LOG OF EXPLORATION PIT NO. EP-12

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	DESCRIPTION — **Elev: 339**
	Fill
1	Trace concrete rubble at surface.
	Vashon Lodgement Till
2	Bottom of exploration pit at depth 1.5 feet No seepage. No caving.
3	
4	
5	**NOTE: Abbreviated test pit for observation of fill depth only. No laboratory samples taken.**
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Radke Short Plat
King County, WA

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Project No. KE140565A
10/24/14

KCTP3 140565.GPJ November 3, 2014

LOG OF EXPLORATION PIT NO. EP-13

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered. **DESCRIPTION** Elev: 344
	Fill
1	Topsoil, glass bottles, car tools, styrofoam, plastic pots.
2	**Vashon Lodgement Till**
3	Bottom of exploration pit at depth 2.5 feet No seepage. No caving.
4	
5	**NOTE: Abbreviated test pit for observation of fill depth only. No laboratory samples taken.**
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10/24/14

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LOG OF EXPLORATION PIT NO. EP-14

This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.

Depth (ft)	DESCRIPTION — Elev: 343
	Fill
1	Topsoil, metal, plastic, garden hose, concrete, playground equipment.
2	
3	
4	**Vashon Lodgement Till**
5	Dense grading to very dense, moist, mottled gray grading to gray, silty, fine gravelly fine to coarse SAND; nonstratified (SM).
6	
7	
8	
9	
10	Bottom of exploration pit at depth 9 feet No seepage. No caving.
11	
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KCTP3 140565.GPJ November 3, 2014

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LOG OF EXPLORATION PIT NO. EP-15

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered. **DESCRIPTION** **Elev: 349**
	Fill
1	Fill thickness varies across pit limits (1 foot to 5 feet); exposed edge of fill pad (central fill), silt fence. Loose, very moist, brown, silty fine SAND, trace organics (SM).
2	
3	
4	
5	**Vashon Lodgement Till**
6	Bottom of exploration pit at depth 5.5 feet No seepage. No caving.
7	
8	
9	**NOTE: Abbreviated test pit for observation of fill depth only. No laboratory samples taken.**
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LOG OF EXPLORATION PIT NO. EP-16

Depth (ft)	DESCRIPTION — Elev: 351
	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	Fill
1	Fill thickness varies across pit limits (1 foot to 5 feet); exposed edge of fill pad (central fill), silt fence. Loose, very moist, brown, silty fine SAND, trace organics (SM).
2	
3	
4	
5	**Vashon Lodgement Till**
6	Bottom of exploration pit at depth 5.5 feet No seepage. No caving.
7	
8	
9	**NOTE: Abbreviated test pit for observation of fill depth only. No laboratory samples taken.**
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LOG OF EXPLORATION PIT NO. EP-17

Depth (ft)	DESCRIPTION — Elev: 354
	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	Fill
1	Topsoil, wood chips, drip irrigation parts.
2	**Vashon Lodgement Till**
3	Bottom of exploration pit at depth 2.5 feet No seepage. No caving.
4	
5	**NOTE: Abbreviated test pit for observation of fill depth only. No laboratory samples taken.**
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LOG OF EXPLORATION PIT NO. EP-18

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered. **DESCRIPTION** **Elev: 360**
	Fill
1	Plastic pots, topsoil, concrete, strapping.
2	**Vashon Lodgement Till**
3	Bottom of exploration pit at depth 2.5 feet No seepage. No caving.
4	
5	**NOTE: Abbreviated test pit for observation of fill depth only. No laboratory samples taken.**
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LOG OF EXPLORATION PIT NO. EP-19

Depth (ft)	DESCRIPTION
	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	Elev: 364
	Fill
	Topsoil, brick.
1	**Vashon Lodgement Till**
2	Bottom of exploration pit at depth 1 feet No seepage. No caving.
3	
4	
5	**NOTE: Abbreviated test pit for observation of fill depth only. No laboratory samples taken.**
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LOG OF EXPLORATION PIT NO. EP-20

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	DESCRIPTION — **Elev: 366**
	Vashon Lodgement Till
	NO FILL
1	Bottom of exploration pit at depth 0.5 feet No seepage. No caving.
2	
3	
4	
5	**NOTE: Abbreviated test pit for observation of fill depth only. No laboratory samples taken.**
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LOG OF EXPLORATION PIT NO. EP-21

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered. **DESCRIPTION** **Elev: 344**
	Fill
1	Loose, wet, gray, silty fine SAND, trace fine gravel, trace organics, trace building debris (rubble, metal) (SM).
	Fill depth tapers to 1 foot at west edge of exploration.
2	Loose, very moist, brown, silty fine SAND (SM).
3	
4	
5	**Vashon Lodgement Till**
6	Bottom of exploration pit at depth 5.5 feet No seepage. No caving.
7	
8	**NOTE: Abbreviated test pit for observation of fill depth only. No laboratory samples taken.**
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LOG OF EXPLORATION PIT NO. EP-22

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered. **DESCRIPTION** Elev: 346
	Fill
1	Loose, very moist, brown, silty fine SAND (SM). Fill depth tapers to 1 foot at north edge of exploration.
2	**Vashon Lodgement Till**
3	Bottom of exploration pit at depth 2.5 feet No seepage. No caving.
4	
5	**NOTE: Abbreviated test pit for observation of fill depth only. No laboratory samples taken.**
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LOG OF EXPLORATION PIT NO. EP-23

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered. **DESCRIPTION** Elev: 351
	Fill
1	Loose, very moist, brown, silty fine SAND (SM).
2	Loose, very moist, gray, silty fine SAND (SM).
3	Fill depth tapers to 1 foot at north edge of exploration.
4	**Vashon Lodgement Till**
5	Bottom of exploration pit at depth 4.5 feet No seepage. No caving.
6	
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8	**NOTE: Abbreviated test pit for observation of fill depth only. No laboratory samples taken.**
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LOG OF EXPLORATION PIT NO. EP-24

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered. **DESCRIPTION** **Elev: 355**
	Fill
1	Loose, very moist, brown, silty fine SAND, trace organics (SM).
2	
3	
4	
	Vashon Lodgement Till
5	
6	Bottom of exploration pit at depth 5 feet No seepage. No caving.
7	
8	**NOTE: Abbreviated test pit for observation of fill depth only. No laboratory samples taken.**
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LOG OF EXPLORATION PIT NO. EP-25

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	DESCRIPTION — **Elev: 355**
	Vashon Lodgement Till
1	NO FILL
	Bottom of exploration pit at depth 0.5 feet No seepage. No caving.
2	
3	
4	
5	**NOTE: Abbreviated test pit for observation of fill depth only. No laboratory samples taken.**
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LOG OF EXPLORATION PIT NO. EP-26

Depth (ft)	DESCRIPTION — Elev: 340
	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	Fill
1	Topsoil, plastic, vehicle and equipment parts, concrete.
	Vashon Lodgement Till
2	Bottom of exploration pit at depth 1.5 feet No seepage. No caving.
3	
4	
5	**NOTE: Abbreviated test pit for observation of fill depth only. No laboratory samples taken.**
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LOG OF EXPLORATION PIT NO. EP-27

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	DESCRIPTION — **Elev: 342**
	Fill
1	Topsoil, plastic, vehicle and equipment parts, concrete.
	Vashon Lodgement Till
2	Bottom of exploration pit at depth 1.5 feet No seepage. No caving.
3	
4	
5	**NOTE: Abbreviated test pit for observation of fill depth only. No laboratory samples taken.**
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LOG OF EXPLORATION PIT NO. EP-28

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered. **DESCRIPTION** **Elev: 344**
	Fill
1	Topsoil, plastic, vehicle and equipment parts, concrete.
	Vashon Lodgement Till
2	Bottom of exploration pit at depth 1.5 feet No seepage. No caving.
3	
4	
5	**NOTE: Abbreviated test pit for observation of fill depth only. No laboratory samples taken.**
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Radke Short Plat
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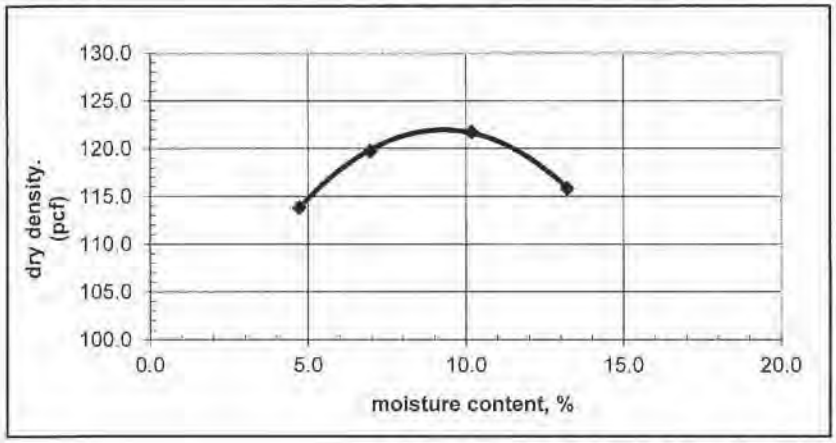
Associated Earth Sciences, Inc.

Proctor Analysis
ASTM D1557, D698

Date Sampled	Project	Project No.		Soil Description
10/24/2014	Radke Short Plat	KE140565A		Tannish brown silty sand
Tested By / **Collected By**	**Location**	**EB/EP No.**	**Depth**	
MS / BG	Onsite	EP-1	4.5'	

Percent passing 3/4" sieve:	98%	ASTM D1557 Method C	Automatic Tamper

A	Mold Number	1	2	3	4	Remarks
B	Water Added	field	wet	wet	wet	
C	Wt. of Wet Soil + Mold (lb)	21.305	21.965	22.415	22.190	
D	Wt. of Mold (lb)	12.430	12.430	12.430	12.430	
E	Wt. of Wet Soil (lb)	8.875	9.535	9.985	9.760	
F	Wet Density, (pcf)	119.209	128.074	134.119	131.096	
G	Wt. of Pan (lb)	0.605	0.610	0.675	0.620	
H	Wt. of Wet Soil + Pan (lb)	1.715	1.685	1.595	1.520	
J	Wt. of Dry Soil + Pan (lb)	1.665	1.615	1.510	1.415	
K	Wt. of Water (lb)	0.050	0.070	0.085	0.105	
M	Wt. of Dry Soil (lb)	1.060	1.005	0.835	0.795	
N	Moisture Content (%)	4.7	7.0	10.2	13.2	
O	Dry Density (pcf)	113.8	119.7	121.7	115.8	
Z	For a 6 inch mold: Z = 0.074449		For a 4" mold: Z = 0.0333			



Test Results:	
Optimum Moisture Percentage:	9.0
Maximum Dry Density:	122.0

Correction for oversize: ASTM D4718	
Corrected Moisture Percentage:	N/A
Corrected Maximum Dry Density	N/A

Assumed Specific Gravity: 2.7

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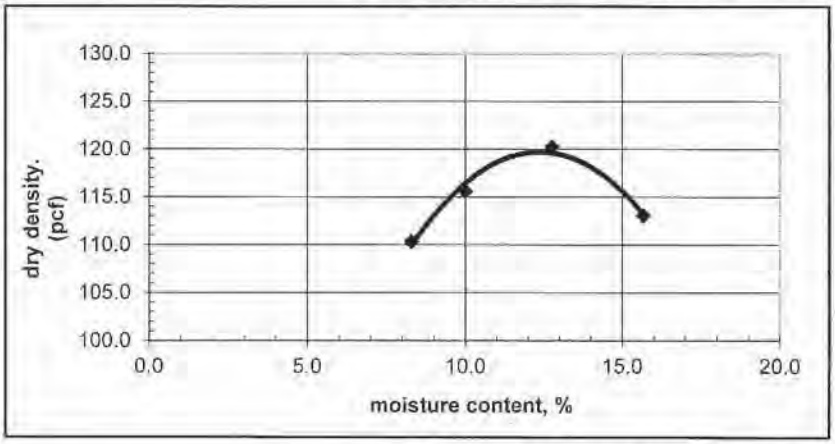
Proctor Analysis
ASTM D1557, D698

Date Sampled	Project	Project No.		Soil Description
10/24/2014	Radke Short Plat	KE140565A		Grey Sand
Tested By / **Collected By**	**Location**	**EB/EP No.**	**Depth**	
MS / BG	Onsite	EP-1	10'	

Percent passing 3/4" sieve:	99%	ASTM D1557 Method C	Automatic Tamper

A	Mold Number	1	2	3	4	Remarks
B	Water Added	field	dry	dry	dry	
C	Wt. of Wet Soil + Mold (lb)	22.165	22.525	21.895	21.325	
D	Wt. of Mold (lb)	12.430	12.430	12.430	12.430	
E	Wt. of Wet Soil (lb)	9.735	10.095	9.465	8.895	
F	Wet Density, (pcf)	130.761	135.596	127.134	119.478	
G	Wt. of Pan (lb)	0.660	0.670	0.660	0.660	
H	Wt. of Wet Soil + Pan (lb)	1.620	1.775	1.650	1.575	
J	Wt. of Dry Soil + Pan (lb)	1.490	1.650	1.560	1.505	
K	Wt. of Water (lb)	0.130	0.125	0.090	0.070	
M	Wt. of Dry Soil (lb)	0.830	0.980	0.900	0.845	
N	Moisture Content (%)	15.7	12.8	10.0	8.3	
O	Dry Density (pcf)	113.1	120.3	115.6	110.3	
Z	For a 6 inch mold: Z = 0.074449		For a 4" mold: Z = 0.0333			



Test Results:	
Optimum Moisture Percentage:	12.0
Maximum Dry Density:	120.0

Correction for oversize: ASTM D4718	
Corrected Moisture Percentage:	N/A
Corrected Maximum Dry Density	N/A

Assumed Specific Gravity: 2.7

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Moisture Content
ASTM D 2216

Date Sampled	Project	Project No.		Soil Description
10/27/2014	Radke Short Plat	KE140565A		
Tested By	**Location**	**EB/EP No.**	**Depth**	**Various**
MS	Onsite			

Sample ID	EP-1 3'	EP-1 5'	EP-1 6.5'	EP-2 5'	EP-2 10'	EP-3 3'
Wet Weight + Pan	334.7	355.3	338.2	333.0	517.2	330.3
Dry Weight + Pan	312.1	340.9	314.4	303.2	483.7	306.5
Weight of Pan	100.6	98.2	97.8	99.8	97.8	99.9
Weight of Moisture	22.6	14.4	23.8	29.8	33.5	23.9
Dry Weight of Soil	211.4	242.6	216.6	203.4	385.9	206.6
% Moisture	**10.7**	**5.9**	**11.0**	**14.6**	**8.7**	**11.6**

