	Topped tree that leans to the South. Has Sapsucker holes all in the trunk. Deadwood in canopy. Poor condition. Gravel parking surface to be applied over portion of the TPZ.	poor	Retain Arborist to supervise parking surface prep	2.40
23-623	Y	Scots Pine	*Pinus sylvestris*	50	70	6	Crooked trunk with self correcting lean. Sap sucker holes all in trunk. Twin top starting at 5m. Good condition. Gravel parking surface to be applied over portion of the TPZ.	good	Retain Arborist to supervise parking surface prep	3.00
24-624	Y	Black Cottonwood	*Populus trichocarpa*	70+ 35= 105	70	4	Dual stem originating from base of tree. One stem has slight lean to the West, while other leans South.	moderate	remove	6.30

25-625	Y	Black Cottonwood	*Populus trichocarpa*	50	70	4	Mature tree with large amounts of deadwood in the canopy.	moderate	remove	3.00
26-626	Y	Black Cottonwood	*Populus trichocarpa*	85	80	4	Mature tree with large amounts of deadwood in the canopy.	moderate	remove	5.10
27-627	Y	Black Cottonwood	*Populus trichocarpa*	45	70	1	Slender growing tree, average vigor.	moderate	remove	2.70
28-628	Y	Black Cottonwood	*Populus trichocarpa*	45	70	1.5	Slight lean to the Northeast, average vigor.	moderate	remove	2.70
29-629	Y	Black Cottonwood	*Populus trichocarpa*	45	30	1	Slight lean to the West with large pieces of deadwood in canopy. Poor condition.	poor	remove	2.70
30-630	Y	Black Cottonwood	*Populus trichocarpa*	45	65	3	Straight trunk with bowed down top. Significant amount of deadwood in canopy. Poor condition.	poor	remove	2.70
31-631	N	Black Cottonwood	*Populus trichocarpa*	42	70	3	Tree leans North. Tree top bows downward.	moderate	remove	2.52
32-632	Y	Cherry	*Prunus spp.*	28+ 13= 41	65	3	Dual stem tree that further splits into four tops. Close to existing house and has large dead branches in canopy.	poor	remove	2.46
33-633	Y	Western Red Cedar	*Thuja plicata*	89	90	5	Tree leans to the West, absent of foliage on East side due to proximity of other trees.	moderate	remove	5.34
34-634	Y	Western Red Cedar	*Thuja plicata*	110	90	5	Vigorous tree with some deadwood in canopy. Good condition.	good	remove	6.60
35-635	Y	Western Red Cedar	*Thuja plicata*	100	90	5	Dual stem originating at 1.6m. Good vigor with some deadwood in canopy. Good condition.	good	remove	6.00
36-636	Y	Douglas Fir	*Pseudotsuga menziesii*	90+ 50= 140	65	6	Twin stem originating from base. Base has some hollows with large dead branches in lower canopy. Both stems have two tops each.	moderate	remove	8.40

37-637	Y	Big Leaf Maple	*Acer macrophyllum*	45	60	6	Tree leans heavily to the West with lack of growth on East side of canopy. Some dead branches.	moderate	remove	2.70
38-638	Y	Big Leaf Maple	*Acer macrophyllum*	60	60	6	Tree leans heavily to the West. Branches growing into tree #637. Some deadwood in canopy.	moderate	remove	3.60
39-639	Y	Big Leaf Maple	*Acer macrophyllum*	60+ 35+ 35= 130	55	6	Multiple stem tree originating at base.Tree leans slightly to the West. Some deadwood in canopy.	moderate	remove	7.80
40-640	Y	Douglas Fir	*Pseudotsuga menziesii*	70	33	4	Two top tree with large dead stubs in lower canopy.	moderate	remove	4.20
41-641	Y	Douglas Fir	*Pseudotsuga menziesii*	70	40	4	Growing next to tree #642 and has included bark between trees 641 & 642. Burl at 2m.	moderate	remove	4.20
42-642	Y	Western Red Cedar	*Thuja plicata*	35	15	3	Growing next to tree #641 and has included bark between trees 641 & 642. Tree is mostly dead. Poor condition.	poor	remove	2.10
43-643	Y	Western Red Cedar	*Thuja plicata*	45	60	4	Dual top tree with some deadwood in canopy. Sparse foliage.	poor	remove	2.70
44-644	Y	Western Red Cedar	*Thuja plicata*	50	70	5	Dual top tree with some deadwood in canopy. Sparse foliage.	poor	remove	3.00
45-645	Y	Western Red Cedar	*Thuja plicata*	75+ 75= 150	85	5	Twin stem originating at 0.6m. One stem has lean to the South. Some deadwood in canopy.	moderate	remove	9.00
46-646	Y	Red Alder	*Alnus rubra*	48	45	4	Twin top tree with some deadwood in canopy. Average vigor.	moderate	remove	2.88
47-647	Y	Big Leaf Maple	*Acer macrophyllum*	48	50	4	Relatively straight trunk with twin top. Grows into os2 Some deadwood in canopy.	moderate	remove	2.88

48-648	Y	Red Alder	*Alnus rubra*	30	60	2	Slender growing with large pieces of deadwood in canopy.	poor	remove	1.80
49-649	Y	Red Alder	*Alnus rubra*	36	60	2	Straight trunk with some deadwood in canopy.	moderate	remove	2.16
50-650	Y	Red Alder	*Alnus rubra*	55	65	2	Trunk bows with self correction. Tree grows into fence at base.	moderate	remove	3.30
51-651	Y	Red Alder	*Alnus rubra*	32	70	2	Straight trunk with some deadwood in canopy.	moderate	remove	1.92
52-652	Y	Douglas Fir	*Pseudotsuga menziesii*	68	45	4	Tree has large dead stubs in canopy. Near many dead cedars.	good	remove	4.08
53-653	N	Big Leaf Maple	*Acer macrophyllum*	47	65	4	Triple top tree with natural form. Some deadwood in canopy.	good	remove	2.82
54-654	Y	Big Leaf Maple	*Acer macrophyllum*	30+ 50+ 30= 110	65	4	Multi-stem tree originating from base. Twin tops with large dead branches in canopy.	moderate	remove	6.60
55-655	Y	Red Alder	*Alnus rubra*	50	50	5	Mature tree with heavy lean to the South. Large wound at 4m showing signs of compartmentalization. Some deadwood in canopy. Poor condition.	poor	remove	3.00
56-656	Y	Western Red Cedar	*Thuja plicata*	90+ 75= 165	80	4	Dual stem tree that originates at base. Some deadwood in canopy.	good	remove	9.90
57-657	Y	Red Alder	*Alnus rubra*	31	20	4	Heavily bowed tree that grows into tree #656. Poor condition.	poor	remove	1.86
58-658	Y	Cherry	*Prunus spp.*	30+ 17= 47	40	3	Tree being girdled from rope ties around stem at 1m. Leans heavily to the north. Poor condition.	poor	remove	2.82

59-659	Y	Western Red Cedar	*Thuja plicata*	72	90	4	Straight trunk with some deadwood in canopy. Good condition.	good	remove	4.32
60-660	Y	Western Red Cedar	*Thuja plicata*	73	40	3	Tree has large dead top. Sounding indicates some hollowing in lower trunk. Poor condition.	poor	remove	4.38
61-661	Y	Western Red Cedar	*Thuja plicata*	73	80	4	Tree leans slightly with self correction. Some deadwood in canopy. Good condition.	good	remove	4.38
62-662	Y	Black Cottonwood	*Populus trichocarpa*	75	60	5	Mature tree with large dead branches in canopy.	moderate	remove	4.50
63-663	Y	Black Cottonwood	*Populus trichocarpa*	78	65	5	Tree leans West and has large dead branches in canopy.	moderate	remove	4.68
64-664	Y	Big Leaf Maple	*Acer macrophyllum*	80	50	4	Tree has large failure on North side. Tree leans heavily to the South. Poor condition.	poor	remove	4.80
65-665	Y	Western Red Cedar	*Thuja plicata*	110+ 90= 200	90	5	Multi-trunk tree originating at 1.5m, included bark between stems. Each stem splits into additional leaders with included bark. Significant deadwood in canopy.	moderate	remove	12.00
66-666	N	Red Alder	*Alnus rubra*	85	25	4	Base originates from same location as tree# 665. Leans to the west.	moderate	remove	5.10
67-667	Y	Black Cottonwood	*Populus trichocarpa*	67	60	5	Straight trunk with large pieces of deadwood in canopy.	moderate	remove	4.02
68-668	Y	Black Cottonwood	*Populus trichocarpa*	85	60	6	Twin stem tree originating at 2m. Some included bark seen and large pieces of deadwood in canopy.	moderate	remove	5.10
69-669	Y	Black Cottonwood	*Populus trichocarpa*	80+ 60+ 60=	60	6	Triple stem tree with large pieces of deadwood in canopy.	moderate	remove	12.00

				200						
70-670	Y	Black Cottonwood	*Populus trichocarpa*	45	65	3	Straight trunk tree with large pieces of deadwood in canopy.	moderate	remove	2.70
71-671	Y	Black Cottonwood	*Populus trichocarpa*	35	65	2	Tree leans slightly to the South. Slender growing with some deadwood.	moderate	remove	2.10
72-772	Y	Black Cottonwood	*Populus trichocarpa*	38	60	2	Straight trunk with large pieces of deadwood in canopy.	moderate	remove	2.28
73-673	Y	Black Cottonwood	*Populus trichocarpa*	40	60	2	Straight trunk with large pieces of deadwood in canopy. Good condition.	moderate	remove	2.40
74-674	Y	Silver Birch	*Betula pendula*	39	50	5	Mature tree with large branch growing to the South. Tree has some stub cuts and large pieces of deadwood in upper canopy.	poor	remove	2.34
75-675	Y	Black Cottonwood	*Populus trichocarpa*	48	60	6	Straight trunk with large dead branches in canopy.	moderate	remove	2.88
76-676	Y	Red Alder	*Alnus rubra*	25+ 25= 50	60	3	Twin stem tree with some deadwood in canopy.	moderate	remove	3.00
77-677	Y	Black Cottonwood	*Populus trichocarpa*	50	65	4	Triple top tree with straight trunk. Deadwood in canopy.	moderate	remove	3.00
78-678	Y	Black Cottonwood	*Populus trichocarpa*	50	65	6	Some ivy growing on trunk near base of tree. Large pieces of deadwood in canopy. Tree leanse Northeast.	moderate	remove	3.00
79-679	Y	Douglas Fir	*Pseudotsuga menziesii*	72	50	7	Tree canopy raised to approximately 10m. Straight trunk full crown. Good condition.	Good	remove	4.32
80-680	Y	Douglas Fir	*Pseudotsuga menziesii*	73	50	6	Straight trunk with significant amount of dead stubs. Soarse crown.	good	remove	4.38

							Good condition.			
81-681	Y	Douglas Fir	*Pseudotsuga menziesii*	100	60	6	Some ivy growing on trunk. Tree has large dead branches on South side with sparse growth.	moderate	remove	6.00
82-682	Y	Douglas Fir	*Pseudotsuga menziesii*	82	65	4	Some ivy growing on trunk. Straight trunk with deadwood in canopy. Sparse growth on Sout/Southeast side.	moderate	remove	4.92
83-683	Y	Douglas Fir	*Pseudotsuga menziesii*	80	80	6	Straight trunk tree with sparse growth on North/Northeast side.	moderate	remove	4.80
84-684	Y	Big Leaf Maple	*Acer macrophyllum*	95	70	4	Many heading cuts on tree, and topping cuts. Included bark at base of tree where stem twing. Poor condition.	poor	remove	5.70
85-685	Y	Douglas Fir	*Pseudotsuga menziesii*	111	60	9	Large straight trunk, canopy raised to 12m. Signs of Cytospora canker, branches overhang house. Sparse growth on East side next to tree #686.	poor	remove	6.66
86-686	Y	Western Red Cedar	*Thuja plicata*	90	60	4	Tree grow next to #685. Canopy raised to 12m, sparse growth on West side.	moderate	remove	5.40
87-687	Y	Big Leaf Maple	*Acer macrophyllum*	34	75	4	Broad crown tree with topping cuts. Some deadwood in canopy.	Good	remove	2.04
88-688	Y	Norway Spruce	*Picea abies*	46	80	4	Tree leans to the South. Deadwood on interior of canopy and North side of tree. Trunk has Sapsucker holes.	Good	remove	2.76
89-689	Y	Norway Spruce	*Picea abies*	63	75	4	Tree raised over driveway. Straight trunk with some deadwood in canopy.	Good	remove	3.78
90-690	Y	Western Red Cedar	*Thuja plicata*	96	80	5	Tree leans slightly to the South. Large dead branches in canopy, tree grows near shed.	Good	remove	5.76

91-691	Y	Western Red Cedar	*Thuja plicata*	92	80	5	Some ivy on trunk near base of tree. Some deadwood in canopy.	good	remove	5.52
92-692	Y	Douglas Fir	*Pseudotsuga menziesii*	88	50	5	Some ivy on trunk at base. Large dead branches in canopy. Canopy of tree starts at 15m.	good	remove	5.28
93-693	Y	Western Red Cedar	*Thuja plicata*	85	80	4	Ivy growing on trunk near base of tree. Large dead branches in upper canopy. Sparse growth on West side.	good	remove	5.10
94-694	Y	Western Red Cedar	*Thuja plicata*	113	75	4	Ivy growing on trunk near base of tree. Sparse growth with some deadwood in upper canopy.	good	remove	6.78
95-695	Y	Douglas Fir	*Pseudotsuga menziesii*	85	30	3	Ivy at base of tree growing up to approximately 15m. Sparse canopy.	moderate	remove	5.10
96-696	Y	Douglas Fir	*Pseudotsuga menziesii*	80	35	3	Ivy growing at base. Sparse canopy.	moderate	remove	4.80
97-697	Y	Big Leaf Maple	*Acer macrophyllum*	75+ 60= 135	60	6	Twin stem tree with included bark. Has some dead stubs in canopy. Tree located between #698 & 699.	moderate	remove	8.10
98-698	Y	Douglas Fir	*Pseudotsuga menziesii*	105	45	4	Mature tree with sparse growth on West side. Growing next to tree #697.	moderate	remove	6.30
99-699	Y	Douglas Fir	*Pseudotsuga menziesii*	90	40	8	Mature tree with large dead branches in canopy.	moderate	remove	5.40
100-700	Y	Western Red Cedar	*Thuja plicata*	43	80	4	Sparse growth with average vigor. Good condition.	good	remove	2.58
101-1101	Y	Big Leaf Maple	*Acer macrophyllum*	45+ 45= 90	40	4	Twin stem tree with one failed stem. Significant amount of epicormic growth. Poor condition.	poor	remove	5.40

102-1102	N	Big Leaf Maple	*Acer macrophyllum*	40+ 50= 90	50	4	Twin stem tree that bows with self correction. Large dead branches in canopy. Has large visible surface roots near base.	poor	remove	5.40
103-1103	Y	Big Leaf Maple	*Acer macrophyllum*	65+ 60= 125	55	5	Twin stem tree with large pisces of deadwood in canopy and hanging dead branches. Included bark near base of tree. Poor condition.	poor	remove	7.50
104-1104	Y	Douglas Fir	*Pseudotsuga menziesii*	66	65	4	Trunk shows sign of cytospora canker. Sparse growth on East side of tree.	moderate	remove	3.96
105-1105	Y	Douglas Fir	*Pseudotsuga menziesii*	71	55	4	Trunk shows signs of Cytospora canker. Sparse growth on East side of tree. Tree has slight bow with self correction.	moderate	remove	4.26
106-1106	Y	Western Red Cedar	*Thuja plicata*	74	85	4	Tree has dead top and sparse growth. Poor condition.	poor	remove	4.44
107-1107	Y	Western Red Cedar	*Thuja plicata*	62	75	3	Tree has dead top and sparse growth. Poor condition.	poor	remove	3.72
108-1108	Y	Silver Birch	*Betula pendula*	87	60	3	Tree has previously failed stem with a large trunk wound. Large pieces and significant amount of deadwood. Tree is hollowing in center. Poor condition.	poor	remove	5.22
109-1109	Y	Douglas Fir	*Pseudotsuga menziesii*	60	65	4	Trunk leans to the North and shows signs of Cytospora canker. Some large dead branches in canopy. Good condition.	good	remove	3.60
110-1110	Y	Douglas Fir	*Pseudotsuga menziesii*	76	80	4	Full form with sparsely growing branches. Good condition.	good	remove	4.56
111-1111	Y	Douglas Fir	*Pseudotsuga menziesii*	79	75	4	On property but just outside of fence on existing site. Trunk bow's with self correction. Large pieces of deadwood in canopy.	moderate	remove	4.74
112-1112	Y	Black Cottonwood	*Populus trichocarpa*	40+ 30+	70	4	Triple stem tree with some deadwood in canopy.	poor	remove	5.28

				18= 88						
113- 1113	Y	Western Red Cedar	*Thuja plicata*	87	80	4	Tree leans slightly. Sparse growth.	moderate	remove	5.22
114- 1114	Y	Big Leaf Maple	*Acer macrophyllum*	57	60	3	Tree overwhelmed in Ivy. Poor condition.	poor	remove	3.42
115- 1115	Y	Western Red Cedar	*Thuja plicata*	89	75	4	Broad canopy with good growth form. Good condition.	Good	remove	5.34
116- 1116	Y	Big Leaf Maple	*Acer macrophyllum*	86	60	4	Trunk bows with self correction. Large wound at base of tree with some Ivy growing on trunk. Poor condition.	poor	remove	5.16
117- 1117	Y	Western Red Cedar	*Thuja plicata*	72	70	4	Small immature tree. Canopy raised to 2m, some deadwood in canopy. Good condition.	good	remove	4.32
118- 1118	Y	Western Red Cedar	*Thuja plicata*	96	75	5	Full canopy with good vigor. Grows next to house on-site. Good condition.	good	remove	5.76
119- 1119	Y	Western Red Cedar	*Thuja plicata*	50	70	4	Tree growing next to driveway. Raised over driveway and leans to the South. Good condition.	good	remove	3.00
120- 1120	Y	Western Red Cedar	*Thuja plicata*	43	70	4	Tree growing next to driveway. Raised over driveway and has sparse growth.	moderate	remove	2.58
121- 1121	Y	Western Red Cedar	*Thuja plicata*	33	70	3	Tree grows near driveway and has sparse growth.	moderate	remove	1.98
122- 1122	Y	Western Red Cedar	*Thuja plicata*	33	70	3	Tree growing near trees # 1121 & 1123. Some deadwood in canopy.	moderate	remove	1.98
123- 1123	Y	Western Red Cedar	*Thuja plicata*	37	70	3	Tree has been pruned for clearance over house service wires. Growing near trees #1122 & 1121. Good condition.	good	remove	2.22
124-	Y	Douglas Fir	*Pseudotsuga*	42	65	4	Tree has crook in trunk at 5m with self correction.	good	remove	2.52

1124			*menziesii*				Good condition.			
125-1125	Y	Big Leaf Maple	*Acer macrophyllum*	51	40	6	Tree has failed top with large dead branches in canopy. Shows signs of sapsucker holes in trunk. Poor condition.	poor	remove	3.06
126-1126	Y	Douglas Fir	*Pseudotsuga menziesii*	64	60	5	Slight lean with self correction. Tree has sparse growth on North side. Gravel parking surface to be applied over portion of the TPZ.	moderate	Retain Arborist to supervise parking surface prep	3.84
127-1127	Y	Douglas Fir	*Pseudotsuga menziesii*	45	75	4	Shared tree with city. Slight lean to the East with self correction.	good	retain	2.70
os1	Y	Douglas Fir	*Pseudotsuga menziesii*	65	70	5	Straight trunk that shows signs of Cytospora canker. Some large dead branches in canopy. Gravel parking surface to be applied over portion of the TPZ.	moderate	Retain Arborist to supervise parking surface prep	3.90
os2	Y	Douglas Fir	*Pseudotsuga menziesii*	80	50	4	Tree #647 grows into tree, some deadwood in canopy. Good condition. Gravel parking surface to be applied over portion of the TPZ.	good	Retain Arborist to supervise parking surface prep	4.80
os3	N	Douglas Fir	*Pseudotsuga menziesii*	70	40	4	Straight trunk with large dead stubs in canopy. Gravel parking surface to be applied over portion of the TPZ.	moderate	Retain Arborist to supervise parking surface prep	4.20
os4	Y	Red Alder	*Alnus rubra*	53	60	3	Twin top tree with large dead branches in canopy.	poor	retain	3.18
ci1	Y	Black	*Populus*	60	70	4	City owned tree that leans slightly to the South. Some	moderate	retain	3.60

		Cottonwood	*trichocarpa*				deadwood in canopy.			
ci2	Y	Black Cottonwood	*Populus trichocarpa*	60	65	4	Straight trunk with some stubs in canopy.	moderate	retain	3.60
ci3	Y	Black Cottonwood	*Populus trichocarpa*	72	65	4	Ivy growing on lower 5m of trunk. Twin top with a straight trunk. Gravel parking surface to be applied over portion of the TPZ.	moderate	Retain Arborist to supervise parking surface prep	4.32
ci4	Y	Western Red Cedar	*Thuja plicata*	30	80	3	Twin stem with three tops. Full crown.	good	retain	1.80
ci5	Y	Douglas Fir	*Pseudotsuga menziesii*	33	80	2	Slender growing tree near more mature Firs.	good	retain	1.98
ci6	Y	Douglas Fir	*Pseudotsuga menziesii*	79	65	4	Some dead branches in canopy.	good	retain	4.74
ci7	Y	Douglas Fir	*Pseudotsuga menziesii*	61	65	4	Some dead branches in canopy.	good	retain	3.66
ci8	Y	Big Leaf Maple	*Acer macrophyllum*	79	80	6	Mature tree with twin top starting at 3m. Some deadwood inc canopy.	moderate	retain	4.74
ci9	Y	Douglas Fir	*Pseudotsuga menziesii*	59	70	6	Tree grows near road. Good condition.	good	retain	3.54
ci10	Y	Douglas Fir	*Pseudotsuga menziesii*	50	70	5	Trunk bows with self correction. Some deadwood in canopy.	good	retain	3.00
ci11	Y	Douglas Fir	*Pseudotsuga menziesii*	55	70	5	Some deadwood in canopy.	good	retain	3.30
ci12	Y	Douglas Fir	*Pseudotsuga menziesii*	48	60	4	Some deadwood in canopy.	good	retain	2.88
ci13	Y	Big Leaf Maple	*Acer macrophyllum*	45	70	4	Full canopy with good form.	good	retain	2.70

