

Appendix L

Tree Survey Memorandum

Memo



P.O. Box 5022
Stateline, NV 89449
(916) 444-7301

Date: March 6, 2014

To: Alfred Knotts, TTD
Brian Judge, TRPA
Mike Vollmer, TRPA

From: Rachel Kozloski, Ascent Environmental

Subject: Tree Survey for the US 50/South Shore Community Revitalization Project

This memorandum summarizes the methods and results of a tree inventory survey conducted for the proposed US 50/South Shore Community Revitalization Project. With this memorandum, we are also submitting GIS files used to derive the information contained herein.

The purpose of the tree inventory effort was to identify and map trees protected under the Tahoe Regional Planning Agency (TRPA) Code of Ordinances (Code) and to provide sufficient and defensible information related to tree removal to support preparation of the EIS/EIR/EIS. All trees measuring 14 inches or greater diameter at breast height (DBH) within the established Archaeological Area of Potential Effect (APE) (APE map prepared by Wood Rodgers and dated September 12, 2013) were included in the tree inventory. Trees protected under the TRPA Code consist of trees measuring 24 inches or greater DBH in eastside forests or 30 inches or greater DBH in westside forests (the California/Nevada state line serves as the boundary for eastside and westside forests on the South Shore [Section 90.2 of the TRPA Code]), and Tree Species of Limited Occurrence (i.e., aspen, black cottonwood, ponderosa pine, Douglas fir, sugar pine, western white pine, whitebark pine, incense cedar, mountain hemlock, and western juniper) (Section 61.1.6 of the TRPA Code).

Methods

The APE established for the project encompasses the area that includes the extent of the four action alternatives being considered in environmental review. The Archaeological APE includes approximately 127 acres of land, much of which is located on private land. Because of the size of the APE and limited access to certain private lands, remote sensing data were used to establish the location, DBH size class, and canopy area for the trees within the APE. A field survey was completed to locate and measure TRPA Tree Species of Limited Occurrence within the APE. As described in the Scope of Work for this task, in order to account for potential growth over the next several years until the project is implemented, trees within 4 inches of the TRPA size criteria were mapped.

Before beginning field work, TRPA's 2013 "Tree Tops" dataset was reviewed. This dataset is derived from remote sensed LiDAR data obtained in 2010 and provides point locations and DBH for trees within the Tahoe Basin. DBH values in the Tree Tops dataset are derived using tree height and crown diameter. Field verification of the Tree

Tops dataset was completed by the TRPA contractor who prepared the data. Ascent conducted additional field verification for the portions of the dataset within the APE. A sample plot was established within the APE to confirm the accuracy of the Tree Tops dataset relative to location and DBH. This plot was located in a mature Jeffrey pine forest and included 70 trees. The accuracy of the LiDAR derived tree locations was found to be within the margin of error of the Magellan Mobile Mapper 120 GPS unit (1 meter) and the accuracy of the calculated DBH figures was found to be within approximately 4 inches of field measured DBH. The results of this sample plot were discussed with Mike Vollmer (TRPA) at a meeting on November 15, 2013, where it was agreed that this level of accuracy would be adequate for the purposes of environmental review, provided that the data were used conservatively (i.e., with a margin of error). Mike suggested that the entire APE could conservatively be described as eastside forest type. Mike also agreed with Ascent's proposed survey protocols, which included a pedestrian survey for Trees of Limited Occurrence and use of vegetation communities to describe the commonly occurring tree species within the APE.

During October and November 2013 an Ascent botanist familiar with tree species of the Tahoe Basin conducted a pedestrian survey of the APE. All TRPA Trees of Limited Occurrence measuring at least 10 inches DBH (measured with a logger's diameter tape at 4.5 feet above ground surface or at the narrowest point below the crotch of multi-trunk trees) were marked using a sub-meter GPS unit and the species and DBH were recorded. As described in the scope, a 4 inch buffer from the 14 inch DBH TRPA standard was included to account for the potential growth of the trees during the life of the project. If obvious structural defects or symptoms of disease or severe decline were observed in a tree, this was noted in the GPS data file. Significant rust or canker infections were noted on 35% of the mature (≥ 10 inches DBH) aspen trees surveyed with the APE. During this survey, vegetation communities within the APE were also delineated with GPS and described.

