AFM
American Forest Management
11415 NE 128th St Suite 110 Kirkland WA 98034 • (425)820-3420 • FAX (425)820-3437
www.americanforestmanagement.com

ARBORIST REPORT
for
Astronomics North Building Expansion Project
Kirkland, WA

April 8th, 2015

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1. Introduction

American Forest Management, Inc. was contacted by Paul Engert of Craft Architects, and was asked to compile an 'Arborist Report' for the Astronomics North Building Expansion Project located within the City of Kirkland, WA. The site is located at 12950 Willows Road.

Our assignment is to prepare a written report on present tree conditions, and to identify all significant trees that will be impacted by the proposed expansion project.

This report encompasses all of the criteria set forth under the City of Kirkland's tree regulations for commercial properties.

Date of Field Examination: April 1st, 2015

2. Description

The topography of the subject property is level or flat. The main footprint of the proposed development area has been cleared and graded in the past.

124 significant trees were assessed on the subject property. These exist around the perimeter of the property or the interior area that was previously cleared and graded. Many of the subject trees are comprised of young to semi-mature red alder that have prolifically established the prior disturbed areas. Another two trees on the neighboring property to the north with drip-lines extending on to the subject parcel were also assessed.

All of the significant trees on the subject property have been identified with a numbered aluminum tag or piece of numbered fluorescent pink flagging tied near the trunk of the tree. These tree numbers correspond with the attached Tree Condition Summary Sheets and copy of the site plan.

3. Methodology

Each tree in this report was visited. Tree diameters were measured by tape. The tree heights were estimated. Each tree was visually examined for defects and vigor. The tree assessment procedure involves the examination of many factors:

- The crown of the tree is examined for current vigor. This is comprised of inspecting the crown (foliage, buds and branches) for color, density, form, and annual shoot growth, limb dieback and disease. The percentage of live crown is estimated for coniferous species only and scored appropriately.

- The bole or main stem of the tree is inspected for decay, which includes cavities, wounds, fruiting bodies of decay (conks or mushrooms), seams, insects, bleeding, callus development, broken or dead tops, structural defects and unnatural leans. Structural defects include crooks, forks with V-shaped crotches, multiple attachments, and excessive sweep.

- The root collar and roots are inspected for the presence of decay, insects and/or damage, as well as if they have been injured, undermined or exposed, or original grade has been altered.

Based on these factors a determination of viability is made. Trees considered 'non-viable' are trees that are in poor condition due to disease, extensive decay and/or cumulative structural defects, which exacerbate failure potential. A 'viable' tree is a tree found to be in good health, in a sound condition with minimal defects and is suitable for its location. Also, it will be wind firm if isolated or left as part of a grouping or grove of trees. A 'borderline' viable tree is a tree where its viability is in question. These are trees that are beginning to display symptoms of decline due to age, species related problems and/or man caused problems. Borderline trees are not expected to positively contribute to the landscape for the long-term and are not recommended for retention.

4. Observations

The majority of the subject property was cleared and graded several years ago. Significant trees primarily exist on the perimeter of the site that were not part of prior land-clearing activity. These are described as follows:

East Perimeter

Significant trees on the east perimeter are comprised of planted rows of Leyland cypress, Lawson cypress and Douglas-fir; and volunteer species of young red alder and young to semi-mature black cottonwood. These are situated on or at the top of the steep slope above the railroad tracks.

The Lawson cypress is mature. They have developed typical structure with multiple forked tops. Tree #3 recently failed, see picture below. The Leyland cypress is also mature to over-mature. One tree recently failed, falling downhill toward the railroad tracks. The root crown of this tree had extensive decay.

The planted rows of Douglas-fir are in fair condition. Trees were planted at a close spacing and have developed poor trunk taper as a result of heavy competition for sunlight and space. Foliage color and density are normal. No evidence of disease or decline was observed in the larger dominant and co-dominant trees. A few of the smaller trees are suppressed and are in decline or have naturally died out.

The alder and cottonwood are typical for age. Trees #10 and #11 have developed extensive decay and are in poor condition.

North Perimeter

Neighboring Tree #47 is situated close to the south property line. #47 is a semi-mature black cottonwood. It has a forked top with co-dominant (equal diameter) stems. Risk of top failure is considered moderate.

Tree #48 is a mature western red cedar situated on the property line. The grade was cut previously south of the tree, see picture below, exposing large surface roots. The main trunk forks at roughly 3’ above ground into two large co-dominant stems. The build-up of included or embedded bark between the stems is considerable. The forked attachment is inherently weak. The south stem is positioned to fall towards the proposal should a failure occur. Risk of failure is considered high.

Trees #49 and #50 are mature western red cedars. The grade was also cut in the past south of the trees, roughly 8’ from the closest trunk face. Both have developed good form. Foliage color and density are normal. Both are considered to be in fair to good condition.

West Perimeter

Prolific red alder establishment has occurred on the previously disturbed area in the northwest portion of the site, see pictures below. Trees are estimated at 8 to 10 years of age. Many are growing on a steep cut bank. Several have developed heavy leans toward the proposal. Trees have developed poor trunk taper and structure from intense competition for sunlight. Many are in premature decline.

Several mature big leaf maples exist on the west perimeter adjacent to the railroad right-of-way. Several of these trees had a new aluminum tag secured to the lower trunk, indicating a recent assessment. The existing tag numbers were used for this evaluation as well. Most of the mature maples exist as large clumps or clusters which developed from cut stumps. Trees have asymmetric crowns with long lateral branches extending to the east, over the proposed parking lot. Only the maples with concerning defects were assessed. Most are in fair condition for age and are structurally sound. Tree #116 has a large dead stem in the center of the cluster. Tree #117 suffered a large stem failure, caused by a soft rot fungus, *Kretzschmaria deusta*. The extent of the rot in the other stems of the cluster is significant. Risk of another stem failure is high.

There are two mature to over-mature black cottonwoods (#118 and #119) situated at the south end of the west perimeter. These are problematic given their proximity to the proposed improvements.

South Perimeter

There are few trees on the south perimeter. This area was cleared and graded in the past. Tree #120, a mature black cottonwood has been negatively impacted on all sides by past activity. The grade has been raised around most of the tree. It appears to be of low vigor and stressed by past impacts.

Subject trees in the southwest portion of the property are in fair to good condition and can be feasibly retained, given their proximity to the proposed improvements.

5. Discussion

It is my understanding all of the trees along the east perimeter will be removed for road improvements and detention vaults. Subject trees are positioned too close to the proposed improvements to be practically preserved.

On the north perimeter, Tree #48 is problematic. The major structural defect is concerning. The south stem or trunk is positioned to fall directly toward the proposal should it split off. The considerable buildup of included or embedded bark between the forked stems indicates a weak attachment and high probability of failure. Removal of this tree is recommended to abate the potentially hazardous condition.

Trees #49 and #50 can be retained. Past excavations and grading directly to the south have not had an adverse impact on health or stability. It would appear from the site plan that no further encroachment will be necessary for future site improvements.

The majority of red alder in the northwest portion is recommended for removal. Trees have developed poor form with heavy downhill leans. Many are showing signs of premature decline (top dieback), which is typical for alder that has regenerated on disturbed sites. The vast majority is considered 'borderline' viable and non-viable.