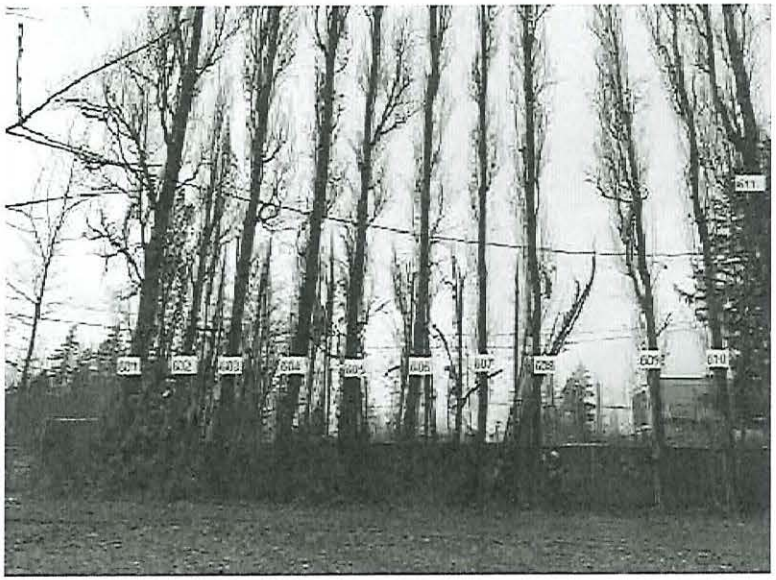


IMAGE 1- Trees 601-611

IMAGE 2- Trees 612 & 613

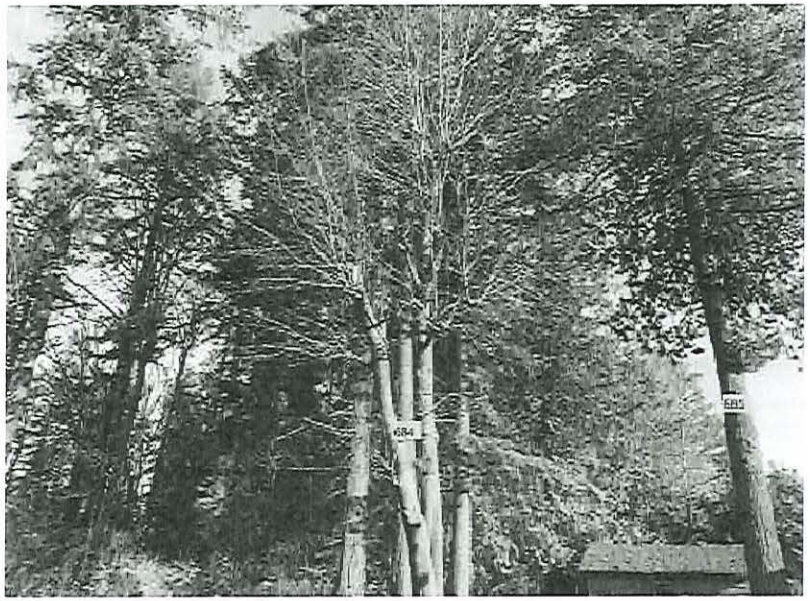


IMAGE 3- Trees 684 & 685

IMAGE 4- Trees ci6-ci8

IMAGE 5- Trees 685 & 686

IMAGE 6- Trees 687. 688 & 689

IMAGE 7- Front of property 17710 97 Avenue

IMAGE 8- Grove of trees at south end of 17709 96 Avenue

IMAGE 9- Grove of trees on East side of 17649 96 Avenue

Summary of Tree Preservation by Tree Species:

Tree Species	Existing	Remove	Retain
Alder and Cottonwood Trees			
Alder	9	9	
Cottonwood	27	24	3
Deciduous Trees (excluding Alder and Cottonwood Trees)			
Big Leaf Maple	16	16	0
Cherry	3	3	0
Holly	1	1	0
Lombardy Poplar	11	0	11
Birch	2	2	0
Coniferous Trees			
Spruce	3	2	1
Cypress	1	0	1
Douglas Fir	30	21	9
Pine	4	0	4
Western Red Cedar	31	30	1
Total (excluding Alder and Cottonwood Trees)	102	75	27
Additional [Estimated] Trees in the proposed [Open Space / Riparian Area]			

Total Replacement Trees Proposed (excluding Boulevard Street Trees)	
Total Retained and Replacement Trees	
Contribution to the Green City Program	

Tree Preservation Summary

Surrey Project No: **Address:** 17649 & 17790 96 Avenue, & 17710 97 Avenue

Registered Arborist: Woodridge Tree Consulting Arborists Ltd.

On-Site Trees	Number of Trees
Protected Trees Identified *	138
Protected Trees to be Removed	99
Protected Trees to be Retained (excluding trees within proposed open space or riparian areas)	39
Total Replacement Trees Required: - Alder & Cottonwoods to be removed (1:1) 24 X one (1) = 24 - All other species to be removed (2:1) 75 X two (2) = 150	174
Replacement Trees Proposed	0
Replacement Trees in Deficit	174
Protected Trees to be Retained in Proposed Open Space or Riparian Areas	-

Off-Site Trees	Number of Trees
Protected Trees Identified	4
Protected Trees to be Removed	0
Protected Trees to be Retained	-
Total Replacement Trees Required: - Alder & Cottonwoods to be removed (1:1) 0 X one (1) = 0 - All other species to be removed (2:1) 0 X two (2) = 0	-
Replacement Trees Proposed	-
Replacement Trees in Deficit	-

*on-site and shared trees, including trees within boulevards and proposed streets and lanes, but excluding trees in proposed open space or riparian areas

Summary, report and plan prepared and submitted by:

Terry Thrale

(Signature of Arborist) Date July 15, 2022

Limitations and Assumptions

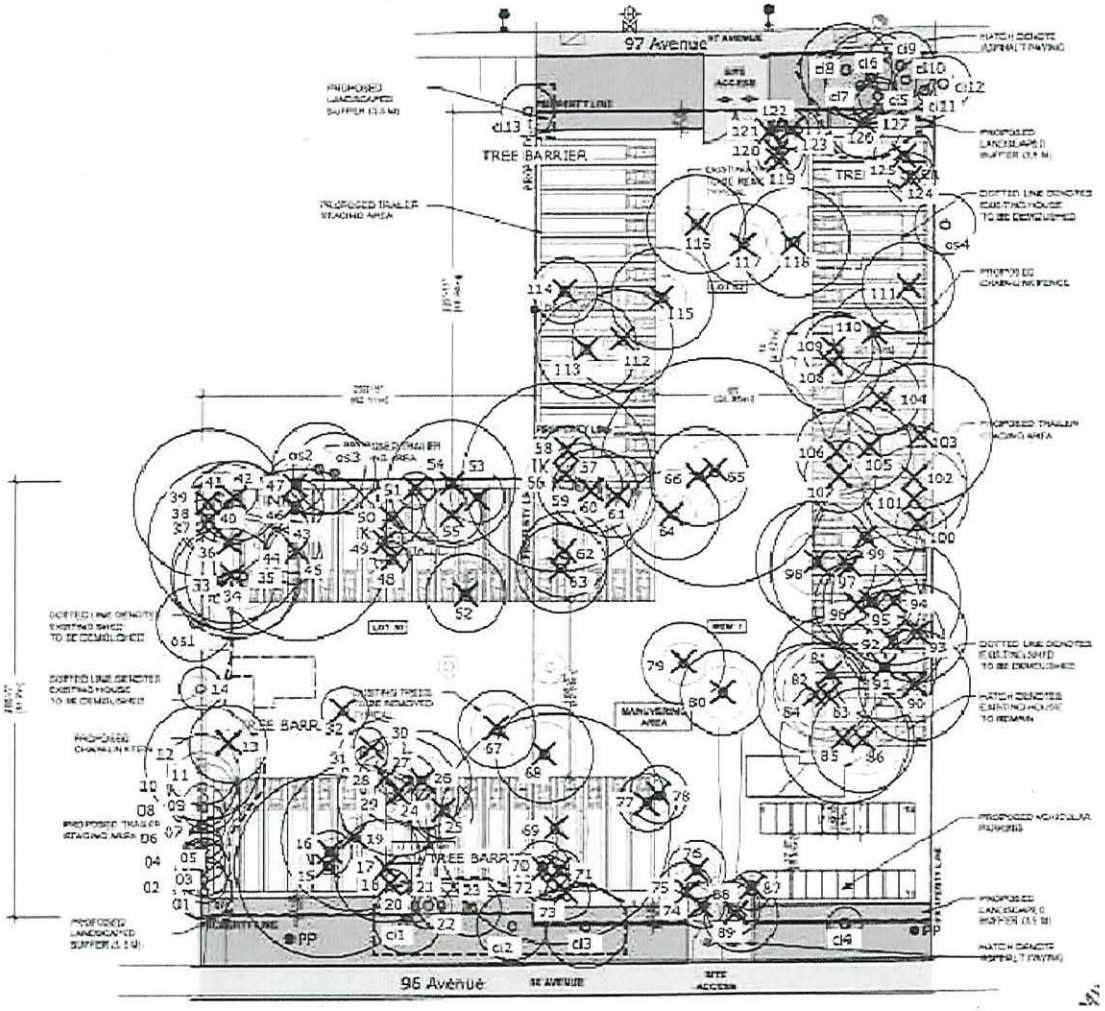
- This report was prepared for and on behalf of the client and it is intended solely for their use. Woodridge Tree Consulting Arborists Ltd. shall not accept any liability derived from the partial, unintended, unauthorized or improper use of this report.
- This report is restricted to the subject trees as detailed in the report. No other trees were inspected or assessed as part of the work related to the preparation of this report.
- The accuracy and ownership of the locations of trees, property lines and other site features were not verified by Woodridge Tree. Third party information to the consultant may have been relied upon in the formation of the opinion of the consultant in the preparation of this report, and that information is assumed to be true and correct.
- The use of maps, sketches, photographs and diagrams are intended only as a reference for the readers use in understanding the contents and findings of this report, and are not intended as a representation of fact.
- Approvals from a municipal or senior government agency may be required in relation to certain recommendations and treatments provided in this report. The owner is responsible to make application for, pay related fees and meet all requirements and conditions for the issuance of such permits, approvals or authorizations.

I certify to the best of my knowledge or belief that:

- staff from this firm have performed site inspections on the dates as stated herein.
- the findings are based on information known to the consultant at that time.
- the statements of fact determined by the consultant are true and correct.

If there are questions regarding the contents of this report please contact our office.

 Adrian Szabunio Diploma in Civil Engineering Technology ISA Certified Arborist ISA Tree Risk Assessment Qualified PR 5079A adrian@woodridgetree.com	 Hanah Dhanani ISA Certified Arborist PN 9275A Bachelor of Urban Forestry Woodridge Tree Consulting Arborists Ltd. hanah@woodridgetree.com



WOODRIDGE TREE

Tree Plan for TUP at 17649, 17709 96 Ave & 17710 97 Ave, Surrey

Date: July 15, 2022

Notes

TREE BARRIER INDICATES THE LOCATIONS REQUIRING ARBORIST SUPERVISION FOR PARKING SURFACE PREPARATION

Legend

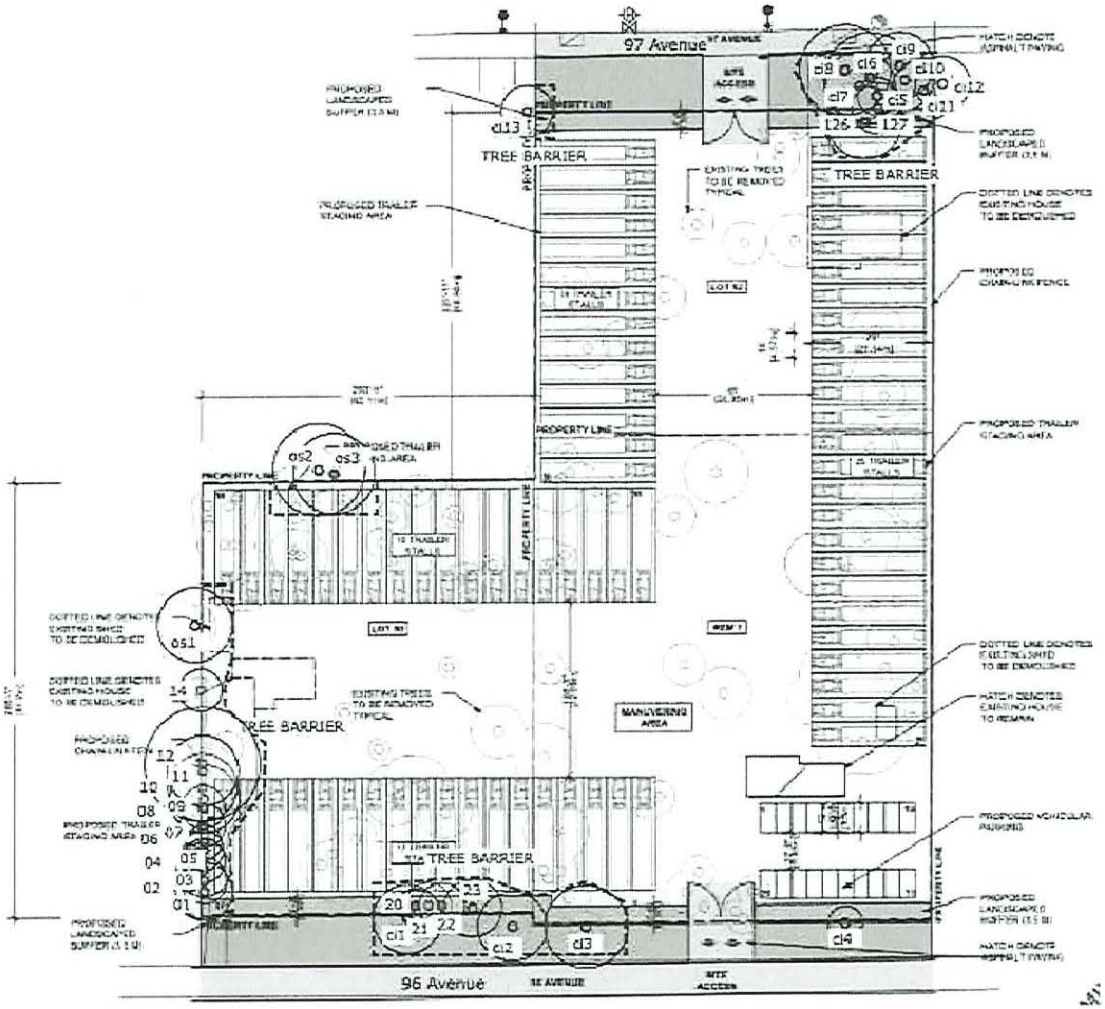
N

dripline

x = remove tree

tree barrier

1m 1:500 10m



WOODRIDGE TREE

Tree Plan for TUP at 17649, 17709 96 Ave & 17710 97 Ave, Surrey

Date: July 15, 2022

Notes

TREE BARRIER INDICATES THE LOCATIONS REQUIRING ARBORIST SUPERVISION FOR PARKING SURFACE PREPARATION

Legend

N

dripline

x = remove tree

tree barrier

1m 1:500 10m

APPENDIX E

Geotechnical Report
GeoPacific Consultants Ltd.

GEOPACIFIC
VANCOUVER KAMLOOPS CALGARY

P 604.439.0922
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geopacific.ca
1779 W 75th Ave,
Vancouver, B.C. Canada V6P 6P2

1214081 BC Ltd.
#125 – 7475 153 Street
Surrey, BC
V3W 0M8

August 3, 2022
File: 20368

Attention: Kal Rai

Re: Preliminary Geotechnical Investigation Report – Proposed Site Re-Development
17710 97 Avenue and 17649 & 17709 96 Avenue, Surrey, BC

1.0 INTRODUCTION

We understand that it is proposed to construct a new commercial development at the above referenced site. The development would be completed in two phases. The first phase would be a parking lot with stormwater infiltration facilities. The second phase would consist of at-grade commercial buildings. We expect the buildings would be reinforced concrete or steel framed construction. The buildings would be surrounded by paved parking and drive aisles. We expect loading from the buildings to be moderately to very heavy.

This report presents the results of a geotechnical investigation of the soil and groundwater conditions at the site and makes preliminary recommendations for the design and construction of the proposed development. The report has been prepared exclusively for our client, for their use and the use of others on their design and development team and the City of Surrey for use in the development and permitting process,

2.0 SITE DESCRIPTION

The development site consists of three properties with the civic address 1170 97 Avenue, 17649 96 Avenue and 17709 96 Avenue. The site is approximately 50 metres west of the intersection of 177A Street and 97 Avenue in Surrey, B.C. The site is an 'L' shape with an area of approximately 1.7 hectares. The site is bounded by 97 Avenue to the north, 96 Avenue to the south, and existing residential developments to the east and west. The site is presently improved with single family homes, surrounded by vegetation including grasses, bushes and large trees. The site slopes done gently from northwest to southeast with a grade change of 3 m over 186 m horizontally.

The location of the site and surrounding improvements is shown on our Drawing No. 20368-01, following the text of this report.

3.0 FIELD INVESTIGATION

3.1 Test Hole Investigation

The subsurface ground conditions were investigated on December 3, 2021 using a track mounted auger drill rig that was supplied and operated by Southlands Drilling of Delta, B.C. The investigation comprised of seven augured test holes, five cone penetration test (CPT) sounding and one seismic cone penetration test (SCPT) sounding. The investigation was supervised by a geologist from our office who logged and sampled the soils encountered.

The augured test holes were advanced up to 6.1 m below current local grades. The test hole logs are included as Figures A.01 to A.04 in Appendix A.

The CPT sounding was advanced up to 4.7 m before reaching refusal on the underlying glacial till. As the cone penetrometer is advanced into the ground it records the tip resistance, sleeve friction, pore water pressure, and inclination every 5 centimetres. Analysis of the CPT sounding data allows us to estimate geotechnical design parameters and to infer the sub-surface stratigraphy from soil-type behaviour characteristics. The stratigraphic interpretation was verified with the augured test holes. The CPT sounding results are presented as Figure B.01 to B.03 in Appendix B of this report. Geotechnical parameters calculated from the CPT soundings, such as undrained shear strength and standard penetration N1(60) values, are presented as Figure C.01 to C.03 in Appendix C of this report. The results of the shear vane are presented in Appendix D.

Prior to our investigation, a utility locate was completed using the subcontracted services of Municon West Coast to scan and clear the test locations of buried services. All test holes were backfilled and sealed in accordance with provincial abandonment requirements following classification, sampling and logging. The approximate locations of the test holes, and CPT soundings are shown on our attached site plan, Drawing No. 20368-01.

3.2 Test Pit Investigation

The test hole investigation was supplemented with a test pit investigation using a mini excavator supplied and operated by D.W. Excavating and Landscape of Langley, BC on July 22, 2022. A total of six test pits were advanced up to 2 m below current site grades. Double Ring Infiltration Tests (DRITs) were completed in four test pits to determine the infiltration potential of the subsurface soils.

The approximate locations of the test pits are shown on our Drawing No. 20368-01 following the text of this report.

3.2 Double Ring Infiltration Testing (DRIT)

The DRITs were completed within the test pits using a double ring infiltrometer set up in general accordance with ASTM D3385, consisting of 2 stainless steel rings measuring 300 mm and 600 mm in diameter. The premise of using 2 rings is to replicate one-dimensional, vertical flow. The water within the annular area flows vertically and laterally, creating a vertical flow path for the water within the inner ring.

The 2 rings were driven into the existing soils approximately 100 mm. The smaller ring was placed within the larger ring to form a central and annular area. The rings were filled with water and mini-piezometers were placed within the rings to record the pressure from the water head. An additional piezometer was placed outside of the rings to record atmospheric pressure changes. The piezometers record the water pressure within the annular space in 2 second intervals. The readings from the piezometer are normalized by the atmospheric pressure and plotted versus time. The slope of the graph indicates the infiltration rate. The results of the infiltration testing are presented in Appendix E following the text of this report.

4.0 SUBSURFACE CONDITIONS

4.1 Soil Conditions

The general geology of the region under investigation, according to the Geological Survey of Canada (GSC) map 1484A, is described as Capilano Sediments. The Capilano Sediments are characterized as marine and glaciomarine stony to stoneless silt loam to clay loam with minor sand and silt.

In general, the soil profile noted from the surface downwards at our test hole locations conforms with the region's geology described by the GSC map and consists of topsoil/fill underlain by silty sand to sand and gravel, silty clay, over very dense glacial till.

A detailed description of the soils encountered is as follows:

FILL/TOPSOIL

The majority of the site is underlain by topsoil up to 0.5 m in thickness. Fill was observed at the location of TP22-01 up to 0.5 m below current site grades. The fill consists of sand and gravel with some silt, is generally compact, moist and grey to brown in colour. We expect the fill thickness will be up to 1.5 m at the location of the existing residential homes.

SILTY SAND TO SAND AND GRAVEL

The fill/topsoil is underlain by a thin layer of silty sand to sand and gravel at the test pit locations up to 0.9 m below current site grades. The silty sand to sand and gravel was noted to be compact, dry to moist, and grey to brown in colour. The silty sand to sand and gravel was not observed at the locations of the test holes.

SILTY CLAY (POST GLACIAL)

The fill/topsoil and silty sand to sand and gravel is underlain by post glacial silty clay at the majority of the test locations extending up to 4.5 m below current site grades. The silty clay was noted to be up to 3.8 m in thickness, firm to hard, moist, and mottled tan to grey in colour.

GLACIAL TILL

The silty sand, sand and gravel or silty clay is underlain by glacial till at the majority of the test locations to the final depth of the investigation. The glacial till is comprised of silty sand and gravel, is very dense, dry to moist and is grey in colour. The glacial till was not observed at the locations of TP22-01, TP22-02, TP22-03, TP22-04 and TP22-05.

For a more detailed description of the subsurface conditions refer to the test hole logs in Appendix A, the CPT sounding logs in Appendix B and interpreted soil parameters in Appendix C, following the text of this report.

4.2 Groundwater Conditions

The static groundwater table was not encountered during the investigation; however, some seepage was encountered overlying the less permeable silty clay or glacial till. The static groundwater is expected to be well below development grade. Our experience in the area suggests that groundwater is likely to vary seasonally, with higher levels during the wetter months of the year. We expect perched groundwater to

develop within any surficial fills during the wetter periods of the year. Where discrete fine sand layers occur within the clay, which we have observed on other sites in the area, light to moderate seepage can be generated below the perched water table.

4.3 Infiltration Testing

The tests were completed between 1.2 m and 1.8 m below current site grades in stiff to very stiff silty clay. The results of the infiltration tests are shown in Table 1 below. Detailed results are attached in Appendix E following the text of this report.

Table 1 – Infiltration Test Results

Test No.	Depth (m)	Infiltration Rate (mm/hr)
DRIT22-01	1.8	17.2
DRIT22-02	1.2	35.0
DRIT22-03	1.5	10.2
DRIT22-04	1.2	3.1

5.0 DISCUSSION

As noted above, the development would be completed in two phases. The first phase would be a parking lot with stormwater infiltration facilities. The second phase would be consist of at-grade commercial buildings. We expect the buildings would be reinforced concrete or steel framed construction. The buildings would be surrounded by paved parking and drive aisles. We expect loading from the buildings to be moderately to very heavy.

We expect that the development can be founded on conventional strip and pad foundations directly supported on the existing compact fill, compact silty sand to sand and gravel, or the natural stiff to very stiff silty clay, or very dense glacial till.

The soils on-site are not considered liquefiable or subject to cyclic strain softening during the British Columbia Building Code (BCBC) 2018 design earthquake.

We confirm from a geotechnical point of view that the proposed development is feasible provided the recommendations outlined in this report are incorporated into the overall design.

6.0 RECOMMENDATIONS FOR DEVELOPMENT

6.1 Site Preparation

Prior to the construction of the foundation and pavement structures, we recommend that all topsoil, loose fill, debris, soft and otherwise deleterious soils be stripped to expose a subgrade of compact fill, compact gravelly to silty sand, stiff to very stiff silty clay, or very dense glacial till. The site should be graded to inhibit the ponding of water while the site is used for truck parking and trailer storage. Table 2 below describes the expected stripping depths as observed at our test locations.

