THE WATERSHED COMPANY

SCIENCE & DESIGN

January 12, 2011

Desiree Goble
City of Kirkland Planning and Community Development
123 Fifth Avenue
Kirkland, WA 98033

Re: Residence XII Renovation and Expansion Project
Critical Areas Report Review
The Watershed Company Reference Number: 060701.13

Dear Desiree:

Thank you for the opportunity to review the critical areas report (CAR) for this project. The report includes a wetland delineation report and history, buffer reduction proposal, and a mitigation plan. It was prepared by David Evans and Associates (DEA) and is dated March 9, 2010. I have made multiple site visits to this site; the most recent took place on January 3, 2011.

The project seeks to expand the facility onto the three adjoining parcels south of the existing building. The expansion will include a new building and associated parking, landscaping, a trail through the wetland buffer, and a wood platform next to the trail. A six-foot wood fence crossing roughly 70 feet of the buffer is also proposed. The project proposes to use the buffer modification provisions in the Kirkland Zoning Code to permit the proposed site improvements. A buffer reduction from 100′ to 67′ is proposed across the site.

Findings

The wetland delineation history for this site is complex, with several firms employing multiple but similar delineation methodologies extending back to the first study by Shapiro & Associates in 1988. The DEA CAR does not disclose which delineation is used in the site plan and mitigation drawings. The Watershed Company (TWC) last delineated the wetland boundary in January 2008, but was never provided with a survey of the delineation flags. Per the CAR, DEA apparently conducted a subsequent delineation in September 2009. Until we received the CAR and conducted this review, The Watershed Company was not aware of the 2009 DEA delineation study. Unfortunately, no wetland boundary flags were present on the site during the site visit for this review. However, from a comparison of the CAR figures with the 2008 TWC

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field sketch and the field visit for this review, it appears the two studies differ in the location of the wetland boundary.

The buffer modification criteria in KZC 90.60 requires that land surface modifications shall be approved only if, among other requirements, "there is no practical or feasible alternative development proposal that results in less impact to the buffer." It appears as though there are areas where full buffer reduction is proposed that are not occupied by the essential development components of the new building and parking areas. There are three specific areas where the full buffer reduction may not be essential to the project:

1) A large triangular area northwest of the new building. It appears a courtyard or other landscaping is proposed here. The CAR has not demonstrated this area is the minimum necessary to accomplish the project objectives.

2) A small triangular area southwest of the new building. A trail connection is proposed here. The CAR has not demonstrated this area is the minimum necessary to accomplish the project objectives.

3) A triangular area south of the parking lot. The CAR has not demonstrated this area is the minimum necessary to accomplish the project objectives.

Similarly, it is possible not all parking stalls are necessary to the project. The parking requirement is 50 stalls per the CAR site plan (a1.0) while 64 stalls are proposed. Elimination of just 6 of the southernmost stalls would allow the site to retain the full 100-foot wetland buffer on the south side.

The CAR has quantified buffer impacts and proposed mitigation at a 1:1 replacement to loss ratio through enhancement with native woody vegetation. There is no code requirement or set precedent in Kirkland to use a prescriptive ratio. What the code does require is that the reduced buffer function at a higher level than the existing standard buffer (KZC 90.60(2)). For most of the reduced buffer length, it is reasonable to assume adequate functional lift will be realized by the proposed enhancement. However, no enhancement is provided south of the new parking lot. Since the buffer will be reduced in this area, a decrease in function is anticipated absent enhancement with native vegetation. Full enhancement of this southerly buffer area is needed to justify buffer reduction.

Per KZC chapter 90.30 (Definitions), "minor improvements" include "walkways, pedestrian bridges, benches and similar features…" The proposed trail appears to fit in this definition. However, the wood platform and 6-foot wood fence do not appear to meet the definition. The necessity of these features remains unclear. Furthermore, a 6-

foot wood fence would constitute a wildlife migration barrier and would therefore be problematic in the buffer.

While the trail has been accounted for in the impact and mitigation sections of the CAR, compliance with KZC 90.45(5)a – e. has not been shown. Specifically, section 90.45 requires that minor improvements be located in the outer one-half of the buffer (i.e. 50 feet or more from the wetland boundary). Trail comes within just a few feet of the DEA 2009 wetland boundary.

The split rail fence, as shown on WM-2, does not extend the full length of the project. The fence stops approximately 35 feet shy of the new property line south of the proposed new parking lot.

The high visibility fence is shown crossing approximately 320 feet of wetland along the south, west and north property lines. Presumably this is also a silt fence installed in a backfilled shallow trench per standard silt fence practice. Native shrubs are found in patches along where this fence is proposed. Therefore, fence placement should be relocated to avoid native shrubs. Trenching should be replaced with straw wattles or other erosion control BMP methods that do not involve excavation within the wetland.

For all mitigation plans in open areas such as the grass field on this project, the Kirkland standard for native plant density has followed guidelines from King County. Per that guidance, minimum adequate woody species spacing is 12 trees/1,000 square feet plus 28 shrubs/1,000 square feet. Mitigation monitoring in Kirkland since 2004 has shown that these ratios are dense enough that most plans meet their performance standards within the five-year timeframe. While the proposed shrub density is adequate, only 66 trees are proposed. At least 179 additional trees (245 total) are needed to meet density requirements and achieve the performance standards.

Proposed trees are specified as 6′ or 6′ - 8′ B&B (Balled and Burlap) on sheet WM-3. B&B trees are expensive, more difficult to plant, and generally perform poorly in mitigation sites due to heightened transplant shock. A more effective and less expensive option is to use 2-gallon stock. Smaller trees transplant much better and usually overtake most B&B trees within three years.

Plant installation details show each woody plant mulched with three inches of bark. A more effective and less expensive option is to use 4 inches of arborist chips or hog fuel. Thick applications of hogfuel more effectively limits competition from herbaceous weeds and field grasses and therefore improves survival and growth.

Soils described in the CAR are gravelly- and sandy-clay soils. Use of the buffer and portions of the wetland margin include historic pasture and current mowed field.

Typically such historic pastures, especially those with clay soils, require de-compaction and amendment with organic matter (compost) for good plant performance. The CAR does not propose any soil amendments or de-compaction outside of individual planting pits. This practice results in poor plant performance as plant roots tend to stay only within the planting pit and do not extend out into the surrounding soil. A better practice is a site-wide compost application that, if practical, is worked into the soil. If full incorporation of compost is impractical, a 2″ – 3″ topdressing application is still better than pit-amendment.

Performance standards are inconsistent between CAR pages 38 – 41 and plan sheet WM-6. To avoid confusion, performance standards should be identical in both areas of the CAR.

Survival counts in all years are proposed. However, survival counts become increasingly difficult and of diminishing value on large sites with volunteer vegetation and plant replacements. Therefore, survival counts should be limited to monitoring years 1 – 3.

No native species cover standards are proposed. At minimum the site should reach 60% native woody (sapling tree and shrub) cover by Year 3 and 85% by Year 5 with contingency replanting if the site is not progressing towards these targets.

While no formal description of the monitoring schedule is found the CAR, it appears as though the site will be monitored only once per year. KZC 90.55(4) (as referenced in 90.60(2)a.2) requires at least two site visits per year with one annual report. The first site visit is typically a weeding and maintenance evaluation in the spring; this information is supplied to the owner or other person responsible for site maintenance. The second, comprehensive site visit measures progress towards the performance standards.

An estimate of $29,470 is reported on sheet WM-6. However, no breakdown of how these costs were determined was provided for review. Also, the full bond amount uses 120% of the estimate, whereas KZC 90.145(3) requires 125%.

Recommendations

The following changes are recommended to bring the plan into conformance with City of Kirkland standards:

1) Use The Watershed Company delineation boundary from 2008 or provide flag locations in the field for review of delineated 2009 DEA boundary.

2) Propose buffer reductions only in areas where the reduction is unavoidable or provide justification for unavoidable buffer reductions outside the proposed parking and building footprints.

3) Reconsider the parking needed for the facility and determine if the full buffer reduction is necessary on the south side of the project.

4) Expand buffer enhancement to encompass all areas where buffer reduction is proposed, such as south of the proposed parking lot.

5) Relocate the trail "minor improvement" to the outer one-half of the 100-foot buffer.

6) Relocate the wood platform, and 6-foot wood fence outside the buffer.

7) Extend the split-rail fence to the adjusted eastern property line such that the fence is between the wetland buffer and the proposed development in all areas of the site.

8) Provide a detail for the high-visibility fence and incorporate BMPs that will not require trenching in the wetland. Alter the fence location to avoid clearing of native woody vegetation.

9) Increase the number of proposed native trees to 245.

10) Specify 2-gallon container plants for all proposed trees in place of B&B stock.

11) Specify arborist chips or hogfuel mulch in place of bark mulch.

12) Evaluate the need for soil amendment and de-compaction in all planted areas.

13) Rectify performance standard inconsistencies between CAR pages 38 through 41 and sheet WM-6.

14) Limit required survival counts to monitoring years 1 – 3.

15) Include performance standards for minimum native woody vegetation cover of 60% by Year 3 and 85% by Year 5. Include contingency replanting requirements if areas are not progressing toward these standards.

16) Propose at least two monitoring site visits per year.

17) Provide fully itemized spreadsheet of costs used to generate the mitigation cost estimate. Calculate the final cost using 125% rather than 120%.

Incorporation of the above recommendations will ensure the CAR meets the requirements of the KZC and will improve the chances of the site meeting performance standards and a successful bond release at the end of the 5-year monitoring period.

Please call if you have any questions or if we can provide you with any additional information.

Sincerely,

Hugh Mortensen, PWS, CSECL
Senior Ecologist

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Ms. Desiree Goble, Planner
City of Kirkland
123 Fifth Avenue
Kirkland, WA 98033

June 28, 2011

Subject: Residence XII - Buffer reduction permit
6-23-11 - Watershed comment response meeting

Desiree:

Based on our June 23, 2011 meeting with you, me, Sharon Chambers (Res XII), Scott Swarts (DEA) and Hugh Mortensen (Watershed) I documented the following understandings from the meeting.

Comment 1: Use the watershed Company Delineated boundary from 2008 or provide flag locations in the field for review of delineated 2009 DEA boundary.
Meeting results: DEA confirmed that wetland line as indicated on their drawings is from the 2008 Watershed company delineation.

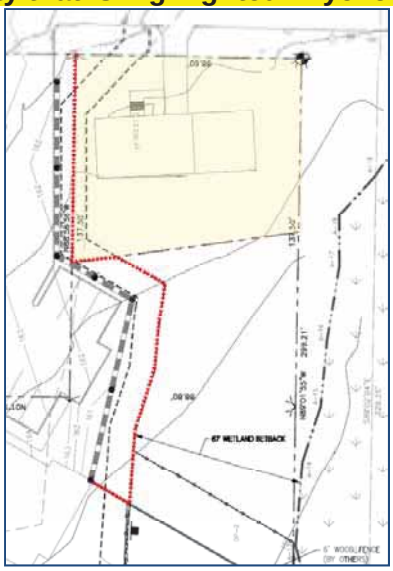
Comment 2: Propose buffer reductions only in areas where the reduction is unavoidable or provide justification for unavoidable buffer reductions outside the proposed parking and building footprints
Comment 3: Reconsider the parking needed for the facility and determine if the full buffer reduction is necessary on the south side of the proposed lot.
Meeting results: Open space, in the buffer, west of the proposed building: Like the original building, outdoor activities for the women take place on the west side of the facility. The Houghton wetlands, on which the property borders, have a serene quality which is important as a back drop for privacy, security and self healing. Residence XII needs these areas for unique landscaping specific to their needs. The east side of the facility will be completely encumbered by public parking and pedestrian circulation. In short, the west side is the only outdoor private area that is secure and the eastside is an unsecured public area.
Parking: We feel there is a strong need for the 14 parking stalls beyond the code required 50 stalls. Currently the stall requirement is based on a "nursing home" requirement of 1 parking stall for each bed and our future requirement will be 50 beds. We feel this is a good start but does not fulfill our requirement of providing parking for our large administrative staff of 25 and our outpatient counseling requirement of 24 patients three days per week for intensive outpatient therapy, 50 patients coming for weekly continuing care groups, a family program of 20 to 30 people four days a week and hosting large AA meetings of up to 75 people. We do not want to build too few parking stalls because our patients will park in nearby business lots which cause hard feeling with our neighbors. **This information will need to be provided in memo format with the other revisions.**

Comment 4: Expand buffer enhancement to encompass all areas where buffer reduction is proposed, such as south of the proposed parking lot.

Meeting results: All meeting participants agreed to the enhancement as described above.
Comment 5: Relocate the trail "minor improvement" to the outer half of the 100 foot buffer.
Meeting results: All meeting participants agreed to the enhancement as described above.

Comment 6: Relocate the wood platform and 6'-0" fence outside the buffer.
Meeting results: All agreed that the wood platform would be removed from the project but that a bench could replace the platform **and will be located in the outer half of the unmodified buffer**. The 6'-0" fence was proposed for security purposes. ***Desiree Goble will confirm***, but all agreed in principal to move the security fence to the East-West property line from 113th Ave NE to the new building edge. It will follow the proposed retaining wall separating property parcel # 292605-9182 from the new development

Comment 7: Extend the split-rail fence to the adjusted eastern property line such that the fence is between the wetland buffer and the proposed development in all areas of the site.
Meeting results: As described above we would prefer to substitute a 6'-0" security fence along the south portion of the buffer separating the buffer from the parking lot, ***Desiree Goble will confirm***. . **Does the red dashed line below indicate the proposed fence placement? It looks like there an existing chain link fence located around the property that is highlighted in yellow below.**



Comment 8: Provide a detail for the high visibility fence and incorporate BMP's that will not require trenching in the wetland. Alter the fence location to avoid clearing of native woody vegetation.
Meeting results: We agreed to all the above and will incorporate the changes in to our revised set of drawings. **Also, please indicate that the high visibility fence is**

equivalent to what the City of Kirkland refers to as a "temporary construction fence".

Comments 9, 10, 11 These comments were all agreed to and will be incorporated in the changes to our revised of drawings.

Comments 12: Evaluate the need for soil amendment and de-compaction in all planted areas.
Meeting results: Watershed commented that they like hog fuel and mulch as amendments for the soils. They further commented it is in our own best interests to check the soil and eliminate competition between grasses and plants. We agreed and will incorporate all comments made by Watershed.

Comment 13: Rectify performance standard inconsistencies between CAR pages 38 through 41 and sheet WM-6.
Meeting results: Desiree Goble stressed, for historical purposes, she requires DEA to correct the CAR and mitigation plan documents as described above. DEA agreed to this task.

Comment 14 and 15: These comments were agreed to and will be incorporated in the changes to our revised set of drawings.

Comment 16: Propose at least monitoring site visits per year.
Meeting results: Desiree Goble pointed out that 2 visits per year are mandatory per the City of Kirkland land use code. We agreed to and will abide by the 2 visits in the final mitigation plan.

Comment 17: Provide a fully itemized spreadsheet of costs used to generate the mitigation cost estimate. Calculate the final cost using 125% rather than 120%.
Meeting results: All agreed a copy of the itemized spreadsheet of costs will be provided and the final cost will use 125% vs. 120%.

Please note comment 6 and 7 are pending and are action items for Desiree Goble. Please get back to us as early as you can on the results of your investigation. If the balances of the documented responses are satisfactory to the City of Kirkland we will begin modifying the CAR and the mitigation plan documents for resubmission. Please feel free to call with any question or comments.

