

APPENDIX 1
ARBORIST REPORT

Maple Hill Community Fields Project

Background and Assignment

I was asked by Tom Dodson and Associates to provide an arborist's report including a tree inventory for a 15-acre site south of Big Bear City in the Sugarloaf neighborhood.

The Bear Valley Unified School District Education Foundation has proposed the development of a multi-use sports complex (Maple Hills Community Fields Project) that would provide recreational and educational opportunities for students and the surrounding community. The San Bernardino Land Use Services Department has requested the arborist's report as part of its review process for this development.

Site Description

The site is located in the unincorporated community of Sugarloaf in the San Bernardino Mountains at an elevation of approximately 7,000 feet. It is just south of Big Bear City and approximately 8 miles southeast of the eastern tip of Big Bear Lake. (See Appendix B, Maps, Figures 1 and 2.) The Pebble Plain Ecological Reserve is located to the west of the site. The Baldwin Lake Elementary School is the adjacent parcel to the south. There are residential neighborhoods to the north, east, and south. The Pebble Plain is an environmentally sensitive area that is home to protected and rare plants and animals.

Singleleaf Pinyon – Utah Juniper Woodlands

The only plant community in the survey area is singleleaf pinyon – Utah juniper woodlands [*Pinus monophylla* – (*Juniperus osteosperma*) Woodland Alliance] as described by the California Native Plant Society (CNPS) *A Manual of California Vegetation Online* (CNPS 2021). This is an open-canopy woodland dominated by singleleaf pinyon pine (*Pinus monophylla*). Other significant trees in this woodland include Utah juniper (*Juniperus osteosperma*) and Ponderosa pine (*Pinus ponderosa*). Occasional trees include black oak (*Quercus kelloggii*) and the tree form of curlleaf mountain mahogany (*Cercocarpus ledifolius* var. *ledifolius*) and little leaf mountain mahogany (*Cercocarpus ledifolius* var. *intricatus*). Shrubs observed in this community include curlleaf mountain mahogany, birchleaf mountain mahogany (*Cercocarpus betuloides*), chamise (*Adenostoma fasciculatum*), big sagebrush (*Artemisia tridentata*), California flannelbush (*Fremontodendron californicum*), prickly pear cactus (*Opuntia* sp.), and Utah serviceberry (*Amelanchier utahensis*).

The survey was conducted during the winter and as a result, no annual herbaceous plants were present at the time of the survey, but many are expected to occur.

Procedures

Matthew South and I visited the site and collected data for the tree inventory on January 1, 2021. Because it would be impractical and expensive to measure and count every tree in the 15-acre stand, plot sampling is the method we chose to derive information about the entire 15-acre forest stand.

Generally, one sampling plot per every 10 acres is recommended to achieve an accurate inventory. The element of randomization is desirable as well to be able to describe the forest correctly. For this 15-acre site, we surveyed trees within three 1/10-acre circular plots in separate, randomly-selected locations. A 1/10-acre circular plot has a radius of 37 feet, 2 inches. We considered a tree 'in' if the center of the tree fell within the plot boundary. For this survey, we only considered overstory trees with a diameter at breast height (dbh) of at least 4 inches.

The data for each tree that we collected included dbh, approximate height, and overall condition. Individual tree locations were collected and recorded using a Geographic Information System (GIS) and assigned unique numbers. (*See Appendix A, Maple Hill Fixed Plot Worksheets and Photos and Appendix B, Maps, Figures 4-6.*)

We used the following grading scale to determine condition:

Poor – Large, dead branches, evidence of bark loss on trunk, and appearance of advanced decline; many dead branches with little shoot growth

Fair – Scattered dead twigs in outer crown; minor crown thinning and reduced shoot growth

Good – Maximum health

Survey Results

In fixed area plots, the relationship between a plot tree and the larger stand is straightforward. A tree in one of our 1/10-acre plots represents 10 trees per acre in the larger stand, which is referred to as the tree's expansion factor. When multiple plots are established, the number of trees per acre computed for each plot are added together and divided by the number of plots to establish an average value.

