

Centennial Park Soil Remediation Project

PRESENTED CITY COUNCIL TO— MARCH 2, 2026

DR. JESSIE FARRIS, URBAN FORESTER

Why This Project Matters:

- High-visibility park with repeated tree losses
- Documented soil and infrastructure conflicts affecting tree performance
- Increasing maintenance and replacement cycle costs
- Elevated storm and failure risk in stressed trees
- Opportunity to improve long-term canopy resilience and planting strategy

Goal: Protect public investment while improving long-term park tree health and sustainability.

Background / Historical Context:

- Original 100 trees planted in 2014 (per Historical Aerials)
- FY 20-21: 10 trees removed, 10 planted
- FY 21-22: 25 trees removed
- FY 22-23: 5 trees removed, 10 planted Arbor Day April 2023
- FY 23-24: Community Survey October 2024
- FY 24-25: 12 removed, 15 Trees planted for Arbor Day April 2025
- FY 25-26: 2 trees removed



2014 Historical Aerial

TOTAL 81 Trees Remaining

Current Issues

- 100 trees initially planted
- Down to 81 (field verification 1/12/26)
- Sanitary Sewer line conflicts
- Signs of stress, soil compaction, storm damage and mechanical damage
- Soil tests positive for Phytophthora fungal pathogen

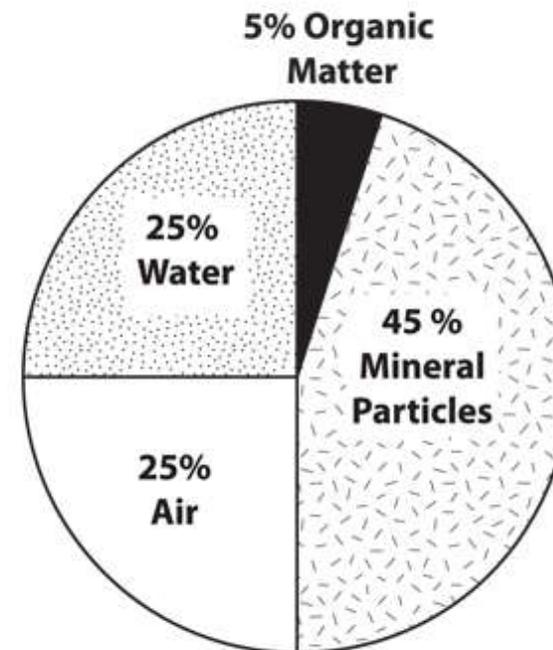


Soil Chemistry 101

What is soil made of?

Soil is not just dirt. It is a chemical system made of:

- Mineral particles (sand, silt, clay)
- Organic Matter (decomposing plant tissues, small living soil organisms, animal waste)
- Water
- Air
- Dissolved nutrients

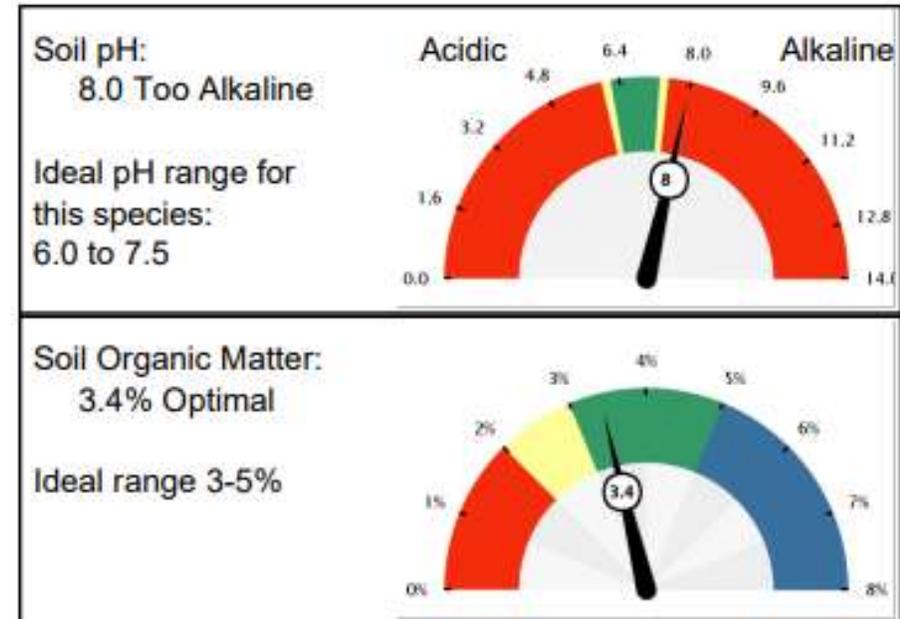


Trees absorb nutrients through their roots!