Table 2: Recommended Minimum Stripping Depths

Test Pit ID	Stripping Depth (m)	Test Pit ID	Stripping Depth (m)
TH21-01	0.1	TP22-01	0.1
TH21-01	0.1	TP22-02	0.5
TH21-01	0.1	TP22-03	0.4
TH21-01	0.1	TP22-04	0.3
TH21-01	0.1	TP22-05	0.2
TH21-01	0.1	TP22-06	0.1
TH21-01	0.1		

The stripping depths in Table 2 are the minimum stripping depths at each test hole and test pit location. It should be appreciated that the depth of stripping can vary across the site, and greater depths may be required in forested areas, areas containing large trees, or where structures have been removed.

Any grade reinstatement should be done with engineered fill. In the context of this report, engineered fill is defined as clean sand and gravel fill, compacted in 300 mm loose lifts to a minimum of 95% Modified Proctor (ASTM D1557), at a moisture content that is within 2% of optimum for compaction. Each subsequent lift should be compacted using vibration and not exceed 300 mm in thickness. Density testing should be conducted on each compacted lift of engineered fill to confirm that its density meets the required standard. Density test results should be forwarded to the geotechnical engineer for review.

The geotechnical engineer should be contacted to review all stripping and engineered fill placement.

6.2 Foundations

Footings which are founded on the existing compact fill, compact silty sand to sand and gravel, stiff to very stiff silty clay as descried in Section 4.1, or on engineered fill can be designed on the basis of a serviceability limit state (SLS) bearing pressure of 150 kPa. Factored ultimate limit state (ULS) bearing pressures, for transient loads such as those induced by wind and earthquakes, are 250 kPa.

If footings are founded on the glacial till, then an SLS of 400 kPa and a factored ULS of 600 kPa could be considered.

We estimate for foundations designed as recommended, settlements will not exceed 25 mm total and 2 mm per meter differential.

Irrespective of the allowable bearing pressures given, pad footings should not be less than 600 mm by 600 mm and strip footings should not be less than 450 mm in width. Footings should also be buried a minimum of 450 mm below the surface for frost protection.

Adjacent footings should achieve a maximum elevation difference equal to half of their horizontal distance to avoid superimposing the upper foundation loading to the lower foundation.

The native soil is highly susceptible to disturbance and changes in moisture content; therefore, we recommend that the subgrade soil be blinded with a minimum of 150 mm of 19 mm clear crush gravel immediately after the foundation elevation is reached and is confirmed by the geotechnical engineer. The subgrade soil should also be graded to inhibit the ponding of water to a sump location where it can be pumped out of the excavation.

The geotechnical engineer shall be contacted for the review of all foundation subgrades.

6.3 Seismic Site Class

We have considered the 2018 BC Building Code design earthquake with a 2% probability of exceedance over a 50-year period which equates to a return of 1 in 2475 years. Accordingly, we have considered an earthquake having a peak horizontal ground acceleration of 0.33 g for this site (National Resource Canada 2015, Site Coordinates: 49.1777 North and 122.7300 West).

The site qualifies as "Site Class C" as defined in Table 4.1.8.4.A of the BC Building Code 2018. Based on our geotechnical investigation and previously undertaken investigations in the area, the subsurface soils are not considered prone to ground liquefaction or other forms of ground softening caused by earthquake induced ground motions.

6.4 Slab-On-Grade Floors

We recommend that the slabs-on-grade be directly underlain by a polyethylene moisture barrier and a minimum of 150 mm of 19 mm clear crush gravel to inhibit upward migration of moisture beneath the slab. To provide suitable support for any concrete slabs-on-grade, we recommend that any grading fills placed under the slab should be compacted to a minimum of 95% MPMDD (ASTM D1557).

All underslab fill should be reviewed by the geotechnical engineer.

6.5 Perimeter Drainage

The static groundwater table was not observed during our investigation; therefore, it is anticipated that new foundations constructed near the current site grade will not encounter the static groundwater table. Perimeter foundation drains are not required for buildings from a geotechnical perspective, provided the building floor slabs will be constructed a minimum of 100 mm above the exterior site grades and the exterior site grade slopes down and away from the building.

6.6 On-Site Pavement Structures

As indicated in Section 1.0, the site will be used as truck parking initially with new pavements anticipated around the future buildings for parking, access ways and loading bays. After completion of the recommended site preparation outlined in section 6.1, it is our opinion that the minimum asphalt pavement structure specific in Table 3 is adequate to support the anticipated traffic loading.

Table 3: Recommended Minimum Pavement Structure for Parking Areas and Drive Aisles

Material	Thickness (mm)	Minimum CBR
Asphaltic Concrete	100	N/A
19 mm minus crushed gravel base course	150	80
100 mm minus, well graded, clean, sand and gravel subbase course	300	20

The asphalt thickness may be reduced to 75 mm in areas occupied by cars and light trucks only.

All base and subbase fills should be compacted to a minimum of 95% Modified Proctor (ASTM D1557) dry density with a moisture content within 2% of optimum for compaction. The base and subbase materials should meet municipal requirements for gradation and density. Density testing should be conducted on the base and subbase materials to confirm that they have been compacted to the required standard. The density testing results should be forwarded to the geotechnical engineer for review.

For Phase 1 of the development, the pavement structure could be left without an asphalt layer, provided the base course is increased to 300 mm in thickness. Routine maintenance will be required to fill potholes and ruts in unpaved areas.

6.8 Temporary Excavations

We expect that temporary excavations would be relatively shallow and less than 1.2 m deep, except for utility installations. The existing on-site ground materials should be excavated at a slope of 1 horizontal to 1 vertical (1H:1V). It should be appreciated that temporary cut slopes which extend beyond a 2H:1V projection taken from any adjacent footing or the corner of adjacent pipes should be reviewed by the geotechnical engineer prior to execution. Light to moderate seepage during the wetter months of the year should be expected due to the formation of perched groundwater. Inflows are expected to be handled adequately with sumps and sump pumps.

Temporary cut slopes in excess of 1.2 m in height must be covered in polyethylene sheeting and require review by a professional engineer in accordance with Work Safe BC guidelines, prior to worker entry.

6.9 Utility Installation

Utility excavations should be sloped in accordance with Section 6.8 of this report or shored in accordance with the latest Work Safe BC regulations. Any excavations in excess of 1.2 m in height requiring worker entry must be reviewed by a professional engineer prior to entry.

Some light to moderate perched groundwater seepage may be encountered during excavations, which we expect can be controlled using conventional sumps and sump pumps.

Pipe bedding, backfill materials and compaction requirements should conform to the specifications outlined in the Master Municipal Construction Documents (MMCD).

6.10 Storm Water Management

The results of the infiltration testing demonstrates that the underlying native soils have a relatively low permeability with rates ranging between 3.1 mm/hr and 35 mm/hr.

We recommend that any stormwater management infrastructure designed for the natural infiltration of stormwater consider an average infiltration rate of 16 mm/hr. Any infrastructure designed to incorporate natural infiltration of stormwater should include an emergency overflow that discharges to the municipal storm system. If higher rates are required, GeoPacific could complete further testing within the existing fills.

The subgrade soils underlying storm water management infrastructure that incorporates the natural infiltration of storm water must be reviewed by the geotechnical engineer prior to construction.

7.0 FIELD REVIEWS

As required by the British Columbia Building Code 2018 "Letters of Assurance", GeoPacific will carry out sufficient field reviews during construction to ensure that the geotechnical design recommendations contained within this report have been adequately communicated to the design team and to the contractors implementing the design. These field reviews are not carried out for the benefit of the Contractors, therefore they do not in any way effect the contractor's obligations to construct the works in accordance with the design.

It is the contractor's responsibility to advise GeoPacific Consultants Ltd. (a minimum of 48 hours in advance) that a field review is required. Geotechnical field reviews are normally required at the time of the following activities:

1. Stripping	Review of site stripping.
2. Excavation	Review of temporary cut slopes and soil conditions.
3. Foundation	Review of foundation subgrade prior to footing construction.
4. Slab-On-Grade	Review of subgrade and under slab fill materials and compaction.
5. Engineered Fill	Review of compaction of engineered fill.
6. Pavement Structure	Review of pavement structure subgrade, sub-base course and base course.
7. Backfill	Review of backfill materials and compaction against foundation walls.
8. Infiltrating Soils	Review of soils underlying storm water management infrastructure that incorporate the natural infiltration of storm water.

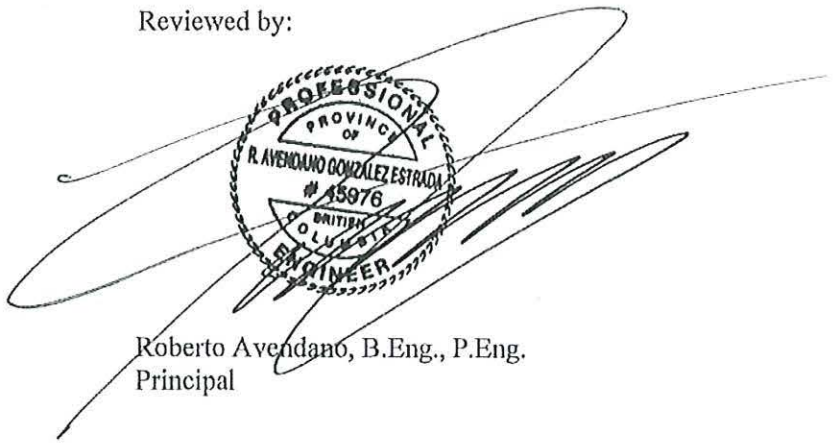
8.0 CLOSURE

This report has been prepared exclusively for our client for the purpose of providing preliminary geotechnical recommendations for the design and construction of the proposed development described herein. The report remains the property of GeoPacific Consultants Ltd. and unauthorized use of, or duplication of this report is prohibited.

We are pleased to assist you with this project and we trust that this information is helpful and sufficient for your purposes at this time. Should you require any further details or if you would like clarification of any of the above, please do not hesitate to call or contact us.

For:
GeoPacific Consultants Ltd.

Reviewed by:



Austin Lockstidt, B.A.Sc., EIT
Engineer In Training

Roberto Avendaño, B.Eng., P.Eng.
Principal

LEGEND:

- SCPT#-# – SEISMIC CONE PENETRATION TEST (SCPT) LOCATION
- CPT#-# – CONE PENETRATION TEST (CPT) LOCATION
- TH#-# – TEST HOLE (TH) LOCATION
- TP#-# – TEST PIT (TP) LOCATION

SITE PLAN

*TEST LOCATIONS ARE APPROXIMATE

REFERENCE:

GEOPACIFIC
VANCOUVER KAMLOOPS CALGARY
1779 West 75th Ave.
Vancouver, B.C. V6P 6P2
P 604.439.0922
F 604.439.9189

DATE: DECEMBER 8, 2021 & JULY 22, 2022		
DRAWN BY: SH	APPROVED BY: RA	REVIEWED BY: AL
SCALE: AS SHOWN		

NEW DEVELOPMENT
17649, 17709, 17710, 96TH AVENUE, SURREY
TEST HOLE SITE PLAN

FILE NO.: 20368
DWG. NO.: 20368-01

REVISIONS:
A.
B.
C.

7922-0234-00(71)

ORIGINAL PAPER SIZE 8.5"x11"

APPENDIX A – TESTING LOGS

Test Hole Log: TH21-01 (SCPT21-01)

File: 20368
Project: NEW DEVELOPMENT
Client: 1214081 BC LTD
Site Location: 17649, 17709, 17710, 96TH AVENUE, SURREY

GEOPACIFIC CONSULTANTS
1779 West 75th Avenue, Vancouver, BC, V6P 6P2
Tel: 604-439-0922 Fax:604-439-9189

Depth (ft / m)	Symbol	SOIL DESCRIPTION	Depth (m)/Elev (m)	Moisture Content (%)	DCPT (blows per foot) 10 20 30 40	Groundwater / Well	Remarks
0 / 0		Ground Surface					
		Grass/Topsoil	0.0				
		Clay very stiff to hard silty CLAY, tan to grey, moist		32.5			perched water observes at 1.2m
				30.4			
		Sand and Gravel [Glacial Till] dense to very dense silty SAND and GRAVEL till, fine to medium grained sand, 10-15mm gravel, grey, slightly moist	4.0	18.0 7.2			
		End of Borehole	6.1				

Logged: SH
Method: Soilid Stem Auger
Date: 2022-12-03

Datum: Ground Elevation
Figure Number: A.01
Page: 1 of 1

Test Hole Log: TH21-02 (CPT21-02)

File: 20368
Project: NEW DEVELOPMENT
Client: 1214081 BC LTD
Site Location: 17649, 17709, 17710, 96TH AVENUE, SURREY

GEOPACIFIC CONSULTANTS
1779 West 75th Avenue, Vancouver, BC, V6P 6P2
Tel: 604-439-0922 Fax:604-439-9189

Depth (ft / m)	Symbol	SOIL DESCRIPTION	Depth (m)/Elev (m)	Moisture Content (%)	DCPT (blows per foot) 10 20 30 40	Groundwater / Well	Remarks
0 / 0		Ground Surface					
		Grass/Topsoil	0.0				
1		***Clay*** soft silty CLAY, tan to brown, moist	0.6				water at surface
2 / 1		***Clay*** very stiff to hard silty CLAY, tan to grey, moist		30.2			
3							
4 / 2							
5				30.1			
6							
7 / 3							
8							
9							
10 / 4				31.4			
11							
12							
13		***Sand and Gravel [Glacial Till]*** dense to very dense silty SAND and GRAVEL till, fine to medium grained sand, 10-15mm gravel, grey, slightly moist	4.6				
14 / 5							
15							
16				10.2			
17							
18 / 6							
19							
20		End of Borehole	6.1				
21							
22 / 7							
23							
24							
25							

Logged: SH
Method: Soilid Stem Auger
Date: 2022-12-03

Datum: Ground Elevation
Figure Number: A.02
Page: 1 of 1

Test Hole Log: TH21-03 (CPT21-03)

File: 20368
Project: NEW DEVELOPMENT
Client: 1214081 BC LTD
Site Location: 17649, 17709, 17710, 96TH AVENUE, SURREY

GEOPACIFIC CONSULTANTS
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Tel: 604-439-0922 Fax:604-439-9189

Depth (ft / m)	Symbol	SOIL DESCRIPTION	Depth (m)/Elev (m)	Moisture Content (%)	DCPT (blows per foot) 10 20 30 40	Groundwater / Well	Remarks
0 / 0		Ground Surface					
		Grass/Topsoil	0.0				
		Clay very stiff silty CLAY, tan to grey, moist					water at surface
4 / 1							
		Sand and Gravel [Glacial Till] dense to very dense silty SAND and GRAVEL till, fine to medium grained sand, 10-15mm gravel, some weathering at top contact, grey, slightly moist	1.2	18.8			
8 / 2							
				16.8			
12 / 3							
16 / 4							
20 / 5							
		End of Borehole	6.1				
24 / 6							
28 / 7							

Logged: SH
Method: Soilid Stem Auger
Date: 2022-12-03

Datum: Ground Elevation
Figure Number: A.03
Page: 1 of 1

Test Hole Log: TH21-04 (CPT21-04)

File: 20368
Project: NEW DEVELOPMENT
Client: 1214081 BC LTD
Site Location: 17649, 17709, 17710, 96TH AVENUE, SURREY

GEOPACIFIC CONSULTANTS
1779 West 75th Avenue, Vancouver, BC, V6P 6P2
Tel: 604-439-0922 Fax:604-439-9189

Depth (ft / m)	Symbol	SOIL DESCRIPTION	Depth (m)/Elev (m)	Moisture Content (%)	DCPT (blows per foot) 10 20 30 40	Groundwater / Well	Remarks
0 / 0		Ground Surface					
		Grass/Topsoil	0.0				
1		***Clay*** soft silty CLAY, brown, moist to wet	0.5				water at surface
2 / 1		***Clay*** very stiff silty CLAY, tan to brown, moist		26.4			
6 / 2		***Sand and Gravel [Glacial Till]*** dense to very dense silty SAND and GRAVEL till, fine to medium grained sand, 10-15mm gravel, some weathering at top contact, grey, slightly moist	1.8	14.3			
20 / 6		End of Borehole	6.1				

Logged: SH
Method: Soilid Stem Auger
Date: 2022-12-03

Datum: Ground Elevation
Figure Number: A.04

Test Hole Log: TH21-05 (CPT21-05)

File: 20368
Project: NEW DEVELOPMENT
Client: 1214081 BC LTD
Site Location: 17649, 17709, 17710, 96TH AVENUE, SURREY

GEOPACIFIC CONSULTANTS
1779 West 75th Avenue, Vancouver, BC, V6P 6P2
Tel: 604-439-0922 Fax:604-439-9189

INFERRED PROFILE

Depth (ft / m)	Symbol	SOIL DESCRIPTION	Depth (m)/Elev (m)	Moisture Content (%)	DCPT (blows per foot) 10 20 30 40	Groundwater / Well	Remarks
0 / 0		Ground Surface					
		Vegetation/Topsoil	0.0				
1		***Clay*** soft silty CLAY, brown, moist to wet					water at surface
2							
3 / 1		***Clay*** very stiff silty CLAY, tan to brown, moist					
4				30.5			
5		***Sand and Gravel [Glacial Till]*** dense to very dense silty SAND and GRAVEL till, fine to medium grained sand, 10-15mm gravel, some weathering at top contact, grey, slightly moist	1.5				
6 / 2							
7				7.7			
8							
9							
10 / 3							
11							
12							
13 / 4							
14							
15							
16 / 5							
17							
18							
19							
20 / 6		End of Borehole	6.1				
21							
22							
23 / 7							
24							
25							

Logged: SH
Method: Soilid Stem Auger
Date: 2022-12-03

Datum: Ground Elevation
Figure Number: A.05
Page: 1 of 1

Test Hole Log: TH21-06

File: 20368
Project: NEW DEVELOPMENT
Client: 1214081 BC LTD
Site Location: 17649, 17709, 17710, 96TH AVENUE, SURREY

GEOPACIFIC CONSULTANTS
1779 West 75th Avenue, Vancouver, BC, V6P 6P2
Tel: 604-439-0922 Fax:604-439-9189

Depth (ft / m)	Symbol	SOIL DESCRIPTION	Depth (m)/Elev (m)	Moisture Content (%)	DCPT (blows per foot) 10 20 30 40	Groundwater / Well	Remarks
0 / 0		Ground Surface					
		Grass/Topsoil	0.0				surface water observed
		Clay soft silty CLAY, tan to brown, moist to wet	0.6				
1 / 1		***Clay*** very stiff to hard silty CLAY, tan to grey, moist		28.0			
2 / 2							
		Sand and Gravel [Glacial Till] dense to very dense silty SAND and GRAVEL till, fine to medium grained sand, 10-15mm gravel, grey, slightly moist	2.1	10.8			
3 / 4							
5 / 6							
		End of Borehole	6.1				
7 / 7							

Logged: SH
Method: Soilid Stem Auger
Date: 2022-12-03

Datum: Ground Elevation
Figure Number: A.06

Test Hole Log: TH21-07

File: 20368
Project: NEW DEVELOPMENT
Client: 1214081 BC LTD
Site Location: 17649, 17709, 17710, 96TH AVENUE, SURREY

GEOPACIFIC CONSULTANTS
1779 West 75th Avenue, Vancouver, BC, V6P 6P2
Tel: 604-439-0922 Fax:604-439-9189

INFERRED PROFILE

Depth (ft / m)	Symbol	SOIL DESCRIPTION	Depth (m)/Elev (m)	Moisture Content (%)	DCPT (blows per foot) 10 20 30 40	Groundwater / Well	Remarks
0 / 0		Ground Surface					
		Grass/Topsoil	0.0				surface water observed
2		***Clay*** soft silty CLAY, some weathering and oxidation, tan to brown, moist to wet	0.6				
1 / 4		***Clay*** stiff to very stiff silty CLAY, tan to grey, moist		29.2			
5		***Sand and Gravel [Glacial Till]*** dense to very dense silty SAND and GRAVEL till, fine to medium grained sand, 10-15mm gravel, grey, slightly moist	1.5				
2 / 6							
10 / 3							
13 / 4							
15				11.7			
16 / 5							
19							
20 / 6		End of Borehole	6.1				
23 / 7							
25							

Logged: SH
Method: Soilid Stem Auger
Date: 2022-12-03

Datum: Ground Elevation
Figure Number: A.07
Page: 1 of 1

Test Pit Log: TP22-01/DRIT22-01

File: 20368
Project: PROPOSED SITE RE-DEVELOPMENT
Client: 1161830 BC LTD.
Site Location: 17710 97 AVENUE AND 17649 & 17709 96 AVENUE, SURREY, BC

GEOPACIFIC CONSULTANTS
1779 West 75th Avenue, Vancouver, BC, V6P 6P2
Tel: 604-439-0922 Fax:604-439-9189

Depth (ft / m)	Symbol	SOIL DESCRIPTION	Depth/Elev (m)	Moisture Content (%)	Groundwater	Remarks
0 / 0		Ground Surface				
		Topsoil	0.0			
1		Sand and Gravel Fill Sand and gravel, some silt fill, compact, dry, brown. Some asphalt debris noted.				
2		Silty Sand Fine grained silty sand, compact, moist, brown.	0.5			
3 / 1		Silty Clay Low plasticity silty clay, stiff, moist, grey. Becomes very stiff at 1.2 m.	0.9			
4						
5						
6						Infiltration rate of 17.2 mm/hr measured at 1.8 m.
2		End of Test Pit	2.0			
7						
8						
9						
3						

INFERRED PROFILE

Logged: ALO
Method: EXCAVATOR
Date: JULY 22, 2022

Datum: GROUND SURFACE
Figure Number: A.08

Test Pit Log: TP22-02/DRIT22-02

File: 20368
Project: PROPOSED SITE RE-DEVELOPMENT
Client: 1161830 BC LTD.
Site Location: 17710 97 AVENUE AND 17649 & 17709 96 AVENUE, SURREY, BC

GEOPACIFIC CONSULTANTS
1779 West 75th Avenue, Vancouver, BC, V6P 6P2
Tel: 604-439-0922 Fax:604-439-9189

INFERRED PROFILE

Depth (ft / m)	Symbol	SOIL DESCRIPTION	Depth/Elev (m)	Moisture Content (%)	Groundwater	Remarks
0 / 0		Ground Surface				
		Topsoil	0.0			
2 /		Sand and Silt Fine grained sand and silt, compact, moist, brown.	0.5			
3 / 1		Silty Clay Low plasticity silty clay, very stiff, moist, grey.	0.8			Infiltration rate of 35.0 mm/hr measured at 1.2 m.
5 /		End of Test Pit	1.5			
6 / 2						
7 /						
8 /						
9 / 3						

Logged: ALO
Method: EXCAVATOR
Date: JULY 22, 2022

Datum: GROUND SURFACE
Figure Number: A.09
Page: 1 of 1

Test Pit Log: TP22-03/DRIT22-03

File: 20368
Project: PROPOSED SITE RE-DEVELOPMENT
Client: 1161830 BC LTD.
Site Location: 17710 97 AVENUE AND 17649 & 17709 96 AVENUE, SURREY, BC

GEOPACIFIC CONSULTANTS
1779 West 75th Avenue, Vancouver, BC, V6P 6P2
Tel: 604-439-0922 Fax:604-439-9189