We surveyed a total of 26 trees. In our three 1/10-acre plots, the tree counts were as follows: Plot A—6 trees; Plot B—9 trees; Plot C—11 trees. Each plotted tree represents $1 \times 10 = 100$ trees per acre in the stand, for a computed value of 60 trees in Plot A; 90 trees in Plot B; and 110 trees in Plot C. Adding these numbers and dividing by three (the number of plots) yields an average of approximately 87 trees

per acre (TPA) in the stand. The site is comprised of 15 acres. At 87 TPA, the site will contain approximately 1,305 trees.

Table 1: Computing the average trees per acre for a stand from three 1/10th-acre plots

Plot	No. of Trees	TPA
A	6	60
B	9	90
C	11	110
	SUM	260
	STAND TPA	87

There were five species of trees in our survey: *Cercocarpus ledifoliosus*, Curleaf mountain-mahogany; *Juniperus osteosperma*, Utah juniper; *Pinus monophylla*, Singleleaf pine; *Pinus ponderosa*, Ponderosa pine; and *Quercus kelloggii*, Black oak. We rated the majority of the trees in good condition. Only two trees were rated in fair condition, and none was classified as poor. We observed no dead trees in the survey.

Table 2: Summary of Plotted Trees

Species	Avg. DBH	Total No. of Trees
<i>Cercocarpus ledifoliosus</i> , Curleaf mountain-mahogany	10.5"	2
<i>Juniperus osteosperma</i> , Utah juniper	19"	2
<i>Pinus monophylla</i> , Singleleaf pine	11"	15
<i>Pinus ponderosa</i> , Ponderosa pine	14"	4
<i>Quercus kelloggii</i> , Black oak	26.5"	3
Total trees surveyed		26

Comments and Recommendations

Based on the proposed development (See Appendix B, Maps, Figure 3.), the entire 15-acre site will be impacted during construction. As mentioned, an estimated 1,305 trees will need to be removed.

Situations might arise whereby a tree on-site can be spared from construction. Alternatively, a tree located off-site but in proximity to construction might be impacted by the site work. In these instances, precautions should be taken so as not to compact the soil during construction and to avoid unnecessary root removals. (*Refer to Appendix C for Tree Preservation Guidelines.*)

If pruning is deemed necessary to spare a tree, it should be performed according to guidelines set forth by the International Society of Arboriculture (ISA) in its publication, *Best Management Practices: Tree Pruning (Third Edition)*. ISA best management practices recommend removing no more than 20 percent of the live crown of a tree in a single year. In mature trees, pruning even that much can have negative effects.

Mature trees are often the most valued in a community, and they evoke powerful emotional attachments. Arborists try to weigh these values with concerns related to the useful lifespan of a tree and the benefits it can provide. Maintaining health and a stabilizing structure are the two main goals of mature tree management.

Consulting Arborist Disclosure

Consulting arborists are tree specialists who use their education, knowledge, training, and experience to examine trees, recommend measures to enhance the beauty and health of trees, and attempt to reduce the risk of living near trees. Clients may choose to accept or disregard the recommendations of the arborist or seek additional advice. Consulting arborists cannot detect every condition that could possibly lead to the failure of a tree. Trees are living organisms that fail in ways we do not fully understand. Conditions are often hidden within trees and below ground. Consulting arborists cannot guarantee that a tree will be healthy or safe under all circumstances, or for a specified period of time. Likewise, remedial treatments an arborist may recommend, like any medicine, cannot be guaranteed. Trees can be managed, but they cannot be controlled. To live near a tree is to accept some degree of risk. The only way to eliminate all risks from trees is to eliminate all trees.