The majority of the mature big leaf maples along the south end of the west perimeter is in fair condition and can be feasibly retained. Tree #116 has a large dead stem that should be removed to reduce hazard risk. Tree #117 is in decline and considered 'borderline' viable. It has a significant soft rot infection which has already caused one stem to fail. Removal is recommended to abate hazard potential. On the remaining mature maples, crown clean pruning is recommended to remove deadwood and any weakly attached branches prior to the completion of construction. Some end-weight reduction may be necessary to reduce the potential of future branch failures onto the new parking lot.

The over-mature black cottonwood trees, #118, #119 and #120 are recommended for removal. These will be problematic in the future as they begin to naturally decline. This is a relatively short-lived pioneer species.

The extent of drip-lines (farthest reaching branches) for all viable trees can be found in the tree summary tables at the back of this report. These have also been delineated on a copy of the site plan for trees with a high potential for retention. The recommended Limits of Disturbance for viable trees can be found on the tree summary tables. The information plotted on the attached site plan may need to be transferred to a final tree retention/protection plan to meet City submittal requirements. The information on the map and in this report shall be used to develop such a plan. The trees that are to be removed shall be shown "X'd" out on the final plan. Trees to be retained shall include tree protection fencing locations per the attached plan.

The attached plan identifies the recommended location of tree protection fencing along the west and north perimeters. A portion of this above the alder grouping was also flagged in the field with fluorescent pink flags labeled "TPF" for Tree Protection Fencing.

6. Tree Protection Measures

The following guidelines are recommended to ensure that the designated space set aside for the preserved trees is protected and construction impacts are kept to a minimum. Standards have been set forth under Kirkland Zoning Code 95.34 of Chapter 95. Please review these standards prior to any development activity.

1. Tree protection fencing shall be erected per prior to moving any heavy equipment on site. Doing this will set clearing limits and avoid compaction of soils within root zones of retained trees.
2. Excavation limits should be laid out in paint on the ground to avoid over excavating.
3. Excavations within the drip-lines of retained trees shall be monitored by a qualified tree professional so necessary precautions can be taken to decrease impacts to tree parts. A qualified tree professional shall monitor excavations when work is required and allowed up to the "limits of disturbance".
4. To establish sub grade for foundations, curbs and pavement sections near the trees, soil should be removed parallel to the roots and not at 90 degree angles to avoid breaking and tearing roots that lead back to the trunk within the drip-line. Any roots damaged during these excavations should be exposed to sound tissue and cut cleanly with a saw. Cutting tools should be sterilized with alcohol.
5. Areas excavated within the drip-line of retained trees should be thoroughly irrigated weekly during dry periods.
6. Preparations for final landscaping shall be accomplished by hand within the drip-lines of retained trees. Large equipment shall be kept outside of the tree protection zones at all times.

7. Tree Removal Summary

A total of 112 significant trees will be removed. Of these, 15 are non-viable and 36 are considered 'borderline' viable. The tables on pages 13, 14 and 15 indicate the proposed action for subject trees.

Supplemental trees may be required. New tree plantings shall be given appropriate space for the species and their growing characteristics. Refer to the *Kirkland Plant List* on the City's website for a list of desirable species.

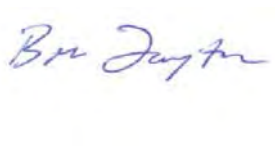
For planting and maintenance specifications, refer to chapters 95.50 and 51 of the Kirkland Zoning Code.

There is no warranty suggested for any of the trees subject to this report. Weather, latent tree conditions, and future man-caused activities could cause physiologic changes and deteriorating tree condition. Over time, deteriorating tree conditions may appear and there may be conditions, which are not now visible which, could cause tree failure. This report or the verbal comments made at the site in no way warrant the structural stability or long term condition of any tree, but represent my opinion based on the observations made.

Nearly all trees in any condition standing within reach of improvements or human use areas represent hazards that could lead to damage or injury.

Please call if you have any questions or I can be of further assistance.

Sincerely,



Bob Layton
ISA Certified Arborist #PN-2714A
ISA Tree Risk Assessor Qualified

Subject Trees #1 > #5 near southeast corner

Tree #3, recent major failure, structure compromised

Subject Trees #6 and #7 on east perimeter

Subject Trees #21 > #37 on east perimeter

Recent Leyland cypress failure – whole tree failure (root disease)

Neighboring Tree #48

Tree #48, major fork, codominant stems – moderate to high risk

#48, grade previously cut – exposed roots

Grade previously cut south of Trees #49 and #50

Subject Trees #51 > #100 red alder on cut bank, heavy leans, decline

Prolific red alder establishment on previously disturbed area-looking south

Prolific red alder establishment on previously disturbed area-looking north

Mature big leaf maple on west perimeter, grade previously cut east of trees

Trees #113 and #114, grade previously cut east of trees

Mature subject big leaf maple on west perimeter

Mature cottonwood trees #118 and #119 – removal recommended

City of Kirkland - Tree Protection Standards

1. Tree Protection Fencing shall be erected at prescribed distance per arborist report. Fences shall be constructed of chain link and be at least 4 feet high.
2. Install highly visible signs on protection fencing spaced no further than 15 feet apart. Signs shall state “Tree Protection Area-Entrance Prohibited”, and “City of Kirkland” code enforcement phone number.
3. No work shall be performed within protection fencing unless approved by Planning Official. In such cases, activities will be approved and supervised by a “Qualified Professional”.
4. The original grade shall not be elevated or reduced within protection fencing without the Planning Official authorization based on recommendations from a qualified professional.
5. No building materials, spoils, chemicals or substances of any kind will be permitted within protection fencing.
6. Protection Fencing shall be maintained until the Planning Official authorizes its removal.
7. Ensure that any approved landscaping within the protected zone subsequent to the approved removal of protection fencing be performed with hand labor.

In addition to the above, the Planning Official may require the following:

a. If equipment is authorized to operate within the root zone, the area will be mulched to a depth of 6” or covered with plywood or similar material to protect roots from damage caused by heavy equipment.
b. Minimize root damage by excavating a 2-foot deep trench, at edge of protection fencing to cleanly sever the roots of protected trees.
c. Corrective pruning to avoid damage from machinery or building activity.
d. Maintenance of trees throughout construction period by watering and fertilization.

Subject Trees (Proposed Action is Arborist Recommendation)

Tag #	Species	DBH	Condition	Proposed Action
1	Lawson cypress	15	good	Remove
2	Lawson cypress	15	fair	Remove
3	Lawson cypress	14	poor	Remove
4	red alder 2	12,8	fair	Remove
5	red alder 3	8,7,6	fair	Remove
6	red alder	16	fair	Remove
7	red alder	12	fair	Remove
8	Douglas-fir	12	good	Remove
9	black cottonwood	22,26	fair	Remove
10	black cottonwood	20	fair-poor	Remove
11	black cottonwood	10	poor	Remove
12	black cottonwood	24,27	fair	Remove
13	red alder	7	fair	Remove
14	red alder	11	fair	Remove
15	red alder	7	fair	Remove
16	red alder	9	fair	Remove
17	black cottonwood	11	fair	Remove
18	black cottonwood	6	fair	Remove
19	red alder	9	fair	Remove
20	red alder	6	fair	Remove
21	Leyland cypress	34	fair	Remove
22	Leyland cypress	30	fair	Remove
23	Leyland cypress	24	fair	Remove
24	black cottonwood	6	fair	Remove
25	Douglas-fir	11	fair	Remove
26	Douglas-fir	13	fair	Remove
27	Leyland cypress	29	fair	Remove
28	Douglas-fir	10	fair-good	Remove
29	Douglas-fir	11	fair-good	Remove
30	Douglas-fir	13	fair-good	Remove
31	Douglas-fir	14	fair-good	Remove
32	Douglas-fir	13	fair-good	Remove
33	Douglas-fir	16	fair-good	Remove
34	Douglas-fir	19	fair-good	Remove
35	Douglas-fir	9	fair	Remove
36	Leyland cypress	28	fair	Remove