Regards,

Jeff Graves

Principal

Attachments: DEA memo dated May 17, 2011

Cc: Sharon Chambers, Peter Tountas, Greg Piantanida, Scott Swarts

Critical Areas Mitigation
Bond Quantity Worksheet

Project Name: Residence 12 Mitigation **Date: Aug 2011** **Prepared by:**

Project Number: RESX0000-0001 **Project Description: Mitigation Plan**

Location: Kirkland, WA **Applicant:** **Phone:**

PLANT MATERIALS*

Type	Unit Price	Unit	Quantity	Description	Cost
PLANTS: Potted, 4" diameter, medium	$5.00	Each			$ -
PLANTS: Container, 1 gallon, medium soil	$11.50	Each	275.00		$ 3,162.50
PLANTS: Container, 2 gallon, medium soil	$20.00	Each	830.00		$ 16,600.00
PLANTS: Container, 5 gallon, medium soil	$36.00	Each			$ -
PLANTS: Seeding, by hand	$0.50	SY			$ -
PLANTS: Slips (willow, red-osier)	$2.00	Each			$ -
PLANTS: Stakes (willow)	$2.00	Each	20.00		$ 40.00
PLANTS: Stakes (willow)	$2.00	Each			$ -
PLANTS: Balled burlapped 6'min. tree	$150.00	Each			$ -
PLANTS: Flats/plugs	$2.00	Each			$ -
					$ -
* All costs include installation				*TOTAL*	**$ 19,802.50**

INSTALLATION COSTS (LABOR, EQUIPMENT, & OVERHEAD)

Type	Unit Price	Unit			Cost
Wood Strand (Hog fuel) mulch, delivered and spread	$37.88	CY	327.00		$ 12,386.76
Decompacting till/hardpan, medium, to 6" depth	$1.57	CY	327.00		$ 513.39
Decompacting till/hardpan, medium, to 12" depth	$1.57	CY			$ -
Hydroseeding	$0.51	SY			$ -
Labor, general (landscaping)	$40.00	HR			$ -
Labor, general (construction)	$40.00	HR			$ -
Labor: Consultant, supervising	$55.00	HR			$ -
Labor: Consultant, on-site re-design	$95.00	HR			$ -
Rental of decompacting machinery & operator	$70.00	HR			$ -
Sand, coarse builder's, delivered and spread	$42.00	CY			$ -
Staking material (set per tree)	$7.00	Each			$ -
Surveying, line & grade	$250.00	HR			$ -
Surveying, topographical	$250.00	HR			$ -
Watering, 1" of water, 50' soaker hose	$3.62	MSF			$ -
Irrigation - temporary	$3,000.00	Acre	0.61		$ 1,830.00
Irrigation - buried	$4,500.00	Acre			$ -
Tilling topsoil, disk harrow, 20hp tractor, 4"-6" deep	$1.02	SY			$ -
	$25.00	HR			$ -
					$ -
				TOTAL	**$ 14,730.15**

HABITAT STRUCTURES*

ITEMS	Unit Cost	Unit			Cost
Fascines (willow)	$ 2.00	Each			$ -
Logs, (cedar), w/ root wads, 16"-24" diam., 30' long	$1,000.00	Each	3.00		$ 3,000.00
Nurse Logs (cedar) w/o root wads, 16"-24" diam., 30'	$1,500.00	Each			$ -
Logs, w/o root wads, 16"-24" diam., 30' long	$245.00	Each			$ -
Logs w/ root wads, 16"-24" diam., 30' long	$460.00	Each			$ -
Rocks, one-man	$60.00	Each			$ -
Rocks, two-man	$120.00	Each			$ -
Root wads	$163.00	Each			$ -
Spawning gravel, type A	$22.00	CY			$ -
Weir - log	$1,500.00	Each			$ -
Weir - adjustable	$2,000.00	Each			$ -
Woody debris, large	$163.00	Each			$ -
Snags - anchored	$400.00	Each			$ -
Snags - on site	$50.00	Each			$ -
Snags - imported	$800.00	Each	3		$ 2,400.00
Nest Box	$50.00	Each	3		$ 150.00
Bat Box	$50.00	Each	3		$ 150.00
* All costs include delivery and installation				*TOTAL*	**$ 5,400.00**

EROSION CONTROL

ITEMS	Unit Cost	Unit			Cost
Backfill and Compaction-embankment	$ 4.89	CY			$ -
Crushed surfacing, 1 1/4" minus	$30.00	CY			$ -
Ditching	$7.03	CY			$ -
Excavation, bulk	$4.00	CY			$ -
Straw wattle	$1.60	LF	317.00		$ 507.20
Jute Mesh	$1.26	SY			$ -
Mulch, by hand, straw, 2" deep	$1.27	SY			$ -
Mulch, by hand, bark mulch, 3" deep (wetland)	$3.25	SY			$ -
Mulch, by machine, straw, 1" deep	$0.32	SY			$ -
Piping, temporary, CPP, 6"	$9.30	LF			$ -
Piping, temporary, CPP, 8"	$14.00	LF			$ -
Piping, temporary, CPP, 12"	$18.00	LF			$ -
Plastic covering, 6mm thick, sandbagged	$2.00	SY			$ -
Rip Rap, machine placed, slopes	$33.98	CY			$ -
Rock Constr. Entrance 100'x15'x1'	$3,000.00	Each			$ -
Rock Constr. Entrance 50'x15'x1'	$1,500.00	Each			$ -
Sediment pond riser assembly	$1,695.11	Each			$ -
Sediment trap, 5' high berm	$15.57	LF			$ -
Sediment trap, 5' high berm w/spillway incl. riprap	$59.60	LF			$ -
Sodding, 1" deep, level ground	$5.24	SY			$ -
Sodding, 1" deep, sloped ground	$6.48	SY			$ -
Straw bales, place and remove	$600.00	TON			$ -
Hauling and disposal	$20.00	CY			$ -
Topsoil, delivered and spread	$35.73	CY	327.00		$ 11,683.71
					$ -
					$ -
				TOTAL	**$ 12,190.91**

GENERAL ITEMS

ITEMS	Unit Cost	Unit			Cost
Fencing, chain link, 6' high	$18.89	LF			$ -
Fencing, chain link, corner posts	$111.17	Each			$ -
Fencing, chain link, gate	$277.63	Each			$ -
Fencing, split rail, 3' high (2-rail)	$10.54	LF	1042.00		$ 10,982.68
Fencing, temporary (NGPE)	$1.20	LF			$ -
Signs, sensitive area boundary (inc. backing, post, install)	$28.50	Each	6.00		$ 171.00
High Visibility Fence	$1.60	Each	1011.00		$ 1,617.60
					$
					$ -
				TOTAL	**$ 12,771.28**

OTHER

(Construction Cost Subtotal) **$ 64,894.84**

ITEMS	Percentage of Construction	Unit			Cost
Mobilization	10%	1			$ 6,489.48
Contingency	30%	1			$ 19,468.45
				TOTAL	**$ 25,957.94**

MAINTENANCE AND MONITORING

NOTE: Projects with multiple permit requirements may be required to have longer monitoring and maintenance terms. This will be evaluated on a case-by-case basis for development applications. Monitoring and maintance ranges may be assessed anywhere from 5 to 10 years.

Maintenance, annual					
Less than 1,000 sq.ft. and buffer mitigation only	$ 1.08	SF		(3 annual events xSF; Includes monitoring)	$ -
Less than 1,000 sq.ft. with wetland or aquatic area mitigation	$ 1.35	SF		(3 annual events xSF; Includes monitoring)	$ -
Larger than 1,000 sq. ft. but less than 5,000 sq.ft. of buffer mitigation	$ 180.00	EACH		(4hr @$45/hr)	$ -
Larger than 1,000 sq. ft. but less than 5,000 sq.ft. of wetland or aquatic area mitigation	$ 270.00	EACH		(6hr @$45/hr)	$ -
Larger than 5,000 sq.ft. but < 1 acre -buffer mitigation only	$ 360.00	EACH	5.00	(8 hrs @ 45/hr)	$ 1,800.00
Larger than 5,000 sq.ft. but < 1 acre with wetland or aquatic area mitigation	$ 450.00	EACH		(10 hrs @ $45/hr)	$ -
Larger than 1 acre but < 5 acres - buffer and / or wetland or aquatic area mitigation	$ 1,600.00	DAY		(WEC crew)	$ -
Larger than 5 acres - buffer and / or wetland or aquatic area mitigation	$ 2,000.00	DAY		(1.25 X WEC crew)	$ -
Monitoring, annual					
Larger than 1,000 sq.ft. but less than 5,000 wetland or buffer mitigation	$ 720.00	EACH		(8 hrs @ 90/hr)	$ -
Larger than 5,000 sq.ft. but < 1 acre with wetland or aquatic area impacts	$ 900.00	EACH	5.00	(10 hrs @ $90/hr)	$ 4,500.00
Larger than 1 acre but < 5 acres - buffer and / or wetland or aquatic area impacts	$ 1,440.00	DAY		(16 hrs @ $90/hr)	$ -
Larger than5 acres - buffer and / or wetland or aquatic area impacts	$ 2,400.00	DAY		(24 hrs @ $90/hr)	$ -
Maintenance and Monitoring Inspection (DDES), annual	$362.25	EACH		(2.5 hrs @ $144.90/hr)	$ -
Maintenance and Monitoring Inspection (DDES), final	$579.60	EACH		(4 hrs @ $144.90/hr)	$ -
				TOTAL	**$ 6,300.00**

Total	**$97,152.78**

DAVID EVANS
AND ASSOCIATES INC.

MEMORANDUM

DATE: November 29, 2011

TO: Sharon Chambers
Residence XII
12029 113th Avenue NE
Kirkland, WA 98034

FROM: Scott Swarts

SUBJECT: **Residence XII Stormwater Dispersion Trench**

PROJECT: RESX00000001 – Renovation and Expansion

COPIES: file

On behalf of Residence XII, David Evans and Associates, Inc. (DEA) prepared this memorandum to describe the proposed stormwater treatment system, stormwater discharge characteristics, need to place the dispersion trench in buffer, and how the proposed stormwater system meets the criteria outlined in Kirkland Zoning Code (KZC) Section 90.45.3.: Storm Water Outfalls.

Proposed Stormwater System. The proposed stormwater treatment system will detain and treat an area covering approximately 1.21 acres. The "system" includes a series of two buried vaults: 1) detention/water quality vault, and 2) Contech Stormwater Solutions stormwater vault (**Attachment 1**). Stormwater runoff from impervious areas would be collected by catch basins and flow to the detention/water quality treatment vault by a series of storm pipes. The proposed underground detention/water quality vault will be 77 feet long by 40 feet wide by 11.5 feet deep. The detention/water quality vault detains stormwater runoff and allows larger particles to settle within it. The outflow of the detention/water quality vault is then treated by a series of twelve 27-inch CFS media filter cartridges housed in an 8- by 16-foot stormfilter vault. The detention/water quality vault and Contech Stormwater Solutions vault together meet the requirements of the 2009 King County Surface Water Design Manual (KCSWDM) for Enhanced Treatment (option 3, per 2009 KCSWDM Table 6.1.2.A). Treated water is then sent to a dispersion trench.

Stormwater Discharge Characteristics. Per the City of Kirkland requirements, the proposed site has a detention vault that is sized per the Level II standards of the 2009 KCSWDM. Level II flow control requires that the developed discharge durations be matched to predeveloped durations for the range of predeveloped discharge rates from 50 percent of the 2-year peak flow up to the full 50-year peak flow. In addition, the developed peak discharge rates are matched to predeveloped discharge rates for the 2-year and 10-year storms. The predeveloped site conditions were modeled as "Till Forest" per the KCSWDM.

Need to place the dispersion trench in the buffer. The dispersion trench outfall should be designed such that it will not backwater the storm system into either the Contech Solutions Stormwater stormfilter vault nor the detention/water quality vault. The placement of the dispersion trench shall be downstream of all storm facilities

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and be constructed along a level grade, so that the discharge from the dispersion trench equally discharges to a downstream area. These constraints require the dispersion trench to be located within the wetland buffer.

If the dispersion trench were relocated closer to the building, where elevations are higher, the dispersion trench outfall elevation would also have to rise. This raise in outfall elevation of the dispersion trench would create a backwater condition in the stormfilter vault. The stormfilter vault becomes ineffective when this happens, and the stormwater would be discharged from the site without the proper treatment. The design of the detention vault and site layout cannot be practically revised to prevent the backwater conditions in the stormfilter vault. In addition, relocating the dispersion trench outside of the wetland buffer will cause impacts to the proposed building foundation walls and to the proposed wall surrounding the parking lot. Together, these impacts create impractical designs/detention/water quality vault designs.

Stormwater system criteria per KZC Section 90.45.3.: Storm Water Outfalls. The project engineers attempted to place the dispersion trench as far away from the wetland and associated buffer and structure setback as was feasibly possible based on required design criteria within the KCSWDM and site constraints. Despite these efforts, the proposed location of the dispersion trench is within the wetland buffer as depicted on **Attachment 1**. The dispersion trench is approximately 104 feet long by 3.5 feet wide, and would cover approximately 364 square feet of buffer, which was included as an impact in the mitigation plan prepared for this project. Based on flow-path, the dispersion trench is typically 40 feet from the wetland edge, but up to 62 feet at its maximum.

Placement of a dispersion trench within the buffer is allowed per KZC 90.45 as long as it can be demonstrated that doing so will not adversely affect: a) water quality; b) fish, wildlife, or their habitat; c) drainage or storm water detention capabilities; d) lead to unstable earth conditions or create erosion hazards or contribute to scouring actions; and e) be materially detrimental to any other property in the area of the subject property or to the city as a whole, including the loss of significant open space or scenic vistas.

a. **Adversely affect water quality**. The proposed stormwater system provides <u>enhanced</u> treatment that includes a series of 12 CFS media filter cartridges. CFS Leaf Media is a granular organic media created from deciduous leaves that are effective at removing soluble metals, total suspended solids (TSS), oil, and neutralizing acid rain. Treated water from the CFS cartridges is discharged to the dispersion trench located in the wetland buffer where it will then flow subsurface through the buffer soils prior to reaching the Heronfield (Juanita 6) wetland complex. The buffer soils will be tilled and amended with a three-way soil mixture that includes 40 percent compost. This will facilitate subsurface flow and additional water quality treatment. Furthermore, a diverse assemblage of trees and shrubs will be planted in the buffer between the dispersion trench and wetland edge that will provide additional treatment and soil stability. Based on the proposed stormwater treatment system providing enhanced treatment and overall flow path, constructing the proposed dispersion trench in the buffer as indicated in **Attachment 1** will not result in an adverse affect to water quality.

b. **Adversely affect fish, wildlife, or their habitat**. As mentioned above, the proposed stormwater system will provide enhanced treatment prior to discharge into the wetland buffer where additional treatment will occur. The stormwater system is subsurface so fish and wildlife will not be exposed to untreated stormwater. The stormwater discharge characteristics (described above) and extended distance between the project site and

documented fish habitat negates the potential to impact fisheries resources associated with Juanita Creek. Based on the proposed stormwater treatment providing enhanced treatment, stormwater detention, overall flow path, and extended distance between the project site and fish resources, constructing the proposed dispersion trench in the buffer as indicated in **Attachment 1** will not result in an adverse affect to fish, wildlife, or their habitat. Furthermore, the overall project will result in a net improvement to wildlife and wildlife habitat by implementing the proposed mitigation plan.

c. **Adversely affect drainage or storm water detention capabilities.** The placement of the proposed dispersion trench within the buffer is being driven by the need to not adversely affect drainage or stormwater detention capabilities. Moving the dispersion trench closer to the building would affect drainage and water detention capabilities.

d. **Lead to unstable earth conditions or create erosion hazards or contribute to scouring actions.** The design of the dispersion trench is such that water exiting it will be spread over a relatively long distance (~100 feet) and therefore eliminate erosion and scour typically associated with constrained outlets such as culverts or pvc pipes. The location of the dispersion trench has also been selected so it is on a relatively level plane, which will limit water velocity and therefore erosion potential. Furthermore, water will generally flow subsurface through tilled soils that have been amended. These soils will be partially bound by the root systems of installed native vegetation as outlined in the mitigation plan (**Attachment 1**). Lastly, the mitigation area, where the dispersion trench is proposed to be located, will include placement of "hog fuel" that will help stabilize the site and further reduce the potential of the dispersion trench resulting in unstable soils, erosion, or scour. Therefore, constructing the proposed dispersion trench in the buffer as indicated in **Attachment 1** will not lead to unstable earth conditions or create erosion hazards or contribute to scouring actions.