Appendix A

Fixed Plot Worksheets and Photos

1/10 Acre Fixed Plot Worksheets—Maple Hill Community Field

ID No.	Genus species	DBH (in.)	HT. (ft.)	Condition	Notes
Plot #A-1	Pinus monophylla	6.5	20	Good	
A-2	Pinus monophylla	14	17	Good	3 stems (6+5+3)
A-3	Pinus monophylla	5	15	Good	
A-4	Pinus monophylla	7.5	20	Good	2 stems (4.5+3)
A-5	Juniperus osteosperma	13	35	Good	
A-6	Pinus monophylla	16.5	25	Good	2 stems (8+8.5)

1/10 Acre Fixed Plot Worksheets—Maple Hill Community Field

ID No.	Genus species	DBH (in.)	HT. (ft.)	Condition	Notes
Plot #B-7	Cercocarpus ledifolius	8	12	Fair	2 stems (5+3); stem to SW had failure
B-8	Pinus monophylla	8.5	35	Good	
B-9	Pinus ponderosa	10	32	Good	
B-10	Pinus ponderosa	5	15	Good	
B-11	Quercus kelloggii	12	20	Good	
B-12	Quercus kelloggii	58	35	Good	5 stems (12+12+12+12+10)
B-13	Pinus monophylla	4	10	Good	
B-14	Pinus monophylla	14	35	Good	
B-15	Quercus kelloggii	9.5	35	Good	

1/10 Acre Fixed Plot Worksheets—Maple Hill Community Field

ID No.	Genus species	DBH (in.)	HT. (ft.)	Condition	Notes
Plot # C-16	Juniperus osteosperma	25	35	Good	
C-17	Pinus ponderosa	16	40	Good	
C-18	Cercocarpus ledifolius	13	10	Good	3 stems (5+5+3)
C-19	Pinus monophylla	7	32	Good	
C-20	Pinus monophylla	15	18	Good	
C-21	Pinus monophylla	15	30	Good	
C-22	Pinus monophylla	22.5	35	Good	
C-23	Pinus monophylla	10	35	Good	
C-24	Pinus ponderosa	25	45	Good	
C-25	Pinus monophylla	6.5	15	Good	
C-26	Pinus monophylla	12.5	18	Fair	(2 stems (6+6.5))



Image 1: Depicts the east edge of Tree Survey Plot A. Photo taken from the northeast edge of the plot facing south.



Image 2: Depicts Tree Survey Plot B and is taken from the center of the plot facing southwest.