Tag #	Species	DBH	Condition	Proposed Action
37	Douglas-fir	15	fair-good	Remove
38	Leyland cypress	22	fair	Remove
39	Leyland cypress	23	fair	Remove
40	Douglas-fir	8	fair-poor	Remove
41	Douglas-fir	8	dead	Remove
42	Douglas-fir	8	dead	Remove
43	Douglas-fir	24	fair-good	Remove
44	Douglas-fir	21	fair-good	Remove
45	Douglas-fir	24	fair-good	Remove
46	bitter cherry	10,11	fair-poor	Remove
47	black cottonwood	23	fair	**Retain**
48	western red cedar	32,28	fair-poor	Remove
49	western red cedar	34	fair-good	**Retain**
50	western red cedar	34, 16	fair-good	**Retain**
51	red alder	8	fair-poor	Remove
52	red alder	10	fair-poor	Remove
53	red alder	11	fair-poor	Remove
54	red alder	7	fair-poor	Remove
55	red alder	6	fair-poor	Remove
56	red alder	13	fair-poor	Remove
57	red alder	10	fair-poor	Remove
58	red alder	7	fair-poor	Remove
59	red alder	9	fair-poor	Remove
60	red alder	13	fair-poor	Remove
61	red alder	11	fair-poor	Remove
62	red alder	8	fair-poor	Remove
63	red alder	7	fair-poor	Remove
64	red alder	7	poor	Remove
65	red alder	7	fair-poor	Remove
66	red alder	6	poor	Remove
67	red alder	11	fair	Remove
68	red alder	12	fair	Remove
69	red alder	8	fair-poor	Remove
70	red alder	8	fair	Remove
71	red alder	8	fair	Remove
72	red alder	12	fair	Remove
73	red alder	6	dead	Remove
74	red alder	13	fair-poor	Remove
75	red alder	14	fair	Remove
76	red alder	9	fair-poor	Remove
77	red alder	10	fair-poor	Remove
78	red alder	16	fair-poor	Remove
79	red alder	9	fair-poor	Remove
80	red alder	10	fair-poor	Remove
81	red alder	8	fair	Remove
82	red alder	7	fair	Remove
83	red alder	6	fair-poor	Remove
84	red alder	6	fair-poor	Remove
85	red alder	9	fair	Remove
86	red alder	7	fair	Remove
87	red alder	7	fair	Remove
88	red alder	7	fair-poor	Remove
89	red alder	6	fair	Remove
90	red alder	8	fair	Remove
91	red alder	10	fair-poor	Remove
92	red alder	8	poor	Remove
93	red alder	6	fair	Remove
94	red alder	6	fair	Remove
95	red alder	8	fair	Remove
96	red alder	6	poor	Remove
97	red alder	6	poor	Remove
98	red alder	7	poor	Remove
99	red alder	7	poor	Remove
100	red alder	10	poor	Remove
101	red alder	8	poor	Remove

Tag #	Species	DBH	Condition	Proposed Action
102	red alder	9	poor	Remove
103	big leaf maple	14	fair	**Retain**
104	red alder	6	fair-poor	Remove
105	red alder	7	fair-poor	Remove
106	red alder	8	fair-poor	Remove
107	big leaf maple 4	16~20	fair	**Retain**
108	red alder	9	fair-poor	Remove
109	red alder	9	fair-poor	Remove
110	red alder	7	poor	Remove
111	red alder	11	fair	Remove
112	red alder	7	fair	**Retain**
113	big leaf maple	11	fair-good	**Retain**
114	big leaf maple	10	fair-good	**Retain**
115	red alder	7	fair	**Retain**
160	bm 2	32,20	fair	**Retain**
155	big leaf maple 4	36,22,15	fair	**Retain**
154	big leaf maple 7	16~30	fair	**Retain**
152	big leaf maple 4	14~20	fair	**Retain**
116	big leaf maple 4	12~28	fair	**Retain**
151	big leaf maple	36	fair	**Retain**
117	big leaf maple	25,18,15	fair-poor	Remove
118	black cottonwood	36	fair	Remove
119	black cottonwood	42	fair	Remove
120	black cottonwood	38	fair-poor	Remove
148	big leaf maple 5	16~24	fair	**Retain**

Tree Summary Table

For: Astronomics Expansion Project
Kirkland

American Forest Management, Inc.

Date: 4/1/2015
Inspector: Layton

Tree/Tag #	Species	Native/ Planted/ Volunteer	DBH	Height	Tree Credit	Drip-Line/Limits of Disturbance (feet)				Condition	Viability	Comments
						N	S	E	W			
1	Lawson cypress	P	15	34		6/na	7/7	na	7/7	good	viable	on steep slope
2	Lawson cypress	P	15	38		6/na	7/na	na	8/8	fair	viable	previous stem failure, mod trunk decay
3	Lawson cypress	P	14	34		4/6	5/na	na	6/7	poor	non-viable	recent major failure, structure compromised
4	red alder 2	N	12,8	42		12/10	14/10	na	12/6	fair	viable	12" with old broken top, typical
5	red alder 3	N	8,7,6	46		18/8	12/8	na	14/8	fair	viable	typical, young
6	red alder	N	16	52		14/10	18/12	na	12/8	fair	viable	semi-mature
7	red alder	N	12	48		12/8	10/8	na	12/8	fair	viable	typical
8	Douglas-fir	N	12	40		14/10	14/10	na	14/8	good	viable	open grown, full crown
9	black cottonwood	N	22,26	120		12/14	24/18	na	20/14	fair	viable	typical, natural lean
10	black cottonwood	N	20	108		14/14	16/16	na	8/16	fair-poor	borderline	large trunk seam, sig decay column
11	black cottonwood	N	10	40		x	x	x	x	poor	non-viable	ext trunk decay
12	black cottonwood	N	24,27	118		26/16	18/18	na	28/18	fair	viable	typical, semi-mature
13	red alder	N	7	32		14/7	5/7	na	8/7	fair	viable	suppressed by cw, natural lean
14	red alder	N	11	46		11/8	8/8	na	10/8	fair	viable	typical
15	red alder	N	7	34		10/7	11/7	na	10/7	fair	viable	typical
16	red alder	N	9	34		12/9	11/9	na	10/9	fair	viable	typical
17	black cottonwood	N	11	55		13/10	15/10	na	15/10	fair	viable	young
18	black cottonwood	N	6	32		4/5	7/6	na	7/6	fair	viable	crooked trunk
19	red alder	N	9	36		6/7	11/8	na	11/8	fair	viable	typical
20	red alder	N	6	34		6/6	8/6	na	10/6	fair	viable	natural lean
21	Leyland cypress	P	34	60		18/16	24/18	na	22/18	fair	viable	mature
22	Leyland cypress	P	30	68		20/18	14/18	na	24/18	fair	viable	multiple forks
23	Leyland cypress	P	24	65		24/18	16/18	na	20/18	fair	viable	trunk forks at DBH, poor attachments
24	black cottonwood	N	6	50		5/6	7/6	na	7/6	fair	viable	typical, poor taper
25	Douglas-fir	P	11	68		4/na	10/10	na	6/8	fair	viable	poor taper
26	Douglas-fir	P	13	70		10/na	14/12	na	4/8	fair	viable	poor taper
27	Leyland cypress	P	29	72		16/na	14/na	na	18/16	fair	viable	typical
28	Douglas-fir	P	10	70		na	na	na	8/8	fair-good	viable	poor taper
29	Douglas-fir	P	11	74		na	na	na	6/8	fair-good	viable	poor taper
30	Douglas-fir	P	13	77		na	na	na	14/12	fair-good	viable	
31	Douglas-fir	P	14	78		na	na	na	12/10	fair-good	viable	
32	Douglas-fir	P	13	75		na	na	na	6/10	fair-good	viable	
33	Douglas-fir	P	16	80		14/12	na	na	14/12	fair-good	viable	
34	Douglas-fir	P	19	74		na	16/14	na	10/12	fair-good	viable	
35	Douglas-fir	P	9	72		na	na	na	4/8	fair	viable	suppressed
36	Leyland cypress	P	28	72		14/16	na	na	18/16	fair	viable	multiple forks, typical
37	Douglas-fir	P	15	72		na	na	na	16/15	fair-good	viable	