Understanding pH

What is Soil pH?

- Soil pH is a measure of the acidity or alkalinity of the soil.
- Soil pH controls nutrient solubility, microbial activity, and root absorption efficiency
- Scale ranges from 0-14
 - 7= neutral
 - < 7= acidic
 - Nutrients like potassium, calcium, and magnesium may be reduced, while aluminum, iron, and zinc can reach toxic levels.
 - >7= alkaline
 - Micronutrients such as iron, manganese, zinc, and boron are often deficient.



Macronutrients: The Big Three (NPK)

The big 3 primary macronutrients essential for soil health and plant growth are Nitrogen (N), Phosphorus (P), and Potassium (K).

These elements are crucial for plant development, energy metabolism, and structure. They are needed in the largest amounts compared to other nutrients.

Nitrogen (N)

- Drives leaf growth (chlorophyll production)
- Low N = pale leaves, slow growth

Phosphorus (P)

- Root development
- Crucial for energy transfer
- Flowering

Potassium (K)

- Water regulation
- Stress tolerance
- Disease resistance

Micronutrients: Small Amounts, Big Impacts

Micronutrients are needed in tiny amounts – but imbalance causes decline.

Iron (Fe)

- Chlorophyll production
- Low = causes interveinal chlorosis (yellow leaves that drop off)

Zinc (Zn)

- Growth regulation enzymes

Boron (B)

- Regulates cell wall formation
- Aids in sugar transport
- Needed in extremely small amount

Why high Boron matters

- Narrow window between "sufficient" and "toxic"
- Excess can:
 - Burn leaf margins
 - Damage root tips
 - Interfere with uptake of other nutrients

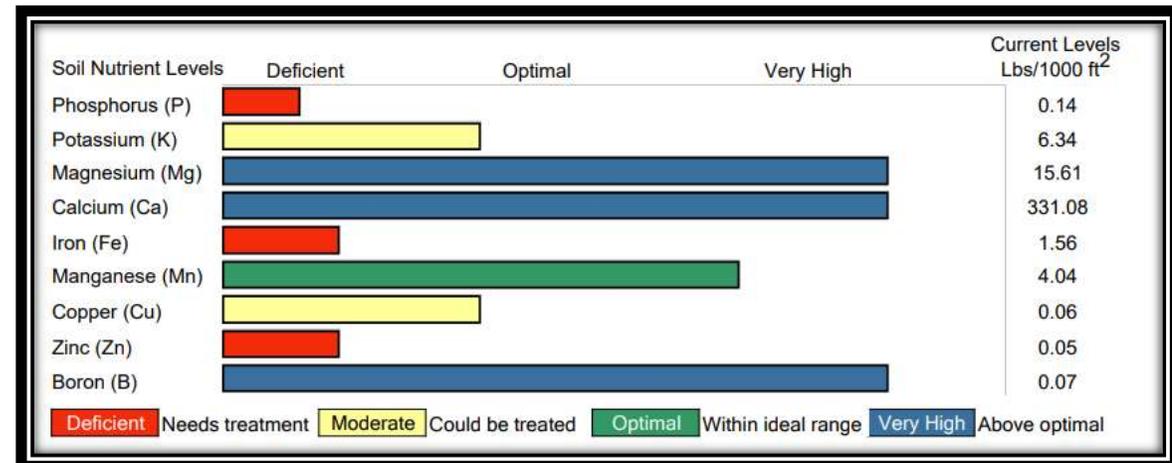
Existing Conditions – Soil Health

*per Bartlett Soil Analysis Report

- Primary limiting factors:

- Soil pH = 8.0 (too alkaline)

- Locks up iron, zinc, and phosphorus (even if present)
 - Nitrogen (NO₃) = very low
 - Phosphorus = very low
 - Iron and Zinc = low
 - Boron = **very high**
 - Easy to tip into toxicity if mismanaged
 - Calcium and Magnesium = very high
 - Typical of North Texas calcareous soil, worsened by compaction and poor drainage