Sample ID	EP-3 7'	EP-5 3'	EP-5 8'	EP-6 3'	EP-6 8'	EP-7 6'
Wet Weight + Pan	303.8	377.8	355.9	370.7	320.8	313.8
Dry Weight + Pan	282.9	361.8	324.0	344.1	296.6	297.3
Weight of Pan	98.2	98.1	94.8	100.5	100.3	100.5
Weight of Moisture	20.9	16.1	31.9	26.6	24.3	16.4
Dry Weight of Soil	184.7	263.7	229.2	243.7	196.2	196.8
% Moisture	**11.3**	**6.1**	**13.9**	**10.9**	**12.4**	**8.4**

Sample ID	EP-7 8'	EP-8 3'	EP-8 8'	EP-9 3'	EP-9 8'	EP-10 3'
Wet Weight + Pan	337.8	357.3	309.3	373.8	362.9	405.7
Dry Weight + Pan	323.3	343.4	296.6	364.4	348.1	389.3
Weight of Pan	99.7	100.9	101.8	101.2	98.8	100.9
Weight of Moisture	14.5	13.9	12.7	9.4	14.8	16.4
Dry Weight of Soil	223.6	242.5	194.8	263.2	249.2	288.4
% Moisture	**6.5**	**5.7**	**6.5**	**3.6**	**5.9**	**5.7**

Sample ID	EP-10 7'	EP-14 4.5'	EP-14 9'
Wet Weight + Pan	301.0	328.0	318.7
Dry Weight + Pan	291.5	314.1	303.6
Weight of Pan	101.2	101.5	97.6
Weight of Moisture	9.5	13.9	15.1
Dry Weight of Soil	190.3	212.6	206.0
% Moisture	**5.0**	**6.5**	**7.3**

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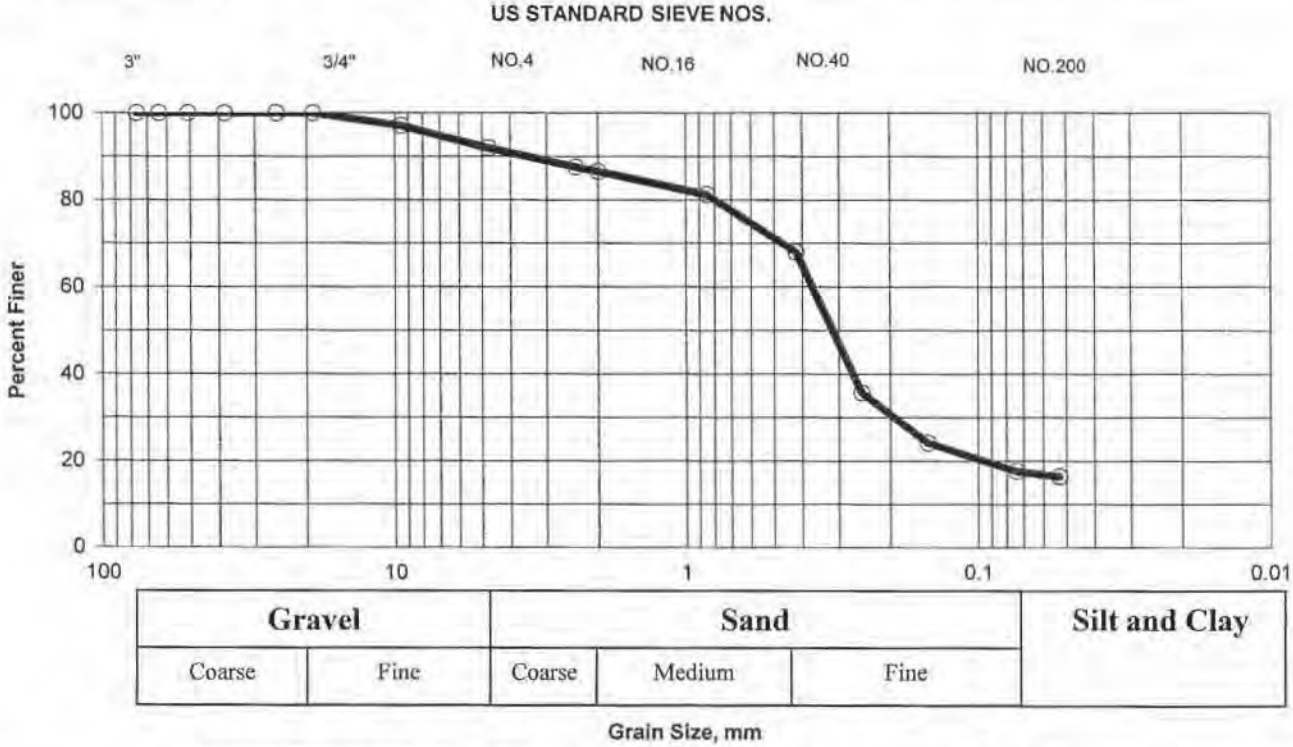
GRAIN SIZE ANALYSIS - MECHANICAL

Date Sampled	Project	Project No.		Soil Description
10/24/2014	**Radke Short Plat**	**KE140565A**		**Sand little silt few gravel**
Tested By	Location	EB/EP No	Depth	
MS	**Onsite**	**EP-1**	**4.5'**	

Wt. of moisture wet sample + Tare	1.715	Total Sample Tare	453.1
Wt. of moisture dry Sample + Tare	1.665	Total Sample wt + tare	1536.42
Wt. of Tare	0.605	Total Sample Wt	1083.3
Wt. of moisture Dry Sample	1.06	Total Sample Dry Wt	1034.5
Moisture %	5%		

					Specification Requirements	
Sieve No.	Diam. (mm)	Wt. Retained (g)	% Retained	% Passing	Minimum	Maximum
3	76.1		0.0	100.0	-	-
2.5	64		0.0	100.0	-	-
2	50.8		0.0	100.0	-	-
1.5	38.1		0.0	100.0	-	-
1	25.4		0.0	100.0	-	-
3/4	19		0.0	100.0		
3/8	9.51	30.59	3.0	97.0		
#4	4.76	84.08	8.1	91.9		
#8	2.38	128.53	12.4	87.6		
#10	2	139.16	13.5	86.5		
#20	0.85	194.54	18.8	81.2		
#40	0.42	331.7	32.1	67.9		
#60	0.25	665.22	64.3	35.7		
#100	0.149	783.95	75.8	24.2		
#200	0.074	852.1	82.4	17.6		
#270	0.053	864.26	83.5	16.5		



ASSOCIATED EARTH SCIENCES, INC.

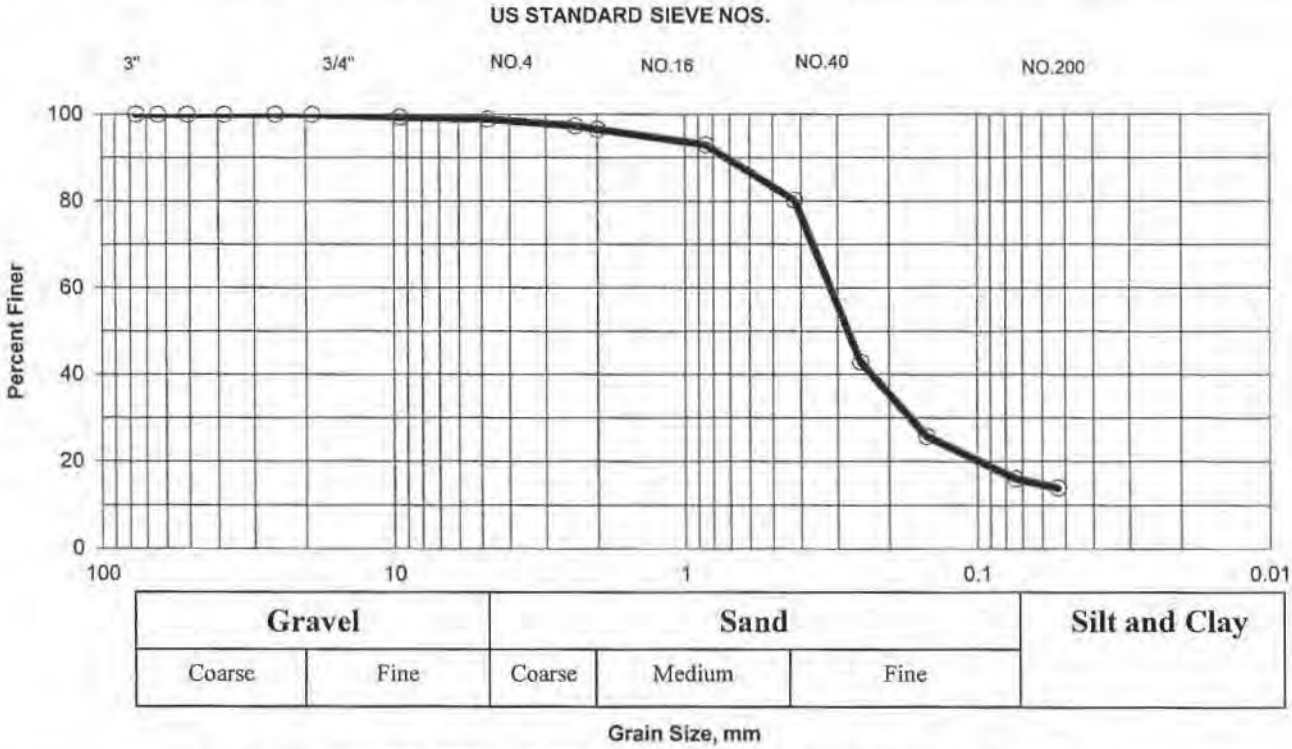
911 5th Ave., Suite 100 Kirkland, WA 98033 425-827-7701 FAX 425-827-5424

GRAIN SIZE ANALYSIS - MECHANICAL

Date Sampled	Project	Project No.		Soil Description
10/24/2014	**Radke Short Plat**	**KE140565A**		**Sand few silt trace gravel**
Tested By	Location	EB/EP No	Depth	
MS	**Onsite**	**EP-1**	**10'**	

Wt. of moisture wet sample + Tare	1.62	Total Sample Tare	309.85
Wt. of moisture dry Sample + Tare	1.49	Total Sample wt + tare	1252.07
Wt. of Tare	0.66	Total Sample Wt	942.2
Wt. of moisture Dry Sample	0.83	Total Sample Dry Wt	814.6
Moisture %	16%		

					Specification Requirements	
Sieve No.	Diam. (mm)	Wt. Retained (g)	% Retained	% Passing	Minimum	Maximum
3	76.1		0.0	100.0	-	-
2.5	64		0.0	100.0	-	-
2	50.8		0.0	100.0	-	-
1.5	38.1		0.0	100.0	-	-
1	25.4		0.0	100.0	-	-
3/4	19		0.0	100.0		
3/8	9.51	5.17	0.6	99.4		
#4	4.76	8.82	1.1	98.9		
#8	2.38	21.59	2.7	97.3		
#10	2	28.03	3.4	96.6		
#20	0.85	57.35	7.0	93.0		
#40	0.42	161.25	19.8	80.2		
#60	0.25	465.13	57.1	42.9		
#100	0.149	604.67	74.2	25.8		
#200	0.074	684.07	84.0	16.0		
#270	0.053	701.85	86.2	13.8		



ASSOCIATED EARTH SCIENCES, INC.

911 5th Ave., Suite 100 Kirkland, WA 98033 425-827-7701 FAX 425-827-5424

SENSITIVE AREAS DETERMINATION FOR

Toll WA, LP – RADKE PROPERTY

Tax Parcel Nos. 384070-0755, 384070-0758, & 384070-0685

Acre Project #14044

Prepared By:

Acre Environmental Consulting, LLC.
17715 28th Ave. NE
Lake Forest Park, WA 98155
(206) 450-7746

For:

Toll WA, LP
9720 NE 120th Place, Suite 100
Kirkland, WA 98034

October 2, 2014

SITE DESCRIPTION

On October 1, 2014 *Acre Environmental Consulting, LLC* visited the approximate 3.53-acre site (3 parcels) located at 12432 Juanita Drive NE in the City of Kirkland, Washington. The site is further located as a portion of Section 25, Township 26N, Range 4E, W.M. The parcel numbers for this property are 384070-0755, 384070-0758, and 384070-0685. The subject site is located within the Champagne Creek Basin, which is designated as a primary basin in the City of Kirkland. The purpose of this site visit was to locate and assess regulated sensitive areas on and adjacent to the subject site. Surrounding land use is comprised of single-family residential development. There are no wetlands or streams located on or adjacent to the subject site.

The methods used for assessing wetlands in the project area are consistent with current Federal, State, and City of Kirkland requirements. *Acre Environmental Consulting, LLC* used the routine methodologies described in the U.S. Army Corps of Engineers Wetland Delineation Manual produced in 1987 and the U.S. Army Corps of Engineers Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region produced in May 2010 to make a determination regarding wetland conditions.

Access to this site can currently be gained from the west via Juanita Drive NE or from the south via NE 125th Street. Two of the subject parcels contain single family residences with associated lawn adjacent to the homes. The remainder of the site is occupied by established forest with a patch of Himalayan blackberry (*Rubus armeniacus*, FacU) in the southwestern portion. Typical vegetation in the forest is represented by a canopy of Douglas fir (*Pseudotsuga menziesii,* FacU), big leaf maple (*Acer macrophyllum*, FacU), Pacific Madrone (*Arbutus menziesii*, Nol/Upl), black cottonwood (*Populus balsamifera*, Fac), with hazelnut (*Corylus cornuta*, FacU), osoberry (*Oemleria cerasiformis,* FacU), Oceanspray (*Holodiscus discolor*, FacU), Himalayan blackberry (*Rubus armeniacus*, FacU), Salal (*Gaultheria shallon*, FacU), Oregon grape (*Berberis nervosa*, FacU), sword fern (*Polystichum munitum,* FacU), English ivy (*Hedera helix*, Nol/Upl), and dewberry (*Rubus ursinus*, FacU), all present in the understory. Typical soils across the subject site have a Munsell color of very dark greyish brown (10YR 3/2), with a texture of gravelly sandy loam from 0 to 18 inches below the surface.

No wetlands or streams are located on the subject site. One area of concern located in the center of the northern parcel was assessed and determined not to be wetland. This is an area of fill material that based on aerial photographs from Google Earth, appears to have been placed in 2002. Vegetation on this fill material is comprised of mowed lawn represented by recently sprouted red alder (*Alnus rubra*, Fac) with colonial bentgrass (*Agrostis tenuis*, Fac), creeping buttercup (*Ranunculus repens,* Fac), English plantain (*Plantago lanceolata*, FacU), hairy Cat's-ear (*Hypochaeris radicata*, FacU), white clover (*Trifolium repens,* Fac), and soft rush (*Juncus effusus*, FacW). Soils in this area have a Munsell color of gray (2.5Y 5/1) with redoximorphic features of light olive brown (2.5Y 5/6), and a texture of fine sandy loam from 0 to 18 inches below the surface. Soils in this area were slightly moist during out October 1, 2014 site assessment.