Results

Table 1 shows the number of trees proposed for removal under each action alternative based on disturbance footprints (i.e., area of tree removal) provided by Wood Rodgers on October 31, 2013 and included as Attachment A to this memorandum. To provide a conservative assessment of the DBH of trees that would be removed by the proposed project, a 4-inch buffer was included for each DBH size class as requested by TRPA. This means that the ≥ 14 to < 24 -inch DBH category shown in Table 1 includes trees with a calculated DBH between ≥ 10 and < 20 inches. Likewise, the ≥ 24 to < 30 -inch DBH class reporting category includes trees with a calculated DBH of ≥ 20 to < 25 inches, and trees with a calculated DBH of 26 inches or above were included in the ≥ 30 -inch DBH class reporting category. Because the APE is located on the boundary between eastside and westside forest types, trees above 24 inches and 30 inches DBH are also differentiated for both California and Nevada.

Use of the LiDAR data provides an efficient and accurate estimate of the total number of trees that would be removed by the project, and is especially valuable in inaccessible areas. In the sample plots created for this survey, 97 percent of the trees with calculated DBH values of ≥ 14 inches also had measured DBH values of ≥ 14 inches. The LiDAR has greater difficulty differentiating between size classes of larger trees. Based on the sampling completed for this project, it would be reasonable to expect that approximately 15 percent of the large diameter trees (≥ 24 inches DBH) shown in Table 1, would have a true measured DBH of less than 20 inches.

Table 1. Tree Removal by Alternative

Alternative	NV Trees Removed (Diameter at Breast Height) ¹			CA Trees Removed (Diameter at Breast Height) ¹			Total Trees Removed (≥14" DBH)	Aspen Stand Removed (sq ft) ²	Aspen Removed (≥10" DBH /≥14"DBH)
	≥14- <24"	≥24- <30"	≥30"	≥14- <24"	≥24- <30"	≥30"			
Alt B - Triangle	133	22	17	396	141	118	827	13,725	3/0
Alt C - Triangle One-Way	164	17	13	248	79	64	585	4,176	9/1
Alt D - PSR Alternative 2	133	22	17	316	106	101	695	13,725	3/0
Alt E - Skywalk	54	10	8	63	25	21	181	0	0/0
¹ Tree removal numbers and DBH values are estimated from remote sensed LiDAR data provided by TRPA in 2013. ² Area of aspen stands, location of mature aspen trees, and aspen DBH from measurements taken during October and November 2013 field surveys. Source: Adapted by Ascent Environmental in 2014.									

Two TRPA Tree Species of Limited Occurrence were found within the APE—quaking aspen (*Populus tremuloides*) and incense cedar (*Calocedrus decurrens*). Of these two species, only aspen was found within the disturbance footprints of the proposed action alternatives. Because of their clonal growth, aspen commonly form stands. The area of aspen stands within the disturbance footprint of each action alternative is shown in Table 1, in addition to the number of aspen with a *measured* DBH of greater than 10 inches and 14 inches, respectively.

Maps of each alternative showing the distribution of trees by size class as well as the location of Trees of Limited Occurrence are provided in Attachment A. An Excel spreadsheet is also provided showing trees removed by alternative (with cross references tree identification numbers) in Appendix B.p