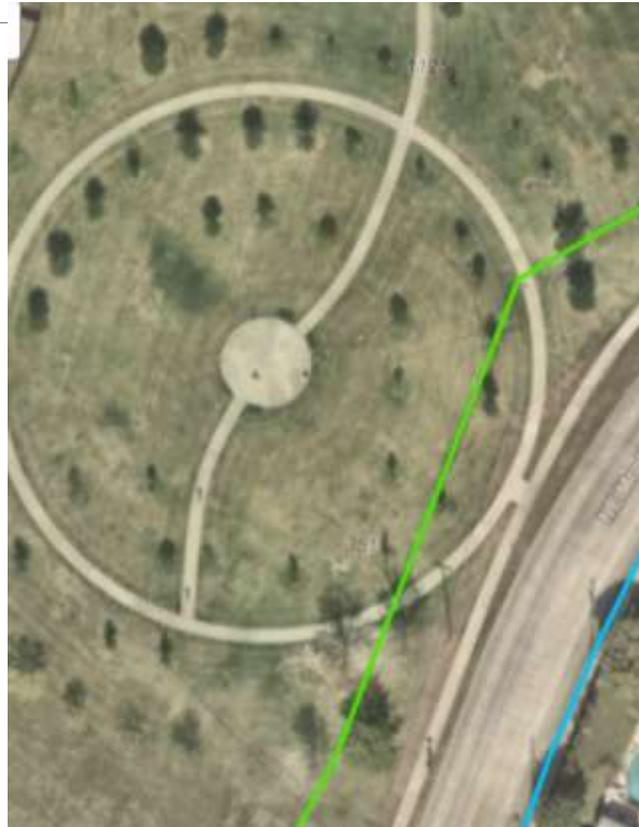
- Nutrient Retention = **very high**

- Soil holds amendments well, mistakes can linger

Existing Conditions – Confirmed Sanitary Sewer Alignment



Existing site conditions showing SS line and removed trees 1/13/26



Burleson Internal GIS Map confirming SS line



Google screenshot showing lacebark elms prior to removal April 2025. Note the arrow indicating the SS line.

Lacebark Elm Placement Evaluation & Lessons Learned



Lacebark Elms:

- Develops a wide, shallow root plate
- Requires consistent lateral soil volume
- Is moderately tolerant of urban conditions – not Burleson’s native soils
- Planting them directly over a sanitary line set them up to fail, even if they initially looked healthy.
- The historical image supports this:
 - Full canopy appearance in April 2025
 - Likely internal root stress already present
 - Decline likely accelerated by weather or storm events

Likely Outcomes if Untreated

- Chronic Chlorosis
- Root stress – opportunistic pathogens (Phytophthora risk increases, mistletoe spreads)
- Storm failures due to poor root regeneration
 - Storm failure is defined as: Compromised root systems that elevate the risk of storm-related tree failure, defined as large limb breakage or uprooting during high winds, heavy rainfall, or saturated soil conditions
- Continued lacebark elm decline and replacement losses
- Negative public feedback

5" Lacebark Elm showing localized mistletoe presence – this implies a weakened root system, but is not the cause of the original decline



Treatment Objectives

- 1.Improve nutrient availability without overcorrecting pH
- 2.Enhance root health and soil structure
- 3.Reduce canopy stress and failure risk
- 4.Extend life expectancy of existing elms
- 5.Inform future species selection and planting strategy

Immediate Priorities (First 0–6 Months)

- DO NOT lime
 - Even though calcium shows high, lime would make everything worse. This is already an alkaline soil.
- Correct pH *functionally* (not chemically)
 - We are not trying to “fix” pH, but buffer it in the root zone.
- Actions:
 - Apply elemental sulfur OR Nutri-Sul 90 Plus
 - Do NOT tank-mix with Fortiphite (important)
 - Apply organic mulch (3–4 inches) under canopy dripline
 - Wood chips preferred
 - Keep off trunk flare
- Why?
 - Sulfur + mulch create localized acidity
 - Improves micronutrient availability without soil shock

Soil Structure and Root Health (0-6 Months)

- Given storm loss + suspected root rot:
 - Identify low spots or irrigation overspray
 - Lacebark elms hate saturated alkaline soils
 - Adjust irrigation schedules immediately if needed
- Air spade work (priority zones)
- Focus on:
 - Trees with repeated failure
 - Areas with historic compaction
- Decompact + incorporate:
 - Organic matter
 - Biochar (low-salt, certified)
- What NOT to Do
 - No lime
 - No high-salt fertilizers
 - No boron
 - No fast-release nitrogen
 - No blanket park-wide fertilization