Drip-Line and Limits of Disturbance measurements from face of trunk

Tree Summary Table

For: Astronomics Expansion Project
Kirkland

American Forest Management, Inc.

Date: 4/1/2015
Inspector: Layton

Tree/Tag #	Species	Native/ Planted/ Volunteer	DBH	Height	Tree Credit	Drip-Line/Limits of Disturbance (feet)				Condition	Viability	Comments
						N	S	E	W			
38	Leyland cypress	P	22	72		na	na	na	14/14	fair	viable	mature
39	Leyland cypress	P	23	72		18/16	na	na	16/16	fair	viable	mature
40	Douglas-fir	P	8	61		na	na	na	3/6	fair-poor	borderline	poor taper, highly suppressed
41	Douglas-fir	P	8	48		x	x	x	x	dead	dead	older dead, lean to tracks
42	Douglas-fir	P	8	54		x	x	x	x	dead	dead	recent dead
43	Douglas-fir	P	24	86		14/14	10/14	na	6/14	fair-good	viable	minor trunk sweep
44	Douglas-fir	P	21	90		12/14	12/na	na	6/20	fair-good	viable	
45	Douglas-fir	P	24	90		18/16	18/18	na	23/18	fair-good	viable	
46	bitter cherry	N	10,11	47		10/na	14/12	na	16/12	fair-poor	borderline	fork at base, poor attachment, trunk decay
47	black cottonwood	N	23	108		na	18/14	16/14	18/14	fair	viable	young to semi mature, forked top, moderate-high risk
48	western red cedar	N	32,28	78		na	12/6	18/18	18/18	fair-poor	borderline	grade previously cut, fork at 3', major included bark
49	western red cedar	N	34	84		na	14/8	12/10	14/14	fair-good	viable	grade previously cut to south and east
50	western red cedar	N	34, 16	83		na	10/12	na	14/14	fair-good	viable	slight lean north
51	red alder	N	8	65		na	na	na	na	fair-poor	borderline	poor taper, lean
52	red alder	N	10	63		na	na	na	na	fair-poor	borderline	poor taper, lean
53	red alder	N	11	72		na	na	na	na	fair-poor	borderline	heavy lean
54	red alder	N	7	60		na	na	na	na	fair-poor	borderline	
55	red alder	N	6	44		na	na	na	na	fair-poor	borderline	heavy lean
56	red alder	N	13	75		na	na	na	na	fair-poor	borderline	heavy lean
57	red alder	N	10	48		na	na	na	na	fair-poor	borderline	heavy lean, suppressed
58	red alder	N	7	47		na	na	na	na	fair-poor	borderline	lean, dead top
59	red alder	N	9	68		na	na	na	na	fair-poor	borderline	heavy lean
60	red alder	N	13	75		na	na	na	na	fair-poor	borderline	heavy lean
61	red alder	N	11	70		na	na	na	na	fair-poor	borderline	heavy lean, decay
62	red alder	N	8	65		na	na	na	na	fair-poor	borderline	trunk decay
63	red alder	N	7	60		na	na	na	na	fair-poor	borderline	trunk decay
64	red alder	N	7	40		na	na	na	na	poor	non-viable	dead top, suppressed
65	red alder	N	7	50		na	na	na	na	fair-poor	borderline	lean, suppressed
66	red alder	N	6	35		na	na	na	na	poor	non-viable	dead top, suppressed
67	red alder	N	11	75		na	na	na	na	fair	viable	lean
68	red alder	N	12	75		na	na	na	na	fair	viable	lean
69	red alder	N	8	65		na	na	na	na	fair-poor	borderline	bent top
70	red alder	N	8	65		na	na	na	na	fair	viable	typical
71	red alder	N	8	65		na	na	na	na	fair	viable	typical
72	red alder	N	12	70		na	na	na	na	fair	viable	lean
73	red alder	N	6	50		na	na	na	na	dead	dead	recent dead
74	red alder	N	13	70		na	na	na	na	fair-poor	borderline	heavy lean

Drip-Line and Limits of Disturbance measurements from face of trunk

Tree Summary Table

For: Astronomics Expansion Project
Kirkland

American Forest Management, Inc.

Date: 4/1/2015
Inspector: Layton

Tree/Tag #	Species	Native/ Planted/ Volunteer	DBH	Height	Tree Credit	Drip-Line/Limits of Disturbance (feet)				Condition	Viability	Comments
						N	S	E	W			
75	red alder	N	14	75		na	na	na	na	fair	viable	lean
76	red alder	N	9	60		na	na	na	na	fair-poor	borderline	suppressed, lean, low vigor
77	red alder	N	10	60		na	na	na	na	fair-poor	borderline	suppressed, lean, low vigor
78	red alder	N	16	75		na	na	na	na	fair-poor	borderline	heavy lean
79	red alder	N	9	45		na	na	na	na	fair-poor	borderline	suppressed, low vigor, decline
80	red alder	N	10	70		na	na	na	na	fair-poor	borderline	heavy lean
81	red alder	N	8	60		na	na	na	na	fair	viable	lean
82	red alder	N	7	55		na	na	na	na	fair	viable	lean
83	red alder	N	6	45		na	na	na	na	fair-poor	borderline	decay, low vigor
84	red alder	N	6	45		na	na	na	na	fair-poor	borderline	bent top, suppressed top
85	red alder	N	9	55		na	na	na	na	fair	viable	typical
86	red alder	N	7	55		na	na	na	na	fair	viable	typical
87	red alder	N	7	50		na	na	na	na	fair	viable	typical
88	red alder	N	7	50		na	na	na	na	fair-poor	borderline	lean, poor taper
89	red alder	N	6	45		na	na	na	na	fair	viable	typical
90	red alder	N	8	50		na	na	na	na	fair	viable	typical
91	red alder	N	10	55		na	na	na	na	fair-poor	borderline	heavy lean, exposed root crown
92	red alder	N	8	40		na	na	na	na	poor	non-viable	heavy lean, failing
93	red alder	N	6	45		na	na	na	na	fair	viable	typical
94	red alder	N	6	45		na	na	na	na	fair	viable	lean
95	red alder	N	8	50		na	na	na	na	fair	viable	natural lean
96	red alder	N	6	30		na	na	na	na	poor	non-viable	suppressed, major decline
97	red alder	N	6	40		na	na	na	na	poor	non-viable	suppressed, major decline
98	red alder	N	7	40		na	na	na	na	poor	non-viable	suppressed, major decline
99	red alder	N	7	45		na	na	na	na	poor	non-viable	heavy lean, dying top
100	red alder	N	10	45		na	na	na	na	poor	non-viable	dead top, decline
101	red alder	N	8	30		na	na	na	na	poor	non-viable	broken top, suppressed
102	red alder	N	9	30		na	na	na	na	poor	non-viable	80% dead
103	big leaf maple	N	14	40		na	na	na	na	fair	viable	heavy self corrected lean
104	red alder	N	6	35		na	na	na	na	fair-poor	borderline	low vigor
105	red alder	N	7	40		na	na	na	na	fair-poor	borderline	low vigor
106	red alder	N	8	45		na	na	na	na	fair-poor	borderline	dying top
107	big leaf maple 4	N	16~20	90		na	na	26/18	na	fair	viable	previous stem failure~hypoxylon, moderate risk
108	red alder	N	9	45		na	na	na	na	fair-poor	borderline	lean, declining top
109	red alder	N	9	50		na	na	na	na	fair-poor	borderline	lean, declining top
110	red alder	N	7	16		na	na	na	na	poor	non-viable	broken, decay
111	red alder	N	11	40		na	na	na	na	fair	viable	typical, cavity