Attachment A

Disturbance Footprint and Tree Removal Maps for Each Action Alternative

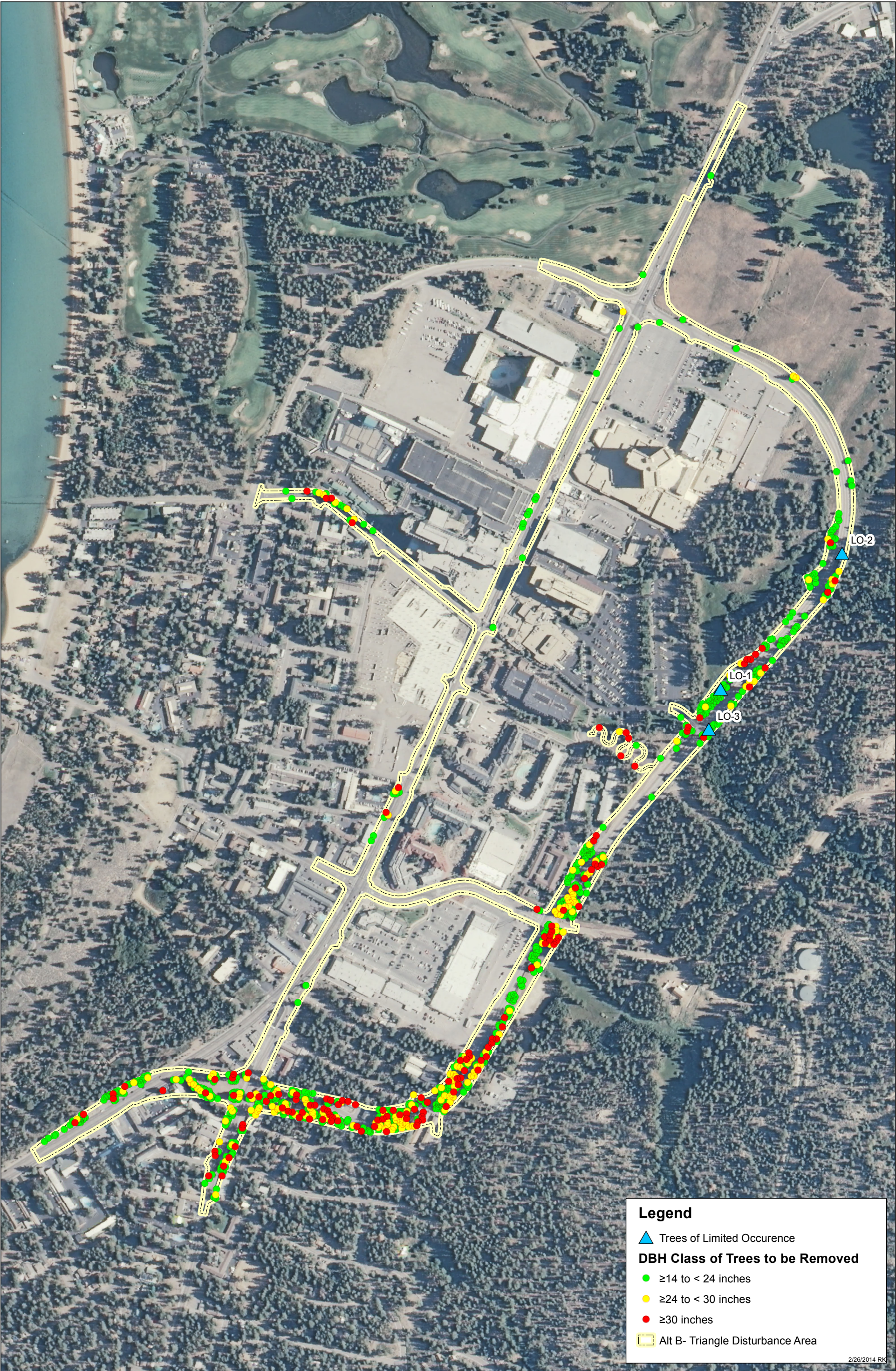


Figure 1: US 50/South Shore Community Revitalization Project
Alt B - Triangle Alternative Tree Removal