At first glance the area of concern appears to meet the criteria for hydric soils and hydrophytic vegetation. However, because this is imported fill material, it formed in a different location under different conditions that those present on the subject site. The hydric soil characteristics are remnant

features from the site where the soil formed and do not reflect conditions on the subject site. It appears that the hydrophytic vegetation is resultant from the placement of fill material and the ongoing mowing. Based on the history of disturbance in this area and the absence of saturated soils, it appears that the vegetation and soil conditions encountered are a result of disturbance and are not due to the presence of wetland conditions on the subject site. As a result, it is the professional opinion of *Acre Environmental Consulting, LLC* that the area of concern does not meet the definition of a jurisdictional wetland.

TERMS & CONDITIONS

The environmental consulting work conducted, including this Sensitive Areas Determination (collectively the "Services") is supplied to Toll WA, LP (the "Client") as a means of determining whether any wetlands, streams, and/or fish and wildlife habitats regulated by the City of Kirkland Sensitive Areas Regulations exist on, or adjacent to the site. The Services are provided in accordance with the following General Terms and Conditions (the "Terms"). In accepting the Services provided by *Acre Environmental Consulting*, LLC ("Acre"), the Client voluntarily enters into and agrees to the binding effect of the following Terms.

This report is intended to provide information deemed relevant in the Client's attempt to comply with the regulations currently in effect. The work for this report has conformed to the standard of care employed by professional ecologists in the Pacific Northwest. All other representations or warranties, whether express or implied, are hereby disclaimed concerning the work or this report. This report is based largely on readily observable conditions and, to a lesser extent, on readily ascertainable conditions. No attempt has been made to determine hidden or concealed conditions. If such conditions exist or arise, the information contained in this report may be rendered inaccurate or incomplete based upon those conditions. Acre acts solely as an independent contractor in providing the Services to the Client, and nothing in the provision of such Services shall be construed as creating an agency, partnership, joint venture or other similar legal relationship between Acre and the Client.

Please note that Acre did not provide detailed analyses of other permitting requirements not discussed in this report (i.e., structural, drainage, geotechnical, or engineering requirements).

The laws applicable to Critical Areas are subject to varying interpretations. While Acre observed professional industry standards when completing this review, the information included in this report does not guarantee approval by any federal, state, and/or local permitting agencies. Therefore, all work on this property should not commence until permits have been obtained from all applicable agencies. If there are any questions regarding this report, please contact me at 206.450.7746.

Acre Environmental Consulting, LLC.

Louis Emenhiser
Principal Wetland Ecologist
Professional Wetland Scientist #1680

From: Lynne Pearson <lymp62@hotmail.com>
Sent: Wednesday, May 13, 2015 5:03 PM
To: Susan Lauinger
Subject: Permit number SUB15-00615

Dear Ms. Lauinger,

I am writing in regards to the proposed Radke Subdivision.
My family lives at 8013 NE 125th Street. Our road will be the access road for the subdivision. We would like you to consider the following:
Install a traffic circle at the intersection of 80th Avenue and NE 125th Street to slow down traffic.
Create an entrance to the subdivision off of Juanita Drive for construction vehicles. We are concerned that the young children who play in our neighbourhood will be endangered by the construction traffic. The access off of Juanita Drive would only need to be open during construction.

Thanks so much,
Lynne Pearson
8013 NE 125th Street
Kirkland Wa 98034
lymp62@hotmail.com

"You can never get a cup of tea large enough or a book long enough to suit me."
— C.S. Lewis

From: Erika Pierson <epmcello@gmail.com>
Sent: Friday, May 15, 2015 11:40 AM
To: Susan Lauinger
Subject: Permit #SUB15-00615

Dear Ms. Lauinger,

I am writing to express my concern about the proposed 20 parcel development near the Shell station on Juanita Drive. It is truly heartbreaking, watching lot after lot of old trees being torn down, and being filled with new houses, all squashed together. Finn Hill is a place of natural beauty, which has been a main attraction for most people who have settled here. To approve this development will bring an unwelcome change to the natural beauty of Juanita Drive.

As a parent, another concern I have is the recent LWSD boundary changes because of our over-crowded Sandburg Elementary School. In the Fall, we will be saying goodbye to several of our friends, who have been moved to other schools, due to these boundary changes. A new 20 house development, along with all of the other developing going on on our hill will fill the school right back up again.

Please reconsider this disruptive plan.

Thank you.

Sincerely,

Erika Pierson
11748 82nd Ave NE
Kirkland, WA 98034

From: Joelle Brown <joeller33@comcast.net>
Sent: Saturday, May 16, 2015 6:03 PM
To: Susan Lauinger
Subject: Radke Subdivision SUB15-00615

Susan Lauinger,

It has come to my attention, through the Finn Hill Neighborhood Alliance meeting and casual conversations, that the wooded property referenced above has been sold to builders intending to clear-cut the property and build 20 houses, under "best use" practices.

Here are my objections:

Finn Hill has been known for its wooded areas. In the past two to three years, I have seen one property after another sold and denuded. Trees that have been growing for over fifty years, cut down in a morning. This isn't something we can just change our minds about tomorrow. This is permanent.

My 8-year-old daughter has just been traumatically kicked out of the elementary school she has been going to, despite the fact that we live five blocks from the school. Three years of making friends and developing a sense of self, and now she must start over. The Lake Washington School District is playing catch-up with the current population density in the area, and this proposal means twenty future houses built within the boundary that we were just moved out of.

At first, I thought I was alone in my despair, thinking that I must be over-reacting; after all, I live in a subdivision too (built in 1964). However, after talking to my neighbors, I have some perspective and the current rate of development seems out of control. I propose a moratorium on land sales and (over)development until a cohesive neighborhood plan has been created and submitted to the city of Kirkland. In this instance, I beg you to consider the character of the neighborhood before allowing another treeless, cookie-cutter subdivision to be a permanent reminder of our failure to maintain a livable community.

Respectfully,
Joelle Brown
8516 NE 136th St
Kirkland WA 98034

From: Andrea Thompson <dudleythompson@gmail.com>
Sent: Monday, May 18, 2015 6:38 AM
To: Susan Lauinger
Subject: Fwd: Permit Number SUB15-00615

---------- Forwarded message ----------
From: **Andrea Thompson** <dudleythompson@gmail.com>
Date: Sunday, May 17, 2015
Subject: Permit Number SUB15-00615
To: slauinger@kirkland.wa.gov

Hi Susan
I am writing to you to submit my comment and objections to the development project above. I was in attendance at the Finn Hill Neighborhood association meeting several months ago, where the Toll Brothers came to talk about this project and present their plans for Kirkland. I was shocked at the news of this huge development in this quiet and green neighborhood. I am begging the city to reconsider approving this project in its current state. Please reconsider and lower the number of houses being approved for this project. Twenty homes going in where once stood one seems excessive, and a bit absurd. I understand the need for new homes in the urban growth areas, but this is too much. This sort of development takes away from Kirkland and from Finn Hill. I recall the developer being proud that they would be preserving four trees on the lot where now dozens stand. Four. Is this really what the future of Kirkland will look like? Is this what city planners have in mind for our "tree city"?

In addition these huge developments have a greater impact on more than just the environment. Lake Washington School District just competed rebuilding the school in that area, Carl Sandburg Elementary, in 2012. This school, in two short years, has already become over crowded and boundary adjustment had to be made. 20+ families are going to be moved out in the Fall of 2015. I have been told that the city works with the school district on these sorts of plans, but when the district is only allowed to build buildings based on current enrollment, this is a problem when huge projects like this come up.The school is done now - what comes next? I'm sure that this development was not on the radar of LWSD at the time of the plans for the new Carl Sandburg. The school will now be full again if these sort of mammoth developments are allowed to continue. You just can not continue to tear down one house and replace it with 8, 9 or 10 homes, especially when the former house probably contained elderly people with children no longer in attendance at the neighborhood schools. The numbers don't add up. There needs to be measure and sensible growth. Inheriting these problems from the unincorporated areas of Kind County is also no excuse. Kirkland needs to be smart about its growth and be proactive.

I would like to ask the planning commission to please reconsider this application and to make an adjustment for fewer houses. Ten homes with actual backyards would be more inline with the feel of the Finn Hill neighborhood. Not twenty homes crammed together like what is happening in neighboring Bothell. Kirkland prides itself on being a great place to live - but when

contractors are allowed to come in and maximize their profits over the benefits of the community and current residents, this in not the Kirkland that we all thought that we were buying into.

Please consider this project more carefully. Don't let contractor greed change the face of Kirkland forever. Keep Kirkland Green!
Thank you for your time and consideration.
Andrea Thompson

May 28, 2015

City of Kirkland
Planning and Community Development Department
123 5th Avenue
Kirkland, WA 98033

Attention: Susan Lauinger

Via: email: slauinger@kirkland wa.gov

Subject: RADKE Subdivision Vacant Parcel #3840700758
12432 Juanita Drive NE, 7922 NE 125th Street

Reference: Case Number: SUB15-00615

Dear Susan:

I am submitting this letter as formal written comments regarding the Radke Subdivision, reference Case Number SUB15-00615.

I have reviewed the Finn Hill Neighborhood Alliance Surface Water Plan dated November 2014. My comments are detailed below.

Concerns:

- ✓ Mitigation of surface water runoff (drainage).
- ✓ It appears block 13 RSA 8 is zoned for ***low density single family residential*** (not high density) yet the contractor is proposing to construct 20 family homes on little more than 3.3 acres of land.

Questions:

- o Please describe what the City of Kirkland considers to be a valid VAULT for storm water drainage, "definition", e.g. Will the vault in question be completely under-ground and not visible on the surface?
- o The existing Parcel #3840700758 is a heavily wooded area with some old growth trees and many that are in excess of 100 feet tall. How many existing trees will be left on this parcel?
- o How noisy will the runoff into the vault be?

Request:

- ✓ Please provide the Hearing Examiner's contact data for appeal purposes, as needed.
- ✓ Confirmation from the City of Kirkland that the cul-de-sac on 125th Street NE will remain a NON through street to Juanita Drive NE.
- ✓ Visually, my front door will look at the proposed drainage area. I respectfully request NO chain-linked fence surrounding the proposed location of the drainage vault. If the vault needs to be fenced in, I respectfully request a Cedar or Redwood 6' wooden fence.
- ✓ I respectfully request the contractor leave a percentage of the existing trees in place.
- ✓ I respectfully request the City of Kirkland provides direction to the contractor that they plant hedges and shrubbery around the vault containment area. If the vault is completely underground, possibly hydro-seed or sod the surface.

Regards,

Daniel Freyling

7835 NE 125th Street
Kirkland, WA 98034
dlfreyling@comcast.net

Susan Lauinger

From: Lisbeth Clausen <karenlisbeth@frontier.com>
Sent: Tuesday, May 26, 2015 6:19 PM
To: Susan Lauinger
Subject: Radke subdivision on Finn Hill case No. SUB15-00615

City of Kirkland
Planning Development Department

Radke Subdivision on Finn Hill
case No. SUB15-00615

May 26, 2015

To Project Planner Ms. Susan Lauinger

On March 25, we attended a presentation by Radke-Toll Brothers at FHMS. Thanks for the recent "blue" notice and for giving us an opportunity to comment on the proposed new Radke-Toll subdivision on Finn Hill.

Traffic from the 20 new homes is a big concern for us. Vehicles, to/from the development, can only go through our narrow neighborhood streets. We are worried about daily car noise, speed, pollution and the effect it will have on our neighborhood. As you, of course, know, there will be no "enter/exit" to Juanita Drive.

Few sidewalks, school kids, pedestrians, wear & tear of street surfaces and noise are something the Planning Department hopefully will consider before making a recommendation on the Radke-Toll application.

How will emergency and utility vehicles make it in/out of those 2 small side streets, which are proposed by Radke-Toll Brothers?

How will construction noise be controlled? We understand there is a "code" indicating, which days and hours are allowed for construction. Please, inform us of the "rules" and a phone number, if "rules" are broken.

Thanks for reading our comments and questions.

Sincerely,

Dana and Lisbeth Clausen
7860 NE 124th Street
Kirkland, WA 98034

425 823 9760

karenlisbeth@frontier.com

-----Original Message-----
> From: Nancy McKenzie [mailto:ngm1949@gmail.com]
> Sent: Monday, May 18, 2015 5:30 PM
> To: Planning Commissioners
> Subject: Juanita drive
>
> I would like to know the thinking of the city of Kirkland planning department regarding yet another proposed 20-lot subdivision off of Juanita drive. Have any of you driven Juanita drive during rush hour either am or pm?
>
> Last Tuesday I left my house around 8:30am & I couldn't even go 3/4 of a mile due to the traffic backed up to Juanita beach. When I turned around at the 3/4 mile to go back home the traffic was backed up to plaza Garcia restaurant. It took me 15 minutes to go .10 of a mile so I could go home.
> Sent from my iPad
> Nancy McKenzie
My address is 11945 - 80th Pl. NE. And, as I stated in my earlier email, the traffic, during rush hour, on Juanita drive is bad. I am opposed to this new subdivision of a 20-lot parcel.

Sent from my iPad
Nancy McKenzie

Susan Lauinger

From: Mark <blueridger123@gmail.com>
Sent: Sunday, May 31, 2015 11:22 PM
To: Susan Lauinger
Subject: permit number SUB15 - 00615 .

Hi Susan,

As a homeowner in the vicinity of this proposed project I'd like to ask that the traffic from that new development be directed towards Juanita Drive which is an arterial, as opposed to funneling through our residential streets.

Thanks,
Mark Moorehead
8055 NE 124th Street
Kirkland, WA 98034
blueridger123@gmail.com

CITY OF KIRKLAND
Department of Public Works
123 Fifth Avenue, Kirkland, WA 98033 425.587.3800
www.kirklandwa.gov

MEMORANDUM

To: Susan Lauinger, Planner

From: Rob Jammerman, Development Engineering Manager

Date: June 10, 2015

Subject: Radke Subdivision, File No SUB15-00615 - Response to Public Comments

The Public Works Department has reviewed the public comments letters related the above project and would like to offer the following:

1. **Comments related to traffic impacts**: The Transportation Engineer has provided a separate memorandum regarding transportation issues.

2. **Comments related to construction traffic access**: A condition has been added to the project requiring primary construction access to be taken from Juanita Drive. There will be elements of work and different phases of construction that will require access from the east through the neighborhood.