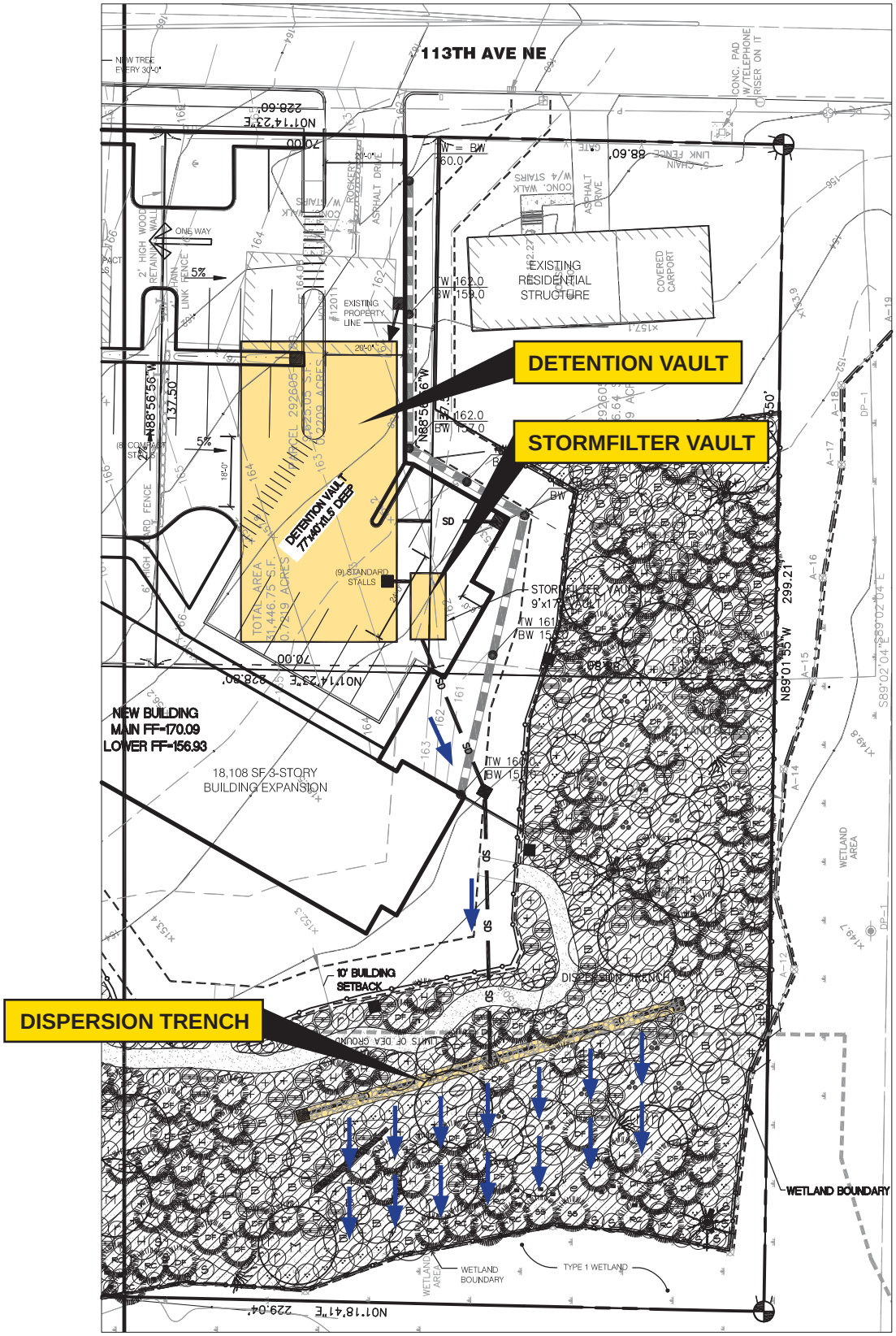
e. **Be materially detrimental to any other property in the area of the subject property or to the city as a whole, including the loss of significant open space or scenic vistas**. The dispersion trench is upslope of Heronfield wetland (Juanita 6), so no other developed properties are downslope of the immediate flowpath. The Heronfield wetland complex covers approximately 15.6 acres. The proposed project includes restoring approximately 0.61 acre of currently degraded wetland buffer, which will improve the quality and functionality of the existing open space and scenic vistas. Based on this information and other data presented in this memorandum, constructing the proposed dispersion trench in the buffer as indicated in **Attachment 1** will not be materially detrimental to any other property in the area of the subject property or to the city as a whole, including the loss of significant open space or scenic vistas.

Based on the information presented in this memorandum, DEA concludes placement of the proposed dispersion trench as shown in **Attachment 1** meets the criteria outlined in KZC Section 90.45.3.: Storm Water Outfalls. We hope you have found our analysis useful and that you concur with our findings. Do not hesitate to contact me directly if you have any questions or comments regarding this memorandum.

Attachments/Enclosures: Attachment 1

Initials: sasw

File Name: T:\R\RESX00000001\0600INFO\0670Reports\Dispersion Trench Memo\Residence XII Dispersion Memo.docx



N

1" = 40'

Flow Path

Stormwater Treatment System	
Residence XII Redevelopment Project	
RESX0000-0001	Attachment 1
November 2011	

DAVID EVANS AND ASSOCIATES INC.

NATURAL GREENBELT PROTECTIVE EASEMENT

Grantor: _____, owner of the hereinafter described real property, hereby grants to

Grantee: The City of Kirkland, a municipal corporation.

A natural greenbelt protective easement over and across the following described real property to wit ("Easement Area"):

No tree trimming, tree topping, tree cutting, tree removal, shrub or brush-cutting or removal of native vegetation, application of pesticides, herbicides, or fertilizers; construction; clearing; or alteration activities shall occur within the Easement Area without prior written approval from the City of Kirkland. Application for such written approval to be made to the Kirkland Department of Planning and Community Development who may require inspection of the premises before issuance of the written approval and following completion of the activities. Any person conducting or authorizing such activity in violation of this paragraph or the terms of any written approval issued pursuant hereto, shall be subject to the enforcement provisions of Chapter 170, Ordinance 3719, the Kirkland Zoning Code. In such event, the Kirkland Department of Planning and Community Development may also require within the immediate vicinity of any damaged or fallen vegetation, restoration of the affected area by planting replacement trees and other vegetation as required in applicable sections of the Kirkland Zoning Code. The Department also may require that the damaged or fallen vegetation be removed.

It is the responsibility of the property owner to maintain critical areas and their buffers by removing non-native, invasive, and noxious plants in a manner that will not harm critical areas or their buffers and in accordance with Kirkland Zoning Code requirements for trees and other vegetation within critical areas and critical area buffers.

The City shall have a license to enter the Easement Area (and the property if necessary for access to the Easement Area) for the purpose of monitoring compliance with the terms of this easement.

Development outside of this Natural Greenbelt Protective Easement may be limited by codified standards, permit conditions, or movement of the critical area.

DRAFT

Each of the undersigned owners agree to defend, pay, and save harmless the City of Kirkland, its officers, agents, and employees from any and all claims of every nature whatsoever, real or imaginary, which may be made against the City, its officers, agents, or employees for any damage to property or injury to any person arising out of the existence of said Natural Greenbelt Protective Easement over said owner's property or the actions of the undersigned owners in carrying out the responsibilities under this agreement, including all costs and expenses, and recover attorney's fees as may be incurred by the City of Kirkland in defense thereof; excepting therefrom only such claims as may arise solely out of the negligence of the City of Kirkland, its officers, agents, or employees.

This easement is given to satisfy a condition of the development permit approved by the City of Kirkland under Kirkland File/Permit No. _____, for construction of _____ upon the following described real property:

This easement shall be binding upon the parties hereto, their successors and assigns, and shall run with the land.

DATED at Kirkland, Washington, this _____ day of _____, _____.

DRAFT

(Sign in blue ink)

(*Individuals Only*)

OWNER(S) OF REAL PROPERTY (INCLUDING SPOUSE)

_____

_____

_____

(*Individuals Only*)

STATE OF WASHINGTON)
) SS.
County of King)

On this _____ day of _____, _____, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared _____ and _____ to me known to be the individual(s) described herein and who executed the Natural Greenbelt Protective Easement and acknowledged that _____ signed the same as _____ free and voluntary act and deed, for the uses and purposes therein mentioned.

WITNESS my hand and official seal hereto affixed the day and year first above written.

_____
Notary's Signature

_____
Print Notary's Name
Notary Public in and for the State of Washington, Residing at: _____
My commission expires: _____

DRAFT

(*Partnerships Only*)

OWNER(S) OF REAL PROPERTY

_____
(Name of Partnership or Joint Venture)

_____
By General Partner

_____
By General Partner

_____
By General Partner

(*Partnerships Only*)

STATE OF WASHINGTON)
) SS.
County of King)

On this _____ day of _____, _____, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared _____ and _____ to me, known to be general partners of _____, the partnership that executed the Natural Greenbelt Protective Easement and acknowledged the said instrument to be the free and voluntary act and deed of each personally and of said partnership, for the uses and purposes therein set forth, and on oath stated that they were authorized to sign said instrument.

WITNESS my hand and official seal hereto affixed the day and year first above written.

_____
Notary's Signature

_____
Print Notary's Name
Notary Public in and for the State of Washington, Residing at: _____
My commission expires: _____

DRAFT

(Corporations Only)

OWNER(S) OF REAL PROPERTY

_____
(Name of Corporation)

_____
By President

_____
By Secretary

(*Corporations Only*)

STATE OF WASHINGTON)
) SS.
County of King)

On this _____ day of _____, _____, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared _____ and _____ to me, known to be the President and Secretary, respectively, of _____, the corporation that executed the Natural Greenbelt Protective Easement and acknowledged the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein set forth, and on oath stated that they were authorized to sign said instrument and that the seal affixed is the corporate seal of said corporation.

WITNESS my hand and official seal hereto affixed the day and year first above written.

_____
Notary's Signature

_____
Print Notary's Name
Notary Public in and for the State of Washington, Residing at: _____

My commission expires: _____

DRAFT

This document is not valid unless produced by Multi Media Services on official watermark paper

SAVE HARMLESS AGREEMENT - WETLAND

The undersigned, being all of the owners of the hereinafter described real property, hereby agree to indemnify, defend, and save harmless the City of Kirkland, its officers and employees from any claim, real or imaginary, filed against the City of Kirkland, its officers, or employees, alleging damage or injury caused by fault on the part of the undersigned, their employees or agents, and/or the City of Kirkland, its officers, or employees and arising out of maintenance, flooding, damming or enlargement of the wetland existing on the hereinafter described real property; provided, however, this agreement shall not include damage resulting from the sole fault of the City of Kirkland, its officers, or employees. Fault as herein used shall have the same meaning as set forth in RCW 4.22.01. This Agreement shall also include all reasonable cost and expense, including attorney's fees, incurred by the City of Kirkland in investigation and/or defense of any such claim.

This Agreement shall be binding upon the heirs, successors, and assigns of the parties hereto and shall run with the land.

The real property subject to this Agreement is situated in Kirkland, King County, Washington, and described as follows:

DATED at Kirkland, Washington, this _____day of _____, _____.

DRAFT

(Sign in blue ink)

(*Individuals Only*)

OWNER(S) OF REAL PROPERTY (INCLUDING SPOUSE)

_____

_____

_____

(*Individuals Only*)

STATE OF WASHINGTON)
) SS.
County of King)

On this _____ day of _____, _____, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared _____ and _____ to me known to be the individual(s) described herein and who executed the Save Harmless Agreement - Wetland and acknowledged that _____ signed the same as _____ free and voluntary act and deed, for the uses and purposes therein mentioned.

WITNESS my hand and official seal hereto affixed the day and year first above written.

_____
Notary's Signature

_____
Print Notary's Name
Notary Public in and for the State of Washington, Residing at: _____

My commission expires: _____

DRAFT

(*Partnerships Only*)

OWNER(S) OF REAL PROPERTY

_____
(Name of Partnership or Joint Venture)

_____
By General Partner

_____
By General Partner

_____
By General Partner

(*Partnerships Only*)

STATE OF WASHINGTON)
) SS.
County of King)

On this _____ day of _____, _____, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared _____ and _____ to me, known to be general partners of _____, the partnership that executed the Save Harmless Agreement - Wetland and acknowledged the said instrument to be the free and voluntary act and deed of each personally and of said partnership, for the uses and purposes therein set forth, and on oath stated that they were authorized to sign said instrument.

WITNESS my hand and official seal hereto affixed the day and year first above written.

_____
Notary's Signature

_____
Print Notary's Name
Notary Public in and for the State of Washington, Residing at: _____
My commission expires: _____

DRAFT

(Corporations Only)

OWNER(S) OF REAL PROPERTY

_____
(Name of Corporation)

_____
By President

_____
By Secretary

(*Corporations Only*)

STATE OF WASHINGTON)
) SS.
County of King)

On this _____ day of _____, _____, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared _____ and _____ to me, known to be the President and Secretary, respectively, of _____, the corporation that executed the Save Harmless Agreement - Wetland and acknowledged the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein set forth, and on oath stated that they were authorized to sign said instrument and that the seal affixed is the corporate seal of said corporation.

WITNESS my hand and official seal hereto affixed the day and year first above written.

_____
Notary's Signature

_____
Print Notary's Name
Notary Public in and for the State of Washington, Residing at: _____

My commission expires: _____

The foregoing Agreement is accepted by the City of Kirkland this _____ day of _____, _____

CITY OF KIRKLAND

BY: _____

DRAFT

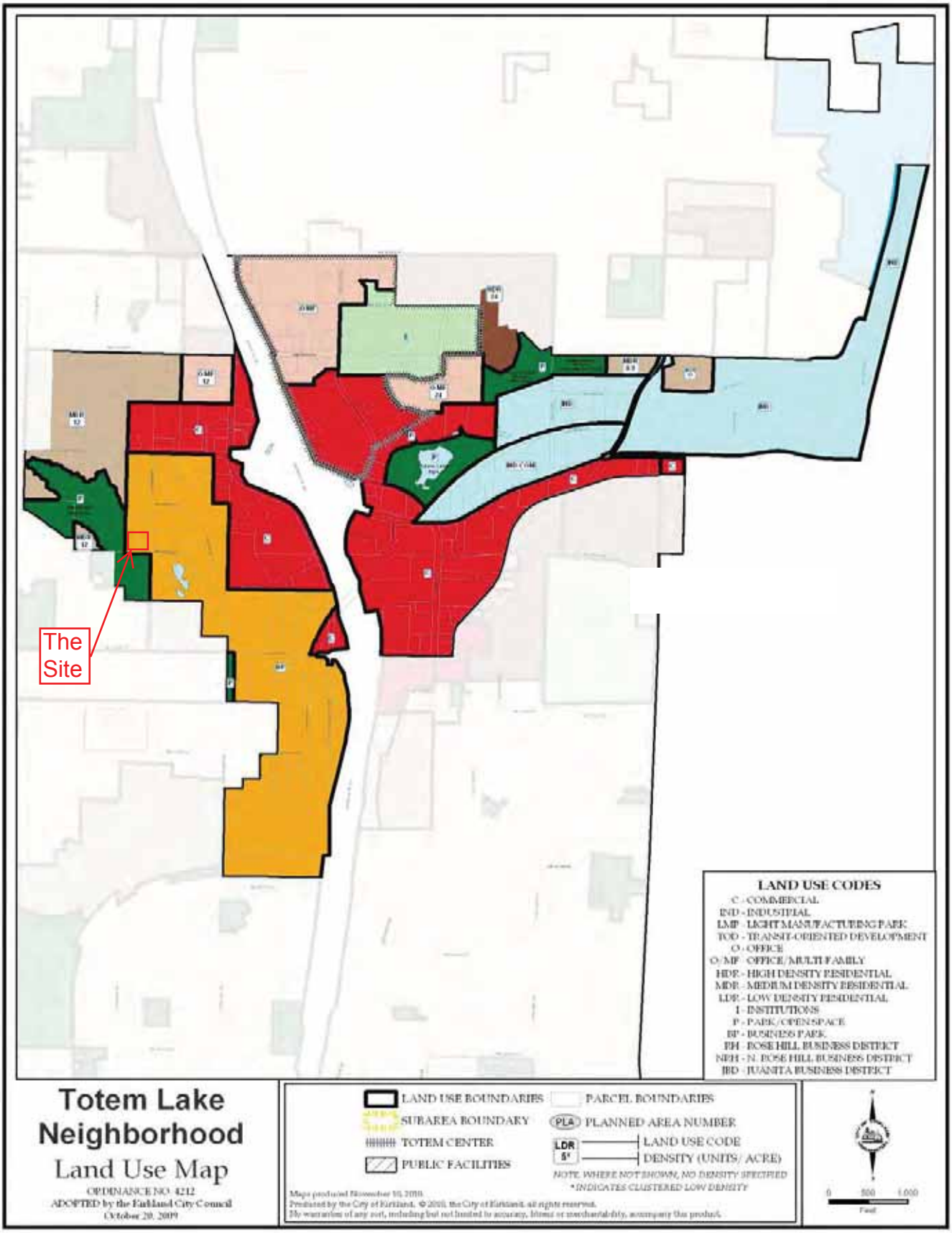


Figure TL-3: Totem Lake – Land Use

Gilles Consulting
Brian K. Gilles
425-822-4994

Evaluation of trees
At

The Residence XII Expansion
At
12029, 12021, 12011, and 12007
100 13th Ave. NE.
Kirkland, WA 98034

January 26, 2010

PREPARED FOR:
Jeff Graves, Principal
Gram\Sage\Graves Inc.
144 Railroad Avenue, # 101
Edmonds, WA 98020

PREPARED BY:
GILLES CONSULTING
Brian K. Gilles, Consulting Arborist
ISA Certified Arborist # PN-0260A
ASCA Registered Consulting Arborist # RCA-418
PNW-ISA Certified Tree Risk Assessor #148

Fax: 425-822-6314
E-mail: bkgilles@comcast.net
P.O. Box 2366 Kirkland, WA 98083

Printed on recycled paper

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EXECUTIVE SUMMARY

Count of GC TREE #'s		SIGNIFICANCE		
TREE LOCATION	**TREE ORIENTATION**	**Not Significant**	**Significant**	**Grand Total**
Subject property	12011	17	1	18
	12007	4	7	11
	12021	24		24
	12029	31		31
Subject property Total		76	8	84
Right-of-way	12029	3		3
Right-of-way Total		3		3
Grand Total		**79**	**8**	**87**

Count of GC TREE #'s		VIABILITY		
TREE LOCATION	**TREE ORIENTATION**	**Non-viable**	**Viable**	**Grand Total**
Right-of-way	12029	3		3
Right-of-way Total		3		3
Subject property	12011	18		18
	12007	7	4	11
	12021	24		24
	12029	31		31
Subject property Total		80	4	84
Grand Total		83	4	87

ASSIGNMENT

Jeff Graves, principal with Gram\Sage\Graves Inc., contracted with Gilles Consulting to evaluate the trees at the Residence XII existing facility at 12029 113th Ave. NE in Kirkland, Washington. The facility has purchased the three homes immediately south of the existing facility and is planning an expansion. Those properties include 12007, 12011, and 12021 113th Ave. NE., Kirkland, Washington. The property is being re-developed

and the City of Kirkland requires an analysis of the trees as part of the permit process. This report provides the analysis. The information in this report can be utilized to create a Tree Plan as required by Chapter 95 of the Kirkland Code.