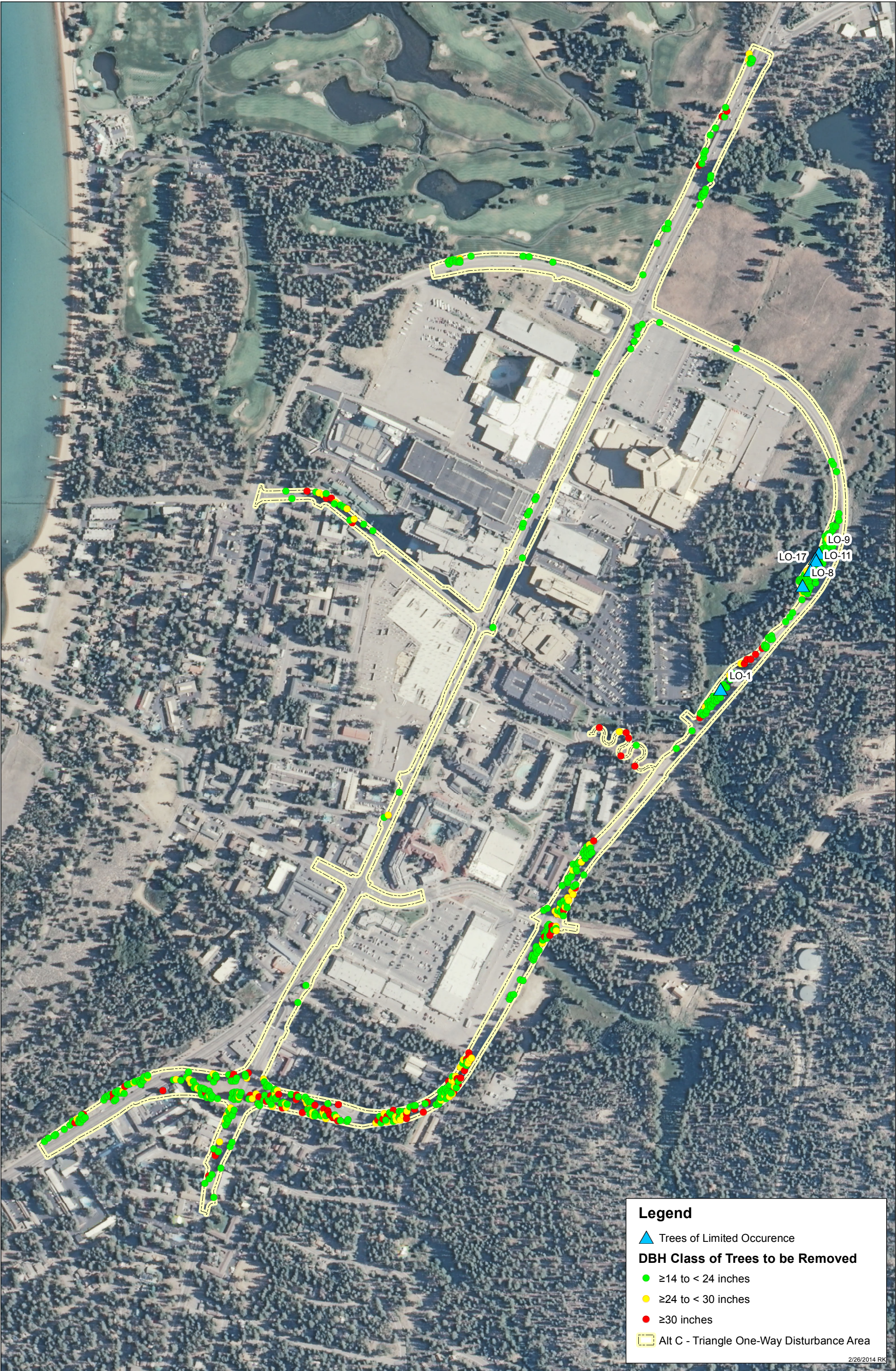


Figure 2: US 50/South Shore Community Revitalization Project
Alt C - Triangle One-Way Alternative Tree Removal