3. **Comments related to street widths in the subdivisions**: The streets widths meet the City of Kirkland standards as identified in Kirkland Zoning Code Chapter 110. These street widths allow for emergency and utility vehicle access.

4. **Comments related to the storm water vault and storm water mitigation**:
   - The project is required to meet the 2009 King County Surface Water Design Manual. When the project is completed, a large underground vault will be installed at the southwest corner of the site in a tract. The vault is design to contain the storm water and release it slowly into the existing public system to mitigate any downstream impacts.
   - There should be no noise generated by the storm water running in to the vault.
   - Tract B (which contains the underground vault) will be improved with landscaping. The Homeowners Association will be required to maintain the landscaping and the City will maintain the vault.
   - Under the current plan, no fencing is required around the vault or around Tract B.

ENVIRONMENTAL
ASSOCIATES, INC.

1380 - 112th Avenue Northeast, Suite 300
Bellevue, Washington 98004
(425) 455-9025 Office
(888) 453-5394 Toll Free
(425) 455-2316 Fax

October 28, 2014 JN-34170

Mr. Hans Christiansen
Toll Brothers
9720 Northeast 120th Place #100
Kirkland, Washington 98034

Subject: **ADDENDUM: PHASE I ENVIRONMENTAL ASSESSMENT**
Radke Property
12432 Juanita Drive Northeast
Kirkland, Washington 98034

On October 27, 2014, Environmental Associates, Inc., (EAI) presented the findings of a "Phase 1 Environmental Site Assessment" to Toll Brothers for the above referenced property (JN 34170). During our research of the property, the property owner (Mr. Radke) advised that approximately 1,451 yards of fill soils originating from an off-site gas station were brought to the subject and used for fill along the main driveway as well as in an area south of the driveway as depicted on the attached Sampling Area map, Plate 1. This addendum addresses the sampling and laboratory testing of fill soils and deeper native soils collected from test pits within the "teardrop" drive area as well as immediately south of the driveway (as shown on the attached map).

On October 24, 2014, staff from EAI arrived on-site to observed the excavation of two (2) test pits designated TP-1 and TP-2 in areas mapped as having historically received the uncharacterized fill. During the excavation of TP-1, we observed approximately 2 feet of fill materials resting upon native grey, hard sandy material with large cobbles (till) with organic (wood) which extended to the base of the pit at a depth of seven (7) feet below ground surface (bgs). In TP-2, we observed approximately 3 feet of fill materials overlying native dark brown silty materials with organic (wood) debris) which also extended to the base of the pit at a depth of 7 feet bgs. Photos depicting the test pits are attached to this addendum.

Soil samples were collected from each of the fill zones (2 feet bgs at TP-1 and 2.5 feet bgs at TP-2) as well as within native materials (7 feet bgs at TP-1 and 5.5 feet bgs at TP-2). During sampling activities, soils were field screened at each sampling interval with a portable photoionization detector (PID) to assess for soil vapors emanating from those depths. No organic vapors were detected on the PID. Soil samples were transferred directly to sterilized laboratory prepared glassware which were then stored in an iced chest maintained at approximately 4 degrees centigrade at the site and taken to the laboratory in this condition in an effort to preserve sample integrity. Each sample container was clearly labeled as to test pit and sample number/depth, date, time, project, etc. EPA-recommended sample-management protocol was observed at each stage of the project.

Laboratory analysis of soil samples was conducted by Friedman and Bruya, Seattle, Washington, a WDOE-accredited analytical laboratory. Soil samples were submitted for analysis of gasoline, heavy oil, and diesel range petroleum hydrocarbons, as well as gasoline constituents including benzene, toluene, ethylbenzene, and xylenes (BTEX) along with chlorinated volatile organic compounds (VOCs) and lead. The laboratory results are depicted in the following tables.

TABLE 1
Soil Testing Results - NWTPH-G/Dx/BTEX
All results and limits in parts per million (ppm)

Sample Name and depth below ground surface	Gas	Diesel	Heavy Oil	Benzene	Toluene	Ethylbenzene	Xylenes
TP-1-Top @ 2' bgs	<2	<50	<250	<0.02	<0.02	<0.02	<0.06
TP-1-Bottom @ 7'bgs	<2	<50	<250	<0.02	<0.02	<0.02	<0.06
TP-2-Top @ 2.5' bgs	<2	<50	<250	<0.02	<0.02	<0.02	<0.06
TP-2-Bottom @ 5.5' bgs	<2	<50	<250	<0.02	<0.02	<0.02	<0.06
Laboratory Detection Limit	2	50	250	0.02	0.02	0.02	0.06
Cleanup Level[1]	30 or 100	2,000	2,000	0.03	7	6	9

NOTES: 1 - Method A soil cleanup levels as offered in the Model Toxics Control Act (MTCA), Chapter 173-340-740 WAC.

TABLE 2
Soil Testing Results - Select Chlorinated Solvents
All results and limits in parts per million (ppm)

Sample Name and depth below ground surface	Tetrachloroethene (PCE)	Trichloroethene (TCE)	cis-1,2-Dichloroethene	Vinyl Chloride
TP-1-Top @ 2' bgs	<0.025	<0.02	<0.05	<0.05
TP-1-Bottom @ 7'bgs	<0.025	<0.02	<0.05	<0.05
TP-2-Top @ 2.5' bgs	<0.025	<0.02	<0.05	<0.05
TP-2-Bottom @ 5.5' bgs	<0.025	<0.02	<0.05	<0.05
Laboratory Detection Limit	0.025	0.02	0.05	0.05
Cleanup Level[1]	0.05 (A)	0.03 (A)	160 (B)	240 (B)

NOTES: 1 - Method (A) or (B) soil cleanup levels as offered in the Model Toxics Control Act (MTCA), Chapter 173-340-740 WAC.

TABLE 3 Soil Testing Results - Lead All results and limits in parts per million (ppm)	
Sample Name and depth below ground surface	**Lead**
TP-1-Top @ 2' bgs	11.90
TP-1-Bottom @ 7'bgs	5.98
TP-2-Top @ 2.5' bgs	1.58
TP-2-Bottom @ 5.5' bgs	5.58
Laboratory Detection Limit	1
Cleanup Level[1]	250
NOTES: 1 - Method A soil cleanup levels as offered in the Model Toxics Control Act (MTCA), Chapter 173-340-740 WAC.	

As shown in the tables above, no detections of petroleum, BTEX constituents, or chlorinated solvents were reported above the minimum laboratory detection limits. Lead was detected in each of the samples however the concentration reported are well below the current MTCA Method A cleanup levels for that metal. Based upon the results of the laboratory analysis, the previously uncharacterized fill does not appear to have impacted subsurface soils at the locations and depths tested.

Limitations:

This addendum has been prepared for the exclusive use Toll Brothers for specific application to this site. Our work for this project was conducted in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area. The findings and conclusions of this study are based upon the results of laboratory testing of selected samples obtained from separated test pit localities and conditions may vary between those locations or at other locations, media, or depths. No other warranty, expressed or implied, is made. If new information is developed in future site work which may include excavations, borings, studies, etc., Environmental Associates, Inc., must be retained to reevaluate the conclusions of this report and to provide amendments as required.

We appreciate the opportunity to be of service in providing this hopefully useful addendum. If you have any questions or if we may be of additional service, please do not hesitate to contact us.

Respectfully submitted,
ENVIRONMENTAL ASSOCIATES, INC.

Garrett J. Scheuerman
Environmental Geologist / Project Manager

Eric Zuern
Environmental Geologist

Don W. Spencer, M.Sc., P.G., R.E.A.
Principal

State of Washington
Hydrogeologist
604
Licensed Geologist
DON W. SPENCER

EPA-Certified Asbestos Inspector/Management Planner
I.D. # AM 48151

EPA/HUD Certified Lead Inspector (Licensed)

Registered Site Assessor/Licensed UST Supervisor
State Certification #0878545-U7

License: 604	(Washington)
License: 11464	(Oregon)
License: 876	(California)
License: 5195	(Illinois)
License: 0327	(Mississippi)

Approximate Parcel Boundaries

Approximate Extent of Fill Soils

Approximate Location of EAI's Test Pits for Soil Sampling

N

ENVIRONMENTAL ASSOCIATES, INC.

1380 - 112th Avenue N.E., Ste. 300
Bellevue, Washington 98004

SAMPLING AREA

Radke Property
12432 Juanita Drive Northeast
Kirkland, Washington 98034

Job Number:	Date:		Plate:
JN-34170	October 2014		1

Test Pit #1 being dug

Soil profile of Test pit #1

Bottom of Test Pit #1 (with organic debris)

Profile of Test Pit #2

Test Pit #1 after being filled in

Test Pit #2 after being filled in

ENVIRONMENTAL ASSOCIATES, INC.
1380 - 112th Avenue N.E., Ste. 300
Bellevue, Washington 98004

SITE PHOTOS

Radke Property
12432 Juanita Drive Northeast
Kirkland, Washington 98034

Job Number:	Date:		Plate:
JN-34170	October 2014		2

DRAFT

Date of Report: 10/27/14
Date Received: 10/24/14
Project: JN 34170, F&BI 410469
Date Extracted: 10/27/14
Date Analyzed: 10/27/14

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
TP-1-Bottom 410469-01	<0.02	<0.02	<0.02	<0.06	<2	108
TP-1-Top 410469-02	<0.02	<0.02	<0.02	<0.06	<2	109
TP-2-Top 410469-03	<0.02	<0.02	<0.02	<0.06	<2	96
TP-2-Bottom 410469-04	<0.02	<0.02	<0.02	<0.06	<2	109

Date of Report: 10/27/14
Date Received: 10/24/14
Project: JN 34170, F&BI 410469
Date Extracted: 10/24/14
Date Analyzed: 10/27/14

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 56-165)
TP-1-Bottom 410469-01	<50	<250	95
TP-1-Top 410469-02	<50	<250	94
TP-2-Top 410469-03	<50	<250	94
TP-2-Bottom 410469-04	<50	<250	93
Method Blank 04-2178 MB	<50	<250	92

Analysis For Total Metals By EPA Method 200.8

Client ID:	TP-1-Bottom	Client:	Environmental Associates
Date Received:	10/24/14	Project:	JN 34170, F&BI 410469
Date Extracted:	10/27/14	Lab ID:	410469-01
Date Analyzed:	10/27/14	Data File:	410469-01.035
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm) Dry Weight	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	91	60	125

Analyte:	Concentration mg/kg (ppm)
Lead	5.98

Analysis For Total Metals By EPA Method 200.8

Client ID:	TP-1-Top	Client:	Environmental Associates
Date Received:	10/24/14	Project:	JN 34170, F&BI 410469
Date Extracted:	10/27/14	Lab ID:	410469-02
Date Analyzed:	10/27/14	Data File:	410469-02.036
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm) Dry Weight	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	93	60	125

Analyte:	Concentration mg/kg (ppm)
Lead	11.9

Analysis For Total Metals By EPA Method 200.8

Client ID:	TP-2-Top	Client:	Environmental Associates
Date Received:	10/24/14	Project:	JN 34170, F&BI 410469
Date Extracted:	10/27/14	Lab ID:	410469-03
Date Analyzed:	10/27/14	Data File:	410469-03.037
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm) Dry Weight	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	93	60	125

Analyte:	Concentration mg/kg (ppm)
Lead	1.58

Analysis For Total Metals By EPA Method 200.8

Client ID:	TP-2-Bottom	Client:	Environmental Associates
Date Received:	10/24/14	Project:	JN 34170, F&BI 410469
Date Extracted:	10/27/14	Lab ID:	410469-04
Date Analyzed:	10/27/14	Data File:	410469-04.038
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm) Dry Weight	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	94	60	125

Analyte:	Concentration mg/kg (ppm)
Lead	5.58

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Environmental Associates
Date Received:	NA	Project:	JN 34170, F&BI 410469
Date Extracted:	10/27/14	Lab ID:	I4-674 mb
Date Analyzed:	10/27/14	Data File:	I4-674 mb.029
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm) Dry Weight	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	95	60	125

Analyte:	Concentration mg/kg (ppm)
Lead	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	TP-1-Bottom	Client:	Environmental Associates
Date Received:	10/24/14	Project:	JN 34170, F&BI 410469
Date Extracted:	10/24/14	Lab ID:	410469-01
Date Analyzed:	10/24/14	Data File:	102417.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	62	142
Toluene-d8	96	51	121
4-Bromofluorobenzene	93	32	146

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	TP-1-Top	Client:	Environmental Associates
Date Received:	10/24/14	Project:	JN 34170, F&BI 410469
Date Extracted:	10/24/14	Lab ID:	410469-02
Date Analyzed:	10/24/14	Data File:	102418.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	62	142
Toluene-d8	95	51	121
4-Bromofluorobenzene	94	32	146

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	TP-2-Top	Client:	Environmental Associates
Date Received:	10/24/14	Project:	JN 34170, F&BI 410469
Date Extracted:	10/24/14	Lab ID:	410469-03
Date Analyzed:	10/24/14	Data File:	102419.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	62	142
Toluene-d8	96	51	121
4-Bromofluorobenzene	93	32	146

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	TP-2-Bottom	Client:	Environmental Associates
Date Received:	10/24/14	Project:	JN 34170, F&BI 410469
Date Extracted:	10/24/14	Lab ID:	410469-04
Date Analyzed:	10/24/14	Data File:	102420.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	96	51	121
4-Bromofluorobenzene	93	32	146

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Environmental Associates
Date Received:	Not Applicable	Project:	JN 34170, F&BI 410469
Date Extracted:	10/24/14	Lab ID:	04-2143 mb
Date Analyzed:	10/24/14	Data File:	102416.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	62	142
Toluene-d8	94	51	121
4-Bromofluorobenzene	93	32	146

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

410469

SAMPLE CHAIN OF CUSTODY

ME 10-24-14 BT1 / VS1

Page # 1 of 1

Send Report To Eric Zuern
Company Environmental Associates, Inc.
Address 1380 112th ave NE, Suite 300
City, State, ZIP Bellevue, WA 98004
Phone # 425-455-9025 Fax # 425-455-2316
Email Address info@environmentalassociatesinc.com
Bill to EAI

SAMPLERS (signature) Eric Zuern

PROJECT NAME/NO. JN 34170

PO # 34170

PROJECT ADDRESS 12432 Juanita Drive NE, Kirkland

• ELECTRONIC DATA REQUESTED Please do not include EIM

TURNAROUND TIME
• Standard Turnaround
CRUSH 24 hour
Rush charges authorized by: Eric Zuern

SAMPLE DISPOSAL
Dispose after 30 days
• Return samples
• Will call with instructions

Samples Received at ____ °C

short list chlorinated.