INFERRED PROFILE				Moisture Content (%)	Groundwater	Remarks
Depth (ft / m)	Symbol	SOIL DESCRIPTION	Depth/Elev (m)			
0 / 0		Ground Surface				
		Topsoil	0.0			
1		Sand and Silt Fine grained sand and silt, compact, moist, brown.	0.4			
2		Silty Clay Low plasticity silty clay, very stiff, moist, grey.	0.7			
3 / 1						
4						
5						Infiltration rate of 10.2 mm/hr measured at 1.5 m.
		End of Test Pit	1.6			
6 / 2						
7						
8						
9 / 3						

Logged: ALO
Method: EXCAVATOR
Date: JULY 22, 2022

Datum: GROUND SURFACE
Figure Number: A.10
Page: 1 of 1

Test Pit Log: TP22-04/DRIT22-04

File: 20368
Project: PROPOSED SITE RE-DEVELOPMENT
Client: 1161830 BC LTD.
Site Location: 17710 97 AVENUE AND 17649 & 17709 96 AVENUE, SURREY, BC

GEOPACIFIC CONSULTANTS
1779 West 75th Avenue, Vancouver, BC, V6P 6P2
Tel: 604-439-0922 Fax:604-439-9189

Depth (ft / m)	Symbol	SOIL DESCRIPTION	Depth/Elev (m)	Moisture Content (%)	Groundwater	Remarks
0 / 0		Ground Surface				
		Topsoil	0.0			
1		Sand and Silt Fine grained sand and silt, compact, moist, brown.	0.3 0.5			
2		Silty Clay Low plasticity silty clay, very stiff, moist, grey.				
3 / 1						
4						Infiltration rate of 3.1 mm/hr measured at 1.2 m.
		End of Test Pit	1.3			
5						
6 / 2						
7						
8						
9 / 3						

Logged: ALO
Method: EXCAVATOR
Date: JULY 22, 2022

Datum: GROUND SURFACE
Figure Number: A.11
Page: 1 of 1

Test Pit Log: TP22-05

File: 20368
Project: PROPOSED SITE RE-DEVELOPMENT
Client: 1161830 BC LTD.
Site Location: 17710 97 AVENUE AND 17649 & 17709 96 AVENUE, SURREY, BC

GEOPACIFIC CONSULTANTS
1779 West 75th Avenue, Vancouver, BC, V6P 6P2
Tel: 604-439-0922 Fax:604-439-9189

Depth (ft / m)	Symbol	INFERRED PROFILE: SOIL DESCRIPTION	Depth/Elev (m)	Moisture Content (%)	Groundwater	Remarks
0 / 0		Ground Surface				
		Topsoil	0.0			
1		Sand and Gravel Medium grained sand and gravel, some silt, compact, dry, grey to brown.	0.2			
2		Silty Clay Low plasticity silty clay, stiff, moist, grey. Becomes very stiff at 1 m.	0.7			
3 / 1		End of Test Pit	1.5			
4						
5						
6 / 2						
7						
8						
9 / 3						

Logged: ALO
Method: EXCAVATOR
Date: JULY 22, 2022

Datum: GROUND SURFACE
Figure Number: A.12
Page: 1 of 1

Test Pit Log: TP22-06

File: 20368
Project: PROPOSED SITE RE-DEVELOPMENT
Client: 1161830 BC LTD.
Site Location: 17710 97 AVENUE AND 17649 & 17709 96 AVENUE, SURREY, BC

GEOPACIFIC CONSULTANTS
1779 West 75th Avenue, Vancouver, BC, V6P 6P2
Tel: 604-439-0922 Fax:604-439-9189

Depth (ft / m)	Symbol	INFERRED PROFILE: SOIL DESCRIPTION	Depth/Elev (m)	Moisture Content (%)	Groundwater	Remarks
0 / 0		Ground Surface				
		Topsoil	0.0			
		Silty Sand Fine grained silty sand, compact, dry, grey to brown.	0.1			
1						
2						
		Silty Sand and Gravel (Glacial Till) Silty sand and gravel, very dense, moist, tan to grey.	0.7			
3						
1		End of Test Pit	1.0			
4						

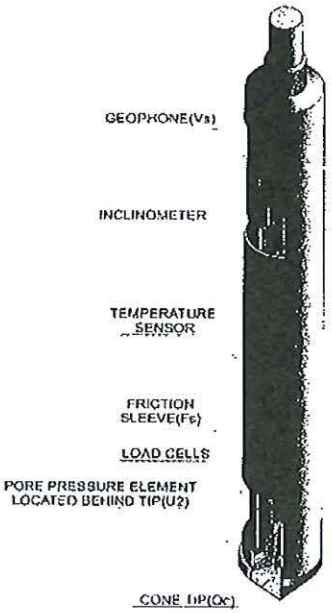
Logged: ALO
Method: EXCAVATOR
Date: JULY 22, 2022

Datum: GROUND SURFACE
Figure Number: A.13

APPENDIX B - ELECTRONIC CONE PENETRATION RESULTS

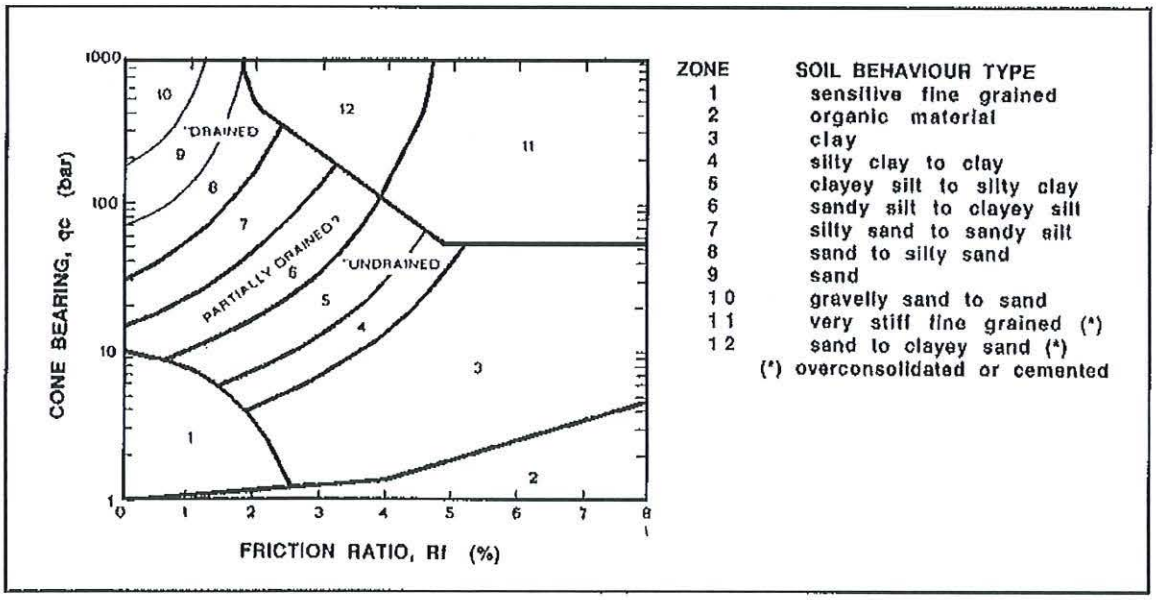
The system used is owned and operated by GeoPacific and employs a 35.7 mm diameter cone that records tip resistance, sleeve friction, dynamic pore pressure, inclination and temperature at 5 cm intervals on a digital computer system. The system is a Hogentogler electronic cone system and the cone used was a 10 ton cone with pore pressure element located behind the tip and in front of the sleeve as shown on the adjacent figure.

Electronic Cone Penetrometer



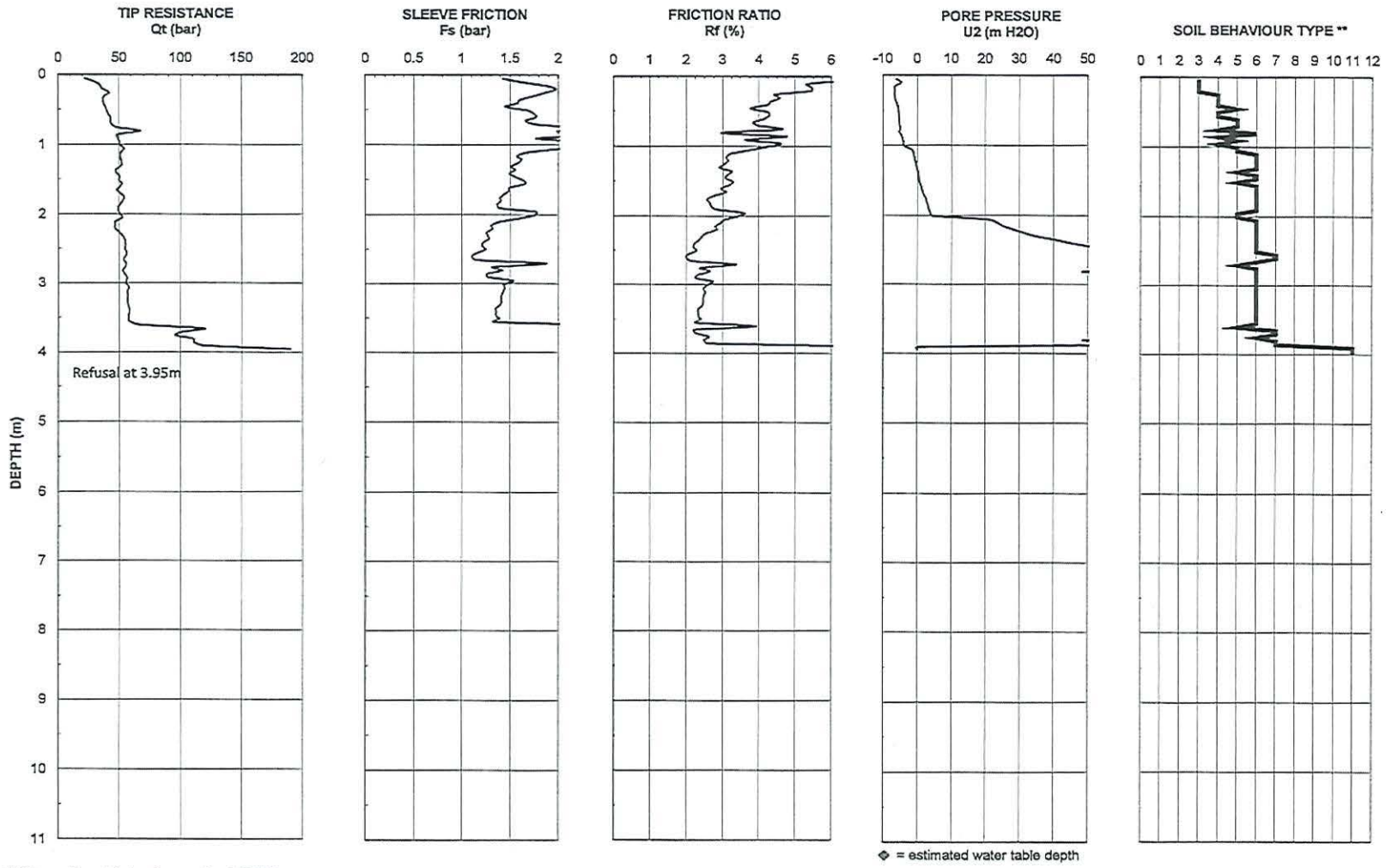
In addition to the capabilities described above, the cone can be stopped at specified depths and dissipation tests carried out. These dissipation tests can be used to determine the groundwater pressures at the specified depth. This is very useful for identifying artesian pressures within specific layers below the ground surface.

Interpretation of the cone penetration test results are carried out by computer using the interpretation chart presented below by Robertson[1]. Raw data collected by the field computer includes tip resistance, sleeve friction and pore pressure. The tip resistance is corrected for water pressure and the friction ratio is calculated as the ratio of the sleeve friction on the side of the cone to the corrected tip resistance expressed as a percent. These two parameters are used to determine the soil behaviour type as shown in the chart below. The interpreted soil type may be different from other classification systems such as the Unified Soil Classification that is based upon grain size and plasticity.



1 Robertson, P.K., 1990, "Soil Classification using the cone penetration test", 1990 Canadian Geotechnical Colloquium, Canadian Geotechnical Journal, Vol. 27, No. 1, 1990

GEOPACIFIC VANCOUVER KAMLOOPS CALGARY	2021-Dec-3	1214081 BC LTD	GeoPacific Project #: 20368
	Sounding: CPT21-01	17649, 17709, 17710 96TH AVENUE, SURREY	Figure: B.01

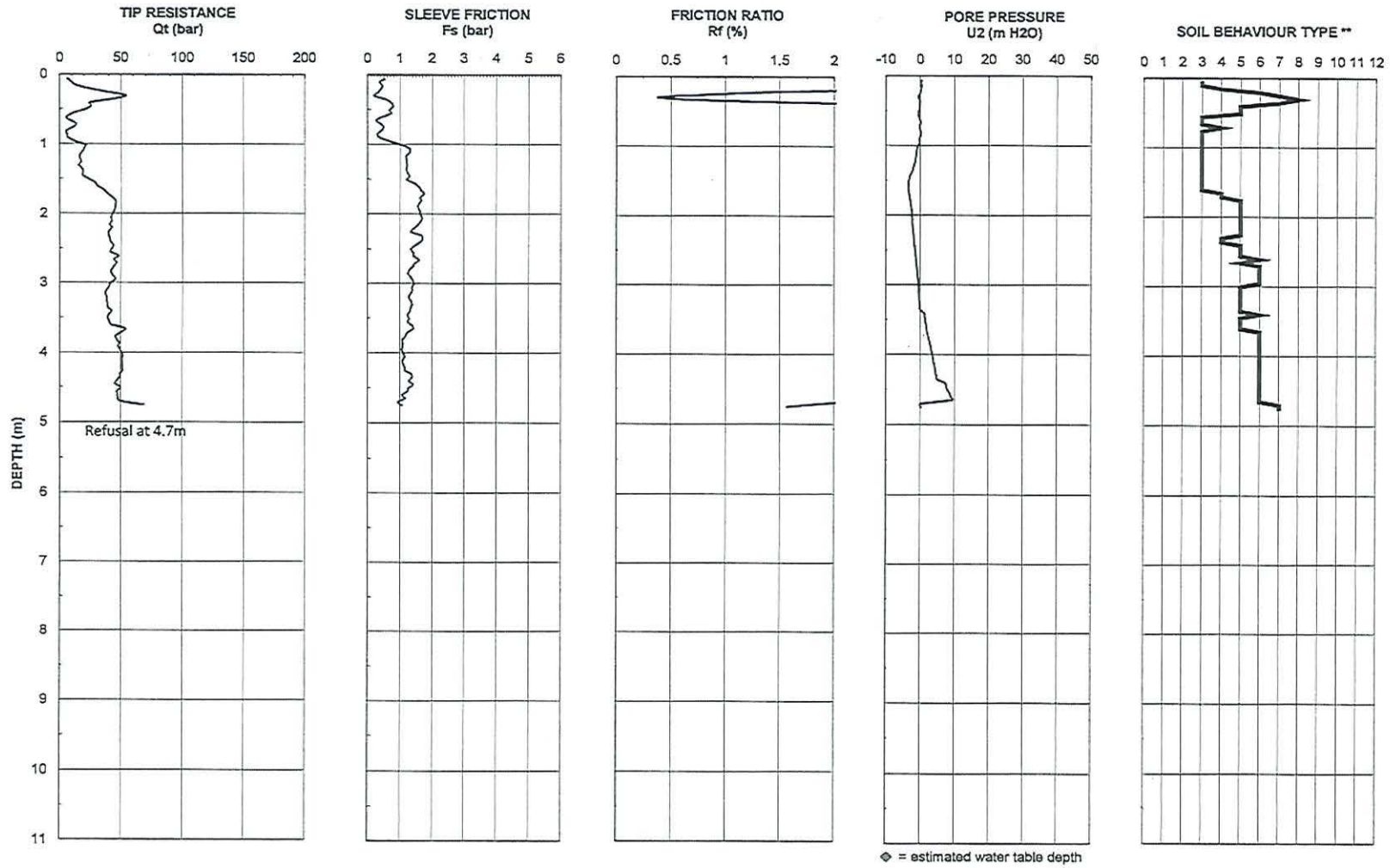


** Based on Robertson et. al 1986

1 Sensitive Fine Grained
2 Organic Material
3 Clay
4 Silty Clay to Clay
5 Clayey Silt to Silty Clay
6 Sandy Silt to Clayey Silt
7 Silty Sand to Sandy Silt
8 Sand to Silty Sand
9 Sand
10 Gravelly Sand to Sand
11 Very Stiff Fine Grained
12 Sand to Clayey Sand

7922-0234-00(87)

GEOPACIFIC VANCOUVER KAMLOOPS CALGARY	2021-Dec-3	1214081 BC LTD	GeoPacific Project #: 20368
	Sounding: CPT21-02	17649, 17709, 17710 96TH AVENUE, SURREY	Figure: B.02



** Based on Robertson et. al 1986

1 Sensitive Fine Grained
2 Organic Material
3 Clay
4 Silty Clay to Clay
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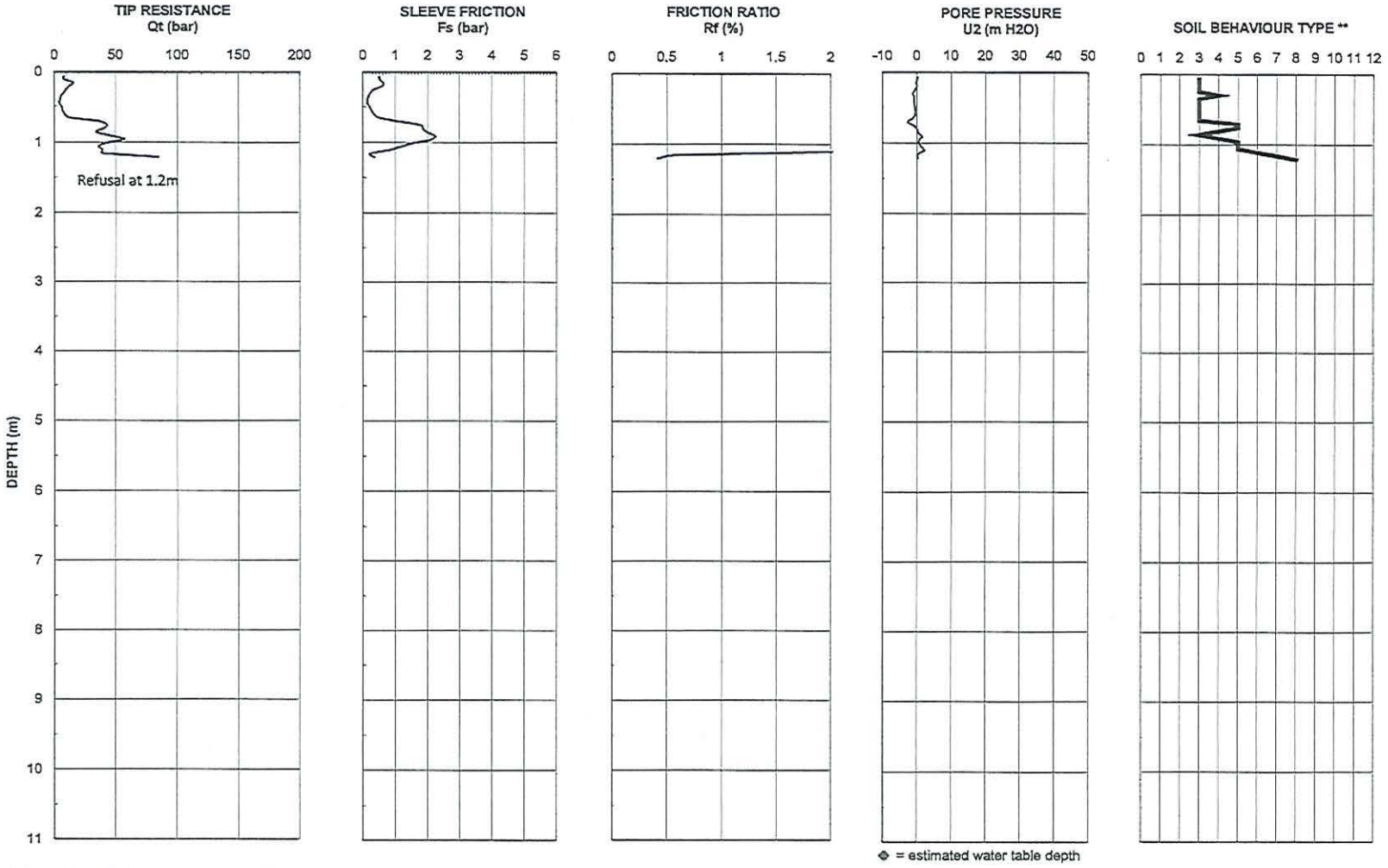
7 Silty Sand to Sandy Silt
8 Sand to Silty Sand
9 Sand
10 Gravelly Sand to Sand
11 Very Stiff Fine Grained
12 Sand to Clayey Sand

7922-0234-00(88)

GEOPACIFIC VANCOUVER KAMLOOPS CALGARY	2021-Dec-3	1214081 BC LTD	GeoPacific Project #: 20368
	Sounding: CPT21-03	17649, 17709, 17710 96TH AVENUE, SURREY	Figure: B.03



** Based on Robertson et. al 1986

1 Sensitive Fine Grained
2 Organic Material
3 Clay
4 Silty Clay to Clay
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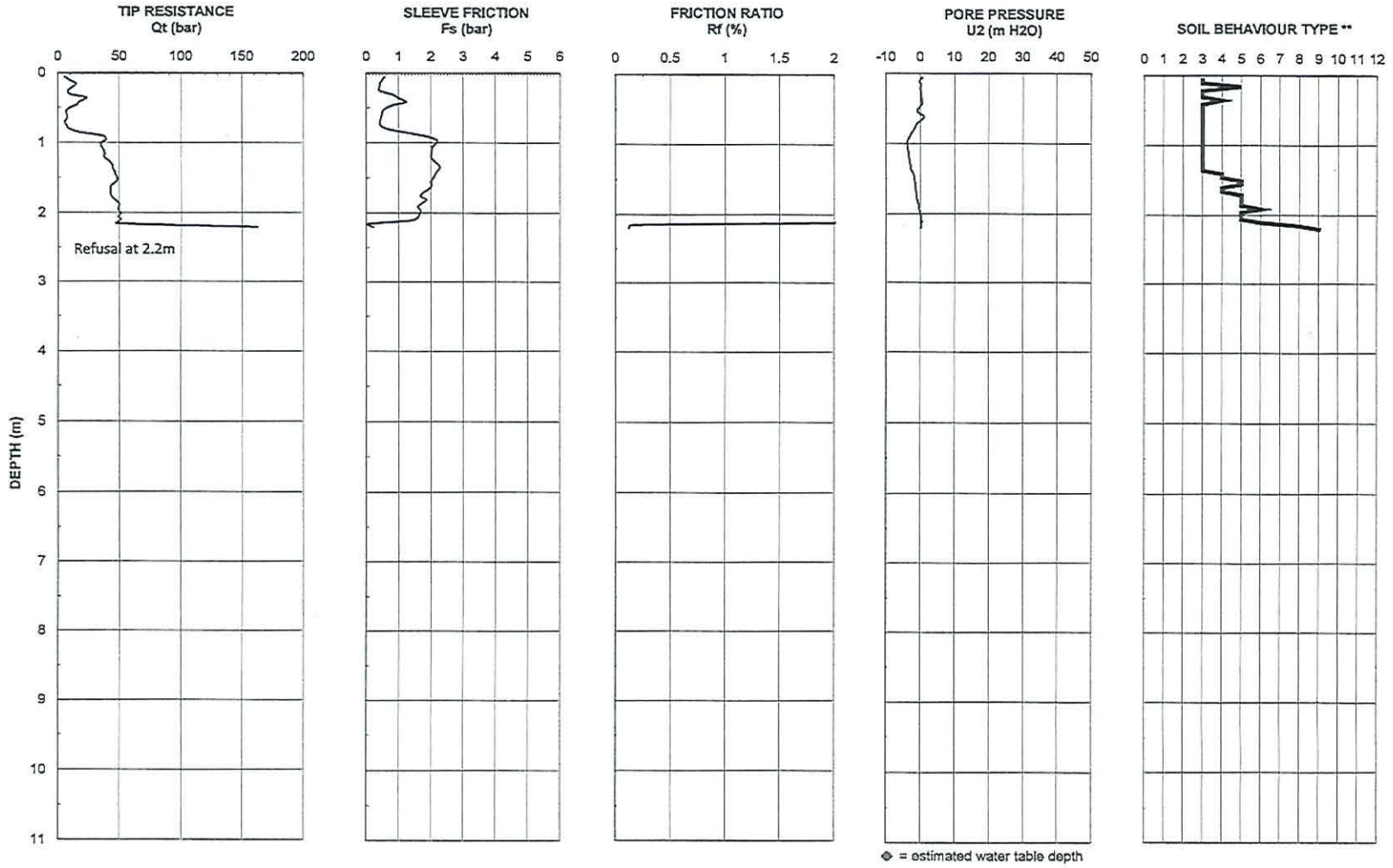
6 Sandy Silt to Clayey Silt
7 Silty Sand to Sandy Silt
8 Sand to Silty Sand
9 Sand
10 Gravelly Sand to Sand
11 Very Stiff Fine Grained
12 Sand to Clayey Sand