Targeted Nutrient Treatment (Year 1 Prescription)

- Nitrogen (critical)

- Choose slow-release only:
 - Nitroform preferred over quick-release Nitro 30
 - Prevents flush growth that increases storm damage risk
- Application
 - Soil injection or deep root feeding
 - Avoid surface broadcast in turf-heavy areas

- Phosphorus (very low)

- Use polyphosphate as prescribed
- Apply once per year, reassess after 12 months

- Iron & Zinc (symptom drivers)

- This is where lacebark elms are likely showing stress.

- Iron

- Iron chelate soil injection
- Avoid foliar-only programs (short-lived benefit)

- Zinc

- Soil-applied zinc per Bartlett recommendation
- Chelated form preferred in high-pH soils

Targeted Nutrient Treatment (Year 1 Prescription)

- Potassium

- Currently medium
- Apply light potassium sulfate only if trees show structural stress or poor wound response
- Avoid heavy K (can antagonize magnesium further)

- Boron

- Boron is already very high
- Do not add boron
- Avoid composts or biosolids with unknown micronutrient content
- Monitor only
- This is a silent failure risk if ignored.

- *Drainage assessment to be considered if treatment options do not show progress after one year.

Treatment Summary (Quick Reference)

Nutrient	Treatment Choice	Rationale
Nitrogen	Nitroform	Slow, stable growth; storm safety
Phosphorus	Polyphosphate	Available in high-pH soils
Iron	Chelated Fe	Corrects chlorosis sustainably
Zinc	Chelated Zn	Enzyme & growth regulation
Potassium	Light K sulfate	Structural support only
Sulfur	Elemental S	Micronutrient access
Boron	None	Avoid toxicity
Plus 3 Fungicide Treatments for Phytophthora pathogen		

Strategic Recommendation for Centennial Park

- Given:
 - Repeated losses
 - Soil constraints
 - SS Line Conflicts
 - Public visibility
- Do not replant lacebark elms in problem zones