METHODOLOGY

To evaluate the trees and to prepare the report, I drew upon my 25+ years of experience in the field of arboriculture and my formal education in natural resources management, dendrology, forest ecology, plant identification, and plant physiology. I also followed the protocol of the International Society of Arboriculture (ISA) for Visual Assessment (VA) that includes looking at the overall health of the trees as well as the site conditions. This is a scientifically based process to look at the entire site, surrounding land and soil, as well as a complete look at the trees themselves.

In examining each tree, I looked at such factors as: size, vigor, canopy and foliage condition, density of needles, injury, insect activity, root damage and root collar health, crown health, evidence of disease-causing bacteria, fungi or virus, dead wood and hanging limbs.

Failure

While no one can predict with absolute certainty which trees will or will not fail, we can, by using this scientific process, assess which trees are most likely to fail and take appropriate action to minimize injury and damage.

Tree Tags

The trees were tagged and numbered 700 through 787. The tags are made of shiny aluminum approximately one inch by three inches in size and are attached to the tree with staples and a one foot strip of brightly colored survey tape. The tags were placed as high as possible to minimize their removal and were generally placed on the South sides of the trunks. Please refer to *Attachment 1, General Site Sketch/Site Plan* for an orientation to the site and the approximate location of the trees.

Missing Trees

There were a few trees on the site that were not included on the survey. They were labeled with the next number in the sequence and then their approximate location was indicated on the included site plan. These trees may need to be surveyed to determine their exact location in relation to the proposed site improvements in order to determine if they can be retained.

OBSERVATIONS

The new properties to the south of the existing facility consist of three single-family home properties with driveways, walkways and stairs to the front doors and backyard

decks. The properties slope generally from east to west and from South to North. The trees are mainly clustered around the houses. There is a line of trees along the mutual property line between 12029 and 12021.

Photo # 1: looking at the row of trees between 12929 & 12021 -- vehicles in the existing parking lot at 12029 can be seen in the lower right corner

Photo # 2: the existing facility at 12029 -- looking SW to the row of trees along the boundary line between 12029 and 12021

In an effort to present the information and conclusions for each tree in a manner that is clear and easy to understand, as well as to save paper (the ISA form is a two page form

for each tree), I have included a detailed spreadsheet, *Attachment 2, Tree Inventory/Condition Spreadsheet*. All the same information from the ISA Tree Hazard Form is included in this spreadsheet and the attached glossary. The descriptions on the spreadsheet were left brief in order to include as much pertinent information as possible and to make the report manageable. The attached glossary provides a detailed description of the terms used in the spreadsheet and in this report. It can be found in *Attachment 3, Glossary*. A brief review of these terms and descriptions will enable the reader to rapidly move through the spreadsheet and better understand the information.

Additional Testing

All of the trees presented symptoms or signs that were easily discernible. A few trees have structural defects or internal decay that was obvious. Therefore, no additional tests were performed during this site visit.

Photo # 3: looking SE at the back of 12007 and 12011

Photos #'s 4 & 5: tree number 701 -- the willow tree in the right-of-way that has been utility pruned/topped and has advanced rot at the base

DISCUSSION AND RECOMMENDATIONS

Trees on Adjacent Properties

There are no trees on adjacent properties with canopies that overhang the subject properties.

Right-of-Way Trees

There are 5 Trees in the 113th Ave. NE right-of-way.

- Tree number 701 is in front of 12011:
  - It is a Pacific Willow in poor condition. It has been repeatedly topped by the utility company. It has multiple forks coming out of a rotten base. The rot extends several feet up into the large trunks.
  - The tree is *Not-Viable* and not worthy of retention.
- Tree number 702 is in front of 12007:
  - It is a big leaf Maple tree that is also in poor condition.
  - The tree is *Not-Viable* and not worthy of retention.
- Trees # 785, 786, and 787 are growing in the planter strip between the curb in the sidewalk in front of the existing facility at 12029:
  - They are all three red maples that are in fair condition.
  - They are all three worthy of retention.

Count of GC TREE #		**SIGNIFICANCE**		
TREE LOCATION	**TREE ORIENTATION**	**Not Significant**	**Significant**	**Grand Total**
Subject property	12011	17	1	18
	12007	4	7	11
	12021	24		24
	12029	31		31
Subject property Total		76	8	84
Right-of-way	12029	3		3
Right-of-way Total		3		3
Grand Total		**79**	**8**	**87**

Count of GC TREE #		VIABILITY		
TREE LOCATION	TREE ORIENTATION	Non-viable	Viable	Grand Total
Right-of-way	12029	3		3
Right-of-way Total		3		3
Subject property	12011	18		18
	12007	7	4	11
	12021	24		24
	12029	31		31
Subject property Total		80	4	84
Grand Total		83	4	87

Trees on the Subject Property

All of the trees included in this report were evaluated for significance and viability as required by Kirkland Code. There are 82 trees are on the subject property that are included in this report. However, many of the trees are not likely to be impacted by the proposed development due to their location around the existing parking lot in the existing facility at 12029. Therefore, full data and evaluation was not collected for those trees. Partial data was collected -- enough data to be able to determine significance, viability, and tree credits.

Required Tree Retention

Chapter 95 of Kirkland Code is Tree Management and Required Landscaping. Section 95.35, Tree Retention, Protection, and Density, spells out the requirements for tree retention and how it is to be done. Subsection 95.35.2 Tree Plan II states, *"A Tree Plan II is required for a development permit or land surface modification resulting in site disturbance and impact to a significant tree in required yards and areas for required landscaping for three or more detached, attached, or stacked dwelling units; or in any use other than residential."* The subsection goes on to describe the requirements of the Tree Plan II:

- "the site map depicting accurate location of significant trees and their drip lines measured relative to visible site features (a survey may be required) and approximate location of significant trees on adjacent property with drip lines extending over the subject property: and
- "a report by a qualified professional stating the size (DBH), species, an assessment of health and determination of viable trees in the areas of required landscaping;

- Additional requirements include having a significant trees and tree protection measures shown on all plan sets including demolition, grading, landscape, and utilities.

Retention of course, needs to take into account the location of the trees and the location of the proposed improvements. However, I strongly advocate retaining as many more trees as possible over the minimum required, if development allows. This affords significant flexibility during construction when unforeseen circumstances and events require the removal of trees that were at first planned for retention. If there is a bank of extra *Significant and Viable Trees* somewhere else on the property they can be switched out with one or more trees that need to be removed unexpectedly.

Minimum Tree Density Calculations

Subsection 95.35.2.d of the Kirkland Code states that a Tree Plan II shall not have the minimum tree density requirement "but shall comply with the required landscaping pursuant to KZC 95. 40."

Please refer to Chapter 95, Tree Management and Required Landscaping, Section 95.40 to determine the required tree retention.

The information from this report will need to be transferred to the *Tree Plan II* - which needs to include tree retention and tree protection.

Tree Protection Measures

In order for trees to survive the stresses placed upon them in the construction process, tree protection must be planned in advance of equipment arrival on site. If tree protection is not planned integral with the design and layout of the project, the trees will suffer needlessly and possibly die. With proper preparation, often costing little or nothing extra to the project budget, trees can survive and thrive after construction. This is critical for tree survival because damage prevention is the single most effective treatment for trees on construction sites. Once trees are damaged, the treatment options available are limited.

The minimum Tree Protection Measures in *Attachment 4, Tree Protection Measures* are on three separate sheets that can be copied and introduced into all relevant documents such as site plans, permit applications and conditions of approval, and bid documents so that everyone involved is aware of the requirements. These Tree Protection Measures are intended to be generic in nature. They will need to be adjusted to the specific circumstances of your site that takes into account the location of improvements and the locations of the trees.

WAIVER OF LIABILITY

There are many conditions affecting a tree's health and stability, which may be present and cannot be ascertained, such as, root rot, previous or unexposed construction damage, internal cracks, stem rot and more which may be hidden. Changes in circumstances and conditions can also cause a rapid deterioration of a tree's health and stability. Adverse weather conditions can dramatically affect the health and safety of a tree in a very short amount of time. While I have used every reasonable means to examine these trees, this evaluation represents my opinion of the tree health at this point in time. These findings do not guarantee future safety nor are they predictions of future events.

The tree evaluation consists of an external visual inspection of an individual tree's root flare, trunk, and canopy from the ground only unless otherwise specified. The inspection may also consist of taking trunk or root soundings for sound comparisons to aid the evaluator in determining the possible extent of decay within a tree. Soundings are only an aid to the evaluation process and do not replace the use of other more sophisticated diagnostic tools for determining the extent of decay within a tree.

As conditions change, it is the responsibility of the property owners to schedule additional site visits by the necessary professionals to ensure that the long-term success of the project is ensured. It is the responsibility of the property owner to obtain all required permits from city, county, state, or federal agencies. It is the responsibility of the property owner to comply with all applicable laws, regulations, and permit conditions. If there is a homeowners association, it is the responsibility of the property owner to comply with all Codes, Covenants, and Restrictions (CC&R's) that apply to tree pruning and tree removal.

This tree evaluation is to be used to inform and guide the client in the management of their trees. This in no way implies that the evaluator is responsible for performing recommended actions or using other methods or tools to further determine the extent of internal tree problems without written authorization from the client. Furthermore, the evaluator in no way holds that the opinions and recommendations are the only actions required to insure that the tree will not fail. A second opinion is recommended. The client shall hold the evaluator harmless for any and all injuries or damages incurred if the evaluator's recommendations are not followed or for acts of nature beyond the evaluator's reasonable expectations, such as severe winds, excessive rains, heavy snow loads, etc.

This report and all attachments, enclosures, and references, are confidential and are for the use of the client concerned. They may not be reproduced, used in any way, or disseminated in any form without the prior consent of the client concerned and Gilles Consulting.

Thank you for calling Gilles Consulting for your arboricultural needs.

Sincerely,

Brian K. Gilles, Consulting Arborist
ISA Certified Arborist # PN-0260A
ASCA Registered Consulting Arborist # RCA-418
PNW-ISA Certified Tree Risk Assessor #148

ATTACHMENTS

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ATTACHMENT 2 - TREE INVENTORY/CONDITIONS SPREADSHEET 14

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EATTACHMENT 5 - REFERENCES 30

SE 1/4, SEC. 29, TWP 26N., RNG. 5E., W.M.

NOTES

1. PURPOSE OF THIS SURVEY: THIS SURVEY WAS PERFORMED IN SEPTEMBER, 2009 IN SUPPORT OF A BUILDING ADDITION PROJECT. CERTAIN FEATURES HAVE BEEN INCLUDED HEREON AS A SUPPLEMENT TO CLIENT PROVIDED CADD FILES. THIS SURVEY IS LIMITED TO VERIFYING ONLY THOSE FEATURES WHICH HAVE BEEN ADDED. A LISTING OF WHICH IS AS FOLLOWS:

   BUILDING CORNERS OF THE RESIDENCE 12 BUILDING.
   WEST WALL FEATURES OF THE RESIDENCE 12 BUILDING.
   THE PATIO IN THE VICINITY OF THE NW CORNER OF THE RESIDENCE 12 BUILDING.
   THE TRANSFORMER LOCATED IN THE SOUTH PARKING AREA PLANTER.
   APPROXIMATELY 30 TREES SURROUNDING THE RESIDENTIAL BUILDINGS.
   LOCATION OF THE HOUSE ON PARCEL 292605-9182.
   THE EXISTING RESIDENCE 12 MAIN DRIVEWAY.
   CONCRETE RETAINING WALLS JUST WEST OF THE SOUTH PARKING LOT.
   WETLAND FLAGS PLACED BY DEA.
   2 FOOT CONTOURS ON THE WEST 00' OF PARCEL 292605-0126 AND A 25' OVERLAP ON TO THE WESTERLY ADJOINING PARCEL.

2. BASIS OF BEARING: WASHINGTON COORDINATE SYSTEM, NORTH ZONE, NAD 83/91.
3. VERTICAL DATUM: NAVD-88
4. SITE BENCHMARKS:
   ESM TEMPORARY BENCH MARK #1, A 4"X4" CONCRETE MONUMENT DOWN 0.5' AT THE CENTERLINE INTERSECTION OF NE 120TH ST AND 113TH AVENUE SE
   ELEV = 157.53 FEET
5. METHODOLOGY: FIELD MEASUREMENT FOR THIS SURVEY WERE PERFORMED USING A LEICA 1201 TOTAL STATION. THIS SURVEY COMPLIES WITH THE MINIMUM REQUIRED "ERROR OF CLOSURE" OF 1:10,000 FOR WASHINGTON STATE PLANE COORDINATES AS SET FORTH PER W.A.C. 332-130-090 (AND POSITIONAL TOLERANCE LEVELS OF LESS THAN 0.01 METERS)
6. MONUMENTATION VERIFICATION: ALL SURVEY MONUMENTS AND OTHER SURVEY MARKERS SHOWN HEREON WERE PROVIDED BY THE CLIENT. DEA DOES NOT GUARENTEE THE ACCURACY OF THE MONUMENTS OR BOUNDARY.
7. ENCUMBRANCES: THIS SURVEY DOES NOT SHOW EASEMENTS OF RECORD OR OTHER PROPERTY RIGHTS WHICH MAY ENCUMBER OR BENEFIT THE PROJECT SITE.
8. UNDERGROUND UTILITIES: NO UNDERGROUND UTILITIES WERE SURVEYED IN CONJUNCTION WITH THIS SURVEY
9. CONTOUR INTERVAL: 2 FOOT
10. SUBSURFACE CONDITIONS WERE NOT EXAMINED OR CONSIDERED AS PART OF THIS SURVEY.
11. 1-800-424-5555 MUST BE CALLED NOT LESS THAN 48 HOURS BEFORE BEGINNING EXCAVATION WHERE ANY UNDERGROUND UTILITIES MAY BE LOCATED. FAILURE TO DO SO COULD MEAN BEARING SUBSTANTIAL REPAIR COSTS. (UP TO THREE TIMES THE COST OF REPAIRS TO THE SERVICE).