7922-0234-00(89)

GEOPACIFIC VANCOUVER KAMLOOPS CALGARY	2021-Dec-3	1214081 BC LTD	GeoPacific Project #: 20368
	Sounding: CPT21-04	17649, 17709, 17710 96TH AVENUE, SURREY	Figure: B.04

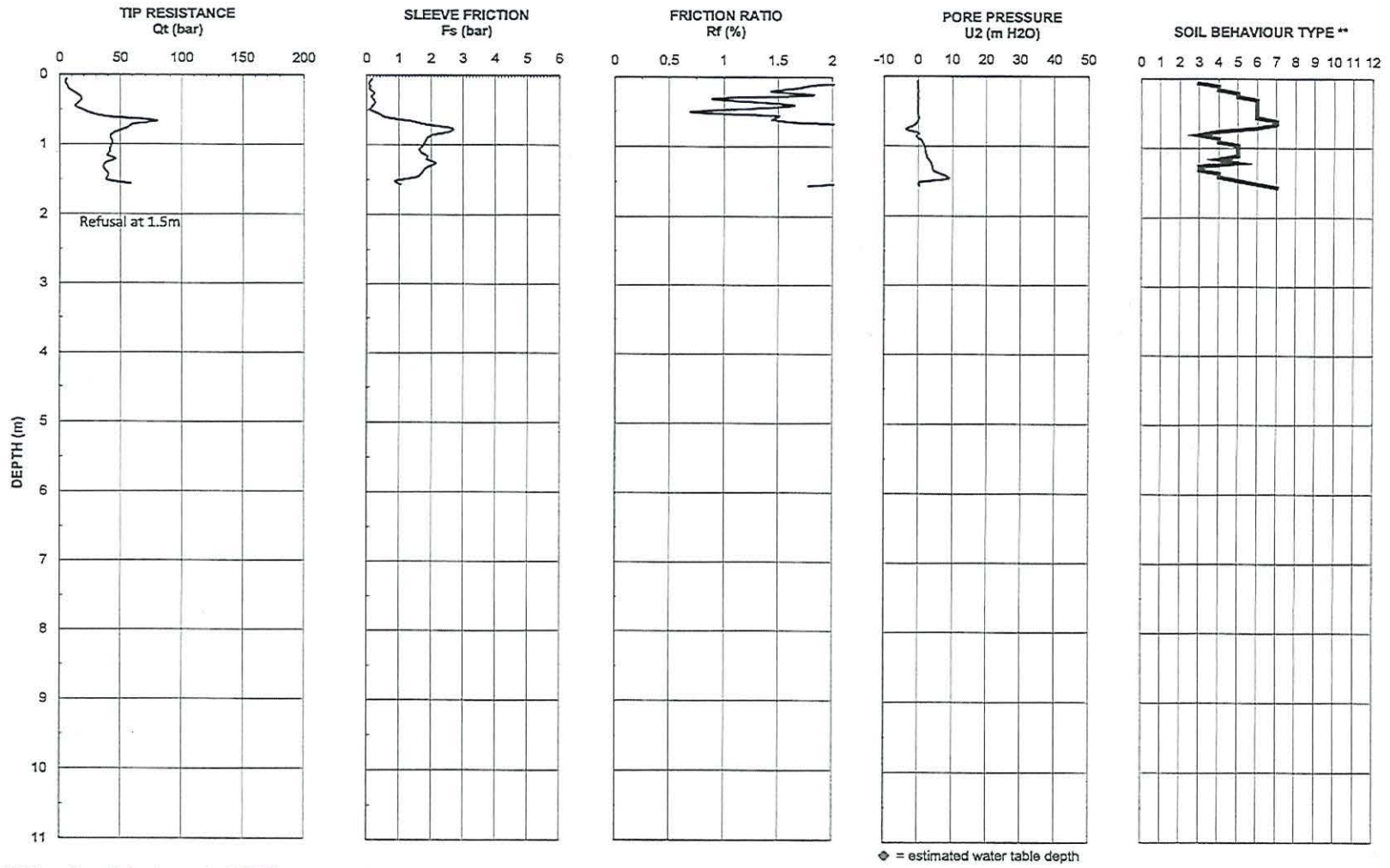


** Based on Robertson et. al 1986

1 Sensitive Fine Grained
2 Organic Material
3 Clay
4 Silty Clay to Clay
5 Clayey Silt to Silty Clay
6 Sandy Silt to Clayey Silt
7 Silty Sand to Sandy Silt
8 Sand to Silty Sand
9 Sand
10 Gravelly Sand to Sand
11 Very Stiff Fine Grained
12 Sand to Clayey Sand

7922-0234-00(90)

GEOPACIFIC VANCOUVER KAMLOOPS CALGARY	2021-Dec-3	1214081 BC LTD	GeoPacific Project #: 20368
	Sounding: CPT21-05	17649, 17709, 17710 96TH AVENUE, SURREY	Figure: B.05



** Based on Robertson et. al 1986

1 Sensitive Fine Grained
2 Organic Material
3 Clay
4 Silty Clay to Clay
5 Clayey Silt to Silty Clay
6 Sandy Silt to Clayey Silt
7 Silty Sand to Sandy Silt
8 Sand to Silty Sand
9 Sand
10 Gravelly Sand to Sand
11 Very Stiff Fine Grained
12 Sand to Clayey Sand

7922-0234-00(91)

APPENDIX C - OVER CONSOLIDATION RATIO ANALYSIS

The over consolidation ratio (OCR) is defined as the ratio between the maximum past vertical pressure on the soil versus the current in-situ vertical pressure. The maximum past vertical pressure is typically caused by the presence of excess overburden which is removed by either natural or man-made reasons. Soil ageing and other chemical precipitation affects can also cause a soil to behave as if it has a higher maximum past pressure, which is sometimes described as pseudo-overconsolidation.

Research by Schmertmann (1974) showed the following equation reasonably approximates the OCR of medium plastic to clayey soils:

$$OCR = \left(\frac{\left(\frac{Su / p'oc}{Su / p'nc} \right)^{5/3} + 0.82}{1.82} \right)$$

Su/p'oc = The undrained shear strength to effective stress ratio of the over consolidated soil

Su/p'nc = The undrained shear strength to effective stress ratio of a normally consolidated soil (OCR = 1). Typically = ~0.2

Soils which are subject to loads less than the maximum past pressure of the soil are typically subject to relatively small elastic settlements. Loads which exceed the maximum past pressure on the soil typically cause consolidation which is the gradual settlement of the ground as a result of expulsion of water from the pores of the soil. The rate of settlement and the time to complete consolidation is a function of the permeability of the soil.

The Schmertman equation has been employed to estimate the OCR of the soils with depth employing the CPT data provided in Appendix B and C.

APPENDIX C - INTERPRETED PARAMETERS

The following charts plot the Standard Penetration Test (SPT) values and the undrained strength of fine grained soils based upon generally accepted correlations. The methods of correlation are presented below.

STANDARD PENETRATION TEST CORRELATION

The Standard Penetration Test $N_{1(60)}$ value is related to the cone tip resistance through a Qc/N ratio that depends upon the mean grain size of the soil particles. The soil type is determined from the interpretation described in Appendix B and the data of Table C.1 below is used to calculate the value of $N_{(60)}$.

Table C.1. Tablulated $Qc/N_{1(60)}$ Ratios for Interpreted Soil Types

Soil Type	Qc/N Ratio
Organic soil - Peat	1.0
Sensitive Fine Grained	2.0
Clay	1.0
Silty Clay to Clay	1.5
Clayey Silt to Silty Clay	2.0
Silt	2.5
Silty Sand to Sandy Silt	3.0
Clean Sand to Silty Sand	4.0
Clean Sand	5.0
Gravelly Sand to Sand	6.0
Very Stiff Fine Grained	1.0
Sand to Clayey Sand	2.0

The $Qc/N_{1(60)}$ ratio is based upon the published work of Robertson (1985)[2]. The values of N are corrected for overburden pressure in accordance with the correction suggested by Liao and Whitman using a factor of 0.5. Where the correction is of the form:

$$N_1 = \sigma^{0.5} * N$$

All calculations are carried out by computer using the software program CPTint.exe developed by UBC Civil Engineering Department. The results of the interpretation are presented on the following Figures.

UNDRAINED SHEAR STRENGTH CORRELATION

It is generally accepted that there is a correlation between undrained shear strength of clay and the tip resistance as determined from the cone penetration testing. Generally the correlation is of the form:

$$S_u = \frac{(q_c - \sigma_v)}{N_k}$$

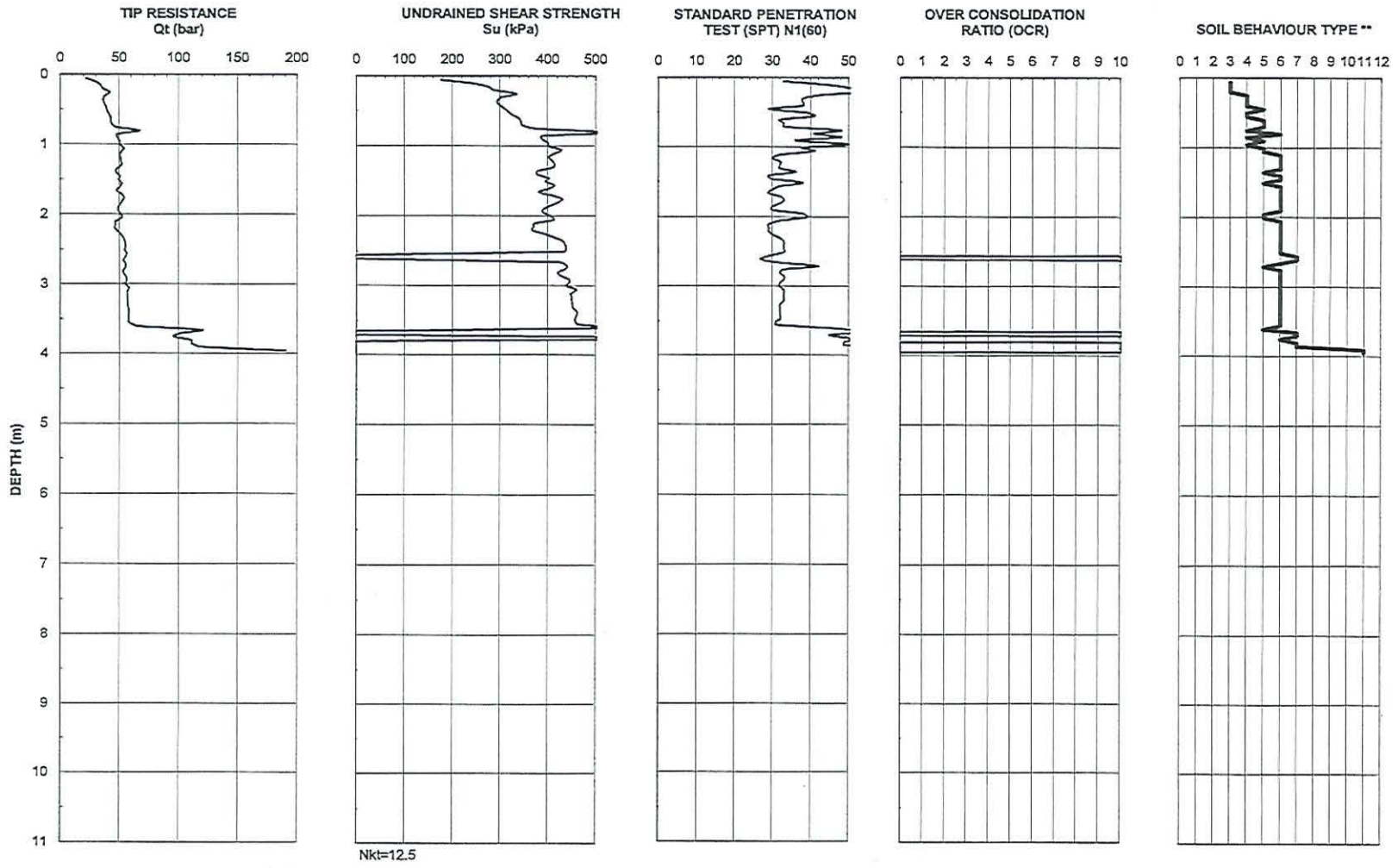
where q_c = cone tip resistance, σ = in situ total stress, N_k = cone constant

The undrained shear strength of the clay has been calculated using the cone tip resistance and an N_k factor of 12.5. All calculations have been carried out automatically using the program CPTint.exe. The results are presented on the Figures following.

---

2 Robertson, P.K., 1985, "In-Situ Testing and Its Application to Foundation Engineering", 1985 Canadian Geotechnical Colloquium, Canadian Geotechnical Journal, Vol. 23, No. 23, 1986

GEOPACIFIC VANCOUVER KAMLOOPS CALGARY	2021-Dec-3	1214081 BC LTD	GeoPacific Project #: 20368
	Sounding: CPT21-01	17649, 17709, 17710 96TH AVENUE, SURREY	Figure: C.01



** Based on Robertson et. al 1986

1 Sensitive Fine Grained
2 Organic Material
3 Clay
4 Silty Clay to Clay
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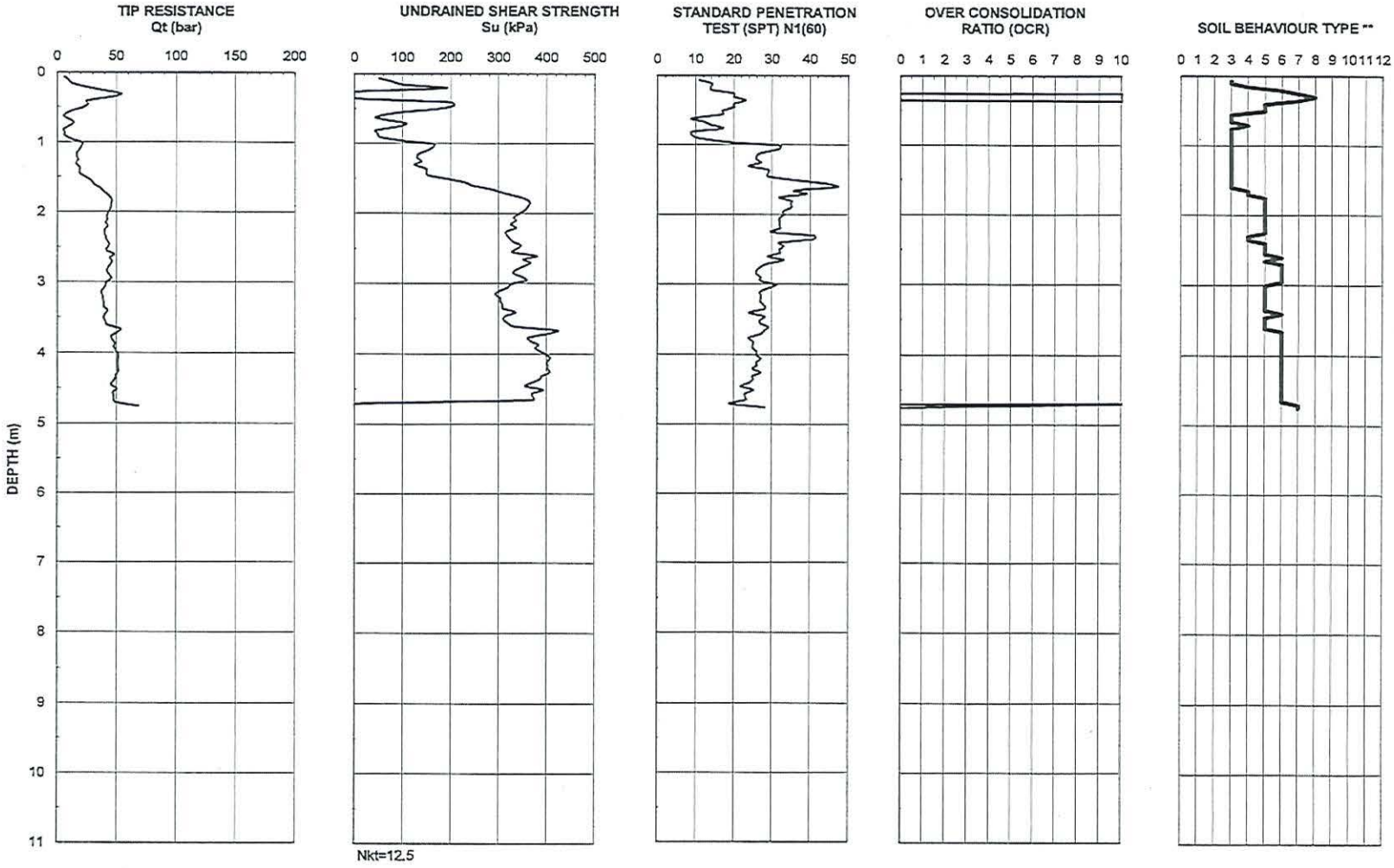
6 Sandy Silt to Clayey Silt
7 Silty Sand to Sandy Silt
8 Sand to Silty Sand
9 Sand
10 Gravelly Sand to Sand
11 Very Stiff Fine Grained
12 Sand to Clayey Sand

7922-0234-00(94)

GEOPACIFIC VANCOUVER KAMLOOPS CALGARY	2021-Dec-3	1214081 BC LTD	GeoPacific Project #: 20368
	Sounding: CPT21-02	17649, 17709, 17710 96TH AVENUE, SURREY	Figure: C.02

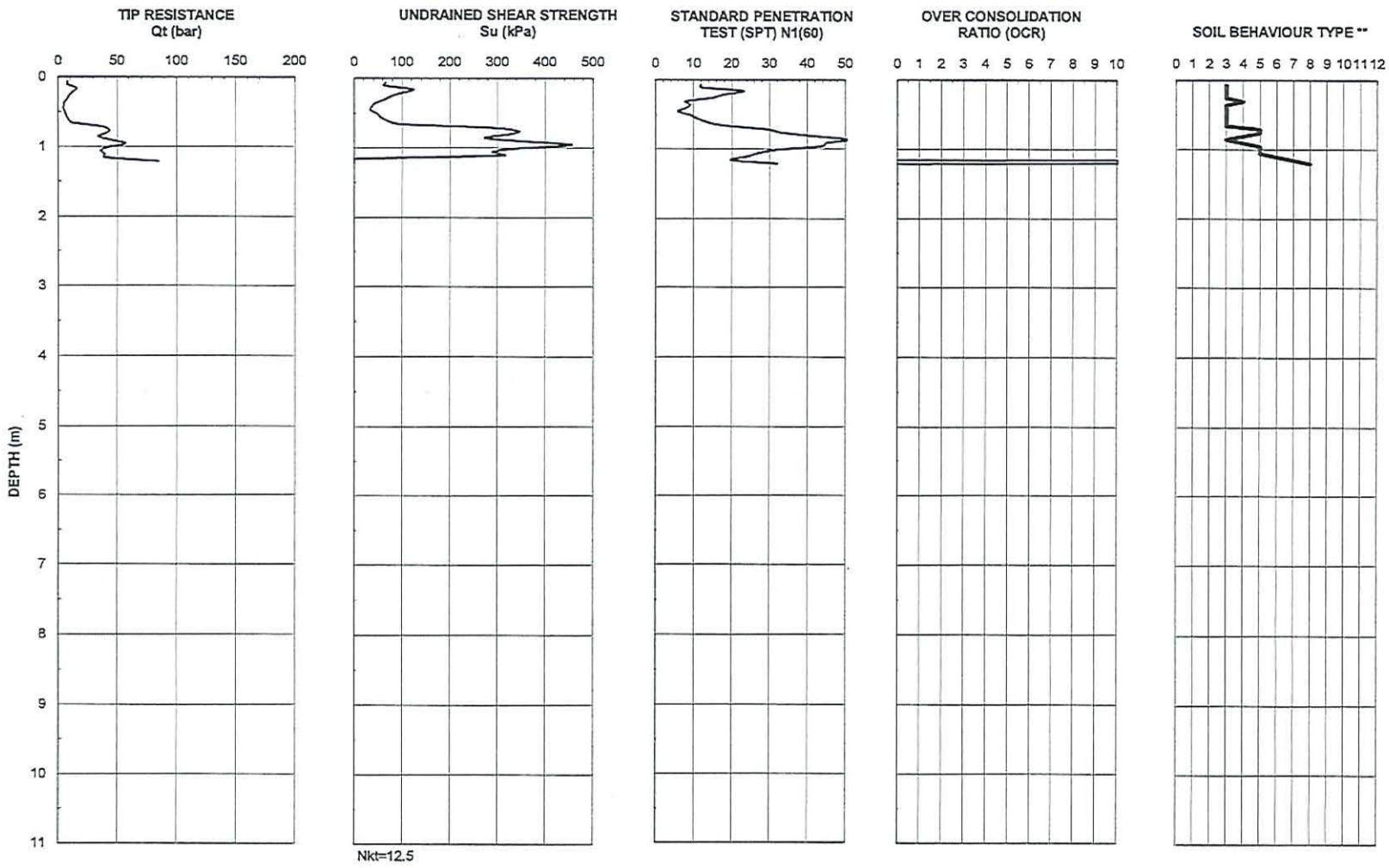


** Based on Robertson et. al 1986

1 Sensitive Fine Grained
2 Organic Material
3 Clay
4 Silty Clay to Clay
5 Clayey Silt to Silty Clay
6 Sandy Silt to Clayey Silt
7 Silty Sand to Sandy Silt
8 Sand to Silty Sand
9 Sand
10 Gravelly Sand to Sand
11 Very Stiff Fine Grained
12 Sand to Clayey Sand

7922-0234-00(95)

GEOPACIFIC VANCOUVER KAMLOOPS CALGARY	2021-Dec-3	1214081 BC LTD	GeoPacific Project #: 20368
	Sounding: CPT21-03	17649, 17709, 17710 96TH AVENUE, SURREY	Figure: C.03

