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## *DC Ranch – Arcadia at Silver Leaf*

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This report is to provide actionable advice regarding the Sissoo trees currently located in Arcadia at Silver Leaf. Of particular concern are the issues that these trees can and will create. These issues include long-term damage to existing roads, hardscapes, walkways, sewer lines, foundations, and nearby landscaping.

Prior to developing our “actionable information,” we conducted a site inspection of the roads, parks and resident’s front yards.

**Purpose of Site Assessment-** On May 31, 2021, we had the opportunity to spend several hours walking and driving through the streets of Arcadia. Our goals in doing this assessment were to:

- a. Look for damage to infrastructure due to the root systems of the Dalbergia Sissoo trees. Also calculate the potential damage that could be caused by these trees as they mature.
- b. Assess the health of these Dalbergia Sissoo trees and the sustainability of keeping them as the street scape trees in this development.
- c. Be able to provide site specific recommendations as to the best course of action regarding the concerns with Dalbergia Sissoo.

### **Damages to Infrastructure**

Current damage to infrastructure due to the Roots of Dalbergia Sissoos- It appears there has already been extensive damage to the streets. We found many asphalt patches in the streets where roots swelling underneath have caused cracking and uneven surfaces. Private driveways and walkways also showed cracks and were lifted due to Sissoo roots. These roots have caused uneven surfaces, which could very easily cause a trip hazard and a liability for the HOA. Many residences in the development have retaining walls in their front yards. We observed in several cases that the roots of Sissoos, some planted only 2' from the base of the retaining wall, have begun to create cracks in these walls. The most alarming problem that we observed was the proximity of Sissoo trees to utility boxes, many within a foot or two of a Sissoo. A few utility boxes were lifted on one side already. One resident had recently had the utility lines marked in their yard and in that case the Sissoo trees were growing very near or almost directly next to electrical, cable, and gas lines. Our concern is that the invasive tree roots may damage these critical service lines.

The roots have tilted the service boxes in the pictures below.



The pavers have been lifted by the tree roots.





The street damage is caused by the roots of the Sissoo tree seeking moisture.



The retaining walls have been damaged by the roots of the Sissoo trees.



**Potential Damage as the Sissoos mature-** All the problems mentioned above will only get worse as the trees grow to mature size. As far as their mature size in the climate and soil that they are in, we would say that the biggest trees that we observed are somewhere close to half of their mature trunk diameter and root mass. As the roots all swell and grow in diameter, they displace soil upwards especially within a 6' radius of the trunk. This explains why older Sissoo trees with trunk diameters of 2' or more seem to have

been planted on a mound sometimes 6-8 inches above the original grade. Any infrastructure within that 6-8 foot radius of the trunk will be lifted along with the soil.

The questions we asked ourselves about these Sissoo trees at Arcadia must be answered by the Board of Directors.

1. Do the benefits of the Sissoo trees outweigh the costs associated with the current damages and potential damages should they remain?
2. We believe trees increase property values and research shows that. But will property values be adversely affected if you keep the Sissoos knowing the ongoing and increasing damages they will cause? Many people and home inspectors are aware of the damages Sissoo trees can create.

**BVOCs:** These are Biogenic Volatile Organic Compounds. Ground level ozone forms when oxides of nitrogen (NOx) and volatile organic compounds (VOCs) react in the presence of strong sunlight. Ozone is a pollutant and contributes to increased temperatures. Think vehicles on highways (hot sun, hot cars, no trees) BVOC is just another name for Ozone. Ozone is bad. And Ozone is reduced by trees and shade.

More importantly, there are certain trees that contribute to better air quality and community wellbeing. We call these trees Ozone Killing Champions. And DC Ranch has most of them.

The Trees that are Ozone Killing Champions are Acacia, Ash, Evergreen Elm, Desert Willow, Ironwood, Palo Verde, Red Push Pistache and Pine. Sissoos are not listed as an Ozone killing tree.

**Root Mitigation and Root Barriers:** As for the root mitigation service that has been proposed, we have three concerns.