LEGEND

	BENCH MARK
	REBAR (FOUND AS NOTED)
436.8	SPOT ELEVATION
	DECIDOUS TREE
	CONIFEROUS TREE
WV	WATER VALVE
WM	WATER METER
	STORM CATCH BASIN
	COMMUNICATION MANHOLE
	LIGHT POLE
F	WETLAND FLAG
	WETLAND DATA PLOT
E	ELECTRICAL TRANSFORMER
ASPH	ASPHALT
C&G	CURB AND GUTTER
CONC	CONCRETE
ECC	EXTRUDED CONCRETE CURB
SDCB	CATCH BASIN
	PARCEL LINE
	EXISTING RIGHT-OF-WAY LINE
	WETLAND BOUNDARY
	CURB
	EDGE OF PAVEMENT
x	FENCE LINE (TYPE AS NOTED)
	RETAINING WALL

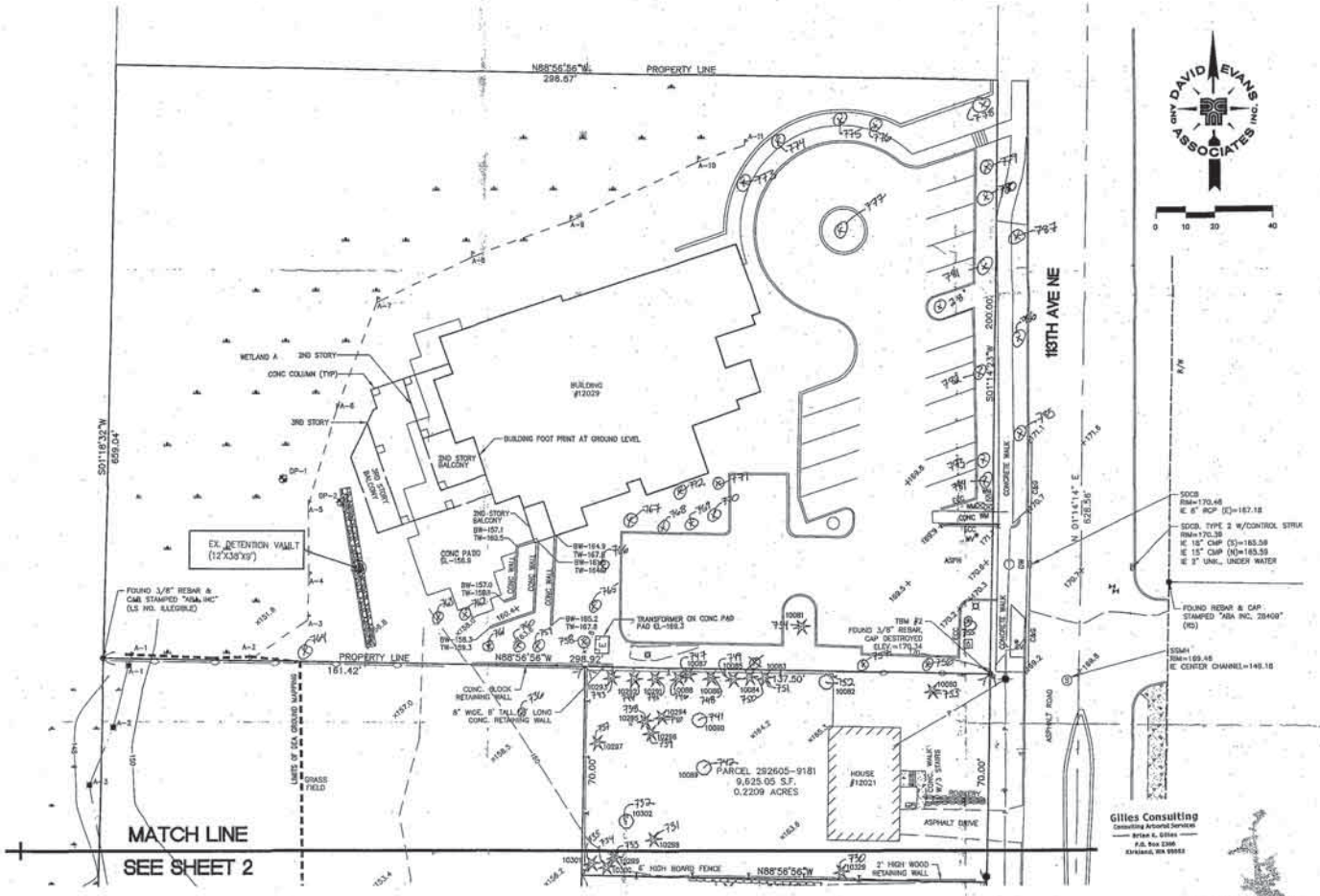
TREE TABLE

TAG	SIZE	TYPE
10080	36"	CEDAR
10081	36"	CEDAR
10082	38"	MAPLE
10083	8"	FIR
10084	18"	FIR
10085	7"	FIR
10086	10"	FIR
10087	8"	FIR
10088	12"	FIR
10089	12"	BIRCH
10090	10"	BIRCH
10291	12"	FIR
10292	14"	FIR
10293	22"	FIR
10294	16"	FIR
10295	2-8"	FIR
10296	22"	FIR
10297	28"	FIR
10298	24"	FIR
10299	8"	FIR
10300	18"	FIR
10301	23"	FIR
10302	6",12"	DECIDOUS
10321	59"	POPLAR
10322	26"	POPLAR
10323	22"	POPLAR
10324	2-24"	POPLAR
10325	48"	POPLAR

CERTIFICATE

I HEREBY CERTIFY THAT THE SURVEY PERFORMED BY DEA, AS SHOWN HEREON, CORRECTLY REPRESENTS A SURVEY MADE UNDER MY DIRECTION AND REPRESENTS THE ACTUAL SITE CONDITIONS IN JULY, 2009.

DOUGLAS E. VOGT PLS 38017 DATE



Gilles Consulting
Consulting Arborist Services
Brian G. Gilles
P.O. Box 2386
Kirkland, WA 98083

ATTACHMENT 1, SITE PLAN W/TREE #'S
DEA Drawing File: SVTPXRESX0000-0001.dwg
Sheet No. 2 of 2, Page 13-A
Gilles Consulting
January 27, 2010

CALL BEFORE YOU DIG
Call: TOLL FREE
1-800-424-5555

TOPOGRAPHIC SURVEY
FOR
RESIDENCE 12
12029 113TH AVE NE
CITY OF KIRKLAND, KING COUNTY, WA

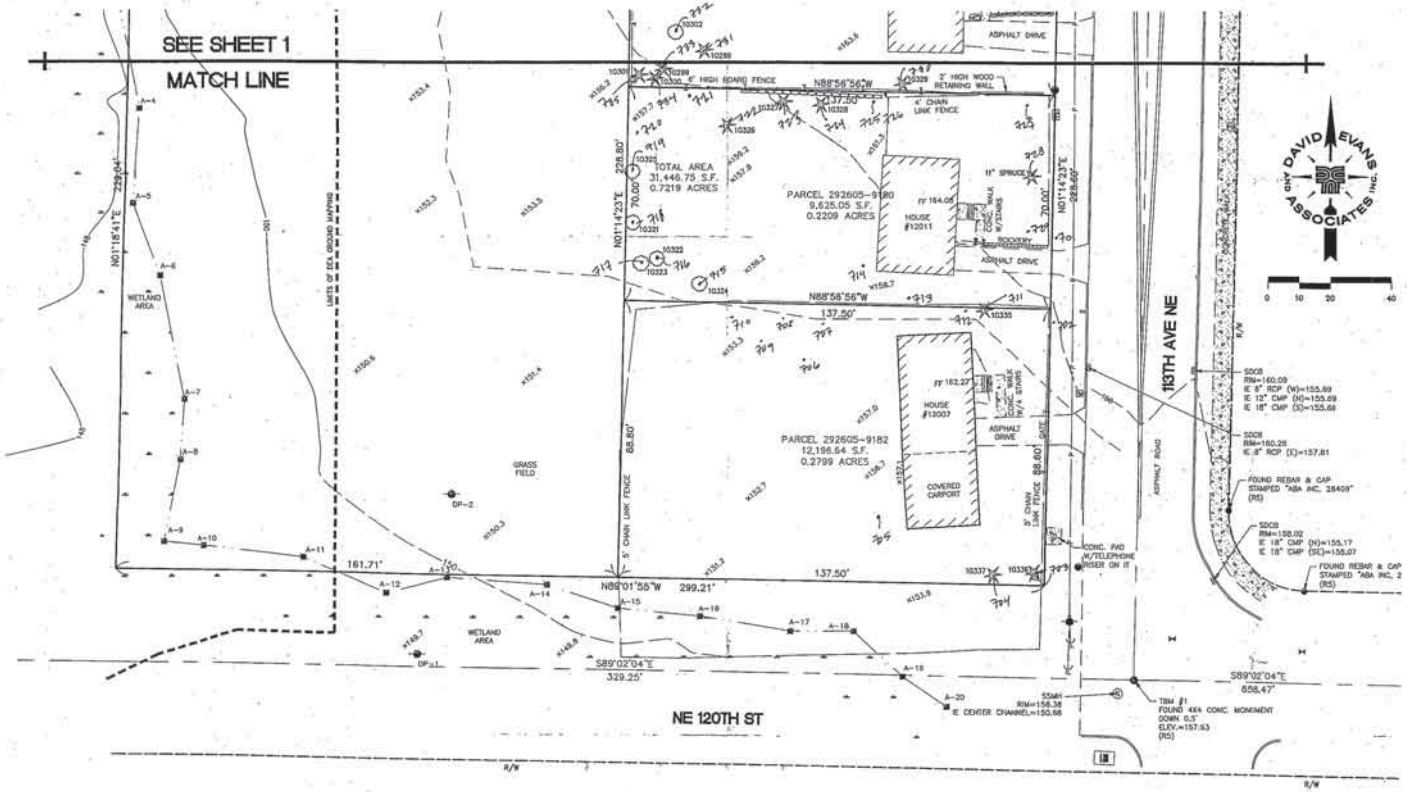
DAVID EVANS AND ASSOCIATES INC.
415 - 118th Avenue SE
Bellevue Washington 98005-3518
Phone: 425.519.6500

REVISIONS:	APPD.

DATE: OCTOBER 6, 2009
DESIGN:
DRAWN: AALA
CHECKED: DEV
REVISION NUMBER:
SCALE: 1"=20'
PROJECT NUMBER: RESX0000-0001
DRAWING FILE: SVTPXRESX0000-0001.dwg
SHEET NO. 1 OF 2

dev 01/18/10 7:11am - G:\WORK\SVTPXRESX0000-0001.dwg

SE 1/4, SEC. 29, TWP 26N., RNG. 5E., W.M.



Gilles Consulting
Consulting Arborist Services
Brian K. Gilles
P.O. Box 2366
Kirkland, WA 98083

ATTACHMENT 1, SITE PLAN W/TREE #'S
DEA Drawing File: SVTPXRESX0000-0001.dwg
Sheet No. 2 of 2, Page 13-B
Gilles Consulting
January 27, 2010

TOPOGRAPHIC SURVEY
FOR
RESIDENCE 12
12029 113TH ANE NE
CITY OF KIRKLAND, KING COUNTY, WA

DOUGLAS E. WOOD
STATE OF WASHINGTON
REGISTERED LAND SURVEYOR
PROFESSIONAL

DAVID EVANS AND ASSOCIATES INC.
415 - 118th Avenue SE
Bellevue, WA 98005-3518
Phone: 425.519.6500

REVISIONS:	APPD.

DATE: OCTOBER 6, 2009
DESIGN:
DRAWN: AALA
CHECKED: DEV
REVISION NUMBER:

SCALE: 1"=20'

PROJECT NUMBER:
RESX0000-0001

DRAWING FILE:
SVTPXRESX0000-0001.dwg

SHEET NO.
2
OF 2

ATTACHMENT 2:
TREE INVENTORY/CONDITION SPREADSHEET

SITE: Residence XII
12007, 12011, 12021, & 12029 113th Ave NE
Kirkland, WA 98034

Date of Inspection: January 20 & 21, 2010

#1 ***Tree Location:*** ***this indicates whether or not the tree is on the subject property or other right of way.***
#2 ***Tree Orientation:*** More specific location of tree oriented to the site plan.
#3 ***Tree #:*** **3A**--Gilies Consulting tree tag number. 3B--DEA site plan #. 3C --5,000 series tag #'s.
#4 ***Species:***

Ap/Msp	Apple, Malus sp.
BLM/Am	Big Leaf Maple, *Acer macrophyllum*
CAp/Msp.	Crab Apple, *Malus sp.*
CBS/Pp	Colorado Blue Spruce, *Picea pungens*
DC/Cd	Deodar Cedar, *Cedrus deodara*
DF/Pm	Douglas Fir, *Pseudotsuga menziezii*
FlCh/Psp	Flowering Cherry, *Prunus sp.*
FrCh/Psp	Fruiting Cherry, *Prunus sp.*
LP/Pn *	Lombardy Poplar, *Populus nigra 'Italica'*
PbB/Bp	Paperbark Birch, *Betula papyrifera*
Plum/Psp	Plum, *Prunus sp.*
ABP/Pn	Austrian Black Pine, *Pinus nigra*
PW/Sl	Pacific Willow, *Salix lasiandra*
RM/Ar	Red Maple, *Acer rubrum*
SP/Ps	Scots Pine, *Pinus sylvestris*
WRC/Tp	Western Red Cedar, *Thuja plicata*
FWP/Ps *	Fastigiate White Pine, *Pinus strobus 'fastigiata'*

#5 ***DBH:*** Trunk diameter @ 4.5' above average ground level.
#6 ***Tree Credit:*** This is based upon Table 95.35.1, Page 12, Chapter 95 of the Kirkland Municipal Code.
#7 ***Drip Line:*** The radius, the distance from the trunk to the furthest branch tips.
#8 ***Limits of Disturbance:*** The boundary between the area of minimum protection around a tree and the allowable site disturbance as determined by a qualified professional.
#9 ***LCR:*** *Live Crown Ratio* - the amount of live canopy expressed as a % of the entire tree height
#10 ***Symmetry:*** General shape of canopy and weight distribution of the tree around the trunk.
#11 ***Foliage:*** General description of foliage density that indicates tree health and vigor.
#12 ***Crown Condition:*** The most important external indication of tree health and vigor.
#13 ***Trunk:*** Description of trunk condition or abnormalities if any.
#14 ***Root Collar:*** The base of the tree where the trunk flares into the roots--deformities or problems are noted here.
#15 ***Roots:*** Root problems are noted here.
#16 ***Comments:*** Additional observations about the tree's condition.
#17 ***Significance:*** A "significant" tree is at least 6" in diameter measured at 4.5' above the average ground level.
#18 ***Current Health Rating:*** A description of general health ranging from dead, dying, hazard, poor, suppressed, fair, good, very good, to excellent.
#19 ***Viability:*** a significant tree that is in good health with a low risk of failure due to structural defects, is relatively wind firm if isolated or remains as part of a grove, and is a species that is suitable for its location.
#20 ***Recommendation:*** This is an estimate of whether or not the tree is of sufficient health, vigor, and structure to consider retaining.
* Trees in red are those that are *Non-viable* due to poor structure, disease, decay, lack of wind firmness, or any combination of these factors.