Drip-Line and Limits of Disturbance measurements from face of trunk

Tree Summary Table

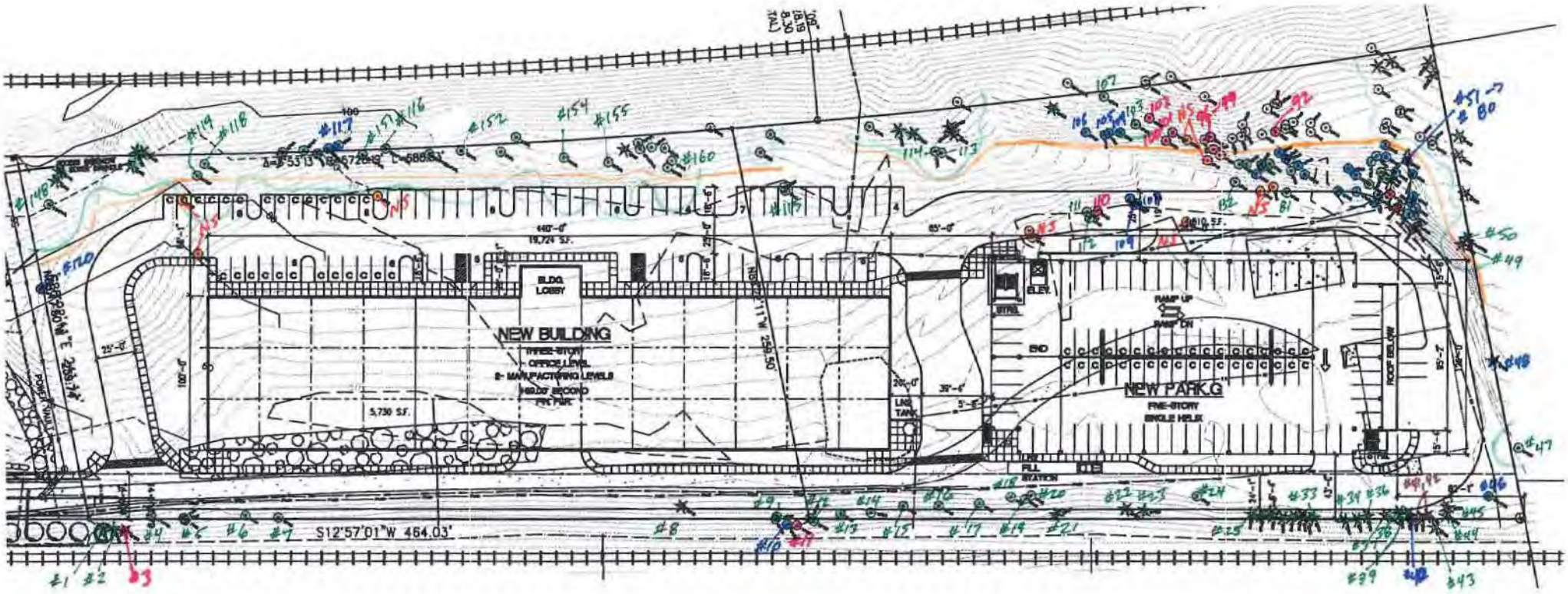
For: Astronomics Expansion Project
Kirkland

American Forest Management, Inc.

Date: 4/1/2015
Inspector: Layton

Tree/Tag #	Species	Native/ Planted/ Volunteer	DBH	Height	Tree Credit	Drip-Line/Limits of Disturbance (feet)				Condition	Viability	Comments
						N	S	E	W			
112	red alder	N	7	35	na	na	na	na	na	fair	viable	forked top
113	big leaf maple	N	11	45	na	14/12	8/na	16/10	na	fair-good	viable	young, forked top
114	big leaf maple	N	10	45	na	4/na	16/12	10/10	na	fair-good	viable	forked top, codom, not pos to fall to pl
115	red alder	N	7	40	na	na	na	na	na	fair	viable	sapling
160	big leaf maple	N	32,20	110	na	20/16	12/18	30/tos	na	fair	viable	remove hazardous 20" stem
155	big leaf maple 4	N	36,22,15	106	na	16/18	20/20	40/tos	na	fair	viable	cc, ew east side, dw
154	big leaf maple 7	N	16~30	115	na	12/20	30/24	40/tos	na	fair	viable	mature, cc, dw, ew east side
152	big leaf maple 4	N	14~20	100	na	10/16	12/18	35/16	na	fair	viable	assym to pl, ew recommended
116	big leaf maple 4	N	12~28	100	na	12/16	10/18	35/16	na	fair	viable	drop dead 26" stem, crown clean and end-weight east side
151	big leaf maple	N	36	110	na	12/18	12/18	35/16	na	fair	viable	crown clean, end-weight east side
117	big leaf maple	N	25,18,15	95	na	10/16	12/18	26/16	na	fair-poor	borderline	previous large stem failure, major soft rot infection, consider removal
118	black cottonwood	N	36	140	na	24/20	14/20	20/20	na	fair	viable	mature, recommend remove and replace
119	black cottonwood	N	42	150	na	10/20	24/24	34/20	na	fair	viable	lean east, problematic, recommend removal
120	black cottonwood	N	38	120	na	20/16	18/20	18/16	24/20	fair-poor	borderline	past disturbance around tree, lacking vigor, grade raised
148	big leaf maple 5	N	16~24	90	na	30/18	28/24	30/16	na	fair	viable	large clump, crown clean, end-weight east side

tos = toe of cut slope
Drip-Line and Limits of Disturbance measurements from face of trunk