The first is that trimming exceptionally large diameter roots one foot from the trunk, as would be needed in the case of the retaining walls and the utility boxes that we mentioned, would be so detrimental to the tree that we suspect the survival rate would be exceptionally low.

Secondly, due to the unique design of the street scape plantings, driveways, walks and street, we believe it would be extremely hard to install any kind of root barrier that would protect the street, private driveways, private walks, utility boxes, and utility lines. To stop roots from going in the direction of any of these problem areas, there would be nowhere left where roots could develop. You can't cage a mature tree.

Thirdly, if the root mitigation plan is like what has happened at Verrado (another DMB property), then we have seen that it is not solving the problem of infrastructure and other damage there. Root pruning there has only produced swelling of roots on BOTH sides of the sidewalk and the production of many more root suckers along the entire extensive root system of the tree that has been root pruned. Many suckers pop up in lawns and in the landscapes of private residents where they are creating other maintenance problems.



Below is a picture taken at Verrado where root mitigation was evident. The cutting of the root caused suckers to grow up in the resident's front yard.



The picture below shows the suckers growing up after the root was cut. Suckers are now growing up on both sides of the cut.



**Health and Sustainability of the Sissoo trees in Arcadia** - We found most of the Sissoo trees in Arcadia to be healthy overall. We did observe that the individual Sissoos that are adjacent to residences with lawns and other high water use plant material are growing much faster than those planted adjacent to residences with a lower water use landscape. This leads us to believe that for the Sissoos to thrive in the soil and climate in Arcadia they require more water and root space than they can get in the small strip of soil that is between the residence's yard and the asphalt (approximately 12 ft.).

We encountered one dead Sissoo on our visit. It was located at the corner of Kemper and 98<sup>th</sup> Way. Its trunk was severely scalded from the sun on its west side and the bark was peeling away from the trunk. In our experience, this usually occurs in Sissoo trees when they are pruned severely, either root pruned or top pruned, either one stops the flow of water upward through the trunk of the tree. This upward flow of cool water keeps the trunk protected from sunburn, so obviously when that flow stops the skin of the trunk on the west side dies from heat and sun exposure. Suckers were growing from the East side base of the tree, which tells us that the root system is still healthy and intact. If there was a pathogen in the soil, the other non-Sissoo trees in the yard would have been affected also, but they were thriving.

We do not think that Dalbergia Sissoo is the long term tree species for the street scapes in Arcadia. This assessment is driven in a large part from the extremely limited amount of space - free of infrastructure - that this development has for a street tree. A Dalbergia Sissoo tree would need much more room to thrive and expand underground than these streets scape areas have to offer. The only way for them to grow the root systems required for their optimal health is to expand into private residences and under the streets where they will continue to cause damage.

### **Unique Problems Associated with the removal of Sissoo Trees:**

Dalbergia Sissoo trees have an extensive root system that can reach in all directions for at least 100 feet, which puts those roots well into even the back yards of many homes. The unique issue with Sissoo roots is that any piece of root throughout the system is capable of growing suckers even if severed from the original tree.

The process of removing the original Sissoo tree involves cutting it down to the stump, treating the stump with chemicals, waiting 30-45 days for those chemicals to kill the roots closest to the trunk.

After all of this, suckers will still come up from the rest of the remaining root system, many in the private yards of residents. These can be spot sprayed several times with a systemic herbicide.

### **Actionable Information**

**Avoid Future Usage of Sissoos:** We would recommend immediately restricting the use of Sissoos in all new development. We would recommend replacing all the Sissoo trees that are in front of residential homes.

**Root Mitigation:** This process does not work and will cause suckers to grow and spread quicker. It has not worked at Verrado or anywhere else with Sissoos.



**Summary of our recommendations-** We would recommend removing the Dalbergia Sissoo from the street scapes in Arcadia for the reasons that we have previously stated. The mitigation of root damage by cutting or root barriers, if even possible, will be costly, indefinite and not guarantee success. The cost of removal at this point will be high but less than waiting later as the trees will continue to grow and become more expensive to remove and the damage more extensive to repair.

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