1	2	3A	3B	3C	4	5	6	7	8 -- LIMITS OF DISTURBANCE				9	10	11	12	13	14	15	16	17	18	19	20
TREE LOCATION	TREE ORIENTATION	GC TREE #s	DEA SITE PLAN #s	5,000-series #s	SPECIES	DBH	TREE CREDIT	DRIP LINE	North	South	East	West	The	SYMMETRY	FOLIAGE	CROWN CONDITION	TRUNK	ROOT COLLAR	ROOTS	COMMENTS	SIGNIFICANCE	CURRENT HEALTH RATING	VIABILITY	RECOMMENDATION
Subject property	12011	701			PW/Sl	16.7"	0.0	10'					50%	Min. Asym.	Average	Utility pruned	Forked at base. Center rot	Base rot	-	Forget 3 feet with included bark down to the base. Trunk diameters are 13.0, 8.3, and 6.4 inches = a single trunk tree of 16.7 inches.	Significant	Poor	Non-viable	Remove
Subject property	12007	702			BLM/Am	11.3"	0.0	7'					40%	Min. Asym.	Average	Utility pruned	Forked at base	NAD	-		Significant	Poor	Non-viable	Remove
Subject property	12007	703	10336		DF/Pm	22.8"	7.0	16'	16'	16'	to road	16'	80%	Min. Asym.	Average	Average	Center rot	NAD	Surface south	Open wound on south side from 2.5 feet up 5 feet with rot and sap flow. Early bark beetle infestation.	Significant	Fair	Viable	Potential to Retain w/ Tree Protection Measures
Subject property	12007	704	10337	521	DF/Pm	29.1"	10.0	18'	18'	18'	to road	18'	75%	Min. Asym.	Average	Average	Center rot	NAD	Surface north	Early bark beetle infestation	Significant	Fair	Viable	Potential to Retain w/ Tree Protection Measures
Subject property	12007	705			FrCh/Psp	13.4"	2.0	10'					70%	Gen. sym.	Average	Average	Forked at base. Center rot	NAD	-	Gummosis. Cherry bark Tortrix. Brown rot. Not construction firm. Trunk diameters are 9.3", 7.0", & 6.7" = single trunk of 13.4".	Significant	Fair	Viable	Remove
Subject property	12007	706			Ap/Msp	8.3"	1.0	10'	10'	10'	10'	10'	75%	Min. Asym.	Average	Average	Leans NE. Center rot	Base rot	-	Burl at base. Poorly pruned. Short shoot elongation.	Significant	Fair	Viable	Potential to Retain w/ Tree Protection Measures
Subject property	12007	707			Plum/Psp	6.8"	0.0	9'					70%	Min. Asym.	Average	Average	Center rot	NAD	-		Significant	Poor	Non-viable	Remove
Subject property	12007	708			Plum/Psp	8.1"	0.0	9'					60%	Maj. Asym.	Thinning	Weak	Forked at 1 foot with included bark to base. Center rot	Base rot	-	Trunk diameters are 6.8 and 4.4 inches = a single trunk tree of 8.1 inches.	Significant	Poor	Non-viable	Remove
Subject property	12007	709			Plum/Psp	5.2"	0.0	9'					50%	Min. Asym.	Thin	Weak	Forked at base	NAD	-		Not Significant	Poor	Non-viable	Remove
Subject property	12007	710			Plum/Psp	5.1"	0.0	10'					40%	Maj. Asym.	Average	Average	Forked at base	NAD	-	Trunk diameters are 4.0 and 3.2 inches = a single trunk tree of 5.1 inches.	Not Significant	Poor	Non-viable	Remove
Subject property	12007	711	10335	5212	DF/Pm	2.2"	0.0	16'	16'	to building	16'	16'	65%	Maj. Asym.	Epicormic growth	Average	Straight	NAD	Surface all directions	Roots restricted to the north by driveway.	Not Significant	Fair	Viable	Potential to Retain w/ Tree Protection Measures
Subject property	12007	712			WRC/Tp	28.0"	9.0	5'	5'	to building	5'	5'	99%	Gen. sym.	Dense	Healthy	Bowed at base	NAD	-	Roots restricted to the north by driveway.	Significant	Good	Viable	Potential to Retain w/ Tree Protection Measures

ATTACHMENT 2:
TREE INVENTORY/CONDITION SPREADSHEET

SITE: Residence XII
12007, 12011, 12021, & 12029 113th Ave NE
Kirkland, WA 98034

Date of Inspection: January 20 & 21, 2010

1	2	3A	3B	3C	4	5	6	7	8 – LIMITS OF DISTURBANCE				9	10	11	12	13	14	15	16	17	18	19	20
TREE LOCATION	TREE ORIENTATION	GC TREE #s	DEA SITE PLAN #s	5,000-series #s	SPECIES	DBH	TREE CREDIT	DRIP LINE	North	South	East	West	The	SYMMETRY	FOLIAGE	CROWN CONDITION	TRUNK	ROOT COLLAR	ROOTS	COMMENTS	SIGNIFICANCE	CURRENT HEALTH RATING	VIABILITY	RECOMMENDATION
Subject property	12011	713			BLM/Am	5.8"	0.0	7'					40%	Min. Asym.	Thin	Average	Center rot	Base rot	-	Growing through chain link fence. Dead branches in canopy.	Not Significant	Poor	Non-viable	Remove
Subject property	12011	714		5218	CBS/Pp	9.2"	1.0	6'	6'	6'	6'	6'	95%	Gen. sym.	Thin	Average	Slightly serpentine	NAD	Surface east	Spider mites.	Significant	Fair	Viable	Potential to Retain w/ Tree Protection Measures
Subject property	12011	715	10324	5216	LP/Pn 'I'	9.8"	1.0	10'	10'	10'	10'	10'	75%	Min. Asym.	Average	Average	Forked at 2 feet with included bark to base	NAD	-	Not construction firm. Mature.	Significant	Fair	Viable	Remove
Subject property	12011	716	10322		LP/Pn 'I'	29.1"	10.0	10'	10'	10'	10'	10'	75%	Min. Asym.	Average	Average	Forked at base	NAD	-	Not construction firm; mature. Trunk diameters are 22.0 in 19.0 inches = a single trunk tree of 29.1 inches.	Significant	Fair	Viable	Remove
Subject property	12011	717	10323		LP/Pn 'I'	23.4"	7.0	7'	7'	7'	7'	7'	75%	Min. Asym.	Average	Average	Typical	NAD	-	Not construction firm; mature. Trunk diameters are 22.0 and 8.0 inches = a single trunk tree of 23.4 inches.	Significant	Fair	Viable	Remove
Subject property	12011	718	10321	5215	LP/Pn 'I'	18.0"	5.0	12'	12'	12'	12'	12'	80%	Min. Asym.	Average	Average	Forked at base. Center rot	Base rot	-	Not construction firm. Mature.	Significant	Fair	Viable	Remove
Subject property	12011	719	10325		LP/Pn 'I'	53.0"	21.0	12'	12'	12'	12'	12'	75%	Gen. sym.	Average	Average	Typical	NAD	-	Tag pocketed. Not construction firm. Ivy up 45 feet.	Significant	Fair	Viable	Remove
Subject property	12011	720			BLM/Am	7.0"	0.0	10'	10'	10'	10'	10'	15%	Maj. Asym.	Average	Suppressed	Center rot	Bowed at base, base rot	-		Significant	Poor	Non-viable	Remove
Subject property	12011	721			SP/Ps	10.0"	0.0	3'	3'	3'	3'	3'	5%	Maj. Asym.	Dying	Dying	Previously topped at 6 feet with nest	NAD	-	Ivy up 100%	Significant	Dying	Non-viable	Remove
Subject property	12011	722	10326		SP/Ps	24.0"	7.0	18'	18'	18'	18'	18'	80%	Gen. sym.	Average	Average	Kinked at 25 feet	NAD	-	Ivy up 10 feet. Early bark beetle.	Significant	Fair	Viable	Potential to Retain w/ Tree Protection Measures
Subject property	12011	723	10327	5219	SP/Ps	10.8"	1.0	10'	10'	10'	10'	10'	65%	Min. Asym.	Thin	Weakening	Leans south, serpentine	NAD	-		Significant	Fair	Viable	Potential to Retain w/ Tree Protection Measures
Subject property	12011	724	10328	5220	SP/Ps	15.0"	3.0	14'	14'	14'	14'	14'	75%	Min. Asym.	Thin	Average	Leans south, serpentine	NAD	-	Fire scar on north side from base up 6 feet.	Significant	Fair	Viable	Potential to Retain w/ Tree Protection Measures
Subject property	12011	725			CAp/Msp.	8.0"	1.0	9'	9'	9'	9'	9'	75%	Gen. sym.	Average	Average	Typical	NAD	-	Poorly pruned.	Significant	Fair	Viable	Potential to Retain w/ Tree Protection Measures
Subject property	12011	726			BLM/Am	5.2"	0.5	12'	12'	12'	12'	12'	75%	Min. Asym.	Average	Suppressed	Bowed at base	NAD	-	Growing on rockery.	Not Significant	Fair	Viable	Potential to Retain w/ Tree Protection Measures
Subject property	12011	727		5194	ABP/Pn	28.7"	10.0	22'	22'	22'	22'	22'	85%	Gen. sym.	Average	Average	Typical	NAD	-	Poorly pruned. Water faucet 2 feet south of days. Trunk diameters are 25.0 and 14.0 inches = a single trunk tree of 28.7 inches.	Significant	Good	Viable	Potential to Retain w/ Tree Protection Measures
Subject property	12011	728	1038		CBS/Pp	11.1"	1.0	8'	8'	8'	8'	8'	75%	Gen. sym.	Average	Average	Bowed at base	NAD	-	Spider mites.	Significant	Fair	Viable	Potential to Retain w/ Tree Protection Measures
Subject property	12011	729			DC/Cd	11.0"	1.0	10'	10'	10'	10'	10'	99%	Min. Asym.	Average	Average	Typical	NAD	-		Significant	Fair	Viable	Potential to Retain w/ Tree Protection Measures

ATTACHMENT 2:
TREE INVENTORY/CONDITION SPREADSHEET

SITE: Residence XII
12007, 12011, 12021, & 12029 113th Ave NE
Kirkland, WA 98034

Date of Inspection: January 20 & 21, 2010

1	2	3A	3B	3C	4	5	6	7	8 -- LIMITS OF DISTURBANCE				9	10	11	12	13	14	15	16	17	18	19	20
TREE LOCATION	TREE ORIENTATION	GC TREE #s	DEA SITE PLAN #s	5,000-series #s	SPECIES	DBH	TREE CREDIT	DRIP LINE	North	South	East	West	The	SYMMETRY	FOLIAGE	CROWN CONDITION	TRUNK	ROOT COLLAR	ROOTS	COMMENTS	SIGNIFICANCE	CURRENT HEALTH RATING	VIABILITY	RECOMMENDATION
Subject property	12021	730	10329	5254	DF/Pm	15.2"	3.0	12'	12'	12'	12'	12'	80%	Gen. sym.	Average	Average	Straight	NAD	-	Early bark beetle infestation	Significant	Fair	Viable	Potential to Retain w/ Tree Protection Measures
Subject property	12021	731	10298		DF/Pm	22.9"	7.0	16'	16'	16'	16'	16'	80%	Min. Asym.	Average	Average	Forked at 25 feet	NAD	-	Ivy up 30 feet.	Significant	Fair	Viable	Remove Ivy. Potential to Retain w/ Tree Protection Measures.
Subject property	12021	732	10302		BLM/Am	14.2"	0.0	12'	-	-	-	-	45%	Maj. Asym.	Average	Average	Forked at 3 feet.	NAD	-	Ivy at 30 feet. Poor structure. Trunk diameters are 11.0, 7.0, and 5.7 inches = a single trunk tree of 14.2 inches.	Significant	Poor	Non-viable	Remove
Subject property	12021	733	10299		DF/Pm	7.1"	0.0	10'	-	-	-	-	15%	Maj. Asym.	Thin	Suppressed	Straight	NAD	-	Ivy up 30 feet. Poor structure.	Significant	Poor	Non-viable	Remove
Subject property	12021	734	10300		DF/Pm	16.7"	4.0	12'	12'	12'	12'	12'	65%	Min. Asym.	Average	Average	Forked at base	NAD	-	Ivy up 30 feet. Trunk diameters are 16.2 and 4.1 inches = a single trunk tree of 16.7 inches.	Significant	Fair	Viable	Remove Ivy. Potential to Retain w/ Tree Protection Measures.
Subject property	12021	735	10301		DF/Pm	19.7"	5.0	12'	12'	12'	12'	12'	85%	Min. Asym.	Average	Average	Slight bow west	NAD	-	Ivy up 30 feet.	Significant	Fair	Viable	Remove Ivy. Potential to Retain w/ Tree Protection Measures.
Subject property	12021	736		5318	BLM/Am	16.1"	4.0	13'	13'	13'	13'	13'	65%	Gen. sym.	Average	Average	Forked at base. Center rot	Base rot	-	There is a crack on the Southeast side of the South trunk from the base up 10 feet. Trunk diameters are 12.4 inches and 10.3 inches = a single trunk tree of 16.1 inches.	Significant	Fair	Viable	Potential to Retain w/ Tree Protection Measures
Subject property	12021	737	10297		DF/Pm	24.9"	8.0	20'	20'	20'	20'	20'	80%	Gen. sym.	Average	Average	Slight bow west	NAD	-	Ivy up 20 feet.	Significant	Fair	Viable	Remove Ivy. Potential to Retain w/ Tree Protection Measures.
Subject property	12021	738	10295	5245	DF/Pm	12.4"	2.0	10'	10'	10'	10'	10'	15%	Maj. Asym.	Thin	Suppressed	Forked at 6 inches with included bark to base	Probable base rot	-	Early bark beetle infestation. Declining. Trunk diameters are 9.9 and 7.5 inches = a single trunk tree of 12.4 inches.	Significant	Fair	Viable	Potential to Retain w/ Tree Protection Measures
Subject property	12021	739	10296		DF/Pm	20.5"	6.0	12'	12'	12'	12'	12'	85%	Maj. Asym.	Average	Average	Slight lean SW	NAD	-	Early bark beetle infestation	Significant	Fair	Viable	Potential to Retain w/ Tree Protection Measures
Subject property	12021	740	10294	5246	DF/Pm	16.1"	0.0	10'	-	-	-	-	75%	Maj. Asym.	Thinning	Weakening	Slight lean east	NAD	-	Canker from 12 feet down 6 feet with heavy sap flow girdling 50% of the trunk.	Significant	Poor	Non-viable	Remove
Subject property	12021	741	10090	5253	PbB/Bp	11.6"	0.0	9'	-	-	-	-	80%	Maj. Asym.	Thinning	Weakening	Previously topped at 35 feet	NAD	-		Significant	Poor	Non-viable	Remove
Subject property	12021	742	10089	5251	PbB/Bp	11.0"	0.0	7'	-	-	-	-	80%	Maj. Asym.	Thinning	Weakening	Previously topped at 25 feet	NAD	-	Burl at 1 foot	Significant	Poor	Non-viable	Remove
Subject property	12021	743	10293	5244	DF/Pm	19.8"	5.0	13'	13'	13'	13'	13'	85%	Min. Asym.	Average	Average	Previously topped at 12 feet, regeneration average	NAD	-	Early bark beetle infestation	Significant	Fair	Viable	Potential to Retain w/ Tree Protection Measures
Subject property	12021	744	10292	5243	DF/Pm	13.5"	0.0	10'	-	-	-	-	60%	Maj. Asym.	Thin	Suppressed	Previously topped at 12 feet, regeneration weak	NAD	-	Early bark beetle infestation	Significant	Poor	Non-viable	Remove