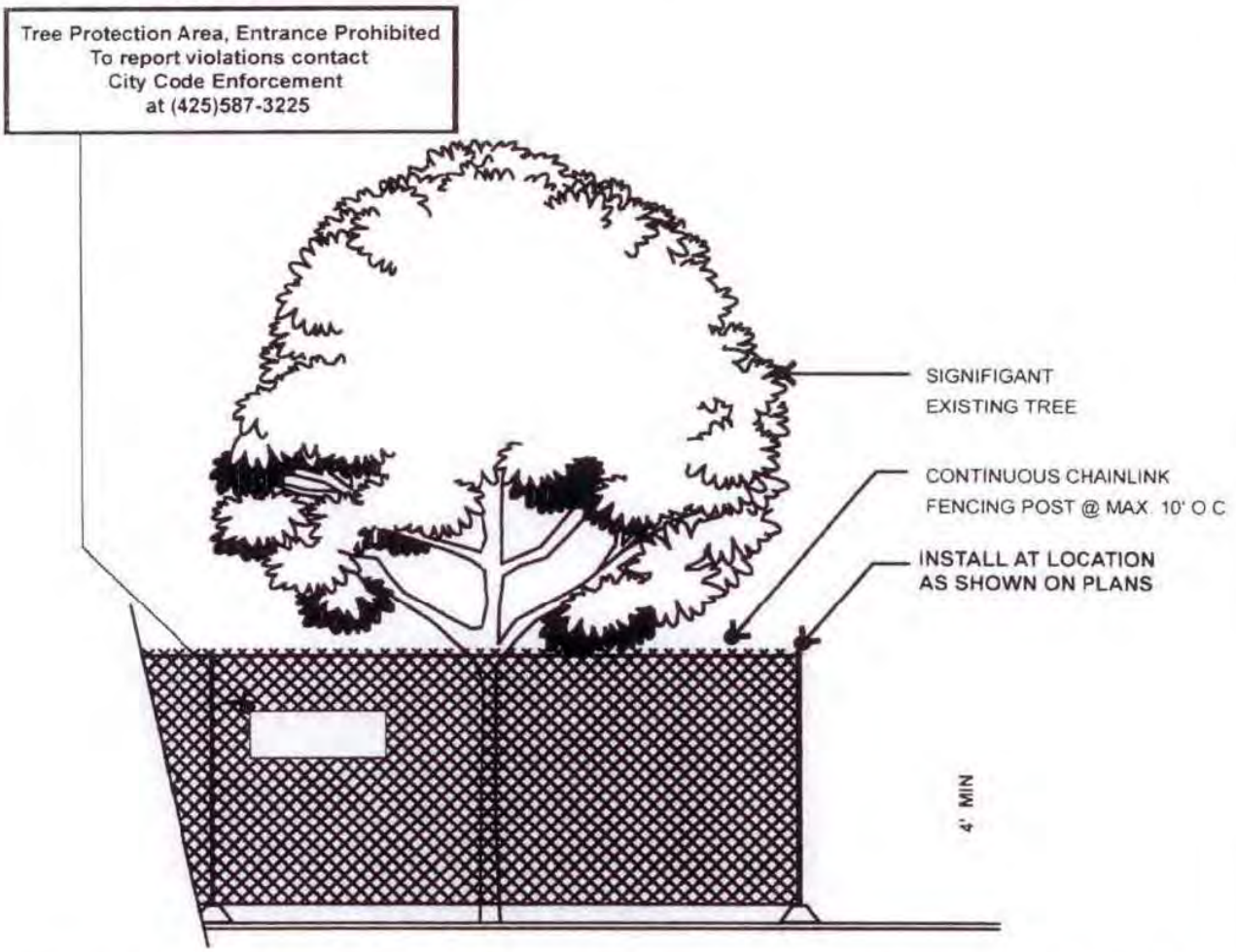


ASTRONOMICS NORTH BLDG EXPANSION PROJECT

- #1 – VIABLE TREE
- #3 – NON-VIABLE
- #10 – BORDERLINE – NOT RECOMMENDED FOR RETENTION
- NS – NON-SIGNIFICANT
- ——— APPROXIMATE DRIPLINE
- ——— – TREE PROTECTION BARRIER

APPROX. SCALE 1" = 75'

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.

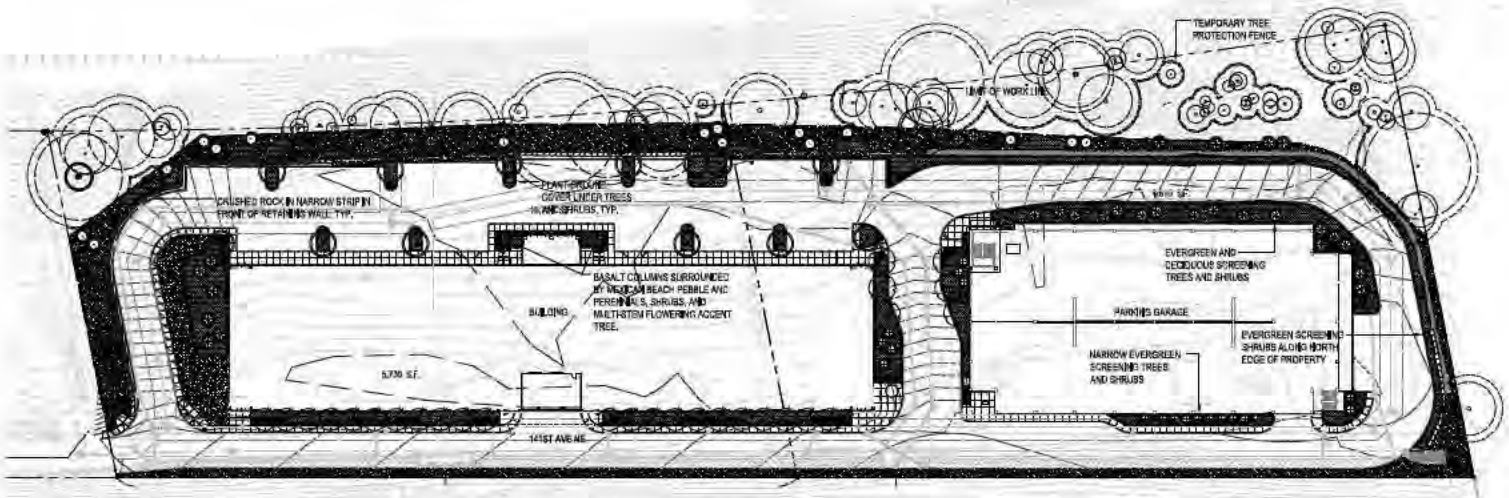
2. TREATMENT OF ROOTS EXPOSED DURING CONSTRUCTION: FOR ROOTS OVER ONE (1) INCH DIAMETER DAMAGED DURING CONSTRUCTION, MAKE A CLEAN STRAIGHT CUT TO REMOVE DAMAGED PORTION OF ROOT. ALL EXPOSED ROOTS SHALL BE TEMPORARILY COVERED WITH DAMP BURLAP TO PREVENT DRYING, AND COVERED WITH SOIL AS SOON AS POSSIBLE.