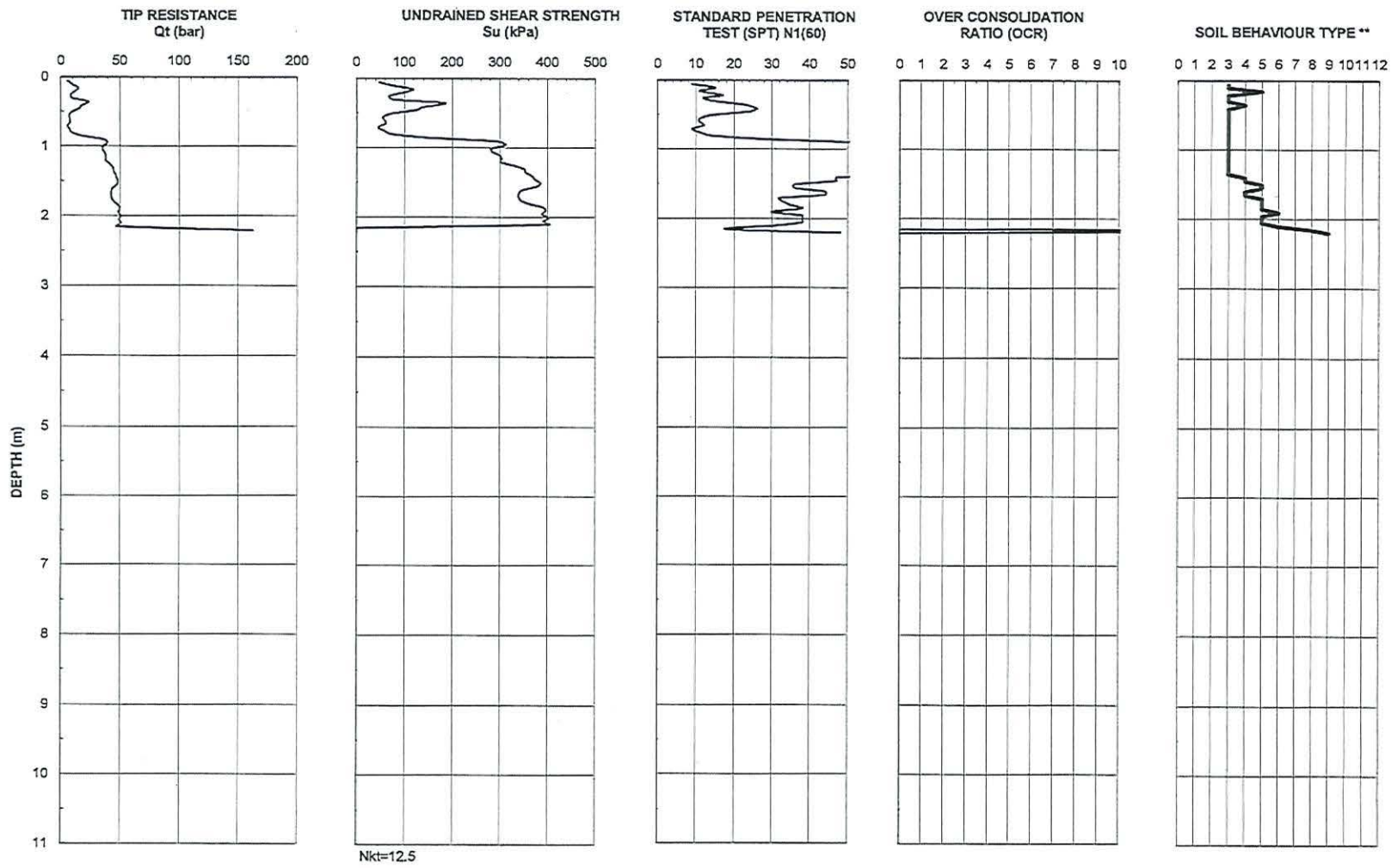


** Based on Robertson et. al 1986

1 Sensitive Fine Grained
2 Organic Material
3 Clay
4 Silty Clay to Clay
5 Clayey Silt to Silty Clay
6 Sandy Silt to Clayey Silt
7 Silty Sand to Sandy Silt
8 Sand to Silty Sand
9 Sand
10 Gravelly Sand to Sand
11 Very Stiff Fine Grained
12 Sand to Clayey Sand

7922-0234-00(96)

GEOPACIFIC VANCOUVER KAMLOOPS CALGARY	2021-Dec-3	1214081 BC LTD	GeoPacific Project #: 20368
	Sounding: CPT21-04	17649, 17709, 17710 96TH AVENUE, SURREY	Figure: C.04

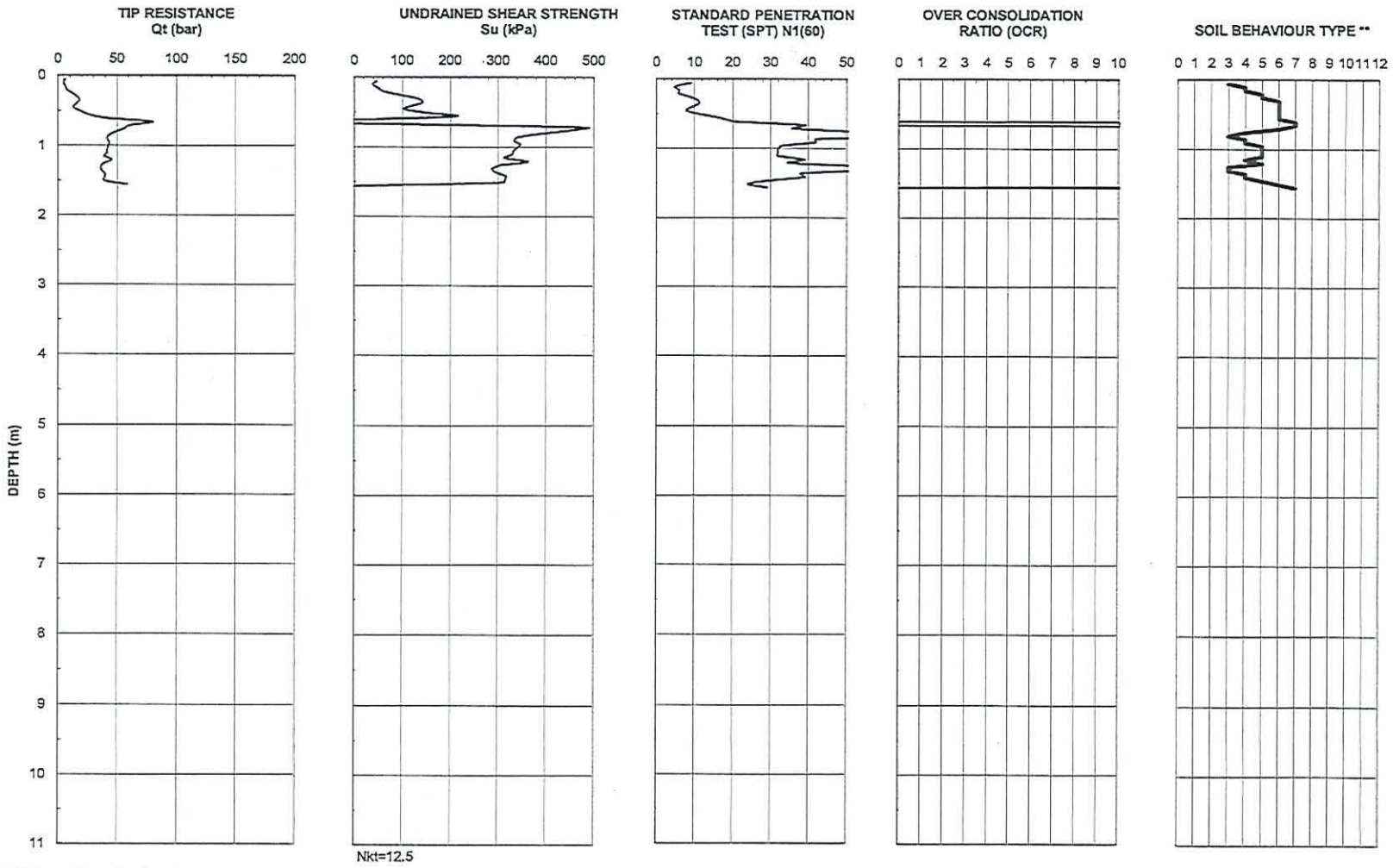


** Based on Robertson et. al 1986

1 Sensitive Fine Grained
2 Organic Material
3 Clay
4 Silty Clay to Clay
5 Clayey Silt to Silty Clay
6 Sandy Silt to Clayey Silt
7 Silty Sand to Sandy Silt
8 Sand to Silty Sand
9 Sand
10 Gravelly Sand to Sand
11 Very Stiff Fine Grained
12 Sand to Clayey Sand

7922-0234-00(97)

GEOPACIFIC VANCOUVER KAMLOOPS CALGARY	2021-Dec-3	1214081 BC LTD	GeoPacific Project #: 20368
	Sounding: CPT21-05	17649, 17709, 17710 96TH AVENUE, SURREY	Figure: C.05



** Based on Robertson et. al 1986

1 Sensitive Fine Grained
2 Organic Material
3 Clay
4 Silty Clay to Clay
5 Clayey Silt to Silty Clay
6 Sandy Silt to Clayey Silt
7 Silty Sand to Sandy Silt
8 Sand to Silty Sand
9 Sand
10 Gravelly Sand to Sand
11 Very Stiff Fine Grained
12 Sand to Clayey Sand

7922-0234-00(98)

APPENDIX D - SHEAR WAVE VELOCITY DATA (Vs)

GEOPACIFIC
VANCOUVER KAMLOOPS CALGARY

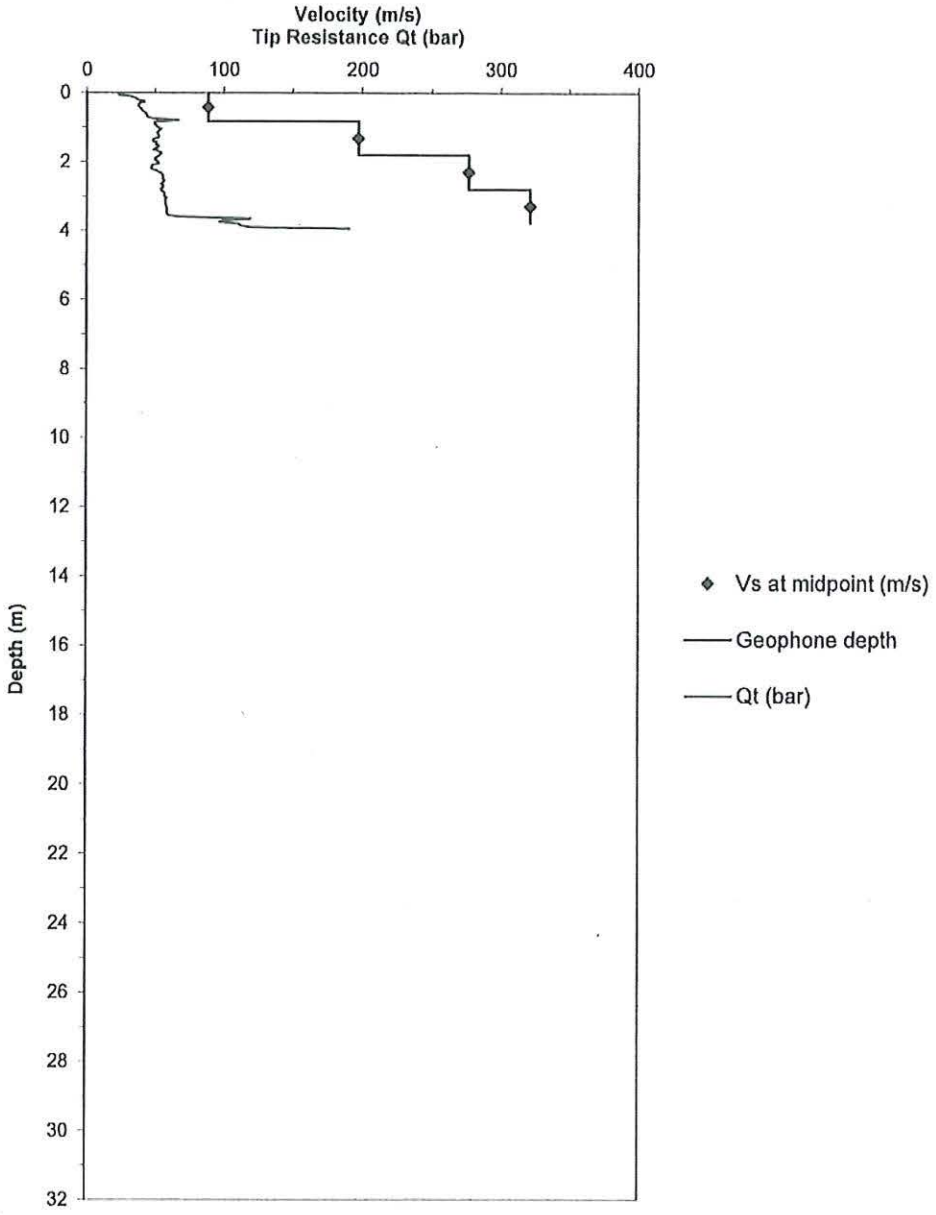
File: 20368
Project: NEW DEVELOPMENT
Client: 1214081 BC LTD
Location: 17649, 17709, 17710, 96TH AVENUE, SURREY
Sounding: SCPT22-01
Date: 2021-012-03

Seismic Source: Beam
Source to cone (m): 0.4

Shear Wave Velocity Data (Vs)

Depth (m)	Geophone Depth (m)	Ray Path (m)	Ray Path Difference d (m)	Midpoint (m)	Time Difference (ms)	Shear Wave Velocity Vs (m/s)	d/Vs
1.02	0.82	0.91	0.91	0.41	10.37	88	0.0104
2.01	1.81	1.85	0.94	1.32	4.79	197	0.0048
3.00	2.80	2.83	0.97	2.31	3.53	276	0.0035
3.97	3.77	3.79	0.96	3.29	3.00	321	0.0030
						Σ(d/Vs)	0.0217
						average Vs = Σd / Σ(d/Vs)	175

File: 20368
Project: NEW DEVELOPMENT
Client: 1214081 BC LTD
Location: 17649, 17709, 17710, 96TH AVENUE, SURREY
Sounding: SCPT22-01
Date: 2021-Dec-03



APPENDIX E – INFILTRATION RESULTS

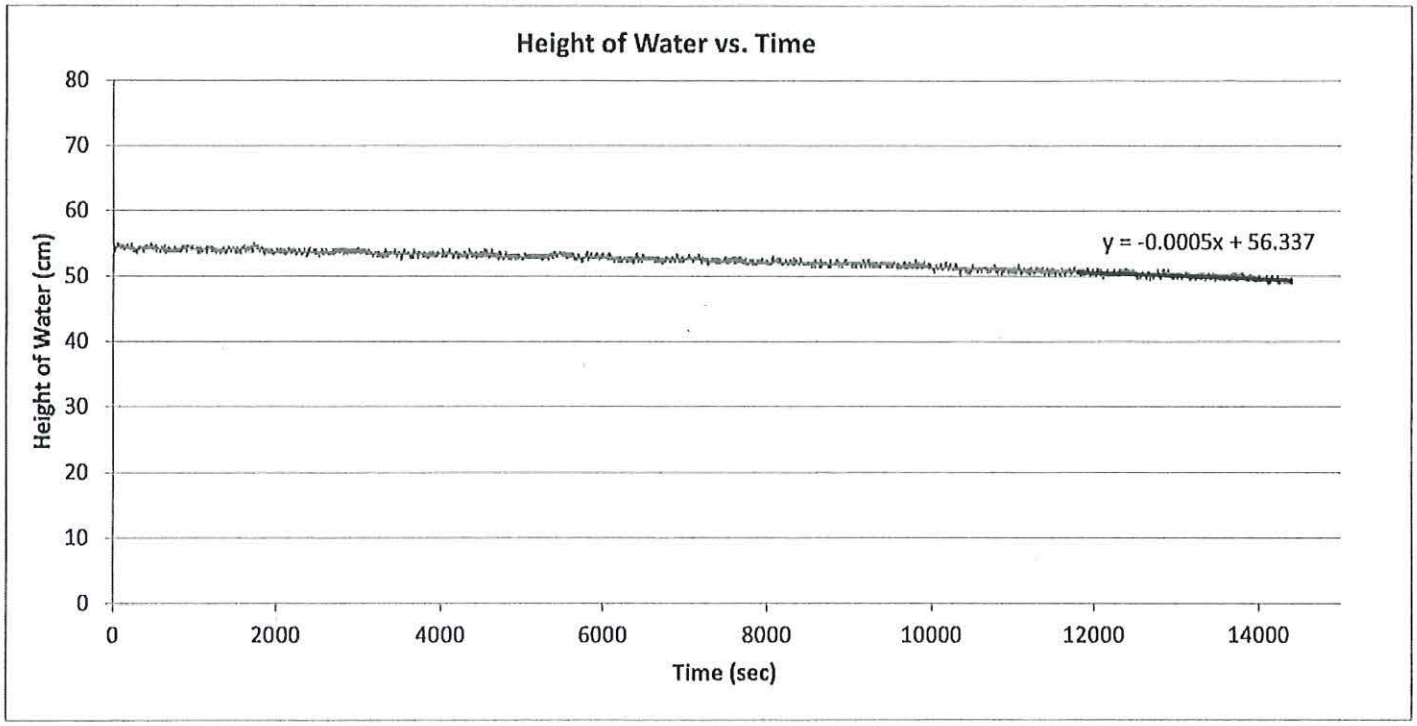
GEOPACIFIC
VANCOUVER KAMLOOPS CALGARY

DOUBLE RING INFILTRATION TEST (ASTM D3385)

Vancouver Lab
1779 West 75th Avenue
Vancouver, B.C
V6P 6P2

CLIENT:	1161830 BC LTD.	PROJECT #:	20368
PROJECT NAME:	PROPOSED REDEVELOPMENT	DATE:	22-Jul-2022 8:30
PROJECT LOCATION:	17649 & 17709 96 AVENUE AND 17710 97 AVENUE, SURREY	TEST NO.:	DRIT22-01

ESTIMATED FIELD SATURATED INFILTRATION RATE: 17.2 mm/Hr



TEST INFORMATION					
LIQUID USED:	WATER	AREA INNER CYLINDER:	72965.63 mm^2	DEPTH OF TEST BELOW CURRENT SITE GRADE (m):	1.8
LIQUID pH:	7.1	ANNULAR AREA:	209777.71 mm^2		
SOIL DESCRIPTION:	SILTY CLAY	CYLINDER ACCURACY:	± 0.5 mm	INFILTRATION RATE (cm/sec):	4.786E-04
SOIL TYPE:	NATIVE	LIQUID DEPTH INNER:	55 cm		
WEATHER ON SITE:	CLEAR	LIQUID DEPTH OUTER:	N/A	DEPTH TO WATER TABLE:	UNKNOWN

Comments:

Per: Austin Lockstidt, B.A.Sc., EIT

Engineer In Training

Reviewed by: Jakub Szary, B.Sc., AScT

Lab Manager

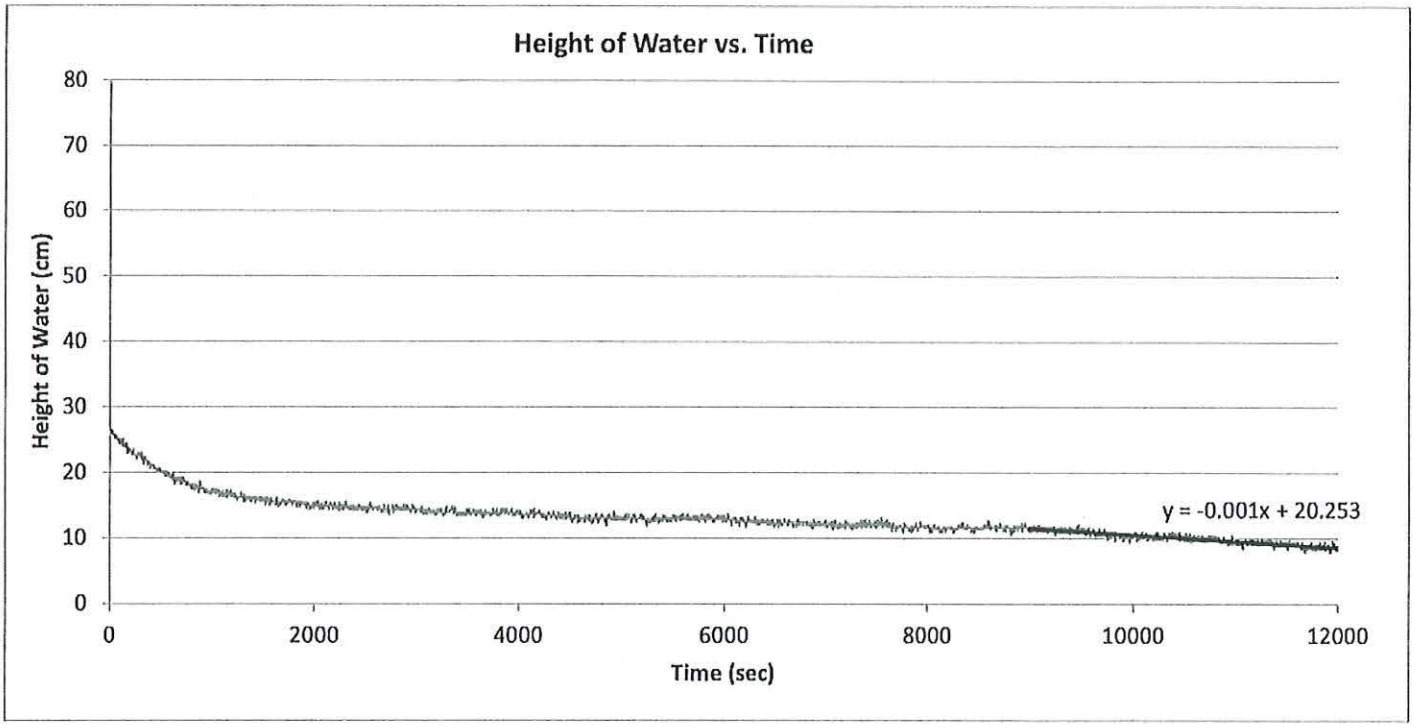
GEOPACIFIC
VANCOUVER KAMLOOPS CALGARY

DOUBLE RING INFILTRATION TEST (ASTM D3385)

Vancouver Lab
1779 West 75th Avenue
Vancouver, B.C
V6P 6P2

CLIENT:	1161830 BC LTD.	PROJECT #:	20368
PROJECT NAME:	PROPOSED REDEVELOPMENT	DATE:	22-Jul-2022 9:00
PROJECT LOCATION:	17649 & 17709 96 AVENUE AND 17710 97 AVENUE, SURREY	TEST NO.:	DRIT22-02

ESTIMATED FIELD SATURATED INFILTRATION RATE: 35.0 mm/Hr



TEST INFORMATION					
LIQUID USED:	WATER	AREA INNER CYLINDER:	72965.63 mm^2	DEPTH OF TEST BELOW CURRENT SITE GRADE (m):	1.2
LIQUID pH:	7.1	ANNULAR AREA:	209777.71 mm^2		
SOIL DESCRIPTION:	SILTY CLAY	CYLINDER ACCURACY:	± 0.5 mm	INFILTRATION RATE (cm/sec):	9.726E-04
SOIL TYPE:	NATIVE	LIQUID DEPTH INNER:	26.5 cm		
WEATHER ON SITE:	CLEAR	LIQUID DEPTH OUTER:	N/A	DEPTH TO WATER TABLE:	UNKNOWN