0 300 600 1,200 Feet N



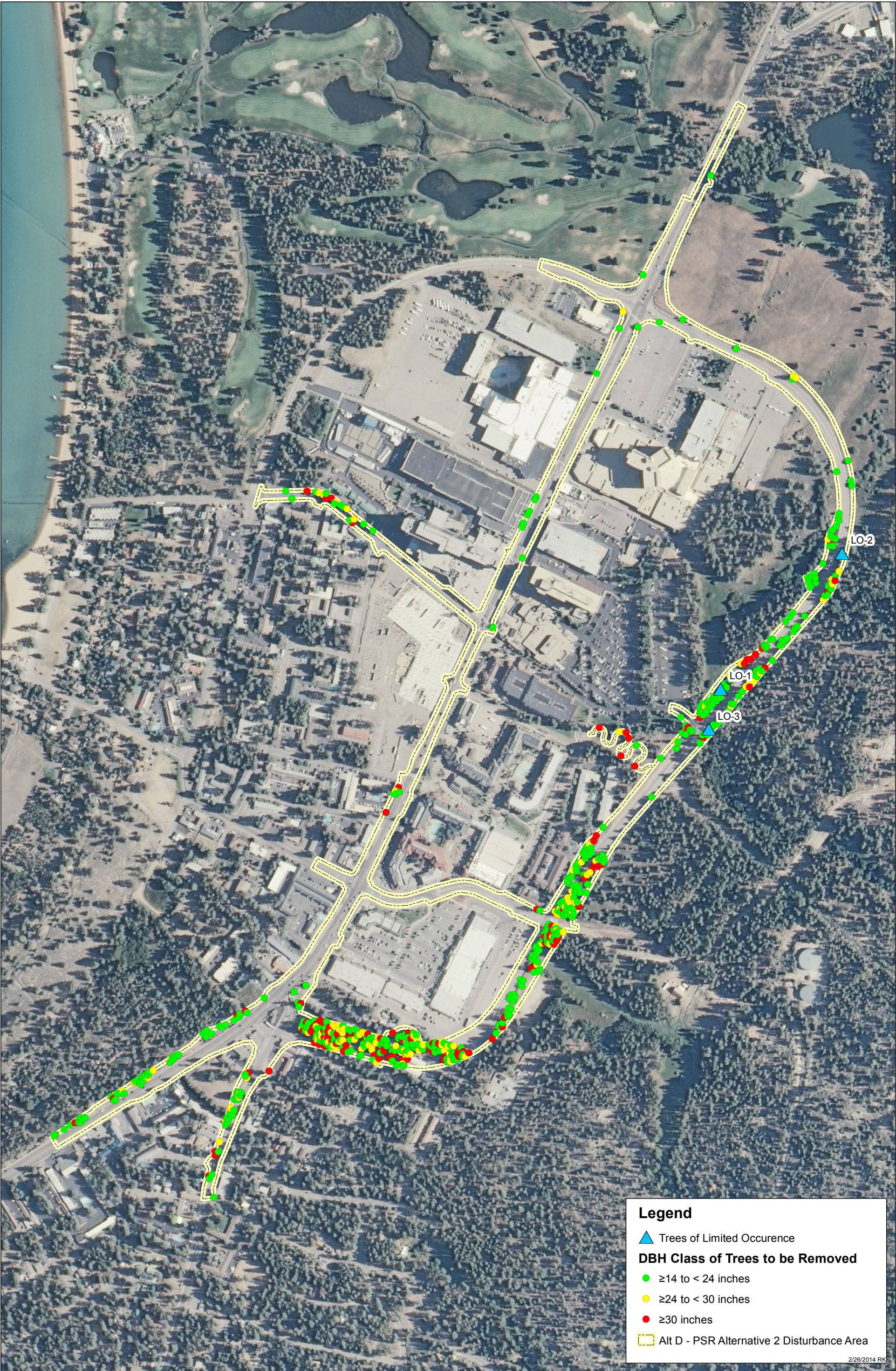


Figure 3: US 50/South Shore Community Revitalization Project
Alt D - PSR Alt 2 Alternative Tree Removal



2/26/2014 RK



Figure 4: US 50/South Shore Community Revitalization Project
Alt E - Skywalk Alternative Tree Removal

0 300 600 1,200
Feet



Attachment B

**Excel Spreadsheet with Tree Data
(Cross references tree ID numbers in GIS)**

Table 1. Tree Removal by Alternative

Alternative	NV Trees Removed (Diameter at Breast Height) ¹			CA Trees Removed (Diameter at Breast Height) ¹			Total Trees Removed (≥14" DBH)	Aspen Stand Removed (sq ft) ²	Aspen Removed (≥10" DBH / ≥14" DBH)
	≥14-23"	≥24-29"	≥30"	≥14-23"	≥24-29"	≥30"			
Alt B - Triangle	133	22	17	396	141	118	827	13,725	3/0
Alt C - Triangle One-Way	164	17	13	248	79	64	585	4,176	9/1
Alt D - PSR Alternative 2	133	22	17	316	106	101	695	13,725	3/0
Alt E - Skywalk	54	10	8	63	25	21	181	0	0/0

¹ Tree removal numbers and DBH values are estimated from remote sensed LiDAR data provided by TRPA in 2013.

² Area of aspen stands, location of mature aspen trees, and aspen DBH from measurements taken during October and November 2013 field surveys.
Source: Adapted by Ascent Environmental in 2014.