ANALYSES REQUESTED

Sample ID	Lab ID	Date	Time	Sample Type	# of containers	TPH-Diesel-Ⓒ	TPH-Gasoline	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	HFS	Lead					Notes
TP-1-Bottom	01 A.E	10-24-14	8:49	Soil	5	X	X	X	X			X					
TP-1-Top	02	↓	8:59	↓	5	X	X	X	X			X					
TP-2-Top	03	↓	9:15	↓	5	X	X	X	X			X					
TP-2-Bottom	04	↓	9:20	↓	5	X	X	X	X			X					

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Eric Zuern	Eric Zuern	EAI	10-24-14	3:30
Received by:	[illegible]	David	FRB	10	15:32
Relinquished by:					
Received by:					

Samples received at 1 °C

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044
FORMS\COC\COC.DOC

From: Posthumus, Barbara <BPosthumus@lwsd.org>
Sent: Thursday, August 06, 2015 8:17 AM
To: Susan Lauinger
Cc: Miller, Forrest; Reith, Kathryn
Subject: RE: City of Kirkland public comments concerning LWSD schools

Hi Susan,

It was nice talking with you today. The district had the future Radke Subdivision included in its planning when developing the updated school boundaries. At the time of the boundary process, we had this development at 35 homes. We understand that it is now expected to be 20 homes. The average elementary student generation rate for new developments in the Juanita area is approximately .165. So for every 10 home we expect about 1-2 students.

Please let me know if you have further questions.

Thanks,
Barbara Posthumus
Director of Business Services
Lake Washington School District
425-936-1211

MEMORANDUM

Date:	March 5, 2015	**TG:**	14340.00
To:	Thang Nguyen, City of Kirkland		
From:	Mike Swenson, PE, PTOE, Transpo Group Jessica Lambert, Transpo Group		
CC:	Hans Christiansen – Toll Brothers		
Subject:	Traffic Impact Analysis – Radke Residential		

The purpose of this traffic impact analysis (TIA) is to identify potential transportation-related impacts associated with the proposed residential development located north of NE 125th Street between Juanita Drive NE and 80th Avenue NE in Kirkland. The following sections summarize a review of existing conditions within the site vicinity, present forecast conditions at the site access driveways, and summarize project related impact fees. The scope of the analysis was coordinated in advance with City staff and satisfies the City's requirements for Traffic Impact Analysis.

Project Description

The proposed project is located north of NE 125th Street between Juanita Drive NE and 80th Avenue NE in the Finn Hill neighborhood of Kirkland. The proposed project includes development of 20 single family detached homes. Figure 1 illustrates the project site and the surrounding vicinity.

Figure 1 – Project Vicinity

Figure 2 shows the current site plan. Vehicular access to 13 of the homes would be provided along NE 125th Street via two new roadways. Access to 5 homes would be provided with direct driveways along NE 125th Street. The remaining 2 homes would be accessed along 80th Avenue NE. It is anticipated that the project would be completed and occupied by 2017.

Study Scope

This analysis includes a review of buildout conditions at the site access driveways, the intersections of 84th Avenue NE/NE 124th Street/NE 123rd Street and 80th Avenue NE/NE 125th Street. This analysis includes an evaluation of existing and future without-project peak hour traffic volumes, traffic operations, and traffic safety at the study area intersections. Future with-project conditions are evaluated by adding site-generated traffic to future without-project conditions. Future with-project conditions are then compared to future without-project conditions to identify the relative impacts of the proposed project on the surrounding transportation system.

Figure 2 – Preliminary Site Plan

As directed by the City, this study evaluates the weekday PM peak period (4:00 to 6:00 p.m.). A horizon year of 2017 was assumed for the analysis based on the anticipated completion of the project.

Roadway Network

The project site is located in the Finn Hill neighborhood of Kirkland, north of NE 125th Street, east of Juanita Drive NE and west of 80th Avenue NE. Characteristics of the existing street system in the proposed project vicinity are shown in Table 1. As shown in Table 1, the site is surrounded by two-lane facilities with on-street parking.

Table 1. Study Area Existing Street System Summary

Roadway	Arterial Classification	Posted Speed Limit	Number of Travel Lanes	Parking	Sidewalks	Bicycle Facilities
NE 125th Street	Local Access	25 mph	2 lanes	Yes	Yes[1]	No
80th Avenue NE	Local Access	25 mph	2 lanes	Yes	Yes[2]	No
NE 124th Street	Local Access	25 mph	2 lanes	Yes[3]	Yes[4]	No
NE 123rd Street	Collector	35 mph	2 lanes	Yes	No	No
84th Avenue NE	Collector	35 mph	2 lanes	Yes	Yes[5]	No

1. Sidewalks are provided on the south side of street west of 80th Avenue NE
2. Sidewalk is only provided on the east side of the street north of NE 125th Street
3. Parking is not allowed on the north side of the street west of 84th Avenue NE
4. Sidewalks are provided intermittently
5. Sidewalks are provided on the east side of the street

The area surrounding the project site is residential in nature. As such, numerous driveways connect directly to the surrounding streets and are often closely spaced to one another.

Planned Improvements

The City of Kirkland's Capital Improvement Program (CIP) for the years 2013 to 2018 was reviewed to identify planned improvements within the project vicinity. No projects were identified in the project vicinity.

Collision History

The Washington State Department of Transportation (WSDOT) provided collision data for the most recent three-year period for along at the study intersections (January 1, 2011 and December 31, 2013). Collision data were reviewed at the two study intersections. There was only

1 collision reported in the three-year period. The collision was at the 84th Avenue NE/NE 124th Street/NE 123rd Street intersection in 2013 with no reported injuries or fatalities.

Traffic Volumes

The following sections summarize the existing traffic volume at 84th Avenue NE/NE 124th Street/NE 123rd Street and 80th Avenue NE/NE 125th Street, and forecast volumes with the addition of project generated traffic.

Existing Traffic Volumes

Existing turning movement counts at the study intersections were completed in January 2015. Detailed intersection turning movement traffic volumes are provided in Attachment A. Existing PM peak hour traffic volumes are summarized in Figure 4.

Future Without-Project Background Traffic Volumes

Forecast 2017 without-project traffic volumes were forecast by applying a 2.0 percent annual growth rate and adding traffic associated with other developments in the project vicinity. The growth rate and pipeline projects were developed through coordination with City Staff.

Project Trip Generation

Trip generation for the proposed project was estimated based on rates published in the Institute of Transportation Engineers (ITE) *Trip Generation* (9th Edition). The proposed project would develop up to 20 single family detached homes. One single family home currently exists on the site and would be removed with construction of the project. The resulting trip generation is shown in Table 2.

Table 2. Estimated Weekday Trip Generation

		Daily		AM Peak-Hour Trips				PM Peak-Hour Trips			
Land Use[1]	**Size**	**Rate**	**Trips**	**Rate**	**In**	**Out**	**Total**	**Rate**	**In**	**Out**	**Total**
Proposed											
Single Family Detached Housing	20 DU	EQN	240	EQN	6	18	24	EQN	16	9	25

Notes: DU = dwelling units.
1. Land use based on Institute of Transportation Engineers (ITE) *Trip Generation Manual,* 9th Edition was assumed to be single family detached housing (#210). The ITE regression equation was used to calculate the number of trips.

As shown in Table 2, the proposed project is anticipated generate a total of 240 weekday daily trips with 24 occurring during the weekday AM peak hour and 25 during the weekday PM peak hour.

Project Trip Distribution & Assignment

Project trips were distributed to the network based on the City concurrency run and are shown in Figure 3. Weekday PM peak hour project trips were assigned to the roadway network based on the distribution patterns shown in Figure 3.

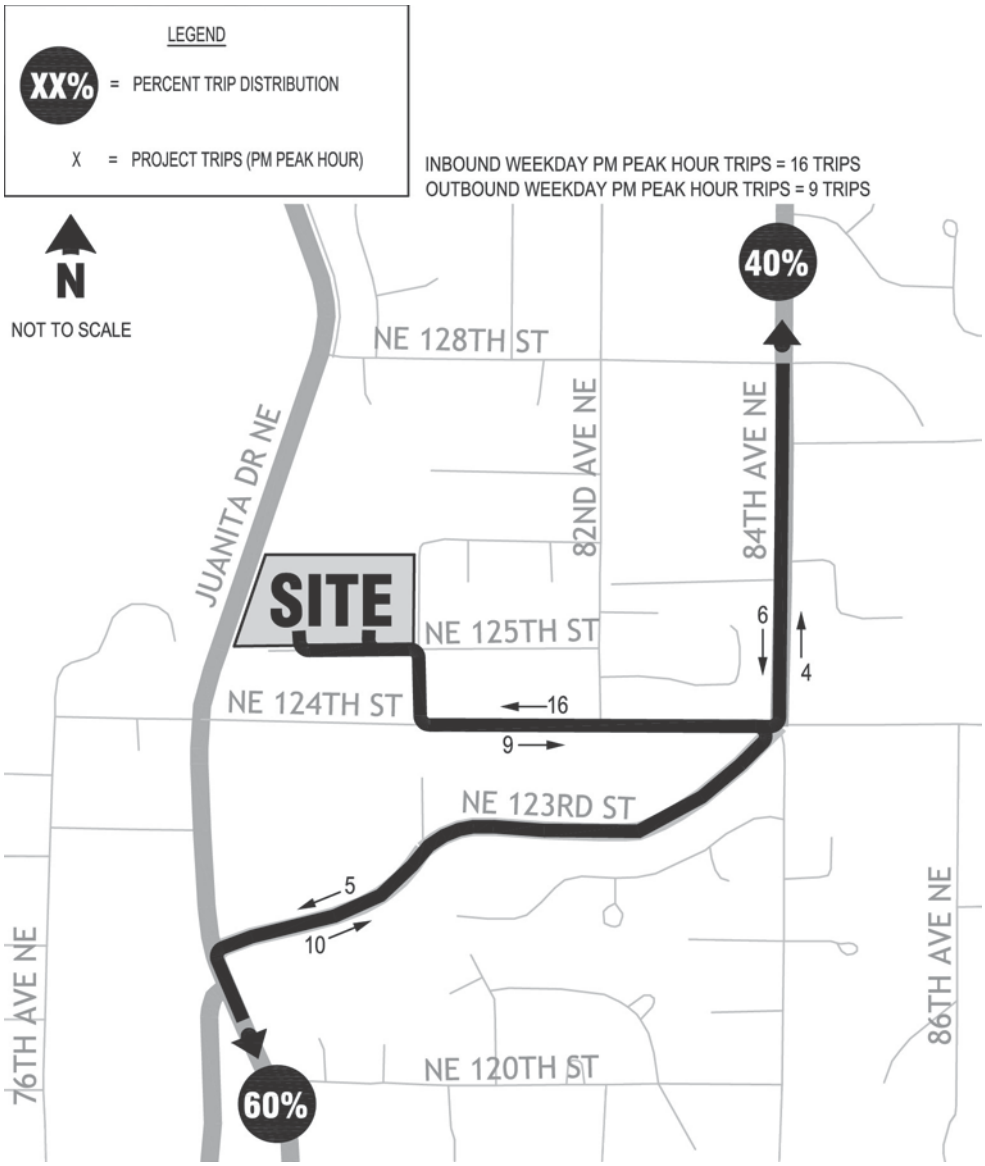


Figure 3 – Project Trip Distribution & Assignment (PM Peak Hour)

Future With-Project Traffic Volumes

Project generated trips were added to future without-project traffic volumes to estimate future with-project traffic volumes. Figure 4 shows the total future with-project weekday PM peak hour traffic volumes at the study intersections and site access driveways for 2017.

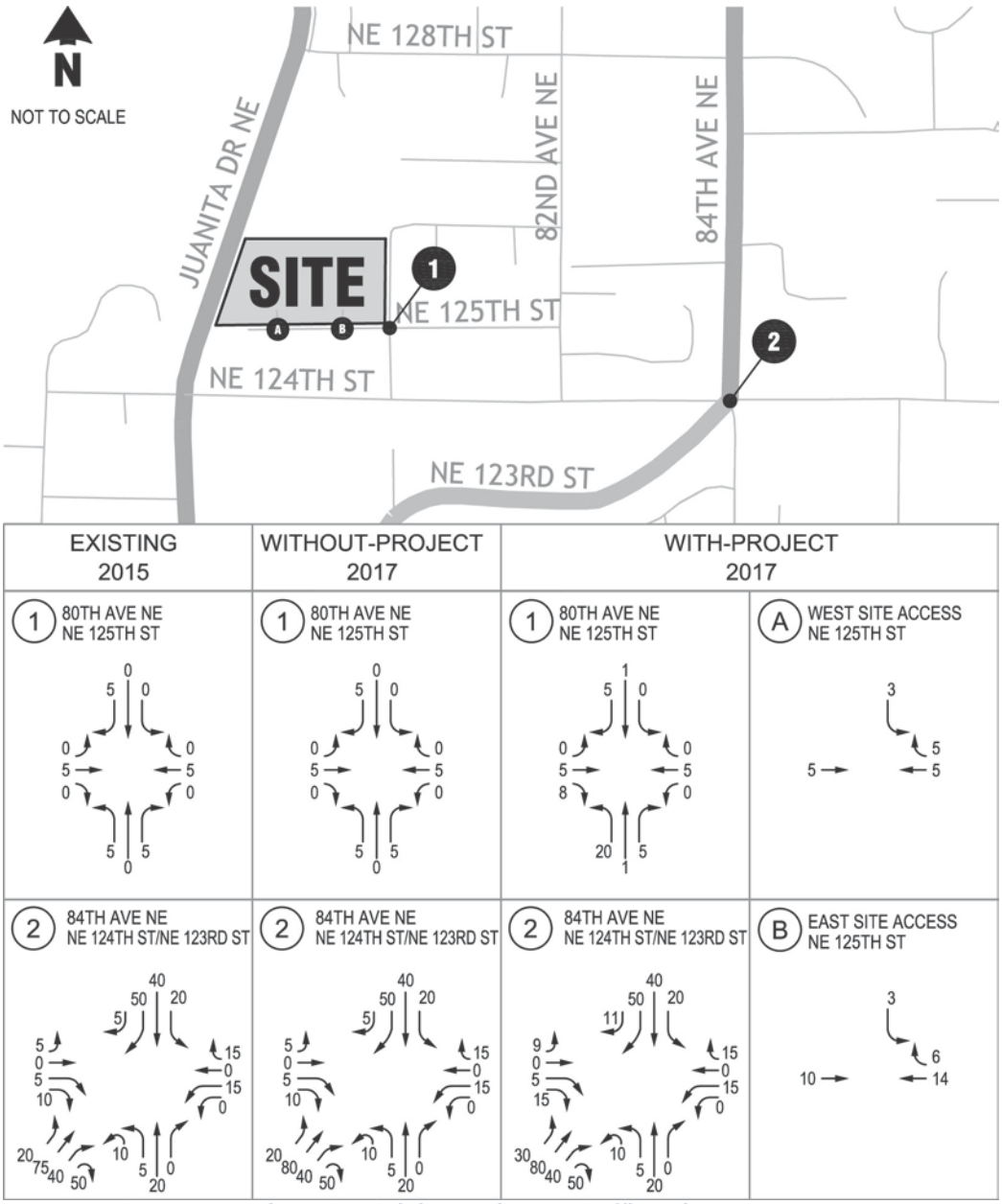


Figure 3 Weekday Peak Hour Traffic Volumes

Traffic Operations

The following sections summarize the results of the traffic operations analysis, including a review of intersection LOS at the two study intersections and two site access locations.