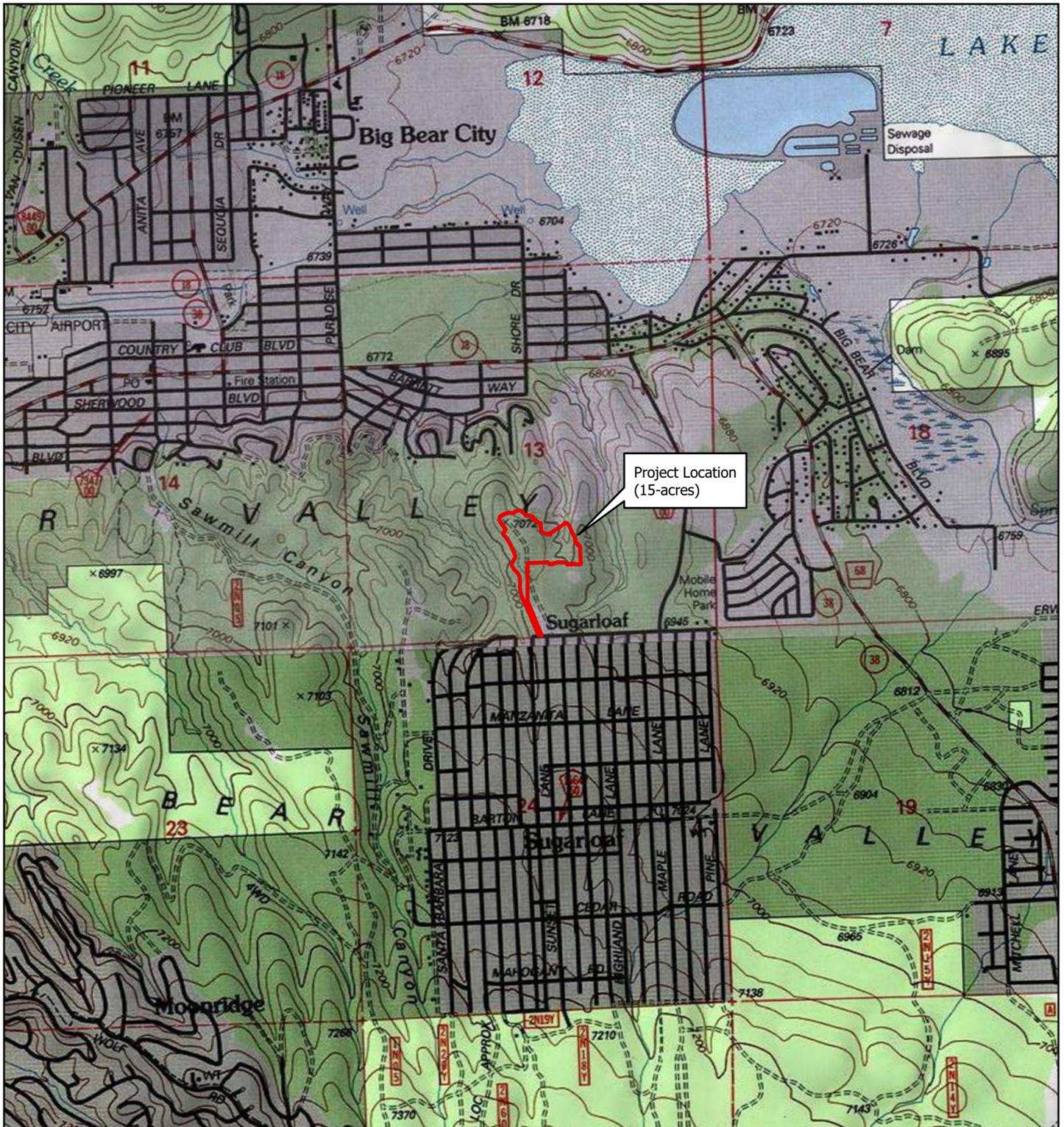


Image 3: Depicts Tree Survey Plot C and is taken from the center of the plot facing east.



Image 4: Depicts the area to the southeast of Tree Survey Plot B and is taken from the east end of the plot facing southeast.