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



N ① LANDSCAPE PLAN
1" = 40'

0 20 40 80

PLANT SCHEDULE

SYMBOL	BOTANICAL NAME / COMMON NAME	SIZE	NOTES
	EXISTING TREES TO REMAIN		PRESERVE AND PROTECT
	DECIDUOUS TREES		
	ACER CIRCINATUM / VINE MAPLE	10'-14' HT	B&B, MULTI-STEM (3) MIN., NURSERY GROWN
	CORNUS KOUSA / FLOWERING DOGWOOD		B&B, MULTI-STEM (3) MIN.
	STYRAX OBASSIA / FRAGRANT SNOWBELL		B&B, MULTI-STEM (3) MIN.
	ACER RUBRUM 'ARMSTRONG' / ARMSTRONG MAPLE	2" CAL.	B&B, MATCHED FORM, STRONG STRAIGHT CENTRAL LEADER
	BETULA PAPYRIFERA / PAPER BIRCH		B&B, MATCHED FORM
	BETULA UTILIS VAR. JACQUEMONTII / WHITE-BARKED HIMALAYAN BIRCH		
	POPULUS TREMULOIDES / QUAKING ASPEN		
	FRAXINUS AMERICANA 'AUTUMN PURPLE' / AUTUMN PURPLE ASH		B&B, MATCHED FORM, STRONG STRAIGHT CENTRAL LEADER
	EVERGREEN TREES		
	PSEUDOTSUGA MENZIESII / DOUG FIR	5' HT. MIN	B&B, FULL & BUSHY TO BASE
	THUJA PLICATA 'GREEN SPORT' / GREEN SPORT WESTERN RED CEDAR		
	THUJA OCCIDENTALIS 'EMERALD' / EMERALD ARBORVITAE		
	THUJA PLICATA 'GREEN GIANT' / GREEN GIANT WESTERN ARBORVITAE		
	THUJA PLICATA 'VIRESCENS' / WESTERN RED CEDAR		
	SHRUBS		
	CORYLOPSIS PAUCIFLORA / BUTTERCUP WINTERHAZEL	3'-4'/6" SPR.	CONT., FULL FOLIAGE, 4' O.C.
	HAMAMELIS MOLLIS 'PALLIDA' / CHINESE WITCH HAZEL	3'-6" HT.	CONT., FULL FOLIAGE, 4' O.C.
	HYDRANGEA QUERCIFOLIA / OAK-LEAF HYDRANGEA	3'-6" HT.	CONT., FULL FOLIAGE, 4' O.C.
	IBERIS JAPONICA 'PRELUDE' / PRELUDE LILY OF THE VALLEY	3'-6" HT.	CONT., FULL FOLIAGE, 3' O.C.
	PRUNUS LAUROCERASUS 'OTTO LUYKEN' / OTTO LUYKEN LAUREL	21"-24" SPR.	CONT., FULL FOLIAGE, 3' O.C.
	PRUNUS LUSITANICA / PORTUGAL LAURE.	3'-6" HT.	CONT., FULL FOLIAGE, 4' O.C.
	ROSA RUGOSA / RAMANAS ROSE	3'-6" HT.	CONT., FULL FOLIAGE, 3' O.C.
	SYMPHORICARPOS ALBA / SNOWBERRY	3'-6" HT.	CONT., FULL FOLIAGE 4' O.C.
	SPIRAEA X BUMALDA 'ANTHONY WATERER' / SPIREA	24"-30" SPR.	CONT., FULL FOLIAGE 3' O.C.
	SPIRAEA NIPPONICA 'SNOWMOUND' / SNOWMOUND SPIREA	24"-30" SPR.	CONT., FULL FOLIAGE 3' O.C.
	SHRUBS CONTINUED		
	SPIRAEA X VANHOUTTEI / SPIREA	30"-36" HT.	CONT., FULL FOLIAGE, 4' O.C.
	TAXUS MEDIA 'BROWNII' / UPRIGHT YEW	30"-36" HT.	CONT., FULL FOLIAGE 3' O.C.
	TAXUS X. MEDIA 'DENSIFORMIS' / DARK GREEN SPREADING YEW	24"-30" SPR.	CONT., FULL FOLIAGE, 42" O.C.
	THUJA O. 'EMERALD GREEN' / ARBORVITAE	6'-8' MIN. HT.	CONT., FULL FOLIAGE, 30" O.C.
	TAXUS BACCATA 'REPANDENS' / SPREADING ENGLISH YEW	24"-30" SPR.	CONT., FULL FOLIAGE, 3' O.C.
	VIBURNUM DAVIDII / DAVID VIBURNUM	24"-30" SPR.	CONT., FULL FOLIAGE, 3' O.C.
	PERENNIALS AND GRASSES		
	ASTILBE 'DEUTSCHLAND' / FALSE SPIRAEA	1 GAL.	CONT., FULL FOLIAGE, 15" O.C.
	CALAMAGROSTIS X A. 'KARL FOERSTER' / FEATHER REED GRASS	2 GAL.	CONT., FULL FOLIAGE, 4' O.C.
	DESCHAMPSIA CESPITOSA / TUFTED HAIRGRASS	2 GAL.	CONT., FULL FOLIAGE, 18" O.C.
	DRYOPTERIS ERYTHROSORA / AUTUMN FERN	1 GAL.	CONT., FULL FOLIAGE, 12" O.C.
	HAKONECHLOA MACRA 'AUREOLA' / GOLDEN JAPANESE FOREST GRASS	1 GAL.	CONT., FULL FOLIAGE, 12" O.C.
	HELICTOTRICHON SEMPERVIRENS / BLUE OAT GRASS	2 GAL.	CONT., FULL FOLIAGE, 18" O.C.
	HEMEROCALLIS 'STELLA DE ORO' / DAYLILY	1 GAL.	CONT., FULL FOLIAGE, 18" O.C.
	PANICUM V. 'HAENSE HERMES' / SWITCH GRASS	2 GAL.	CONT., FULL FOLIAGE, 24" O.C.
	POLYSTICHUM MUNITUM / SWORD FERN	1 GAL.	CONT., FULL FOLIAGE, 18" O.C.
	RUDBECKIA F. 'GOLDSTURM' / BLACK-EYED SUSAN	1 GAL.	CONT., FULL FOLIAGE, 12" O.C.
	GROUND COVER		
	ARCTOSTAPHYLOS UVA-URSI / KINNIKINNICK	1 GAL.	CONT., FULL FOLIAGE, 18" O.C.
	FRAGARIA CHILOENSIS / BEACH STRAWBERRY		
	JUNIPERUS PLUMOSA 'COMPACTA' / CREEPING JUNIPER		
	JUNIPERUS SQUAMATA 'BLUE STAR' / BLUE STAR JUNIPER		
	MAHONIA REPENS / CREEPING MAHONIA		
	SOD FINE LAWN		
	EROSION CONTROL HYDROSEED		

LANDSCAPE NOTES:

1. IMPORT TOPSOIL SHALL BE TILLED INTO EXISTING SOILS AT A MIN. OF 24" DEPTH.
2. GROUND COVER SHALL EXTEND UNDER ALL PERENNIALS, ORNAMENTAL GRASSES, SHRUBS, AND DECIDUOUS TREE CANOPIES AT THE SPECIFIED SPACING TO PROVIDE COMPLETE COVERAGE IN ALL NEW PLANTING AREAS.
3. ALL STREET TREES SHALL MAINTAIN A 2.5' CLEARANCE FROM SIDEWALK.
4. NEW PLANTINGS SHALL BE COVERED WITH 2" OF ORGANIC MULCH. MAINTAIN 6" CLEARANCE OF MULCH AROUND TRUNKS OF SHRUBS AND TREES.
5. ALL NEW LANDSCAPE AREAS SHALL RECEIVE A FULLY AUTOMATIC IRRIGATION SYSTEM.
6. STREET TREES SHALL BE LIMBED UP 6' FROM FINISH GRADE.
7. REFER TO CIVIL ENGINEERING DRAWINGS FOR GRADING AND DRAINAGE INFORMATION. IMMEDIATELY NOTIFY LANDSCAPE ARCHITECT OF ANY ADVERSE DRAINAGE CONDITIONS WHICH MAY AFFECT THE HEALTH OF PLANT MATERIAL.
8. ALL REQUIRED LANDSCAPING SHALL BE MAINTAINED THROUGHOUT THE LIFE OF THE DEVELOPMENT. ALL TREES DESIGNATED FOR PRESERVATION IN TREE RETENTION PLAN SHALL BE MAINTAINED FOR 5 YEARS.