ATTACHMENT 2:
TREE INVENTORY/CONDITION SPREADSHEET

SITE: Residence XII
12007, 12011, 12021, & 12029 113th Ave NE
Kirkland, WA 98034

Date of Inspection: January 20 & 21, 2010

1	2	3A	3B	3C	4	5	6	7	8 – LIMITS OF DISTURBANCE				9	10	11	12	13	14	15	16	17	18	19	20
TREE LOCATION	TREE ORIENTATION	GC TREE #s	DEA SITE PLAN #s	5,000-series #s	SPECIES	DBH	TREE CREDIT	DRIP LINE	North	South	East	West	The	SYMMETRY	FOLIAGE	CROWN CONDITION	TRUNK	ROOT COLLAR	ROOTS	COMMENTS	SIGNIFICANCE	CURRENT HEALTH RATING	VIABILITY	RECOMMENDATION
Subject property	12021	745	10291	5247	DF/Pm	12.7"	2.0	12'	12'	12'	12'	12'	50%	Maj. Asym.	Thin	Weakening	Previously topped at 12 feet, regeneration average	NAD	-	Early bark beetle infestation	Significant	Fair	Viable	Potential to Retain w/ Tree Protection Measures
Subject property	12021	746	10088	5241	DF/Pm	12.5"	2.0	10'	10'	10'	10'	10'	75%	Min. Asym.	Average	Average	Previously topped at 10 feet, regeneration average.	NAD	-	Early bark beetle infestation	Significant	Fair	Viable	Potential to Retain w/ Tree Protection Measures
Subject property	12021	747	10087		DF/Pm	7.2"	0.0	8'	-	-	-	-	15%	Maj. Asym.	Thin	Suppressed	Previously topped at 10 feet, regeneration weak.	NAD	-	Early bark beetle infestation	Significant	Poor	Non-viable	Remove
Subject property	12021	748	10086	5240	DF/Pm	12.5"	2.0	10'	10'	10'	10'	10'	75%	Min. Asym.	Average	Average	Previously topped at 10 feet, regeneration average.	NAD	-	Early bark beetle infestation	Significant	Fair	Viable	Potential to Retain w/ Tree Protection Measures
Subject property	12021	749	10085	5239	DF/Pm	8.0"	0.0	7'	-	-	-	-	40%	Maj. Asym.	Thin	Suppressed	Previously topped at 14 feet, regeneration average.	NAD	-	Burl at base. Early bark beetle infestation.	Significant	Poor	Non-viable	Remove
Subject property	12021	750	10084	5238	DF/Pm	18.7"	5.0	12'	12'	12'	12'	12'	80%	Min. Asym.	Thin	Average	Previously topped at 14 feet, regeneration average. Leans west.	NAD	-	Early bark beetle infestation	Significant	Fair	Viable	Potential to Retain w/ Tree Protection Measures
Subject property	12021	751	10083	5237	DF/Pm	8.7"	0.0	13'	-	-	-	-	60%	Min. Asym.	Average	Average	Bowed at fork at 18 feet.	Base rot	-	Not wind firm. Early bark beetle infestation	Significant	Poor	Non-viable	Remove
Subject property	12021	752	10082	5236	BLM/Am	39.9"	15.0	24'	24'	24'	24'	24'	60%	Min. Asym.	Thinning	Weakening	Typical	Partially exposed	Surface south	Newly broken out branches. Dead branches in canopy.	Significant	Fair	Viable	Prune dead branches. Potential to Retain w/ Tree Protection Measures.
Subject property	12021	753	10080	5197	WRC/Tp	41.5"	16.0	24'	24'	24'	24'	24'	95%	Gen. sym.	Average	Average	Typical	NAD	-	Ivy up 75%	Significant	Fair	Viable	Remove ivy. Potential to Retain w/ Tree Protection Measures.
Subject property	12029	754	10081		WRC/Tp	33.3"	12.0	16'	16'	16'	16'	16'	90%	Gen. sym.	Average	Average	Broken out or previously topped at 40 feet, regeneration average	NAD	Restricted all directions	Rot extends down from topping wound at lest 2.5 feet. Hazard Rating: Target: 4, Size of Part: 2, Probability of Failure: about 3. During and after construction, if size of planter bed changes, then closely monitor and/or re-evaluate.	Significant	Fair	Viable	Potential to Retain w/ Tree Protection Measures
Subject property	12029	755			RM/Ar	4.5"	0.5	7'	to driveway	7'	to sidewalk	to parking lot	75%	Gen. sym.	Dense	Healthy	Typical	NAD	-		Not Significant	Good	Viable	Potential to Retain w/ Tree Protection Measures
Subject property	12029	756			DF/Pm	4.8"	0.5	7'	to parking lot	7'	7'	7'	95%	Min. Asym.	Average	Average	Straight	NAD	Restricted north	Foliage sheared from base up 6 feet on north side. Early bark beetle.	Not Significant	Fair	Viable	Potential to Retain w/ Tree Protection Measures

ATTACHMENT 2:
TREE INVENTORY/CONDITION SPREADSHEET

SITE: Residence XII
12007, 12011, 12021, & 12029 113th Ave NE
Kirkland, WA 98034

Date of Inspection: January 20 & 21, 2010

1	2	3A	3B	3C	4	5	6	7	8 – LIMITS OF DISTURBANCE				9	10	11	12	13	14	15	16	17	18	19	20
TREE LOCATION	TREE ORIENTATION	GC TREE #s	DEA SITE PLAN #s	5,000-series #s	SPECIES	DBH	TREE CREDIT	DRIP LINE	North	South	East	West	The	SYMMETRY	FOLIAGE	CROWN CONDITION	TRUNK	ROOT COLLAR	ROOTS	COMMENTS	SIGNIFICANCE	CURRENT HEALTH RATING	VIABILITY	RECOMMENDATION
Subject property	12029	757			DF/Pm	4.8"	0.5	7'	to parking lot	7'	7'	7'	95%	Min. Asym.	Average	Average	Straight	NAD	Restricted north	Foliage sheared from base up 6 feet on north side. Early bark beetle.	Not Significant	Fair	Viable	Potential to Retain w/ Tree Protection Measures
Subject property	12029	758			DF/Pm	6.5"	1.0	8'	to pad	8'	8'	8'	99%	Gen. sym.	Average	Average	Slight bow SW	Partially exposed	Surface north	Early bark beetle.	Significant	Fair	Viable	Potential to Retain w/ Tree Protection Measures
Subject property	12029	759			DF/Pm	5.4"	0.5	7'	to retaining wall	to retaining wall	7'	7'	90%	Gen. sym.	Average	Average	Straight	NAD	Surface north	Early bark beetle.	Not Significant	Fair	Viable	Potential to Retain w/ Tree Protection Measures
Subject property	12029	760			FlCh/Psp	5.2"	0.5	11'	to retaining wall	to retaining wall	11'	11'	60%	Min. Asym.	Thin	Average	Typical	NAD	Surface west		Not Significant	Fair	Viable	Potential to Retain w/ Tree Protection Measures
Subject property	12029	761			DF/Pm	7.5"	1.0	12'	to retaining wall	to retaining wall	12'	12'	95%	Gen. sym.	Average	Average	Straight	Partially exposed	Surface all directions	Early bark beetle.	Significant	Fair	Viable	Potential to Retain w/ Tree Protection Measures
Subject property	12029	762			FlCh/Psp	6.6"	1.0	10'	10'	10'	10'	10'	55%	Gen. sym.	Average	Average	Typical	Partially exposed	Surface north		Significant	Fair	Viable	Potential to Retain w/ Tree Protection Measures
Subject property	12029	763			DF/Pm	5.0"	0.5	10'	10'	10'	10'	10'	95%	Gen. sym.	Average	Average	Straight	NAD	-	Early bark beetle.	Not Significant	Fair	Viable	Potential to Retain w/ Tree Protection Measures
Subject property	12029	Are			DF/Pm	4.8"	0.5	5'	5'	5'	5'	5'	99%	Gen. sym.	Dense	Healthy	Straight	NAD	-	Landscape tree around the parking lot of the existing facility	Not Significant	Good	Viable	Potential to Retain w/ Tree Protection Measures
Subject property	12029	765			FlCh/Psp	8.3"	1.0												-	Landscape tree around the parking lot of the existing facility	Significant	Good	Viable	
Subject property	12029	766			FlCh/Psp	8.6"	1.0												-	Landscape tree around the parking lot of the existing facility	Significant	Good	Viable	
Subject property	12029	767			FlCh/Psp	4.8"	0.5												-	Landscape tree around the parking lot of the existing facility	Not Significant	Fair	Viable	
Subject property	12029	768			FlCh/Psp	4.6"	0.5												-	Landscape tree around the parking lot of the existing facility	Not Significant	Fair	Viable	
Subject property	12029	769			FlCh/Psp	4.2"	0.5												-	Landscape tree around the parking lot of the existing facility	Not Significant	Fair	Viable	
Subject property	12029	770			FlCh/Psp	6.1"	1.0												-	Landscape tree around the parking lot of the existing facility	Significant	Fair	Viable	
Subject property	12029	771			FlCh/Psp	4.0"	0.5												-	Landscape tree around the parking lot of the existing facility	Not Significant	Fair	Viable	
Subject property	12029	772			FlCh/Psp	4.4"	0.5												-	Landscape tree around the parking lot of the existing facility	Not Significant	Fair	Viable	
Subject property	12029	773			FlCh/Psp	7.4"	1.0												-	Landscape tree around the parking lot of the existing facility	Significant	Fair	Viable	
Subject property	12029	774			FlCh/Psp	6.6"	1.0												-	Landscape tree around the parking lot of the existing facility	Significant	Fair	Viable	
Subject property	12029	775			FlCh/Psp	5.0"	0.5												-	Landscape tree around the parking lot of the existing facility	Not Significant	Fair	Viable	
Subject property	12029	776			FlCh/Psp	6.8"	1.0												-	Landscape tree around the parking lot of the existing facility	Significant	Fair	Viable	
Subject property	12029	777			RM/Ar	4.0"	0.5												-	Landscape tree around the parking lot of the existing facility	Not Significant	Fair	Viable	
Subject property	12029	778			RM/Ar	5.0"	0.5												-	Landscape tree around the parking lot of the existing facility	Not Significant	Good	Viable	
Subject property	12029	779			RM/Ar	5.8"	0.5												-	Landscape tree around the parking lot of the existing facility	Not Significant	Good	Viable	

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TREE INVENTORY/CONDITION SPREADSHEET

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TREE LOCATION	TREE ORIENTATION	GC TREE #s	DEA SITE PLAN #s	5,000-series #s	SPECIES	DBH	TREE CREDIT	DRIP LINE	North	South	East	West	The	SYMMETRY	FOLIAGE	CROWN CONDITION	TRUNK	ROOT COLLAR	ROOTS	COMMENTS	SIGNIFICANCE	CURRENT HEALTH RATING	VIABILITY	RECOMMENDATION
Subject property	12029	780			FWP/Ps T	6.8"	1.0												-	Landscape tree around the parking lot of the existing facility	Significant	Good	Viable	
Subject property	12029	781			FWP/Ps T	7.5"	1.0												-	Landscape tree around the parking lot of the existing facility	Significant	Good	Viable	
Subject property	12029	782			FWP/Ps T	6.8"	1.0												-	Landscape tree around the parking lot of the existing facility	Significant	Good	Viable	
Subject property	12029	783			RM/Ar	4.0"	0.5												-	Landscape tree around the parking lot of the existing facility	Not Significant	Good	Viable	
Subject property	12029	784			FWP/Ps T	6.5"	1.0												-	Growing in planter strip between the curb and sidewalk	Significant	Good	Viable	
Right-of-way	12029	785			RM/Ar	4.5"	0.5												-	Growing in planter strip between the curb and sidewalk	Not Significant	Fair	Viable	
Right-of-way	12029	786			RM/Ar	4.9"	0.5												-	Growing in planter strip between the curb and sidewalk	Not Significant	Fair	Viable	
Right-of-way	12029	787			RM/Ar	5.3"	0.5												-	Growing in planter strip between the curb and sidewalk	Not Significant	Fair	Viable	
							219.5	Total tree credits																

ATTACHMENT 3 - GLOSSARY

Terms Used in This Report, on the Tree Condition / Inventory Spreadsheet, and Their Significance

In an effort to clearly present the information for each tree in a manner that facilitates the reader's ability to understand the conclusions I have drawn for each tree, I have collected the information in a spreadsheet format. This spreadsheet was developed by Gilles Consulting based upon the *Tree Risk Assessment in Urban Areas and the Urban/Rural Interface* course manual and the *Tree Risk Assessment Form*, both sponsored by the Pacific Northwest Chapter of the International Society of Arboriculture, and the *Hazard Tree Evaluation Form* from the book, *The Evaluation of Hazard Trees in Urban Areas*, by Matheny and Clarke. The descriptions were left brief on the spreadsheet in an effort to include as much pertinent information as possible, to make the report manageable, and to avoid boring the reader with infinite levels of detail. However, a review of these terms and descriptions will allow the reader to rapidly move through the report and understand the information.

1) **TREE LOCATION**--indicates what general area of the site the tree is on, or whether the tree is Off the Project property.
2) **TREE ORIENTATION**—a specific description of the location of the tree.
3) **TREE #**—the individual number of each tree. Some tree was have three tags so we have three columns:
    i) 3A: these are the Gilles Consulting tag members running from 701 two 787.
    ii) 3B: these are the David Evans and Associates tag members in the 10,000 series.
    iii) 3C: some of the trees have an additional tag in the 5,000 member series.
4) **SPECIES**—this describes the species of each tree with both most readily accepted common name and the officially accepted scientific name.
5) **DBH**—Diameter Breast Height. This is the standard measurement of trees taken at 4.5 feet above the average ground level of the tree base.
    i) Occasionally it is not practical to measure a tree at 4.5 feet above the ground. The most representative area of the trunk near 4.5 feet is then measured and noted on the spreadsheet. For instance, a tree that forks at 4.5 feet can have an unusually large swelling at that point. The measurement is taken below the swelling and noted as, '28.4" at 36"'.
    ii) Trees with multiple stems are listed as a "clump of x," with x being the number of trunks in the clump. Measurements may be given as an average of all the trunks, or individual measurements for each trunk may be listed.
        (1) Every effort is made to distinguish between a single tree with multiple stems and several trees growing close together at the bases.
6) **TREE CREDIT**—Tree Credit based on Trunk Diameter
7) **DRIP LINE**— the radius, the distance from the trunk to the furthest branch tips.

8) **LIMITS OF DISTURBANCE**— the boundary between the area of minimum protection around a tree and the allowable site disturbance as determined by a qualified professional.
9) **% LCR**—Percentage of Live Crown Ratio. The relative proportion of green crown to overall tree height. This is an important indication of a tree's health. If a tree has a high percentage of Live Crown Ratio, it is likely producing enough photosynthetic activity to support the tree. If a tree has less than 30 to 40% LCR it can create a shortage of needed energy and can indicate poor health and vigor.
10) **SYMMETRY**—is the description of the form of the canopy. That is, the balance or overall shape of the canopy and crown. This is the place I list any major defects in the tree shape—does the tree have all its foliage on one side or in one unusual area. Symmetry can be important if there are additional defects in the tree such as rot pockets, cracks, loose roots, weak crown etc. Symmetry is generally categorized as Generally Symmetrical, Minor Asymmetry or Major Asymmetry:
    i) Gen. Sym.—Generally Symmetrical. The canopy/foliage is generally even on all sides with spacing of scaffold branches typical for the species, both vertically and radially.
    ii) Min. Asym.—Minor Asymmetry. The canopy/foliage has a slightly irregular shape with more weight on one side but appears to be no problem for the tree.
    iii) Maj. Asym.—Major Asymmetry. The canopy/foliage has a highly irregular shape for the species with the majority of the weight on one side of the tree. This can have a significant impact on the tree's stability, health and hazard potential—especially if other defects are noted such as cracks, rot, root defects.
11) **FOLIAGE/BRANCH**—describes the foliage of the tree in relation to a perfect specimen of that particular species. First the branch growth and foliage density is described, and then any signs or symptoms of stress and/or disease are noted. The condition of the foliage, or the branches and buds for deciduous trees in the dormant season, are important indications of a tree's health and vigor.
    i) For Deciduous trees in the dormant season:
        (1) The structure of the tree is visible,
        (2) The quantity and quality of buds indicates health, and is described as good bud set, average bud set, or poor bud set. These are abbreviated in the spreadsheet as: gbs, abs, or pbs.
        (3) The amount of annual shoot elongation is visible and is another major indication of tree health and vigor. This is described as:
            a) Excellent, Good, Average, or Short Shoot Elongation. These are abbreviated in the spreadsheet as ESE, GSE, ASE, OR SSE.
    ii) For evergreen trees year round and deciduous trees in leaf, the color and density of the foliage indicates if the tree is healthy or stressed, or if an insect infestation, a bacterial, fungal, or viral infection is present. Foliage is categorized on a scale from:

(1) Dense—extremely thick foliage, an indication of healthy vigorous growth,
(2) Good—thick foliage, thicker than average for the species,
(3) Normal/Average—thick foliage, average for the species, an indication of healthy growth,
(4) Thin or Thinning—needles and leaves becoming less dense so that sunlight readily passes through; an indication that the tree is under serious stress that could impact the long-term survivability and safety of the tree,
(5) Sparse—few leaves or needles on the twigs, an indication that the tree is under extreme stress and could indicate the future death of the tree
(6) Necrosis—the presence of dead twigs and branchlets. This is another significant indication of tree health. A few dead twigs and branches are reasonably typical in most trees of size. However, if there are dead twigs and branchlets all over a certain portion of the tree, or all over the tree, these are indications of stress or attack that can have an impact on the tree's long-term health.
(7) Hangers—a term to describe a large branch or limb that has broken off but is still hanging up in the tree. These can be particularly dangerous in adverse weather conditions.