Appendix B Maps



Source: ESRI USA Topo Maps 2021

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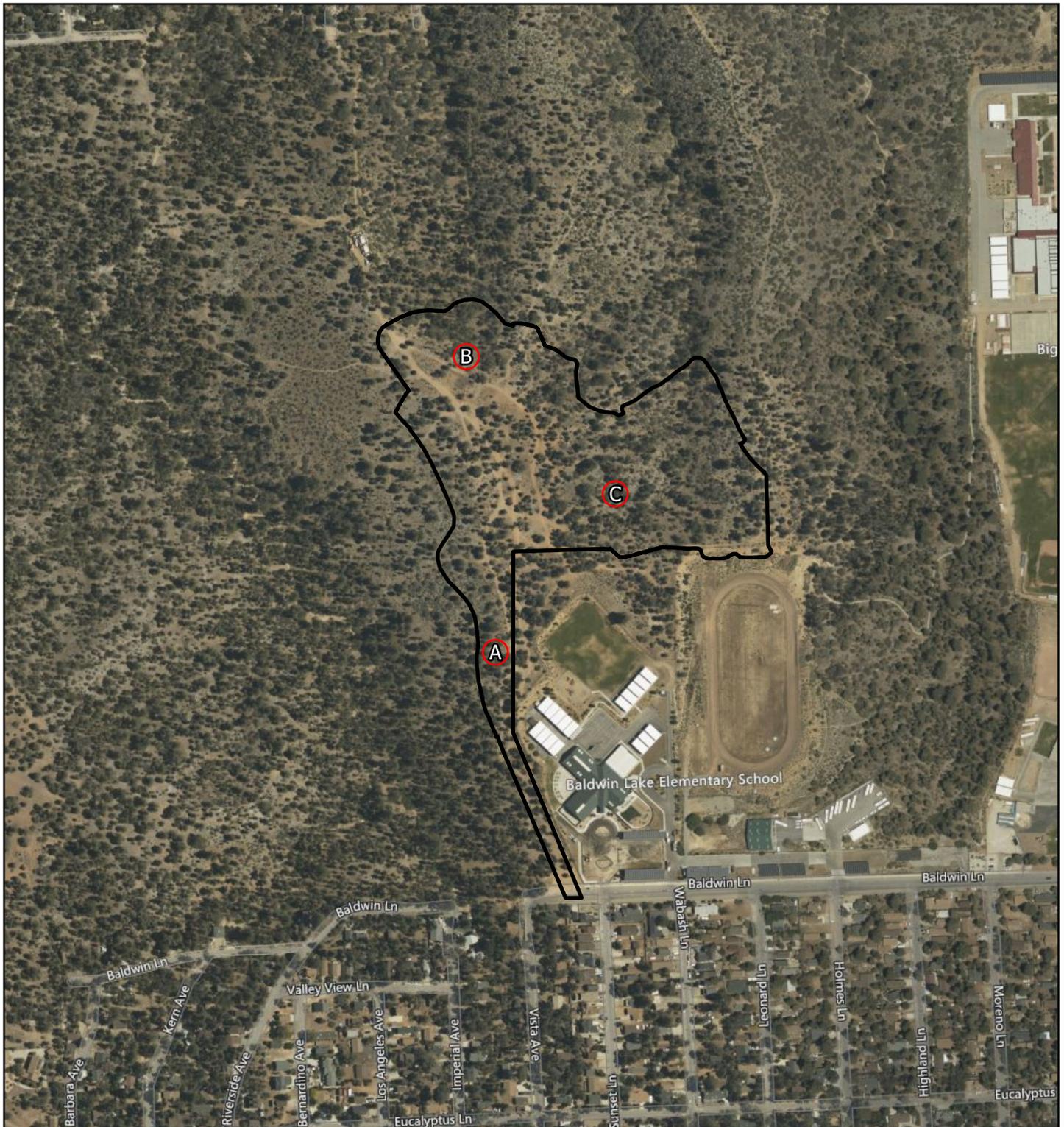
Figure 1. Project Location

Project Area - 15-acres

Project Site is in the Big Bear City Census Designated Place (CDP) in unincorporated San Bernardino County on the USGS Big Bear City 7.5-minute quadrangle map in Section 13 of Township 02 North (T02N) and Range 01 East (R01E)