Comments:

Per: Austin Lockstidt, B.A.Sc., EIT

Engineer In Training

Reviewed by: Jakub Szary, B.Sc., AScT

Lab Manager

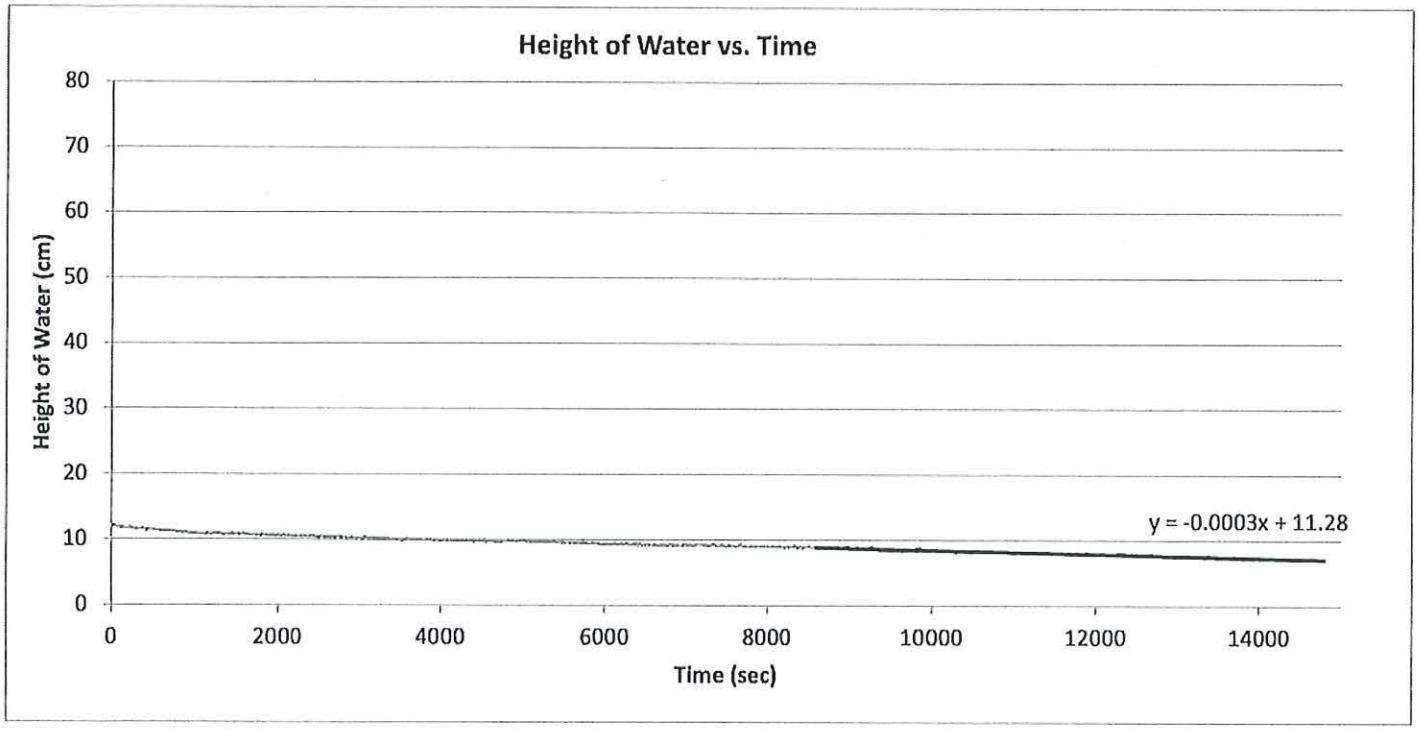
GEOPACIFIC
VANCOUVER KAMLOOPS CALGARY

DOUBLE RING INFILTRATION TEST (ASTM D3385)

Vancouver Lab
1779 West 75th Avenue
Vancouver, B.C
V6P 6P2

CLIENT:	1161830 BC LTD.	PROJECT #:	20368
PROJECT NAME:	PROPOSED REDEVELOPMENT	DATE:	22-Jul-2022 9:30
PROJECT LOCATION:	17649 & 17709 96 AVENUE AND 17710 97 AVENUE, SURREY	TEST NO.:	DRIT22-03

ESTIMATED FIELD SATURATED INFILTRATION RATE: 10.2 mm/Hr



TEST INFORMATION					
LIQUID USED:	WATER	AREA INNER CYLINDER:	72965.63 mm^2	DEPTH OF TEST BELOW CURRENT SITE GRADE (m):	1.5
LIQUID pH:	7.1	ANNULAR AREA:	209777.71 mm^2		
SOIL DESCRIPTION:	SILTY CLAY	CYLINDER ACCURACY:	± 0.5 mm	INFILTRATION RATE (cm/sec):	2.842E-04
SOIL TYPE:	NATIVE	LIQUID DEPTH INNER:	12.2 cm		
WEATHER ON SITE:	CLEAR	LIQUID DEPTH OUTER:	N/A	DEPTH TO WATER TABLE:	UNKNOWN

Comments:

Per: Austin Lockstidt, B.A.Sc., EIT

Engineer In Training

Reviewed by: Jakub Szary, B.Sc., AScT

Lab Manager

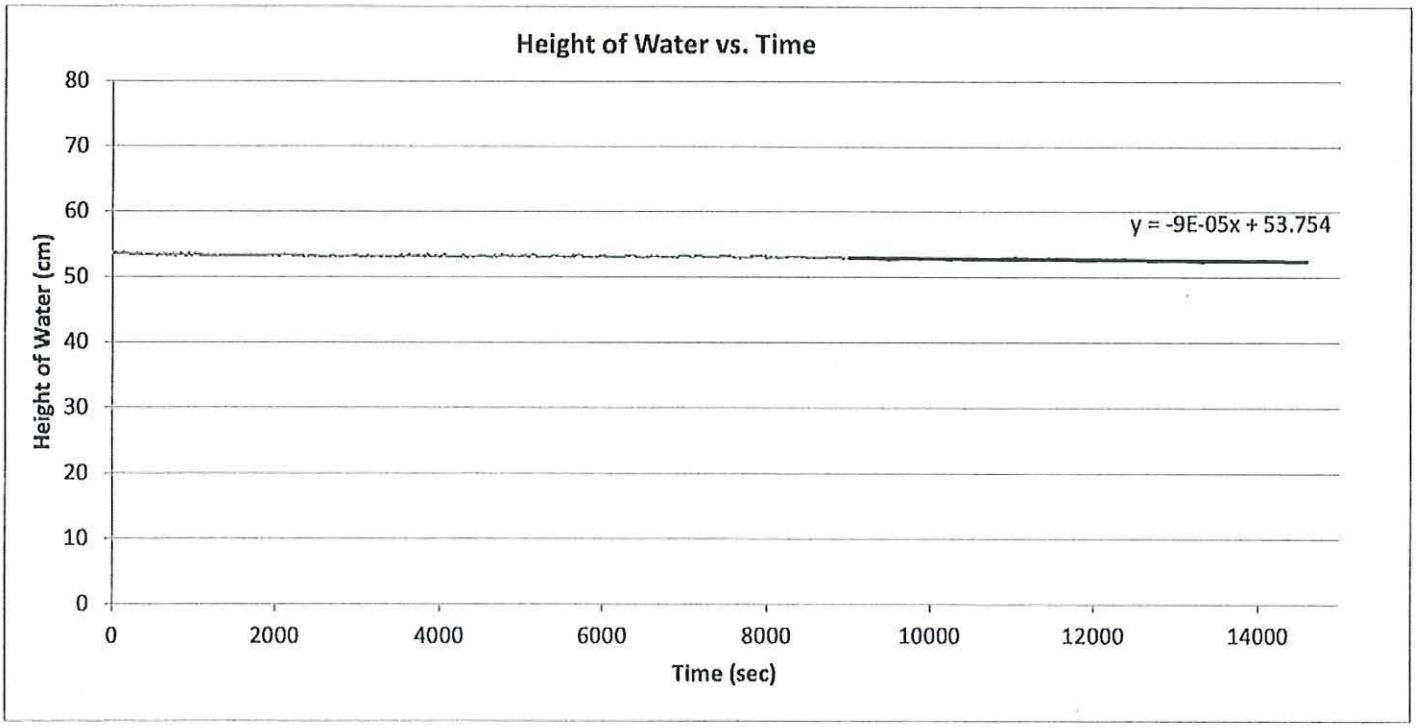
GEOPACIFIC
VANCOUVER KAMLOOPS CALGARY

DOUBLE RING INFILTRATION TEST (ASTM D3385)

Vancouver Lab
1779 West 75th Avenue
Vancouver, B.C
V6P 6P2

CLIENT:	1161830 BC LTD.	PROJECT #:	20368
PROJECT NAME:	PROPOSED REDEVELOPMENT	DATE:	22-Jul-2022 10:00
PROJECT LOCATION:	17649 & 17709 96 AVENUE AND 17710 97 AVENUE, SURREY	TEST NO.:	DRIT22-04

ESTIMATED FIELD SATURATED INFILTRATION RATE: 3.1 mm/Hr



TEST INFORMATION					
LIQUID USED:	WATER	AREA INNER CYLINDER:	72965.63 mm^2	DEPTH OF TEST BELOW CURRENT SITE GRADE (m):	1.2
LIQUID pH:	7.1	ANNULAR AREA:	209777.71 mm^2		
SOIL DESCRIPTION:	SILTY CLAY	CYLINDER ACCURACY:	± 0.5 mm	INFILTRATION RATE (cm/sec):	8.702E-05
SOIL TYPE:	NATIVE	LIQUID DEPTH INNER:	53.8 cm		
WEATHER ON SITE:	CLEAR	LIQUID DEPTH OUTER:	N/A	DEPTH TO WATER TABLE:	UNKNOWN

Comments:

Per: Austin Lockstidt, B.A.Sc., EIT

Engineer In Training

Reviewed by: Jakub Szary, B.Sc., AScT

Lab Manager

APPENDIX F

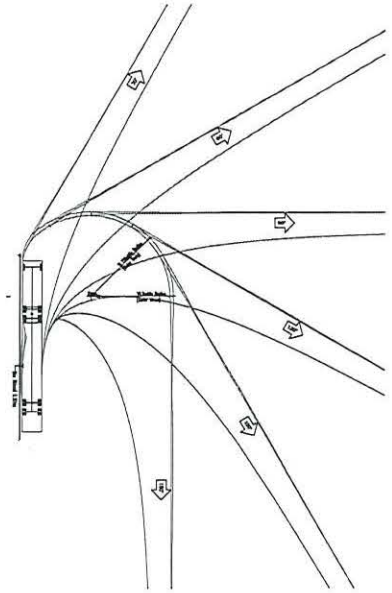
Engineering Plans
Aplin & Martin Consultants Ltd.

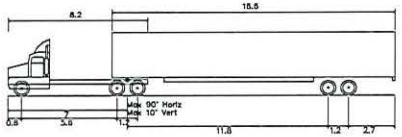
7922-0234-00(108)

LEGEND

TREES TO BE RETAINED

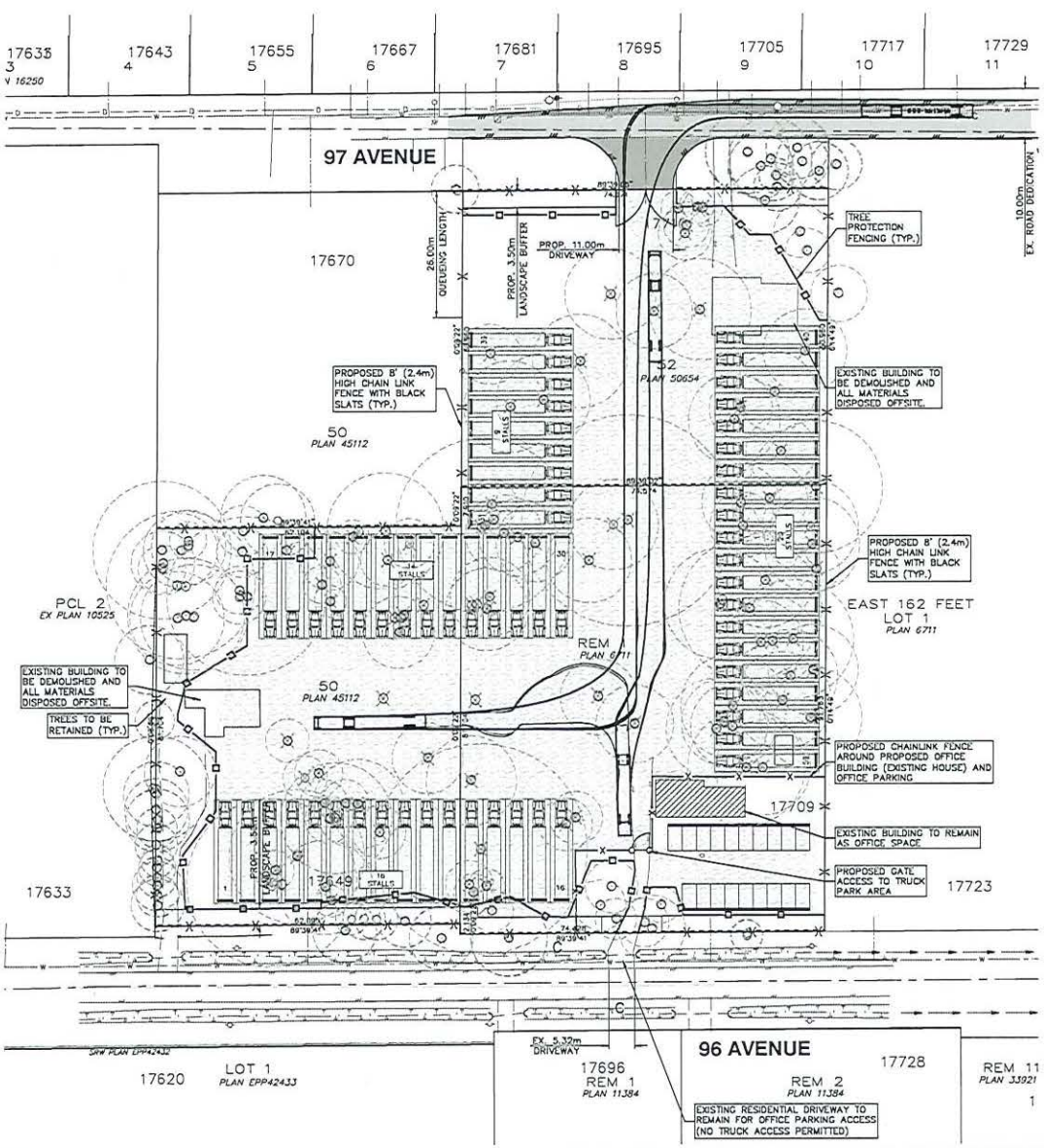
TREES TO BE REMOVED





WB-20-90 - Tractor & Semi-Trailer

Overall Length	22.700m
Overall Width	2.600m
Overall Body Height	3.730m
Min Body Ground Clearance	0.435m
Track Width	2.600m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	10.700m



LEGAL DESCRIPTION: -

B.M. MONUMENT NO. - ELEVATION: -
LOCATED AT OF STREET & AVENUE

REV. NO.	DESCRIPTION	DR	CH	DATE	APP
4	96 AVENUE SCOPE REMOVED	AP	RMS	08/24/22	JJB
3	PROPOSED COST SHARING - FOR DISCUSSION	WW	ML	08/04/22	JJB
2	UPDATED SITE PLAN	WW	RMS	07/14/22	JJB
1	TUP APPLICATION SUBMITTED	MJC	HH	05/20/22	JJB

APLIN MARTIN
ENGINEERING ARCHITECTURE PLANNING SURVEYING
EGBC Permit to Practice Number #1001010
201 - 12448 82 Avenue, Surrey, B.C. Canada V3W 3E9
Tel: (604) 597-9058, Fax: (604) 597-9061, Email: general@aplinmartin.com

DEVELOPER: RAI EXPRESS LINES (1214081 BC LTD.)
#125 - 7475 135 STREET, SURREY, BC V3W 0M8

PROJECT: TEMPORARY USE PERMIT
17709 / 17649 96 AVENUE, AND 17710 97 AVENUE, SURREY, BC

The location of existing underground utilities are shown in an approximate way only & have not been independently verified by the owner or its representatives. The contractor shall determine the exact location of all existing utilities before commencing work, and agrees to be fully responsible for any and all damages which might be occasioned by the contractor's failure to exactly locate and preserve any and all underground utilities.

TITLE: TUP - KEY PLAN

DESIGN: HH CHECK: HH
DRAWN: MJC APPR: JJB

A & M FILE: 22-082

PROJECT NO. 7822-0234-00

SCALE: HORZ. 1:500 VERT. N/A

DRAWING DATE: APRIL 2022

DRAWING NO. -

A & M DRAWING NO. 22-082- 02

SHEET NO. 02 of 09

REV. 4

0 5 1:500 25m

7922-0234-00(109)

LEGEND:

- PROPOSED GRAVEL PARKING/ STORAGE SURFACE
- PROPOSED TREE PROTECTION FENCE
- MANHOLE
- CLEANOUT
- LAWN BASIN (AS PER MMCD)
- PROPOSED SWALE
- OVERLAND FLOW ARROW
- PRE-CAST WHEEL STOP

TUP Permit 22-082
11709/17649 96 Ave and 17710 97 Ave, Surrey, BC 5-Aug-22

5 Year Peak Flow Calculations

	Tc min	Runoff coefficient %	Area Ha	Intensity mm	n	Q cms
Infiltration						0.010
Q_{Post}	15	0.90	1.64	36	0.00278	0.146

Storage Volume Required (Modified Rational Method)

Storage Volume = $T_r (Q_{p2} - Q_{rel}) + 0.5 \times T_c \times Q_{rel}^2 (1/Q_{p2} - 1/Q_{p1})$

T_r = Duration of storm, in seconds
T_c = Time to concentration, in seconds
Q_{r1} = Peak flow for storm, $T_r = T_c$, cms
Q_{p2} = Peak flow for storm specified, cms
Q_{rel} = Maximum release rate, cms = Q_{Pre}

Maximum Storage Required = 416 cm

Rainfall Duration Tr min	Rainfall Intensity I mm	Peak Flow Q_{p1} cms	Peak Flow Q_{p2} cms	Required Storage cm
60	17	0.146	0.071	220
120	12	0.146	0.049	285
180	10	0.146	0.040	326
240	8	0.146	0.034	355
300	7	0.146	0.031	376
360	7	0.146	0.028	391
420	6	0.146	0.026	401
480	6	0.146	0.024	409
540	6	0.146	0.023	413
600	5	0.146	0.021	416
660	5	0.146	0.020	416
720	5	0.146	0.019	415
780	5	0.146	0.019	413
840	4	0.146	0.018	409
900	4	0.146	0.017	404
960	4	0.146	0.017	397
1020	4	0.146	0.016	390

INFILTRATION RATE (I): 35 mm/hr

AREA (A): 1020 m^2

$Q_{infiltration} = I*A/1000/3600$

$Q_{infiltration}$ = 0.010 cms

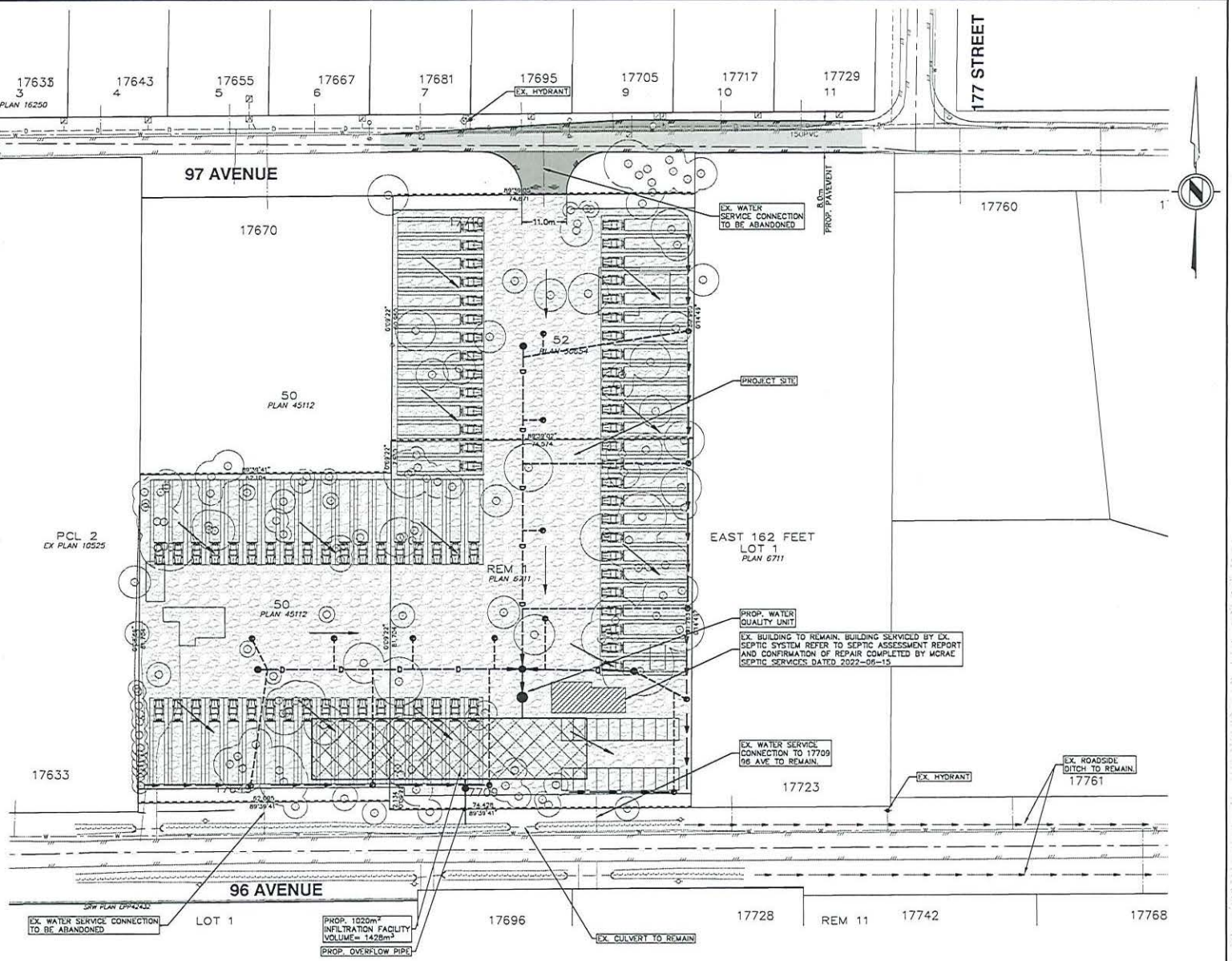
ROCK PIT VOLUME (V_{RP}):

Required Storage (S) = 416 m^3
Porosity (η) = 0.3
Required V_{RP} = S/η = 1387 m^3

V_{RP} = 15m X 68m X 1.4m = 1428 m^3

NOTICE TO CONTRACTOR

IT IS THE RESPONSIBILITY OF THE CONTRACTOR'S SURVEYOR TO VERIFY THAT ALL LEGAL SURVEY DIMENSIONS SHOWN ON THE ENGINEERS DRAWINGS AGREE WITH THOSE ON THE REGISTERED LEGAL SURVEY PLAN. SHOULD THERE BE ANY DISCREPANCIES, THEN IMMEDIATELY NOTIFY THE ENGINEER OF RECORD



REV. NO.	DESCRIPTION	DR	CH	DATE	APP
3	PROPOSED COST SHARING – FOR DISCUSSION	WW	ML	08/04/22	JJB
2	UPDATED SITE PLAN	WW	RWS	07/14/22	JJB
1	TUP APPLICATION SUBMITTED	MJC	HH	05/20/22	JJB

LEGAL DESCRIPTION: –
B.M. MONUMENT NO. – ELEVATION: –
LOCATED AT OF STREET & AVENUE

APLIN MARTIN
ENGINEERING ARCHITECTURE PLANNING SURVEYING
EGBC Permit to Practice Number #1001018
201 - 12448 82 Avenue, Surrey, B.C. Canada V3W 3E9
Tel: (604) 597-9058, Fax: (604) 597-9061, Email: general@aplinmartin.com

DEVELOPER: RAI EXPRESS LINES (1214081 BC LTD.)
#125 - 7475 135 STREET, SURREY, BC V3W 0M8

PROJECT: TEMPORARY USE PERMIT
17709 / 17649 96 AVENUE, AND 17710 97 AVENUE, SURREY, BC

The location of existing underground utilities are shown in an approximate way only & have not been independently verified by the owner or its representatives. The contractor shall determine the exact location of all existing utilities before commencing work, and agrees to be fully responsible for any and all damages which might be occasioned by the contractor's failure to exactly locate and preserve any and all underground utilities.