12) **CROWN CONDITION**—the crown is uppermost portion of the tree, generally considered the top 10 to 20% of the canopy or that part of the canopy above the main trunk in deciduous trees and above the secondary bark in evergreen trees.

i) The condition of the tree's crown is a reflection of the overall health and vigor of the entire tree. The crown is one of the first places a tree will demonstrate stress and pathogenic attack such as root rot.

ii) If the **Crown Condition** is healthy and strong, this is a good sign. If the crown condition is weak, broken out, or shows other signs of decline, it is an indication that the tree is under stress. It is such an important indication of health and vigor that this is the first place a trained forester or arborist looks to begin the evaluation of a tree. Current research reveals that, by the time trees with root rot show significant signs of decline in the crown, fully 50% or more of the roots have already rotted away. **Crown Condition** can be described as:

(1) Healthy Crown—exceptional growth for the species.
(2) Average Crown—typical for the species.
(3) Weak Crown—thin spindly growth with thin or sparse needles.
(4) Flagging Crown—describes a tree crown that is weak and unable to grow straight up.
(5) Dying Crown—describes obvious decline that is nearing death.
(6) Dead Crown—the crown has died due to pathological or physical injury. The tree is considered to have significant stress and/or weakness if the crown is dead.

(7) Broken out—a formerly weak crown condition that has been broken off by adverse weather conditions or other mechanical means.
(8) Regenerated or Regenerating—formerly broken out crowns that are now growing back, Regenerating crowns may appear healthy, average, or weak and indicate current health of the tree.
(9) Suppressed—a term used to describe poor condition of an entire tree or just the crown. Suppressed crowns are those that are entirely below the general level of the canopy of surrounding trees which receive no direct sunlight. They are generally in poor health and vigor. Suppressed trees are generally trees that are smaller and growing in the shade of larger trees around them. They generally have thin or sparse needles, weak or missing crowns, and are prone to insect attack as well as bacterial and fungal infections.

13) **TRUNK**—this is the area to note any defects that can have an impact on the tree's stability or hazard potential. Typical things noted are:

i) FORKED—bifurcation of branches or trunks that often occur at a narrow angle.
ii) INCLUDED BARK—a pattern of development at branch or trunk junctions where bark is turned inward rather than pushed out. This can be a serious structural defect in a tree that can and often does lead to failure of one or more of the branches or trunks especially during severe adverse weather conditions.
iii) EPICORMIC GROWTH—this is generally seen as dense thick growth near the trunk of a tree. Although this looks like a healthy condition, it is in fact the opposite. Trees with Epicormic Growth have used their reserve stores of energy in a last ditch effort to produce enough additional photosynthetic surface area to produce more sugars, starches and carbohydrates to support the continued growth of the tree. Generally speaking, when conifers in the Pacific Northwest exhibit heavy amounts of Epicormic Growth, they are not producing enough food to support their current mass and are already in serious decline.
iv) INTERNAL STRUCTURAL WEAKNESS—a physical characteristic of the tree trunk, such as a **kink, crack, rot pocket, or rot column** that predisposes the tree trunk to failure at the point of greatest weakness.
v) BOWED—a gradual curve of the trunk. This can indicate an Internal Structural Weakness or an overall weak tree. It can also indicate slow movement of soils or historic damage of the tree that has been corrected by the curved growth.
vi) KINKED—a sharp angle in the tree trunk that indicates that the normal growth pattern is disrupted. Generally this means that the internal fibers and annual rings are weaker than straight trunks and prone to failure, especially in adverse weather conditions.
vii) GROUND FLOWER—an area of deformed bark near the base of a tree trunk that indicates long-term root rot.

14) **ROOT COLLAR**—this is the area where the trunk enters the soil and the buttress roots flare out away from the trunk into the soil. It is here that signs of rot, decay, insect infestation, or fungal or bacterial infection are noted. **NAD** stands for **N**o **A**pparent **D**efects.
15) **ROOTS**—any abnormalities such as girdling roots, roots that wrap around the tree itself that strangle the cambium layer and kill the tree, are noted here.
16) **COMMENTS**—this is the area to note any additional information that would not fit in the previous boxes or attributes about the tree that have bearing on the health and structure of the tree.
17) **SIGNIFICANCE**—a "significant" tree is at least 6" in diameter measured at 4.5' above the average ground level.
18) **CURRENT HEALTH RATING**— a description of general health ranging from dead, dying, poor, senescent, suppressed, fair, good, very good, to excellent.
19) **VIABILITY**— a significant tree that is in good health with a low risk of failure due to structural defects, is relatively wind firm if isolated or remains as part of a grove, and is a species that is suitable for its location.
    (1) Please note that many trees may be listed as "Non-Viable" due to poor health, poor structure, or the tree may be below the size threshold for a "Viable Tree." However, it is worth examining the Non-Viable Trees to determine if any or all of them can be left on the property. They can add significant benefit to the landscape and contribute to wildlife habitat.

1) **RECOMMENDATION**— this is an estimate of whether or not the tree is of sufficient health, vigor, and structure that it is worth retaining. Specific recommendations for each tree are included in this column. They may include anything from pruning dead wood, mulching, aerating, injecting tree-based fertilizer into the root system, shortening into a habitat tree or wildlife snag, or to completely removing the tree.
    i) **Monitor:** "Monitor" is a specific recommendation that the tree be re-evaluated on a routine basis to determine if there are any significant changes in health or structural stability. "Monitor annually" (or bi-annually, tri-annually, etc.)" means the tree should be looked at once every year (or every 2 or 3 years, etc.) This yearly monitoring can be a quick look at the trees to see if there are any significant changes. Significant changes such as storm damage, loss of crown, partial failure of one or more roots, etc. require that a full evaluation be done of the tree at that time.

NOTE: TREES WITH THE SAME DESCRIPTION AND DIFFERENT RATINGS: Two trees may have the same descriptions in the matrix boxes, one may be marked "Significant," while another may be marked "Non-Significant." The difference is in the degree of the description—early necrosis versus advanced necrosis for instance. Again, these descriptions were left brief in an effort to include as much pertinent information as

possible, to make the report manageable, and, not to bore the reader with infinite levels of detail.

ATTACHMENT 4 - TREE PROTECTION MEASURES

In order for trees to survive the stresses placed upon them in the construction process, tree protection must be planned in advance of equipment arrival on site. If tree protection is not planned integral with the design and layout of the project, the trees will suffer needlessly and will possibly die. With proper preparation, often costing little, or nothing extra to the project budget, trees can survive and thrive after construction. This is critical for tree survival because damage prevention is the single most effective treatment for trees on construction sites. Once trees are damaged, the treatment options available are limited.

The following minimum Tree Protection Measures are included on three separate sheets so that they can be copied and introduced into all relevant documents such as site plans, permit applications and conditions of approval, and bid documents so that everyone involved is aware of the requirements. These Tree Protection Measures are intended to be generic in nature. They will need to be adjusted to the specific circumstances of your site that takes into account the location of improvements and the locations of the trees.

TREE PROTECTION MEASURES:

1. Tree Protection Fences will need to be placed around each tree or group of trees to be retained.
    a. Tree Protection Fences are to be placed according to the attached drawing and as noted in the attached Tree Inventory/Conditions Spreadsheet, Column 6 - Limits of Disturbance.
    b. Tree Protection Fences must be inspected prior to the beginning of any construction work/activities.
    c. Nothing must be parked or stored within the Tree Protection Fences—no equipment, vehicles, soil, debris, or construction supplies of any sorts.

2. Cement trucks must not be allowed to deposit waste or wash out materials from their trucks within the Tree Protection Fences.

3. The Tree Protection Fences need to be clearly marked with the following or similar text in four inch or larger letters:

TREE PROTECTION AREA, ENTRANCE PROHIBITED
To report violations contact
City Code Enforcement at
425-587-3225

4. The area within the Tree Protection Fencing must be covered with wood chips, hog fuel, or similar materials to a depth of 8 to 10 inches. The materials should be placed prior to beginning construction and remain until the Tree Protection Fencing is taken down.

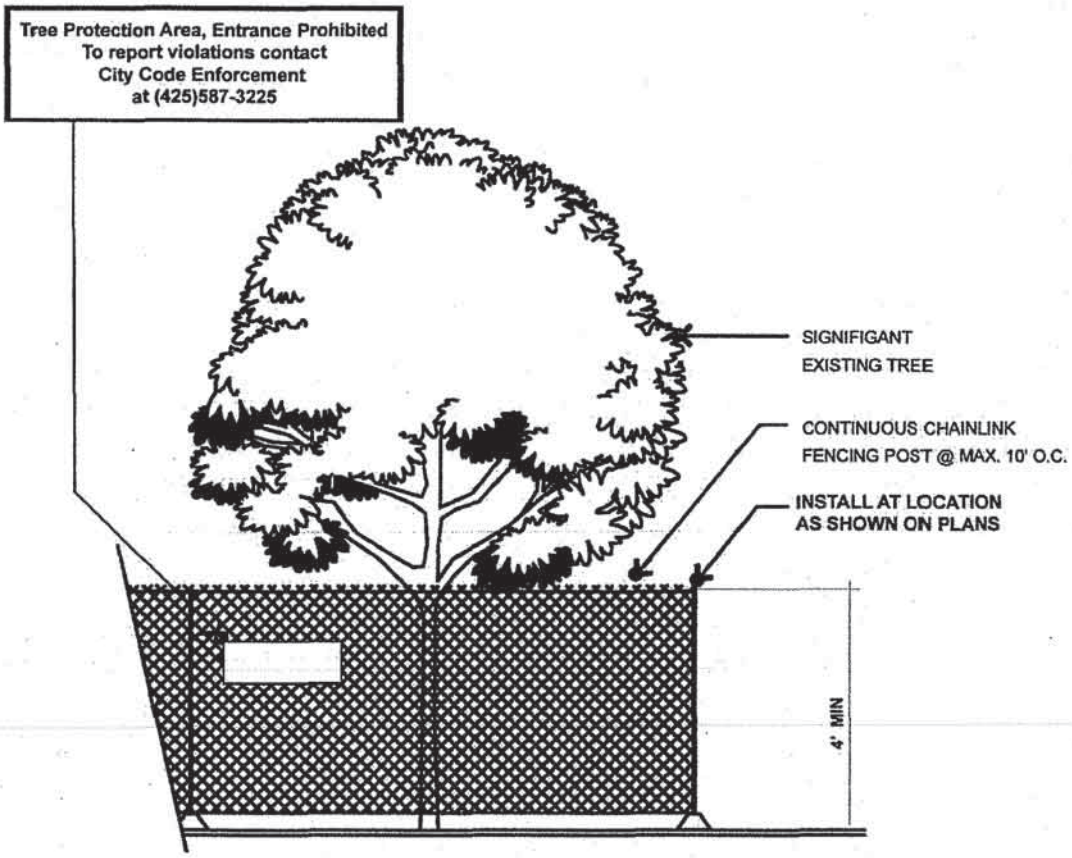
5. When excavation occurs near trees that are scheduled for retention, the following procedure must be followed to protect the long term survivability of the tree:
    a. An International Society of Arboriculture, (ISA) Certified Arborist must be working with all equipment operators.
        i. The Certified Arborist should be outfitted with a shovel, hand pruners, a pair of loppers, a handsaw, and a power saw (a "sawsall" is recommended).
    b. The hoe must be placed to "comb" the material directly away from the trunk as opposed to cutting across the roots.
        i. Combing is the gradual excavation of the ground cover plants and soil in depths that only extend as deep as the tines of the hoe.
    c. When any roots of one inch diameter or greater, of the tree to be retained, is struck by the equipment, the Certified Arborist should stop the equipment operator.

d. The Certified Arborist should then excavate around the tree root by hand/shovel and cleanly cut the tree root.
    i. The Certified Arborist should then instruct the equipment operator to continue.

6. Putting Utilities Under the Root Zone:
    a. Boring under the root systems of trees (and other vegetation) shall be done under the supervision of an ISA Certified Arborist. This is to be accomplished by excavating a limited trench or pit on each side of the critical root zone of the tree and then hand digging or pushing the pipe through the soil under the tree. The closest pit walls shall be a minimum of 7 feet from the center of the tree and shall be sufficient depth to lay the pipe at the grade as shown on the plan and profile.
    b. Tunneling under the roots of trees shall be done under the supervision of an ISA Certified Arborist in an open trench by carefully excavating and hand digging around areas where large roots are exposed. No roots 1 inch in diameter or larger shall be cut.
    c. The contractor shall verify the vertical and horizontal location of existing utilities to avoid conflicts and maintain minimum clearances; adjustment shall be made to the grade of the new utility as required.

7. Watering:
    a. Some of the trees will require significant watering throughout the summer and early fall in order to survive long-term. An easy and economical watering can be done using soaker hoses placed three feet from the trunk of the tree and spiraled around the tree. One 75-foot soaker hose per tree is adequate. It is best to place the soakers using landscape staples, (available from HD Fowler in Bellevue for pennies apiece) then cover the area with two to three inches composed materials. The composted material will act as a mulch to minimize evaporation and will also stimulate the microbial activity of the soil which is another benefit to the health of the tree.
    b. Water the tree to a depth of 18 to 20 inches. I recommended leaving the water on the soaker hoses for six to eight hours and then digging down to determine how deep your water is penetrating. Then adjust accordingly. It may take a good two days of watering to reach the proper depth.
    c. Once the water reaches the proper depth, turn off the hoses for four weeks and then water again. Water more often when temperatures increase—every three weeks when temperatures exceed 80 degrees and every two weeks when temperatures exceed 90 degrees. This drying out of the soil in between watering is important to prevent soil pathogens from attacking the trees.

FENCING SIGN DETAIL



1. MINIMUM FOUR (4) FOOT HIGH TEMPORARY CHAINLINK FENCE SHALL BE PLACED AT THE CRITICAL ROOT ZONE OR DESIGNATED LIMIT OF DISTURBANCE OF THE TREE TO BE SAVED. FENCE SHALL COMPLETELY ENCIRCLE TREE (S). INSTALL FENCE POSTS USING PIER BLOCK ONLY. AVOID POST OR STAKES INTO MAJOR ROOTS. MODIFICATIONS TO FENCING MATERIAL AND LOCATION MUST BE APPROVED BY PLANNING OFFICIAL.

2. TREATMENT OF ROOTS EXPOSED DURING CONSTRUCTION: FOR ROOTS OVER ONE (1) INCH DIAMETER DAMAGED DURING CONSTRUCTION, MAKE A CLEAN STRAIGHT CUT TO REMOVE DAMAGED PORTION OF ROOT. ALL EXPOSED ROOTS SHALL BE TEMPORARILY COVERED WITH DAMP BURLAP TO PREVENT DRYING, AND COVERED WITH SOIL AS SOON AS POSSIBLE.

3. NO STOCKPILING OF MATERIALS, VEHICULAR TRAFFIC, OR STORAGE OF EQUIPMENT OR MACHINERY SHALL BE ALLOWED WITHIN THE LIMIT OF THE FENCING. FENCING SHALL NOT BE MOVED OR REMOVED UNLESS APPROVED BY THE CITY PLANNING OFFICIAL. WORK WITHIN PROTECTION FENCE SHALL BE DONE MANUALLY UNDER THE SUPERVISION OF THE ON-SITE ARBORIST AND WITH PRIOR APPROVAL BY THE CITY PLANNING OFFICIAL.

4. FENCING SIGNAGE AS DETAILED ABOVE MUST BE POSTED EVERY FIFTEEN (15) FEET ALONG THE FENCE.

CITY OF KIRKLAND WASHINGTON

TREE PROTECTION FENCING DETAIL

ATTACHMENT 5 - REFERENCES

1. Dirr, Michael A. *Manual of Woody Landscape Plants, Their Identification, Ornamental Characteristics, Culture, Propagation, and Uses*. Champaign: Stipes Publishing Company, 1990.

2. Harris, Richard W. et al. *Arboriculture, Integrated Management of Landscape Trees, Shrubs, and Vines*. 4th ed. Upper Saddle River: Prentice Hall, 2004.

3. Johnson, Warren T. and Lyon, Howard H. *Insects That Feed on Trees and Shrubs*. Ithaca: Comstock Publishing Associates, 1991.

4. Matheny, Nelda P. and Clark, James R. *Evaluation of Hazard Trees*. 2nd ed. Savoy: The International Society of Arboriculture Press, 1994

5. Matheny, Nelda P. and Clark, James R. *Trees & Development, A Technical Guide to Preservation of Trees During Land Development*. Savoy: The International Society of Arboriculture Press, 1998.

6. Mattheck, Claus and Breloer, Helge. *The Body Language of Trees, A Handbook for Failure Analysis*. London: HMSO, 1994.

7. Pacific Northwest Chapter-ISA. *Tree Risk Assessment in Urban Areas and the Urban/Rural Interface*. Course Manual. Release 1.2. PNW-ISA: Silverton, Oregon, 2008.

8. Watson, Gary W., and Neely, Dan, eds. *Trees & Building Sites*. Savoy: The International Society of Arboriculture Press, 1995.