Center Coordinate (decimal degrees):
 Latitude: 34.2539N Longitude: -116.8311W

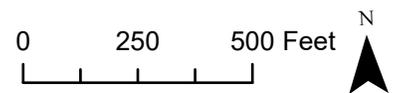




Source: BING Aerial Basemap 2021

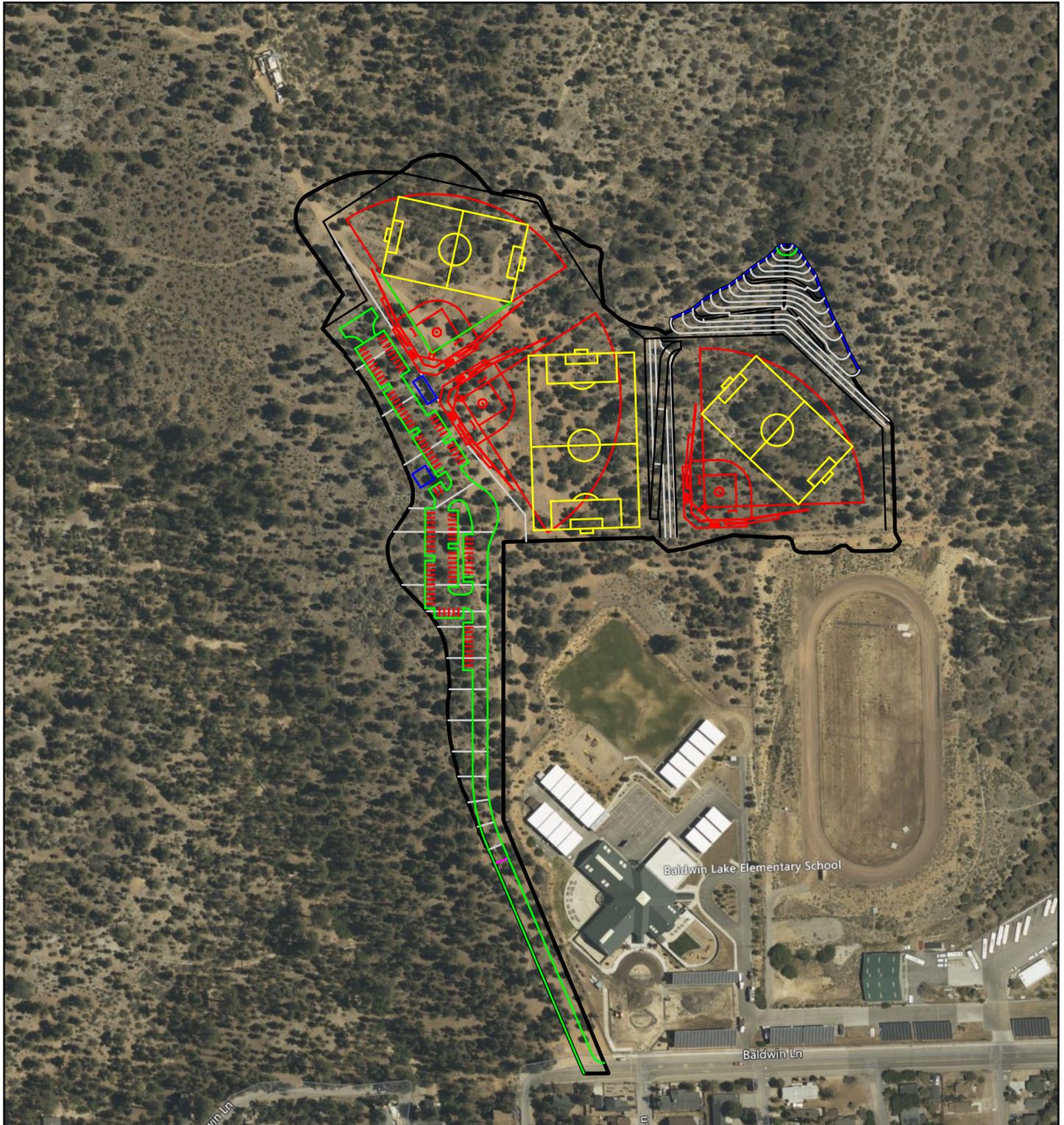
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Figure 2. Project Vicinity & Survey Areas



- Tree Survey Sampling Area (0.1-acre)
- Project Boundary - 15-acres

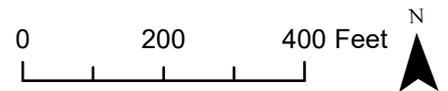




Source: BING Aerial Basemap 2021

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Figure 3. Proposed Development



 Project Boundary - 15-acres

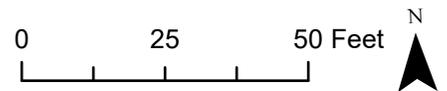




Source: BING Aerial Basemap 2021

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Figure 4. Tree Survey Plot A