Intersection & Driveway Level of Service

The operational characteristics of an intersection are evaluated by calculating the intersection level of service (LOS). Traffic operations were evaluated based on the procedures identified in the *Highway Capacity Manual* (2010), and evaluated using Synchro version 8.0. At side-street stop-controlled intersections LOS is measured in average delay per vehicle during the peak hour of traffic and is reported for the worst operating approach of the intersection. Traffic operations for an intersection can be described alphabetically with a range of levels of service (LOS A through

F), with LOS A indicating free-flowing traffic and LOS F indicating extreme congestion and long vehicle delays. Attachment B contains a detailed explanation of LOS criteria and definitions.

Table 3 summarizes the weekday PM peak hour LOS at the study intersections and site access locations for existing and future conditions. Operations at the intersections and site access locations are reported for the worst operating movement at each location. Detailed LOS worksheets are included in Attachment C.

Table 3. Weekday PM Peak Hours LOS Summary

	2015 Existing			2017 Without-Project			2017 With-Project		
Intersection	**LOS[1]**	**Delay[2]**	**WM[3]**	**LOS**	**Delay**	**WM**	**LOS**	**Delay**	**WM**
80th Avenue NE/NE 125th Street[4]	A	7	EB/WB	A	7	EB/WB	A	7	NB
84th Avenue NE/NE124th Street/NE 123rd Street	A	4	SB	A	4	SB	A	4	SB
West Site Access/NE 125th Street	-	-	-	-	-	-	A	9	SB
East Site Access/NE 125th Street	-	-	-	-	-	-	A	9	SB

Source: *Highway Capacity Manual*, 2010 and Transpo Group, 2015
1. Level of service (LOS), based on 2010 *Highway Capacity Manual* methodology.
2. Average delay in seconds per vehicle. Delay is provided for the worse movement at side-street stop controlled intersections.
3. Worst movement reported for side-street stop controlled intersections where EB = eastbound approach, NB = northbound approach.
4. Intersection operates with no traffic control, for analysis purposes the intersection was treated as an all-way stop

As shown in Table 3, both study intersections currently operate at LOS A. Under future (2017) without and with-project conditions both site access locations and study intersections are anticipated to operate at LOS A.

Site Access Safety Review

The following sections summarize the results of the traffic safety conducted at the site access driveways. This review included consideration of the collision history near the project site and sight-distance.

Traffic Safety Impact

Based on the three-year accident history, the study area has not experienced any reported collisions near the vicinity of the proposed driveways. The pipeline projects as well as slight increases in traffic volumes may increase the potential for safety related issues, but no history exists that would suggest a trend in decreasing safety conditions.

Sight Distance

Intersection and stopping sight distance was reviewed at both site access locations. Field observations indicate that there are no sight distance issues at either site access location with the exception of small shrubbery which would be removed with the project. Traveling eastbound along NE 125th Street the roadway has an uphill grade and NE 125th Street ends in a cul-de-sac to the west, near the western site access location. From either driveway location the end of the cul-de-sac can be seen to the west. Looking east from the western site access location sight distance was measured at approximately 450 feet. Looking east from the eastern site access location sight distance was measured at approximately 185 feet or approximately the middle of the 80th Avenue NE/NE 125th Street intersection.

Transportation Impact Fee

The City of Kirkland requires new development to pay a transportation impact fee. Table 4 shows the estimated impact fee. This calculation is provided as a preliminary estimate, the City of Kirkland will calculate the final transportation fee.

Table 4. Estimated Transportation Impact Fee

Land Use	Size	Impact Fee[1]	Estimated Fee
Proposed Use			
Detached Housing	20 dwelling units	$3,942 per unit	$78,840
Existing Use			
Detached Housing	1 dwelling unit	$3,942 per unit	$3,942
Total			**$74,898**

1. Transportation Impact Fee Schedule, Updated June 19, 2014

Transportation Concurrency

The City of Kirkland requires new development to pass a concurrency test. The proposed project was tested against and passed the City of Kirkland concurrency requirements. The concurrency test results are included in Attachment D.

Summary & Conclusions

- The proposed 20 single family home residential development is located in Kirkland, Washington north of NE 125th Street and east of Juanita Drive. The proposed project would demolish the existing single family home currently located at the project site.
- The proposed project is anticipated to generate a total of 240 weekday daily trips with 24 occurring during the AM peak hour and 25 during the PM peak hour.
- Both study intersections are anticipated to operate at LOS A under future without and with-project condition.
- The site access driveways are anticipated to operate at LOS A under future 2017 with-project conditions.
- No sight distance issues were identified and City of Kirkland requirements are met.

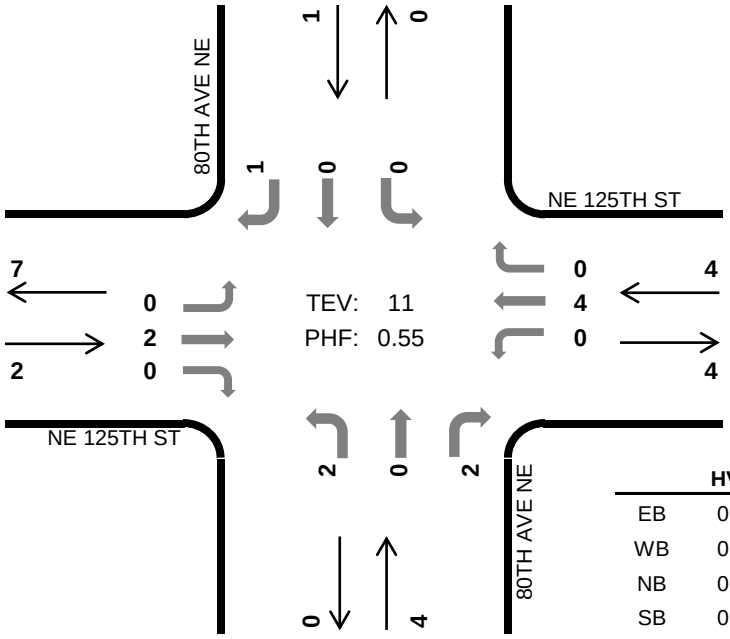
Attachment A: Traffic Counts

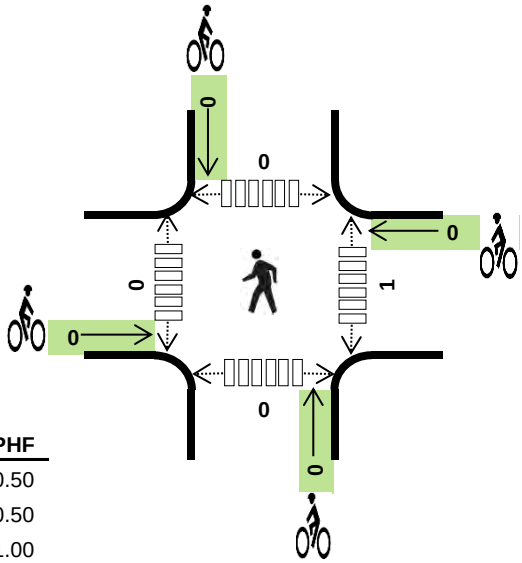
80TH AVE NE
NE 125TH ST

N

Peak Hour

Date: Wed, Feb 04, 2015
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:00 PM to 5:00 PM





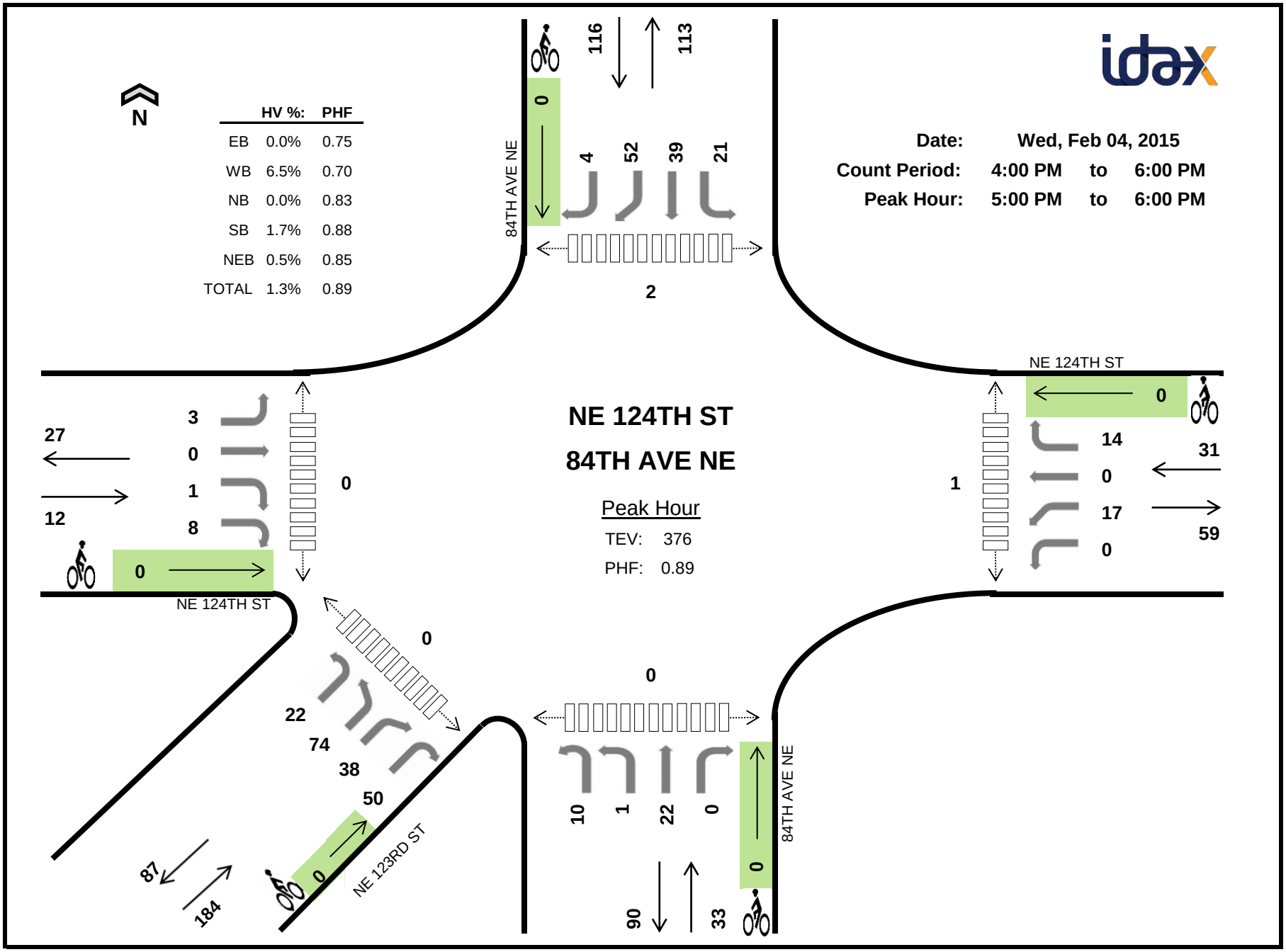
	HV %:	PHF
EB	0.0%	0.50
WB	0.0%	0.50
NB	0.0%	1.00
SB	0.0%	0.25
TOTAL	0.0%	0.55

Two-Hour Count Summaries

Interval Start	NE 125TH ST Eastbound			NE 125TH ST Westbound			80TH AVE NE Northbound			80TH AVE NE Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	**0**	**1**	**0**	**0**	**2**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**5**	
4:15 PM	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**2**	
4:30 PM	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**2**	
4:45 PM	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**2**	**11**
5:00 PM	0	0	0	0	0	1	1	0	0	0	1	0	3	9
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	2	2	9
5:30 PM	0	3	0	0	0	0	0	0	0	0	0	0	3	10
5:45 PM	0	2	0	0	0	0	0	0	0	0	0	0	2	10
Count Total	0	7	0	0	4	1	3	0	2	0	1	3	21	
Peak Hr	**0**	**2**	**0**	**0**	**4**	**0**	**2**	**0**	**2**	**0**	**0**	**1**	**11**	

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
4:15 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
4:30 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
4:45 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**1**	**0**	**0**	**0**	***1***
5:00 PM	0	0	0	0	*0*	0	0	0	0	*0*	1	0	0	0	*1*
5:15 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
5:30 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
5:45 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	0	0	0	0	*0*	0	0	0	0	*0*	2	0	0	0	*2*
Peak Hr	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**1**	**0**	**0**	**0**	***1***


N
HV %: PHF
EB 0.0% 0.75
WB 6.5% 0.70
NB 0.0% 0.83
SB 1.7% 0.88
NEB 0.5% 0.85
TOTAL 1.3% 0.89
Date: Wed, Feb 04, 2015
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 5:00 PM to 6:00 PM
NE 124TH ST
84TH AVE NE
Peak Hour
TEV: 376
PHF: 0.89
NE 123RD ST
116
113
0
4
52
39
21
2
27
12
3
0
1
8
0
0
NE 124TH ST
0
14
0
17
0
31
59
1
0
22
74
38
50
87
184
0
0
10
1
22
0
90
33
0
84TH AVE NE

Two-Hour Count Summaries

Interval Start	NE 124TH ST Eastbound				NE 124TH ST Westbound				84TH AVE NE Northbound				84TH AVE NE Southbound				NE 123RD ST Northeastbound				15-min Total	Rolling One Hour
	LT	TH	RT	HR	LT	BL	TH	RT	HL	LT	TH	RT	LT	TH	BR	RT	HL	BL	BR	HR		
4:00 PM	0	0	0	1	0	3	1	2	5	0	15	0	3	4	11	0	7	10	9	11	82	
4:15 PM	1	0	0	2	0	4	0	1	4	0	4	1	7	6	13	2	7	11	14	12	89	
4:30 PM	0	1	0	0	1	5	0	4	3	0	4	0	3	4	13	1	5	19	9	13	85	
4:45 PM	0	0	0	1	0	5	0	0	4	0	4	0	4	12	11	1	5	11	9	8	75	331
5:00 PM	**1**	**0**	**0**	**2**	**0**	**6**	**0**	**2**	**2**	**0**	**8**	**0**	**5**	**13**	**13**	**1**	**6**	**16**	**6**	**10**	**91**	340
5:15 PM	**0**	**0**	**1**	**3**	**0**	**3**	**0**	**2**	**5**	**1**	**4**	**0**	**3**	**8**	**10**	**1**	**9**	**19**	**7**	**14**	**90**	341
5:30 PM	**2**	**0**	**0**	**2**	**0**	**5**	**0**	**6**	**2**	**0**	**2**	**0**	**9**	**7**	**15**	**2**	**5**	**22**	**10**	**17**	**106**	362
5:45 PM	**0**	**0**	**0**	**1**	**0**	**3**	**0**	**4**	**1**	**0**	**8**	**0**	**4**	**11**	**14**	**0**	**2**	**17**	**15**	**9**	**89**	**376**
Count Total	4	1	1	12	1	34	1	21	26	1	49	1	38	65	100	8	46	125	79	94	707	
Peak Hr	**3**	**0**	**1**	**8**	**0**	**17**	**0**	**14**	**10**	**1**	**22**	**0**	**21**	**39**	**52**	**4**	**22**	**74**	**38**	**50**	**376**	

Note: Two-hour count summary volumes include heavy vehicles but excludes bicycles in overall count.