TITLE: PRELIMINARY SERVICING PLAN

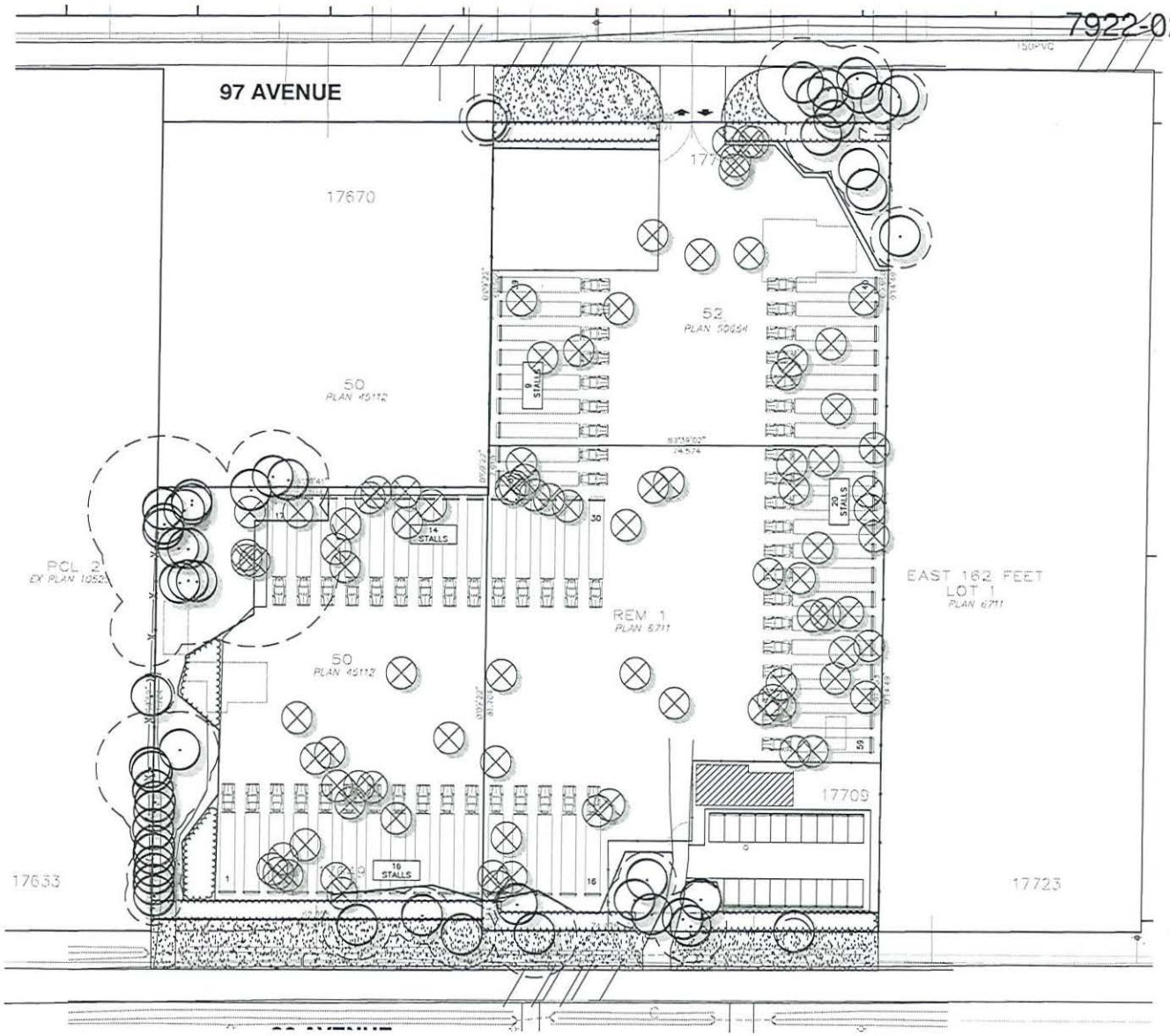
DESIGN: HH CHECK: HH
DRAWN: MJC APPR: JJB
A & M FILE: 22-082
PROJECT NO. 7822-0234-00
SCALE: HORZ. 1:500 VERT. N/A
DRAWING DATE: APRIL 2022
DRAWING NO. .
A & M DRAWING NO. 22-082- 04
SHEET NO. 04 of 09
REV. 3

1:500

APPENDIX G

Landscaping Plans
Pmg Landscape Architects

7922-0234-00(111)



TREE MANAGEMENT LEGEND

	TREE TO RETAIN
	TREE TO REMOVE

0 20 40 100 200Ft

pmg LANDSCAPE ARCHITECTS
Suite C100 - 4185 Still Creek Drive
Burnaby, British Columbia, V5C 6G9
p: 604 294-0011 ; f: 604 294-0022

SEAL:

NO.	DATE	REVISION DESCRIPTION	DR.
2	22.SEP.15	REVISE PER UPDATED ARBORIST REPORT	SA
1	22.SEP.15	REVISE PER NEW SITE PLAN/TREE RETENTION	SA

CLIENT:

RAI EXPRESS LINES LTD.

PROJECT:

TEMPORARY USE PERMIT

11709, 17649, 17710 - 97 AVENUE
SURREY, BC

DRAWING TITLE:

TREE MANAGEMENT PLAN

DATE:	22JUL.14	DRAWING NUMBER:
SCALE:	1/32" = 1'-0"	L0
DRAWN:	SA	
DESIGN:	SA	
CHK'D:	RK	OF 2

22095-3.ZIP

PMG PROJECT NUMBER: 22-095

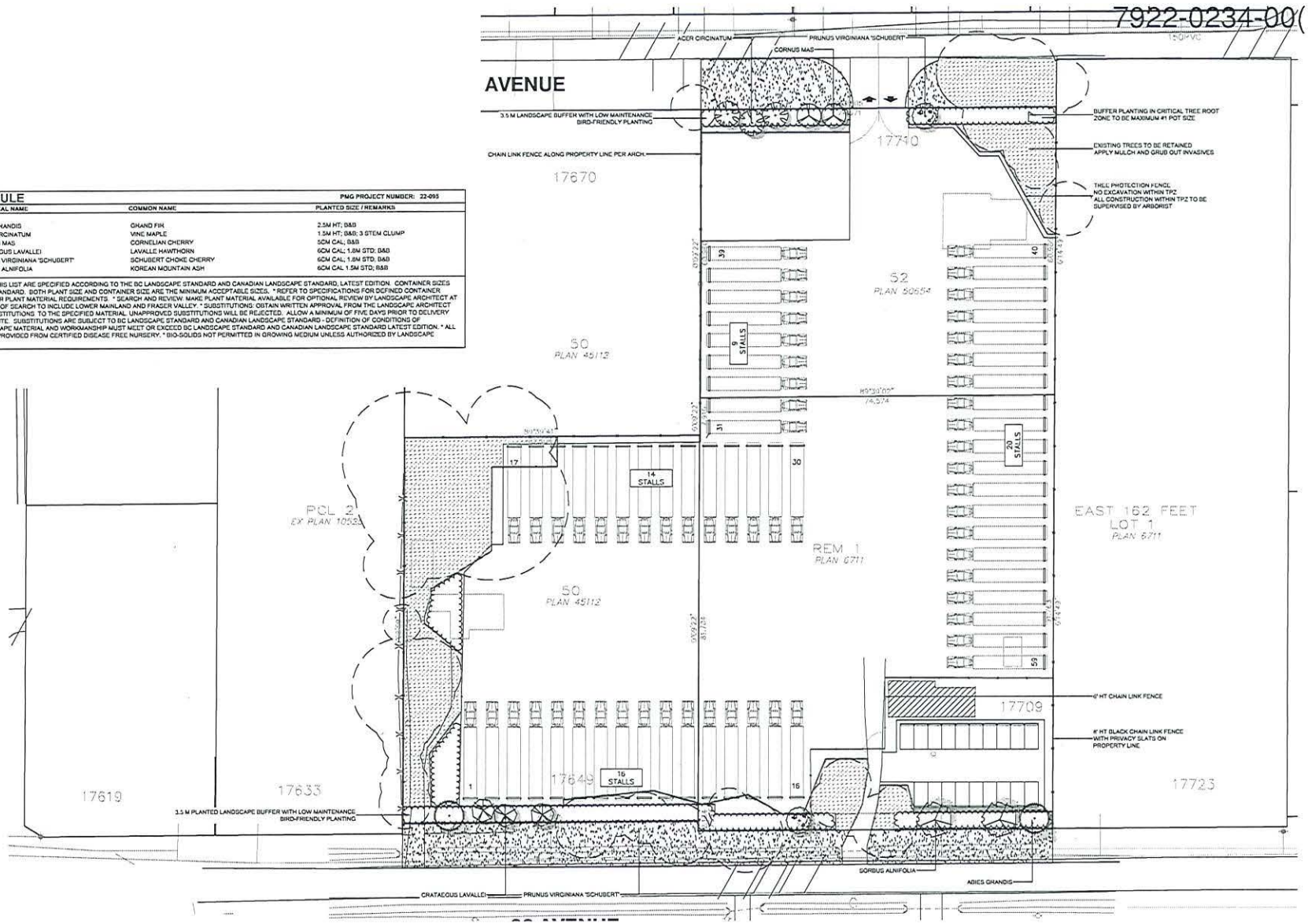
7922-0234-00(112)

PLANT SCHEDULE

PMG PROJECT NUMBER: 22-095

KEY	QTY	BOTANICAL NAME	COMMON NAME	PLANTED SIZE / REMARKS
TREE				
ABG	2	ABIES GHANDIS	GHAND FIR	2.5M HT; B&B
ACI	3	ACER CIRCINATUM	VINE MAPLE	1.5M HT; B&B; 3 STEM CLUMP
CMA	2	CORNUS MAS	CORNELIAN CHERRY	5CM CAL; B&B
CLA	3	CRATAEGUS LAVALLEI	LAVALLE HAWTHORN	6CM CAL; 1.8M STD; B&B
PVS	2	PRUNUS VIRGINIANA 'SCHUBERT'	SCHUBERT CHOKE CHERRY	6CM CAL; 1.8M STD; B&B
SAL	2	SORBUS ALNIFOLIA	KOREAN MOUNTAIN ASH	6CM CAL 1.5M STD; B&B

NOTES: * PLANT SIZES IN THIS LIST ARE SPECIFIED ACCORDING TO THE BC LANDSCAPE STANDARD AND CANADIAN LANDSCAPE STANDARD, LATEST EDITION. CONTAINER SIZES SPECIFIED AS PER CNLA STANDARD. BOTH PLANT SIZE AND CONTAINER SIZE ARE THE MINIMUM ACCEPTABLE SIZES. * REFER TO SPECIFICATIONS FOR DEFINED CONTAINER MEASUREMENTS AND OTHER PLANT MATERIAL REQUIREMENTS. * SEARCH AND REVIEW: MAKE PLANT MATERIAL AVAILABLE FOR OPTIONAL REVIEW BY LANDSCAPE ARCHITECT AT SOURCE OF SUPPLY. AREA OF SEARCH TO INCLUDE LOWER MAINLAND AND FRASER VALLEY. * SUBSTITUTIONS: OBTAIN WRITTEN APPROVAL FROM THE LANDSCAPE ARCHITECT PRIOR TO MAKING ANY SUBSTITUTIONS TO THE SPECIFIED MATERIAL. UNAPPROVED SUBSTITUTIONS WILL BE REJECTED. ALLOW A MINIMUM OF FIVE DAYS PRIOR TO DELIVERY FOR REQUEST TO SUBSTITUTE. SUBSTITUTIONS ARE SUBJECT TO BC LANDSCAPE STANDARD AND CANADIAN LANDSCAPE STANDARD - DEFINITION OF CONDITIONS OF AVAILABILITY. * ALL LANDSCAPE MATERIAL AND WORKMANSHIP MUST MEET OR EXCEED BC LANDSCAPE STANDARD AND CANADIAN LANDSCAPE STANDARD LATEST EDITION. * ALL PLANT MATERIAL MUST BE PROVIDED FROM CERTIFIED DISEASE FREE NURSERY. * BIO-SOLIDS NOT PERMITTED IN GROWING MEDIUM UNLESS AUTHORIZED BY LANDSCAPE ARCHITECT.



FENCING LEGEND

- 8' HT. BLACK CHAIN LINK FENCE WITH SLATS
- 6' HT. CHAIN LINK FENCE
- TREE PROTECTION FENCE

0 20 40 100 200ft

22095-3.ZIP

pmg LANDSCAPE ARCHITECTS
Suite C100 - 4185 Still Creek Drive
Burnaby, British Columbia, V5C 6G9
p: 604 294-0011 ; f: 604 294-0022

SEAL:

NO.	DATE	REVISION DESCRIPTION	DR.
2	22.SEP.13	REVISE PER UPDATED ARBORIST REPORT	SA
1	22.SEP.13	REVISE PER NEW SITE PLAN/TREE RETENTION	SA

CLIENT:

RAI EXPRESS LINES LTD.

PROJECT:

TEMPORARY USE PERMIT

11709, 17649, 17710 - 97 AVENUE
SURREY, BC

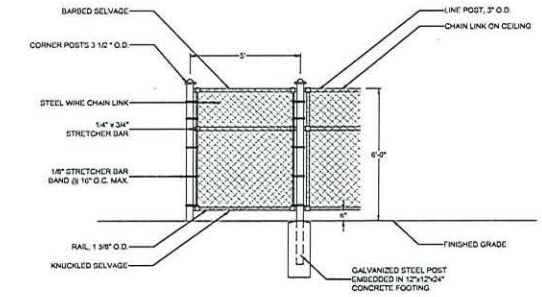
DRAWING TITLE:

LANDSCAPE PLAN

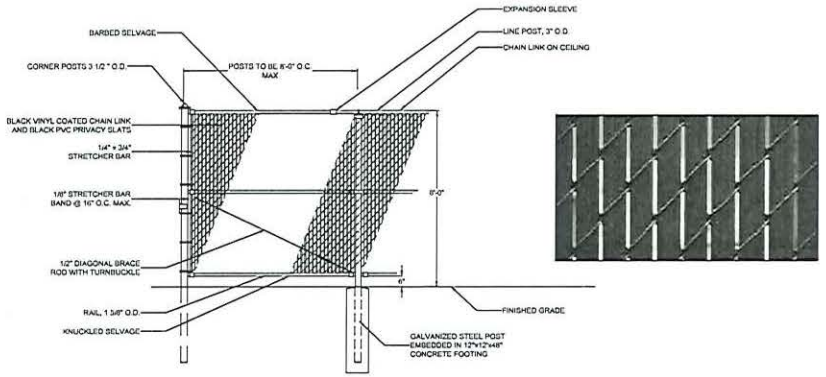
DATE:	22.JUL.14	DRAWING NUMBER:
SCALE:	1/32" = 1'-0"	L1
DRAWN:	SA	
DESIGN:	SA	
CHK'D:	RK	OF 2

PMG PROJECT NUMBER: 22-095

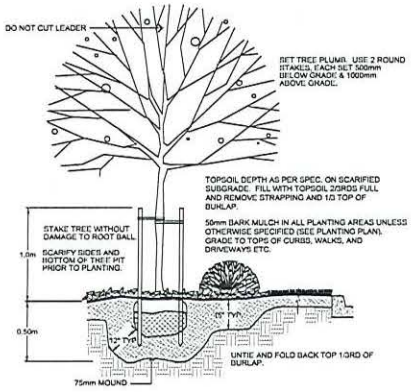
7922-0234-00(113)



1 L1 **6' HT CHAINLINK FENCE**
3/8"=1'-0"



2 L1 **8' HT CHAINLINK FENCE WITH PRIVACY SLATS**
3/8"=1'-0"



3 L1 **TREE PLANTING DETAIL**
1/4"=1'-0"

pmg LANDSCAPE ARCHITECTS
Suite C100 - 4185 Still Creek Drive
Burnaby, British Columbia, V5C 6G9
p: 604 294-0011 ; f: 604 294-0022

SEAL:

NO.	DATE	REVISION DESCRIPTION	DR.
2	22.SEP.13	REVISE PER UPDATED ARBORIST REPORT	SA
1	22.SEP.13	REVISE PER NEW SITE PLAN/TREE RETENTION	SA

CLIENT:

RAI EXPRESS LINES LTD.

PROJECT:

TEMPORARY USE PERMIT

11709, 17649, 17710 - 97 AVENUE SURREY, BC

DRAWING TITLE:

LANDSCAPE DETAILS

DATE:	22.JUL.14	DRAWING NUMBER:
SCALE:	AS NOTED	L2
DRAWN:	SA	
DESIGN:	SA	
CHK'D:	RK	OF 2

22095-3.ZIP

PMG PROJECT NUMBER: 22-095

EXPLANATORY PLAN OF STATUTORY RIGHT OF WAY OVER PART OF LOT 1 PLAN 6711 EXCEPT: FIRSTLY: THE EAST 162 FEET AND SECONDLY: PART SUBDIVIDED BY PLAN 50654; AND LOT 50 PLAN 45112, ALL OF DISTRICT LOT 390A GROUP 2 NWD

PLAN EPP140743

7922-0234-00(114)

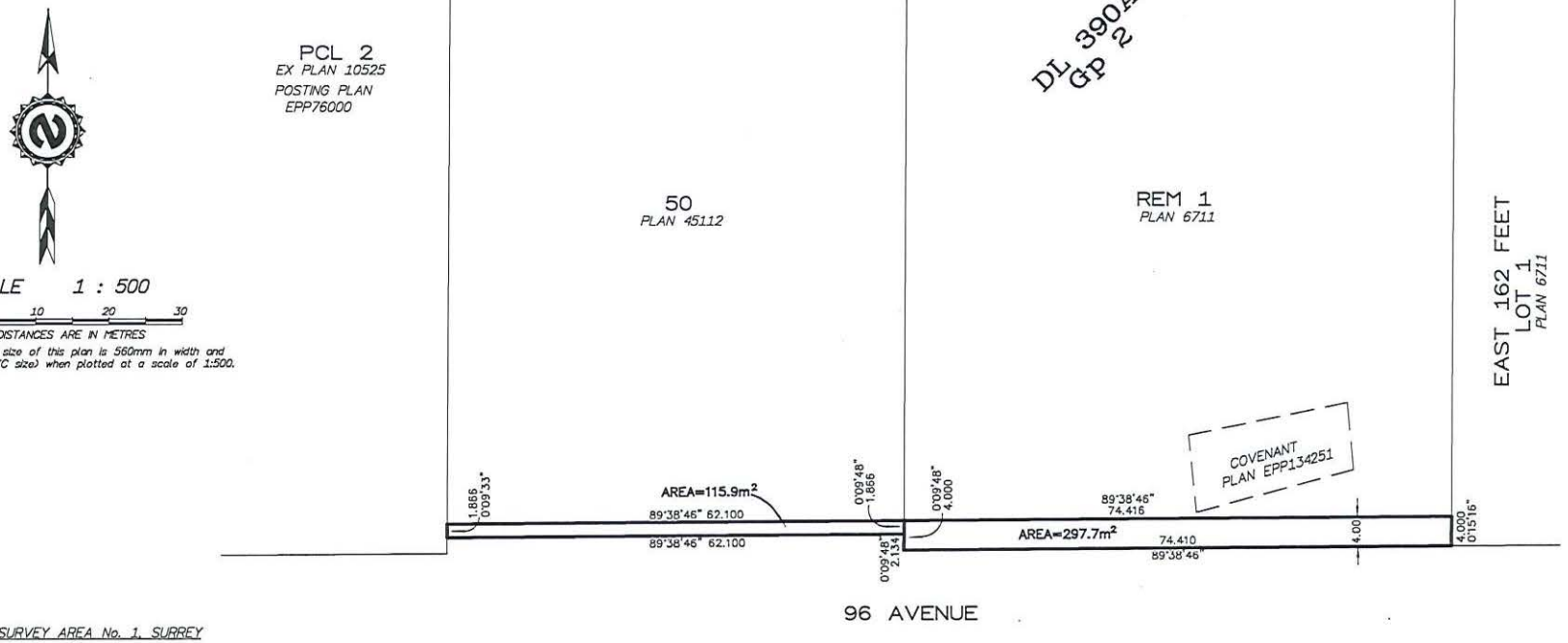
B.C.G.S. 92G.017
PURSUANT TO SECTION 99(1)(e), LAND TITLE ACT
FOR STREAM SIDE PROTECTION PURPOSES

BOOK OF REFERENCE

LEGAL DESCRIPTION	AREA
LOT 50 PLAN 45112	115.9m²
REM 1 PLAN 6711	297.7m²

LEGEND

m² DENOTES SQUARE METRES



96 AVENUE

SCALE 1 : 500

5 0 10 20 30

ALL DISTANCES ARE IN METRES

The intended plot size of this plan is 560mm in width and 432mm in height (C size) when plotted at a scale of 1:500.

INTEGRATED SURVEY AREA No. 1, SURREY

NAD 83 (CSRS) 4.0.0.BC.1.MVRD
Grid bearings are derived from PLAN EPP76000 and are referred to the central meridian of UTM Zone 10N.

This plan shows horizontal ground-level distances unless otherwise specified. To compute grid distances, multiply ground-level distances by the average combined factor of 0.9995984, which has been derived from control monument 8614.

This plan is based on the following Land Title and Survey Authority of BC records:

POSTING PLAN EPP76000

M. Adam Fulkerson, B.C.L.S. 906
17th day of SEPTEMBER, 2024.

THIS PLAN LIES WITHIN THE METRO VANCOUVER REGIONAL DISTRICT

TARGET LAND SURVEYING
C120 - 20178 96th Ave
Langley, BC V1M 0B2
604-583-6161

FILE: 10170-SPEA-SRW