- Pinyon Pine
- Utah Juniper
- Tree Survey Sampling Area (0.1-acre)
- Project Boundary

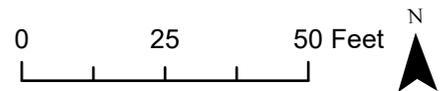




Source: BING Aerial Basemap 2021

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Figure 5. Tree Survey Plot B



- Pinyon Pine
- Black Oak
- Mountain Mahogany
- Ponderosa Pine
- Tree Survey Sampling Area (0.1-acre)
- Project Boundary

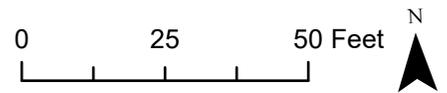




Source: BING Aerial Basemap 2021

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Figure 6. Tree Survey Plot C



- Pinyon Pine
- Utah Juniper
- Ponderosa Pine
- Mountain Mahogany
- Tree Survey Sampling Area (0.1-acre)
- Project Boundary



Appendix C

Tree Preservation Guidelines

Tree Preservation Guidelines

Trees are an essential element of a landscape's image and quality of life. Hardscape elements, such as sidewalks, curbs, gutters, walls, and driveways are also part of the landscape. Trees that are impacted during construction need to be protected.

Trees should be considered for preservation for the following benefits they provide:

- 1) They stabilize the soil and prevent erosion;
- 2) They reduce stormwater runoff by intercepting rainfall, promote infiltration, and lower the water table through transpiration;
- 3) They moderate temperature changes, promote shade, and reduce the force of wind;
- 4) They provide buffers and screens against noise and visual disturbance, providing a degree of privacy;
- 5) They filter pollutants from the air, remove carbon dioxide from the air, and produce oxygen;
- 6) They provide a habitat for animals and birds; and
- 7) They increase property values and improve site aesthetics.

To manage this process and protect existing trees, the following guidelines should be followed during the construction process:

1. Root Pruning

- a. There shall be no disturbance to roots more than 2 inches in diameter. Roots less than 2 inches in diameter must be cleanly cut to encourage good callus tissue. It is recommended that roots be pruned back to the next root node.
- b. Recommended distances from the trunk that roots should be pruned have been established for construction activities around trees. The recommendations are: Preferred distance – 5 times the diameter of the tree at breast height (dbh); Minimum distance – 3 times dbh.
- c. The recommended time to prune roots is before active root growth in late summer and fall.
- d. The less frequently roots are pruned the less impact there will be on tree health and stability.

2. Construction Projects

The following guidelines have been developed to protect trees during construction projects:

- a. A root protection zone shall be defined by a minimum 42" high barrier constructed around any potentially impacted tree. This barrier shall be at the drip line of the tree or at a distance from the trunk equal to 6

inches for each inch of trunk diameter 4.5 feet above the ground, if this method defines a larger area.

- b. Should it be necessary to install irrigation lines within this area, the line shall be located by boring, or an alternate location for the trench is to be established.

The minimum clearance between an open trench and a tree shall be no closer than 10 feet or 6 inches for each inch of trunk diameter measured at 4.5 feet above existing grade, if this method defines a larger distance. The maximum clearance shall be 10 feet. The contractor shall conform to these provisions.

- c. At no time shall any equipment, materials, supplies or fill be allowed within the prescribed root protection.

It is recognized that failure to abide by these provisions will result in substantial root damage to trees that might not be immediately apparent.

3. Protecting Tree Roots from Compaction.

No vehicles shall be permitted to be parked under the dripline of trees in non-paved areas. Avoid placing heavy equipment, large rocks or boulders, and gravel under the drip line of the tree. The object is to avoid soil compaction, which makes it difficult for roots to receive oxygen from the soil.

In summary, trees are valuable resources, and in the interest of protecting them, it is imperative that these guidelines be followed. Although it might be slightly more costly in the short run, the long-term results will be beneficial both aesthetically and fiscally.