Interval Start	Heavy Vehicle Totals						Bicycles						Pedestrians (Crossing Leg)					
	EB	WB	NB	SB	NEB	Total	EB	WB	NB	SB	NEB	Total	East	West	North	South	SW	Total
4:00 PM	0	0	0	0	0	*0*	0	0	0	0	0	*0*	1	1	0	0	0	*2*
4:15 PM	1	1	0	1	1	*4*	0	0	0	0	0	*0*	1	0	0	2	1	*4*
4:30 PM	0	0	0	1	1	*2*	0	0	0	0	1	*1*	0	1	0	0	1	*2*
4:45 PM	0	0	0	0	1	*1*	0	0	0	0	0	*0*	0	1	0	1	1	*3*
5:00 PM	**0**	**1**	**0**	**1**	**0**	***2***	**0**	**0**	**0**	**0**	**0**	***0***	**1**	**0**	**0**	**0**	**0**	***1***
5:15 PM	**0**	**1**	**0**	**0**	**1**	***2***	**0**	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**2**	**0**	**0**	***2***
5:30 PM	**0**	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	**0**	***0***
5:45 PM	**0**	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	**0**	***0***
Count Total	1	3	0	4	4	*12*	0	0	0	0	1	*1*	3	3	2	3	3	*14*
Peak Hr	**0**	**2**	**0**	**2**	**1**	***5***	**0**	**0**	**0**	**0**	**0**	***0***	**1**	**0**	**2**	**0**	**0**	*3*

Attachment B: LOS Definitions

Highway Capacity Manual 2010

Signalized intersection level of service (LOS) is defined in terms of a weighted average control delay for the entire intersection. Control delay quantifies the increase in travel time that a vehicle experiences due to the traffic signal control as well as provides a surrogate measure for driver discomfort and fuel consumption. Signalized intersection LOS is stated in terms of average control delay per vehicle (in seconds) during a specified time period (e.g., weekday PM peak hour). Control delay is a complex measure based on many variables, including signal phasing and coordination (i.e., progression of movements through the intersection and along the corridor), signal cycle length, and traffic volumes with respect to intersection capacity and resulting queues. Table 1 summarizes the LOS criteria for signalized intersections, as described in the *Highway Capacity Manual 2010* (Transportation Research Board, 2010).

Table 1. Level of Service Criteria for Signalized Intersections

Level of Service	Average Control Delay (seconds/vehicle)	General Description
A	≤10	Free Flow
B	>10 – 20	Stable Flow (slight delays)
C	>20 – 35	Stable flow (acceptable delays)
D	>35 – 55	Approaching unstable flow (tolerable delay, occasionally wait through more than one signal cycle before proceeding)
E	>55 – 80	Unstable flow (intolerable delay)
F[1]	>80	Forced flow (congested and queues fail to clear)

Source: *Highway Capacity Manual 2010*, Transportation Research Board, 2010.
1. If the volume-to-capacity (v/c) ratio for a lane group exceeds 1.0 LOS F is assigned to the individual lane group. LOS for overall approach or intersection is determined solely by the control delay.

Unsignalized intersection LOS criteria can be further reduced into two intersection types: all-way stop and two-way stop control. All-way stop control intersection LOS is expressed in terms of the weighted average control delay of the overall intersection or by approach. Two-way stop-controlled intersection LOS is defined in terms of the average control delay for each minor-street movement (or shared movement) as well as major-street left-turns. This approach is because major-street through vehicles are assumed to experience zero delay, a weighted average of all movements results in very low overall average delay, and this calculated low delay could mask deficiencies of minor movements. Table 2 shows LOS criteria for unsignalized intersections.

Table 2. Level of Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay (seconds/vehicle)
A	0 – 10
B	>10 – 15
C	>15 – 25
D	>25 – 35
E	>35 – 50
F[1]	>50

Source: *Highway Capacity Manual 2010*, Transportation Research Board, 2010.
1. If the volume-to-capacity (v/c) ratio exceeds 1.0, LOS F is assigned an individual lane group for all unsignalized intersections, or minor street approach at two-way stop-controlled intersections. Overall intersection LOS is determined solely by control delay.

Attachment C: LOS Worksheets

HCM 2010 AWSC
1: 80th Ave NE & NE 125th St

Radke Residential
Existing 2015 PM Peak Hour

Intersection	
Intersection Delay, s/veh	6.8
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	0	5	0	0	0	5	0	0	5	0	5
Peak Hour Factor	0.92	0.55	0.55	0.55	0.92	0.55	0.55	0.55	0.92	0.55	0.55	0.55
Heavy Vehicles, %	2	0	0	0	2	0	0	0	2	0	0	0
Mvmt Flow	0	0	9	0	0	0	9	0	0	9	0	9
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7	7	6.8
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	50%	0%	0%	0%
Vol Thru, %	0%	100%	100%	0%
Vol Right, %	50%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	10	5	5	5
LT Vol	5	0	0	0
Through Vol	0	5	5	0
RT Vol	5	0	0	5
Lane Flow Rate	18	9	9	9
Geometry Grp	1	1	1	1
Degree of Util (X)	0.019	0.01	0.01	0.008
Departure Headway (Hd)	3.738	3.954	3.954	3.344
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	961	909	909	1073
Service Time	1.746	1.961	1.961	1.355
HCM Lane V/C Ratio	0.019	0.01	0.01	0.008
HCM Control Delay	6.8	7	7	6.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0	0	0

HCM 2010 AWSC
1: 80th Ave NE & NE 125th St

Radke Residential
Existing 2015 PM Peak Hour

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	0	0	5
Peak Hour Factor	0.92	0.55	0.55	0.55
Heavy Vehicles, %	2	0	0	0
Mvmt Flow	0	0	0	9
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	6.4
HCM LOS	A

Lane

SimTraffic Performance Report
Existing 2015 PM Peak Hour

Radke Residential
Existing 2015 PM Peak Hour

2: NE 123rd St & 84th Ave NE & NE 124th St Performance by movement

Movement	EBL	EBR	EBR2	WBL	WBR	NBL2	NBL	NBT	SBL	SBT	SBR	SBR2
Denied Del/Veh (s)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
Total Del/Veh (s)	4.4	3.1	2.7	5.2	3.1	4.6	5.0	6.0	4.7	6.2	3.2	3.0

2: NE 123rd St & 84th Ave NE & NE 124th St Performance by movement

Movement	NEL2	NEL	NER	NER2	All
Denied Del/Veh (s)	0.3	0.2	0.2	0.2	0.2
Total Del/Veh (s)	4.8	5.1	2.9	1.3	4.0

HCM 2010 AWSC
1: 80th Ave NE & NE 125th St

Radke Residential
Future 2017 Without-Project PM Peak Hour

Intersection	
Intersection Delay, s/veh	6.8
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	0	5	0	0	0	5	0	0	5	0	5
Peak Hour Factor	0.92	0.55	0.55	0.55	0.92	0.55	0.55	0.55	0.92	0.55	0.55	0.55
Heavy Vehicles, %	2	0	0	0	2	0	0	0	2	0	0	0
Mvmt Flow	0	0	9	0	0	0	9	0	0	9	0	9
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7	7	6.8
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	50%	0%	0%	0%
Vol Thru, %	0%	100%	100%	0%
Vol Right, %	50%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	10	5	5	5
LT Vol	5	0	0	0
Through Vol	0	5	5	0
RT Vol	5	0	0	5
Lane Flow Rate	18	9	9	9
Geometry Grp	1	1	1	1
Degree of Util (X)	0.019	0.01	0.01	0.008
Departure Headway (Hd)	3.738	3.954	3.954	3.344
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	961	909	909	1073
Service Time	1.746	1.961	1.961	1.355
HCM Lane V/C Ratio	0.019	0.01	0.01	0.008
HCM Control Delay	6.8	7	7	6.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0	0	0

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	0	0	5
Peak Hour Factor	0.92	0.55	0.55	0.55
Heavy Vehicles, %	2	0	0	0
Mvmt Flow	0	0	0	9
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	6.4
HCM LOS	A

Lane

2: NE 123rd St & 84th Ave NE & NE 124th St Performance by movement

Movement	EBL	EBR	EBR2	WBL	WBR	NBL2	NBL	NBT	SBL	SBT	SBR	SBR2
Denied Del/Veh (s)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
Total Del/Veh (s)	4.5	3.1	2.7	5.2	3.1	4.7	4.9	6.0	4.5	6.2	3.2	2.9

2: NE 123rd St & 84th Ave NE & NE 124th St Performance by movement

Movement	NEL2	NEL	NER	NER2	All
Denied Del/Veh (s)	0.3	0.2	0.2	0.2	0.2
Total Del/Veh (s)	4.9	5.1	2.9	1.3	4.0

HCM 2010 AWSC
1: 80th Ave NE & NE 125th St

Radke Residential
Future 2017 With-Project PM Peak Hour

Intersection	
Intersection Delay, s/veh	7
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	0	5	8	0	0	5	0	0	20	1	5
Peak Hour Factor	0.92	0.55	0.55	0.55	0.92	0.55	0.55	0.55	0.92	0.55	0.55	0.55
Heavy Vehicles, %	2	0	0	0	2	0	0	0	2	0	0	0
Mvmt Flow	0	0	9	15	0	0	9	0	0	36	2	9
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	6.8	7.1	7.2
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	77%	0%	0%	0%
Vol Thru, %	4%	38%	100%	17%
Vol Right, %	19%	62%	0%	83%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	26	13	5	6
LT Vol	20	0	0	0
Through Vol	1	5	5	1
RT Vol	5	8	0	5
Lane Flow Rate	47	24	9	11
Geometry Grp	1	1	1	1
Degree of Util (X)	0.053	0.024	0.01	0.011
Departure Headway (Hd)	4.004	3.639	4.02	3.492
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	898	983	890	1026
Service Time	2.014	1.664	2.046	1.511
HCM Lane V/C Ratio	0.052	0.024	0.01	0.011
HCM Control Delay	7.2	6.8	7.1	6.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.1	0	0

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	0	1	5
Peak Hour Factor	0.92	0.55	0.55	0.55
Heavy Vehicles, %	2	0	0	0
Mvmt Flow	0	0	2	9
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	6.6
HCM LOS	A

Lane

2: NE 123rd St & 84th Ave NE & NE 124th St Performance by movement

Movement	EBL	EBR	EBR2	WBL	WBR	NBL2	NBL	NBT	SBL	SBT	SBR	SBR2
Denied Del/Veh (s)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
Total Del/Veh (s)	4.4	3.3	2.8	5.2	2.8	4.8	4.5	5.9	4.6	6.3	3.3	3.3

2: NE 123rd St & 84th Ave NE & NE 124th St Performance by movement

Movement	NEL2	NEL	NER	NER2	All
Denied Del/Veh (s)	0.2	0.2	0.2	0.2	0.2
Total Del/Veh (s)	4.7	5.2	3.0	1.3	4.1

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	0	10	14	6	3	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	55	55	55	55	55	55
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	18	25	11	5	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	36	0	-	0	49	31
Stage 1	-	-	-	-	31	-
Stage 2	-	-	-	-	18	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1588	-	-	-	965	1049
Stage 1	-	-	-	-	997	-
Stage 2	-	-	-	-	1010	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1588	-	-	-	965	1049
Mov Cap-2 Maneuver	-	-	-	-	965	-
Stage 1	-	-	-	-	997	-
Stage 2	-	-	-	-	1010	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	8.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1588	-	-	-	965
HCM Lane V/C Ratio	-	-	-	-	0.006
HCM Control Delay (s)	0	-	-	-	8.8
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	0	5	5	5	3	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	55	55	55	55	55	55
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	9	9	9	5	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	18	0	-	0	23	14
Stage 1	-	-	-	-	14	-
Stage 2	-	-	-	-	9	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1612	-	-	-	998	1072
Stage 1	-	-	-	-	1014	-
Stage 2	-	-	-	-	1019	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1612	-	-	-	998	1072
Mov Cap-2 Maneuver	-	-	-	-	998	-
Stage 1	-	-	-	-	1014	-
Stage 2	-	-	-	-	1019	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1612	-	-	-	998
HCM Lane V/C Ratio	-	-	-	-	0.005
HCM Control Delay (s)	0	-	-	-	8.6
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Attachment D: Concurrency Worksheets

1) Project ID:	**Radke SF**	**4) Transportation Concurrency Status**	**6) Transportation Concurrency Certificate Date:**
2) Project Description:	20 Single Family Units	**PASS**	
	Gross Trips: Enter Exit Enter Exit	**5) Transportation Concurrency Test Date**	**7) Certificate of Occupancy Date**
3) Build-out Year:	2017 factor = 1	January 14, 2015	

SUMMARY OF TRAFFIC IMPACTS

8) Daily Trips	240 net new	**PM Peak Trips:**	25 (16, 9)	**Impacted Subarea(s):**	North	**TAZ:**	636	Case #	TRAN14-02395