LANDSCAPE CALCULATIONS

REQUIRED PARKING LOT LANDSCAPE: 2,375 SF (25 SF/ SURFACE STALL)
PROVIDED PARKING LOT LANDSCAPE: 5,158 SF

REQUIRED PARKING LOT TREES: 16 TREES (1 TREE / ISLAND)
PROVIDED PARKING LOT TREES: 16 TREES

REQUIRED SITE TREES: 47 (1 TREE / 1,000 SF LANDSCAPE AREA)
PROVIDED SITE TREES: 159 TREES

ASTRONICS CORPORATION

CRAFT architects
2505 Third Avenue
Suite 324
Seattle, WA 98121
206.720.7091 phone
206.729.2949 fax
www.craftarchitects.com

ASTRONICS
NORTH BUILDING / ZONING SUBMITTAL
12950 Willows Road
Kirkland, Washington

CONSULTANT
Brumbaugh & Associates
Landscape Architecture
600 North 85th Street, Suite 103
Seattle, WA 98103-3920
Telephone 206 782 9933
Facsimile 206 782 3075

STATE OF WASHINGTON
REGISTERED
LANDSCAPE ARCHITECT
MARK H. BRUMBAUGH
CERTIFICATE NO. 459

Submittals/Revisions:

Sheet Title: LANDSCAPE PLAN

Date: 4.28.2015
Design: MHB
Drawn:
Project No: 2015-ASTRONICS
Approved:
Building No:
Sheet No: L2.0

Memorandum

11241 willows road ne
suite 200
redmond, wa 98052
phone (425) 822-4446
fax (425) 827-9577

To: David Barnes, Associate Planner, Planning and Building Department, City of Kirkland

From: Tom Early, Otak, Inc.

Date: April 29, 2016

Subject: Urban Forestry memo regarding Astronics proposal at 12950 Willows Road

Project No.: ZON15-00875 permit application

The proposal includes developing the site for an office building and associated parking. The proposed plan includes planting 63 trees and retaining 96 trees. The retained trees represent 142.5 density credits. This tree planting will meet code requirements for one tree per 1000 square feet of landscape area and one tree per parking lot island.

There are three groves on site and they are proposed for retention and protection. These groves contain many mature native trees including Big Leaf Maple, Douglas Fir and Western Red Cedar. Removal of noxious weeds, like blackberry, along the perimeters of the site should occur in order to minimize the long term maintenance after the development is completed.

The landscape plan appears sound with a diversity of trees, shrubs and groundcovers with the exception of paper birch and whitebarked Himalayan birch trees. These trees suffer from the Bronze Birch Borer throughout the Puget Sound Basin. It would be best to substitute these species for a non-birch species.

An image of the Big Leaf Maple grove in the middle of the western property line

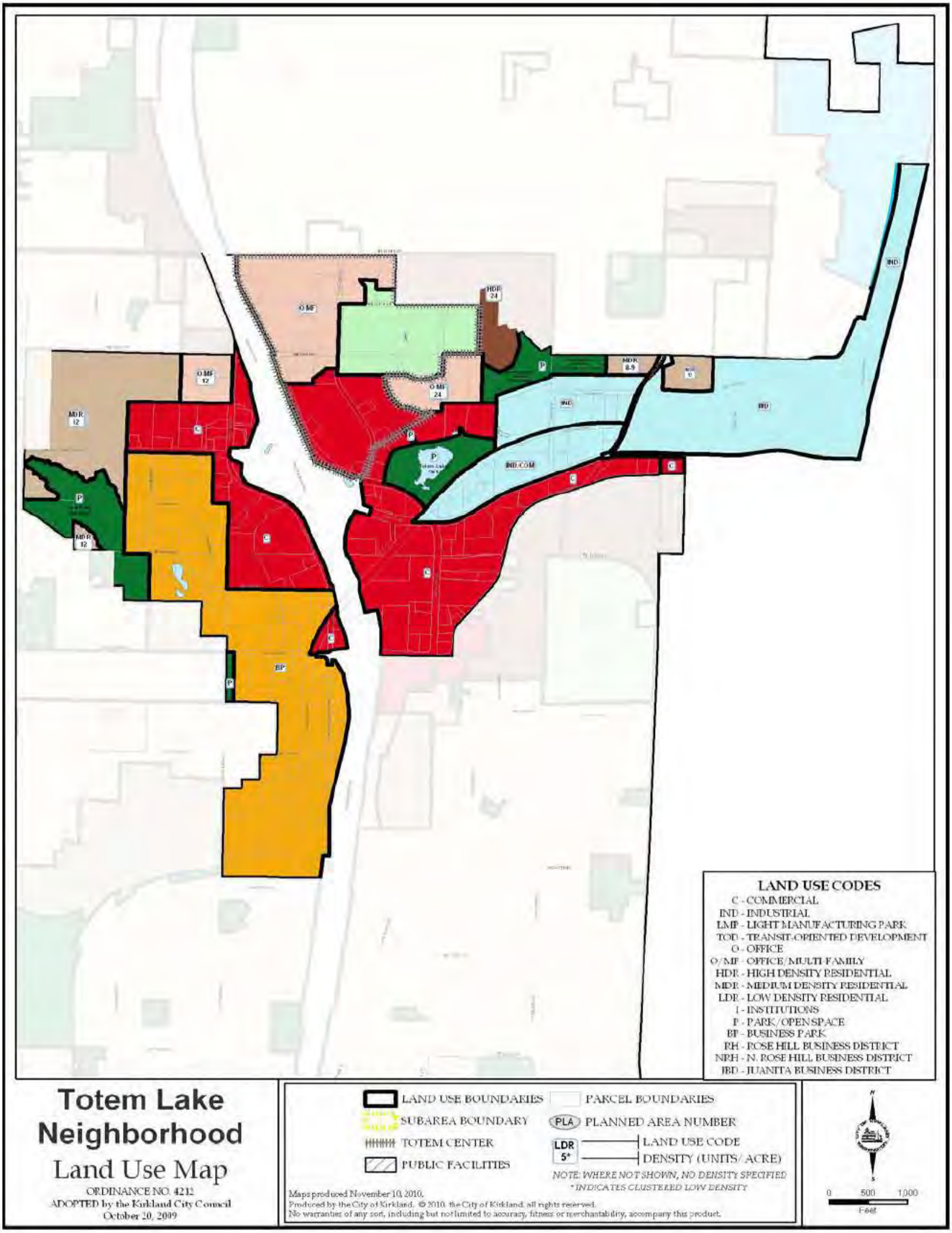


Figure TL-3: Totem Lake – Land Use