Copyright © Robert O'Neil

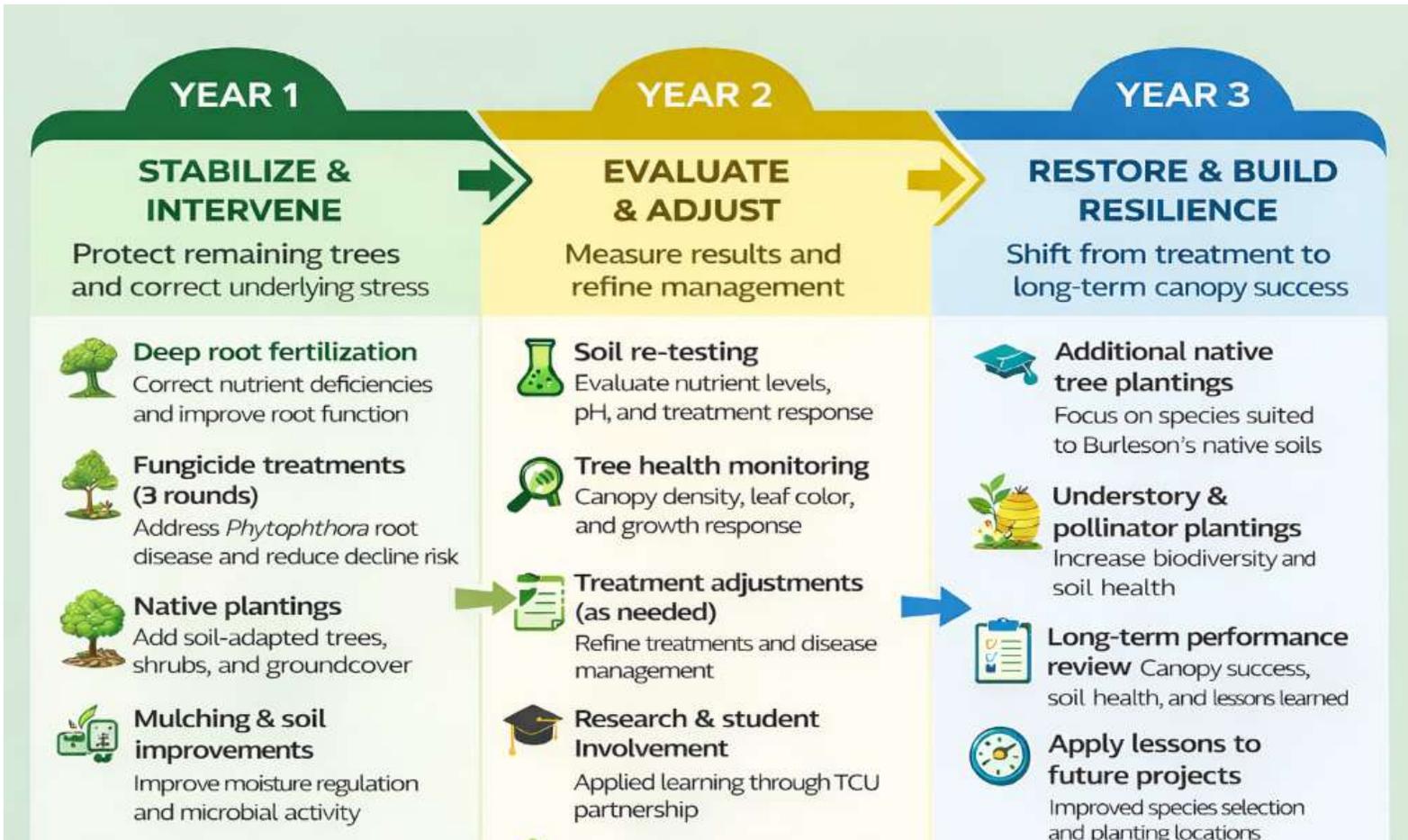
- High-value N-fixers for alkaline soils
- Texas mountain laurel
 - Excellent alkaline tolerance
 - Reliable nodulation
 - Deep-rooted, drought tolerant
- Honey mesquite
 - Very strong nitrogen fixer
 - Outstanding soil conditioner
 - Best used in buffer zones, not high-use turf areas
- Shrub-layer fixers (often overlooked)
 - Texas kidneywood
 - Leadplant
- Shrubs often contribute more usable nitrogen through faster turnover than trees.

Next Steps

- Deep Root Fertilization and Fungicide Treatments confirmed with LATour Tree Service
 - 1st treatment Monday, February 2, 2026
 - 2nd treatment – 1st week of May
 - 3rd treatment – 1st week of August
 - 4th treatment – 1st week of November
- Launch educational social media strategy (The Trees That Grow)
- Reached out to TCU contacts for potential research collaboration
- 1 tree replacement planned by playground (Live Oak); Low risk area



Centennial Park Tree Health & Restoration Timeline (3-Year Phased Approach)



Outcomes:

- ✓ Healthier trees, native to Texas
- ✓ Reduced-storm related failure risk
- ✓ Improved soil conditions
- ✓ Smarter, more resilient parks



THE CITY OF
BURLESON
TEXAS

Rooted in the Future:

WHAT'S NEXT FOR BURLESON PARKS FORESTRY

Upcoming Items for Parks Forestry:

- **TreePlotter Inventory for Parks**
 - Create a comprehensive tree inventory to track species, condition, canopy coverage, and maintenance needs
- **Tree Plantings Through Texas A&M Grant Funding**
 - Expand park canopy using grant-supported, soil-appropriate, climate-resilient tree species (65 trees)
- **Forestry Training for Parks Staff**
 - Build internal capacity through hands-on training in tree care, planting, pests & diseases, risk assessments and safety
- **Trees For Tomorrow School Program**
 - Collaboration with BISD students to learn about tree care, biology, benefits and stewardship
- **Arbor Day Planting & Education Event April 24, 2026**
 - Community tree planting paired with hands-on urban forestry education and youth activities (15 trees)
- **Urban Forestry Classes at Russell Farm**
 - Ongoing workshops on tree care, native species, and sustainable landscape practices
- **Urban Wood Reuse Program**
 - Reclaim wood from removed trees for benches, signage, and park projects—reducing waste and costs
- **Parks Forestry Department Framework**
 - Establish clear standards, roles, and long-term strategy to support sustainable park forestry management

Questions / Comments

Dr. Jessie Farris
Parks and Recreation
sfarris@burlesontx.com
817.426.9105