Signalized Intersection PM Peak Traffic Impact

		Project PM Peak Turning Volumes												PM Peak	Daily Trips	Sum of	Vol.
		Eastbound			Westbound			Northbound			Southbound						
Code	Intersection	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT				
999	Project Driveway/ NE 125th Street						9				14			23			
	NE 124th St/84th Ave NE	4		5				10					6				
	NE 132nd St/84th Ave NE				3				2	2		2					
501	NE 122nd Pl/Juanita Dr NE				5					10				15			
502	South Holmes Pt Dr NE/Juanita Dr NE								10			5		15			
503	NE 141st Street/Juanita Dr NE								0			0		0			
112	Kirkland Way/6th Street													0			
201	NE 116th St/98th Ave NE		3	1		5		3						12			
202	NE 124th St/100th Ave NE				2					1				3			
203	NE 132nd St/100th Ave NE		1			1								2			
205	Forbes Creek Dr/Market St								3			1		4			
206	NE 120th Pl/100th Ave NE	1											1	2			
207	Juanita Dr/93rd Ave NE		5			10								15			
208	Juanita Dr/97th Ave NE	1	4			9							1	15			
														0			
														0			
														0			
														0			
														0			
														0			
														0			
														0			
														0			

	2017 LOS Standards		*LOS with Project Impacts*			
Subarea No	A= Max. Intersection LOS	B=Average 2015 V/C	a=No. exceeding 1.4	b=Average V/C	**a <= A?**	**b<= B?**
Southwest (1xx)	1.4	0.91	0	0.79	yes	yes
Northwest (2xx)	1.4	0.96	0	0.83	yes	yes
Northeast (3xx)	1.4	0.94	0	0.77	yes	yes
East(4xx)	1.4	1.08	0	0.93	yes	yes
Annex(5xx)	1.4	n/a	0	n/a	yes	n/a

TEST RESULTS

Result: **PASS**

* Based on Critical Movement, Planning Method TRC #212.
1. Number of intersection exceeding Average V/C LOS Standard
1. Sixth Year Target Average V/C ratio, see step 6, part 1 of the guidelines

CITY OF KIRKLAND
Department of Public Works
123 Fifth Avenue, Kirkland, WA 98033 425.587.3800
www.kirklandwa.gov

MEMORANDUM

To: Susan Lauinger, Planner

From: Thang Nguyen, Transportation Engineer

Date: June 17, 2015

Subject: Radke Residential Development Traffic Study Review, Tran14-02395/SEP15-00616

This memo summarizes my review of the traffic report dated June 8, 2015 *Traffic Impact Analysis – Radke Residential* memorandum submitted by the Transpo Group for the proposed Radke Residential development. My findings and recommendations are summarized below followed by my review comments on the traffic impacts documented in the traffic report. My responses to public comments are included at the end of this memo.

Staff Findings

The proposed project passed traffic concurrency. Therefore, no off-site concurrency mitigation is required.

The proposed project will not create significant SEPA traffic impacts that warrant specific off-site transportation mitigation.

Staff Recommendations

SEPA Mitigation
Staff does not recommend any SEPA traffic mitigation because the proposed project will not create significant off-site SEPA traffic impacts.

Public Works Permit Conditions:

1. Pay transportation impact fee as discussed in the Transportation Impact Fee section of this memo.
2. No monument, structure or landscaping taller than three feet may be in the sight distance triangle.

Project Description and Trip Generation

The applicant proposes to demolish an existing single-family house and construct 20 single-family homes at the corner of NE 125th Street and 80th Avenue NE, east of Juanita Drive NE. The project site fronts the entire north side of NE 125th Street (from 80th

Avenue NE to the west end of the street) and part of 80th Avenue NE. Ten existing homes front the south side of the street. The proposed project is anticipated to be built and occupied by the end of 2017. The project is forecasted to generate 240 daily trips and 25 net new PM peak hour trips.

Two driveways are proposed to connect to NE 125th Street to serve 13 homes. The two main driveways will be opposite of the two cul-de-sacs on the south side of the street. Five homes that fronts NE 125th Street between the cul-de-sacs will have direct midblock access to NE 125th Street and two homes along 80th Avenue NE will have direct midblock access to 80th Avenue NE.

Traffic Concurrency
Developments are tested for traffic concurrency for the weekday PM peak hour. The proposed project passed traffic concurrency. Per *Section 25.10.020 Procedures* of the KMC, the Concurrency Test Notice expires within one year of the concurrency test notice (January 15, 2016) unless a development permit and certificate of concurrency are issued or an extension is granted.

Concurrency Appeal
The concurrency test notice may be appealed by the public or by an agency with jurisdiction. The concurrency test notice is subject to an appeal until the SEPA review process is complete and the appeal deadline has passed. Concurrency appeals are heard before the Hearing Examiner along with any applicable SEPA appeal. For more information, refer to the Kirkland Municipal Code, Title 25.

Traffic Impacts
The scope of the traffic report was completed in accordance to the City of Kirkland TIA guidelines.

The citywide trip distribution was determined by using the Bellevue-Kirkland-Redmond (BKR) traffic model.

The City's Traffic Impact Analysis Guidelines (TIAG) requires a level of service (LOS) analysis using the Highway Capacity Manual Operational Method for intersections that have a proportionate share equal or greater than 1% as calculated using the method in the TIAG. Based on the proportionate share calculation for the full build-out of the proposed project, two intersections met the 1% proportionate share threshold.

- 80th Avenue NE/NE 125th Street
- 84th Avenue NE/NE 124th Street/NE 123rd Street

Traffic Mitigation Threshold
The City requires developers to mitigate traffic impacts when one of the following two conditions is met:

1. An intersection level of service is at E and the project has a proportional share of 15% or more at the intersection.
2. An intersection level of service is at F and the project has a proportional share of 5% or more at the intersection.

Off-site and Driveway Operation Traffic Impact
Based on the level of service analyses both off-site intersections analyzed are calculated to operate at LOS-A. The two main project driveways are also calculated to operate at LOS-A. The project traffic does not trigger the level of service mitigation threshold; therefore, are not subject to mitigation.

Traffic Safety
Based on WSDOT collision data, there have been few crashes near the project site. None of the locations analyzed are on the City of Kirkland's High Accident Location list. It is not anticipated that the proposed project would increase the number of crashes on public streets.

Driveway & Sight Distance
Intersection and stopping sight distances were reviewed at the project's two main driveways and they exceed the City's required 150 feet sight distance. All other driveways are anticipated to operate safely similar to all existing residential driveways along NE 125th Street and 80th Avenue NE. There is no sight line restriction at any of the project driveways that would create an unsafe traffic condition.

Transportation Impact Fee
Per City's Ordinance 3685, Transportation Impact Fees is required for all developments and is calculated based on the most updated Transportation Impact Fee Schedule, January 1, 2015. Road impact fees are used to construct transportation capacity improvements throughout the City to help the City maintain traffic concurrency. Table 1 summarizes the road impact fee calculation for the proposed project. The net new fee in Table 1 includes a credit for an existing single-family house that will be demolished.

Table 1. Road Impact Fee

	Net New	**Impact Fee Rate**	**Net New Fee**
Proposed Single-Family	19 units	$3,942 per unit	$74,898

Final transportation impact fees will be determined at final building approval.

Street and Pedestrian Improvement Conditions:

1. The subject property abuts Juanita Drive (an Arterial type street), NE 125th Street, 80th Ave. NE, and a new interior access street (all of which are Neighborhood Access type streets). Zoning Code sections 110.10 and 110.25

require the applicant to make half-street improvements in rights-of-way abutting the subject property. Section 110.30-110.50 establishes that this street must be improved with the following:

Juanita Drive -The City has an adopted master plan for Juanita Drive. The street improvement design will match Figure 11: Cross-Section with Multipurpose Trail on page 31 (lower cross section) in the master plan. The half-street improvements along the front of this project will consist of the following (from centerline of Juanita Drive right-of-way):

- ✓ 11 ft. drive lane
- ✓ 2 ft. buffer zone
- ✓ 5 ft. bike lane
- ✓ 5-15 ft. wide planter strip/drainage swale
- ✓ 10 ft. wide meandering asphalt pathway (save existing trees where feasible).
- ✓ 12 ft. right-of-way dedication
- ✓ Plant street trees 30 ft. o.c. between in the planter strip or behind the pathway. Existing trees shall be taken into account. Trees planted behind the sidewalk may be deciduous or evergreen.

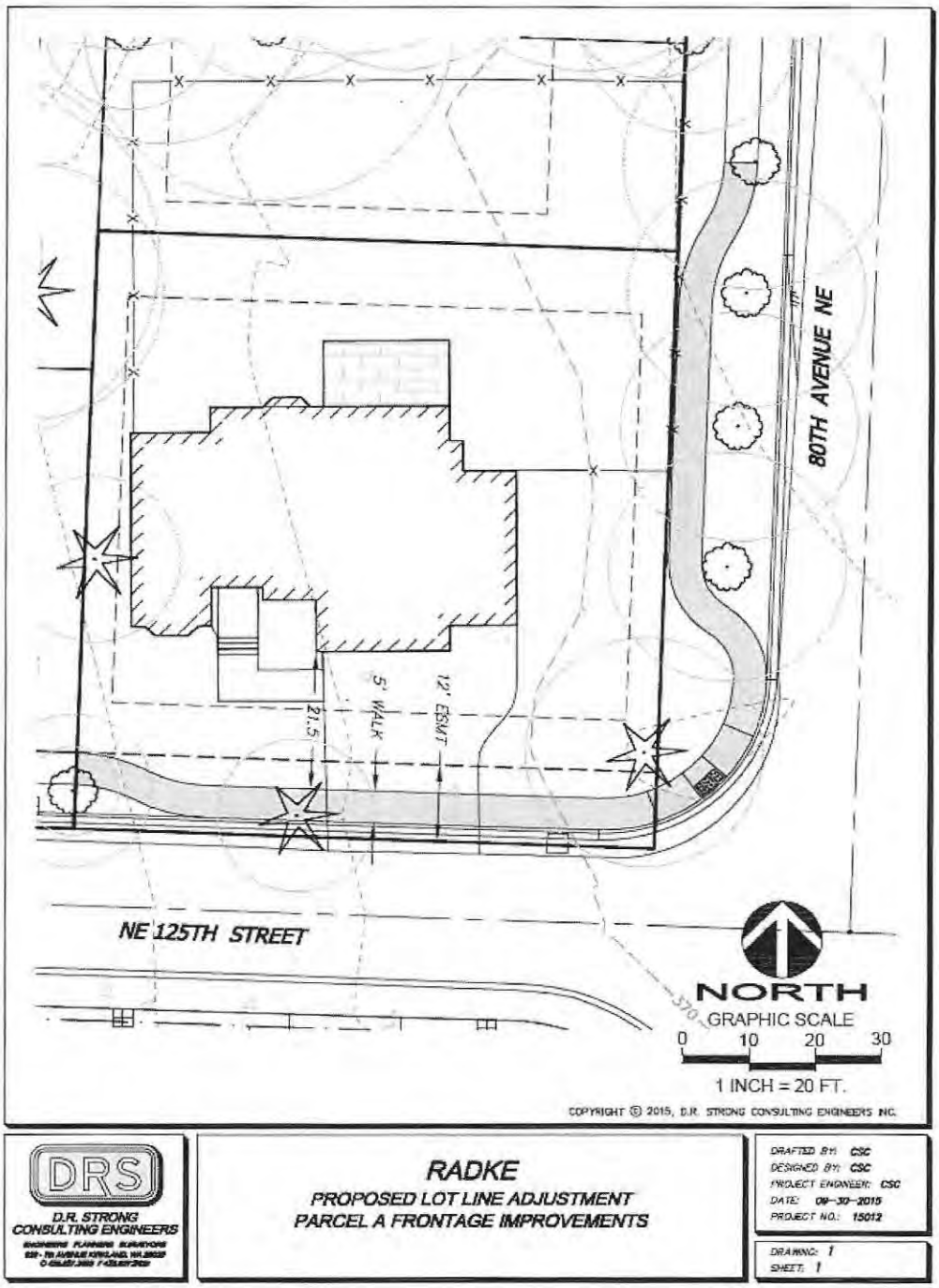
Impact Fee Credit-The Public Works Director and has determined that the said street improvements and right-of-way dedication will qualify as a Traffic Impact Fee Credit per Kirkland Municipal Code Title 27.04.060-Credits. The credit can be approved because the dedication and improvements will meet the goals and objectives of the Capital Facilities Plan. The value of the street improvements and right-of-way dedication will be determined during the review of the Land Surface Modification Permit and the credit will be distributed against the impact fees owed at the issuance of the Building Permits for the new homes. The impact fee credit cannot exceed the total impact fees owed by the project.

Public Comments

Staff have received traffic comments from the public relating to the proposed project. Below are staff's responses to the public comments.

1. ***Install a traffic circle at the intersection of 80th Avenue and NE 125th Street to slow down traffic.***
    a. Based on the traffic count during the peak hour, there are less than 30 vehicle per hour going through the intersection. There have been no record of speeding through the intersection that staff is aware of. The City has an evaluation process for considering a traffic circle and that process requires engineering studies, traffic warrants and public involvement. Prior to considering a traffic circle there are measures that can be taken to deal with speeding including enforcement, education, notification, pavement marking, signs and citizen speed watch. Residents can contact the Neighborhood Traffic Control Coordinator (Kathy Robertson, KRobertson@kirklandwa.gov, (425) 587-3870) to learn more about the process and requirements.
2. ***Traffic should have direct access to Juanita Drive.***
    a. Juanita Drive is a principal arterial. The purpose of principal arterial is to provide movement across and between large subareas of an urban region and serves predominantly "through traffic" with minimum direct service to abutting land uses. Local neighborhood street serves to provide access to land use and connections to the arterial system. NE 125th Street and 80th Avenue NE serves that purpose and has the capacity to serve the proposed development.
3. ***Traffic on Juanita Drive has long back up during the peak commute times.***
    a. The proposed development will not have a significant traffic impact on Juanita Drive that warrants traffic mitigations. The Juanita Drive Master Plan was completed in 2014. The master plan contains a variety of projects to be phased in over the next several years. The plan identifies intersection treatments that will improve overall traffic flow and safety.
4. ***How will emergency and utility vehicles make it in/out of those 2 small side streets, which are proposed by Radke-Toll Brothers?***
    a. The two streets proposed to provide access to the site will be designed to meet the City's Public Works and Fire Departments requirements.
5. ***Confirmation from the City of Kirkland that the cul-de-sac on 125th Street NE will remain a non through street to Juanita Drive NE.***
    a. The City has no plan to connect NE 125th Street to Juanita Drive NE with the proposed development.

cc: Rob Jammerman, Development Engineer Manager
Energov



The above Radke Proposed Lot Line Adjustment Parcel A Frontage Improvement Plan which includes the proposed conceptual layout of sidewalks and easements along the south portion of Radke Parcel A and in the right of way along 80th boarding the east side of Parcel A has been reviewed and approved by:

Randy Radke — Date: October 1st, 2015

Betsy Radke — Date: October 1st, 2015