



SOIL DIAGNOSTIC ASSESSMENT

City of El Paso Parks and Recreation
New Park Development Site – Modesto Gomez Park
4600 Edna Ave, El Paso, TX 79905
Sites MG001 - MG004 | Approximately 1.5 Acres

Prepared by:
AURUM TECH, LLC
El Paso, Texas

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Executive Summary

Aurum Tech, LLC conducted a comprehensive soil diagnostic assessment of a proposed park development site for the City of El Paso Parks and Recreation Department. The approximately 2-acre site was formerly part of a decommissioned landfill, has remained undeveloped for seven years, and is irrigated with municipal reclaimed water.

This assessment integrates four complementary analytical methods: standard soil chemistry, Haney Soil Health testing, Phospholipid Fatty Acid (PLFA) microbial community analysis, and 16S rRNA gene sequencing. The multi-method approach provides both chemical and biological perspectives on soil health.



FINDING: All four sampling sites exhibit severely compromised soil health requiring remediation before successful ornamental establishment can be expected.

Critical Findings

Finding	Severity	Affected Sites
Very low microbial biomass	CRITICAL	All sites
Zero mycorrhizal fungi (AMF)	CRITICAL	All sites
Critically low organic matter (0.8-0.9%)	CRITICAL	All sites
Alkaline pH with high lime buffering	HIGH	All sites (pH 7.8-8.0)
Salt stress (EC 1.46 mmho/cm)	HIGH	All sites (primarily MGTURF2-C)
Micronutrient unavailability	MODERATE	All sites

Remediation Feasibility

Despite significant challenges, this site is a viable candidate for successful remediation. Positive indicators include:

- Balanced carbon-to-nitrogen ratio (9.4-10.0) supports efficient amendment metabolism
- Existing microbes are metabolically active (low stress indicators)
- Presence of beneficial Actinomycete bacteria confirms biological function remains
- Seven years undisturbed has allowed natural contamination attenuation

Aurum Tech recommends a biochar-based carbon restoration strategy to address the root cause of soil dysfunction. With proper implementation, the site can be prepared for successful ornamental planting within 3-4 months.

Site Background

Site History

The subject site was previously part of a municipal decommissioned landfill operation. Since closure, the site has received no active management, amendments, or agricultural inputs. The absence of recent chemical inputs means remediation efforts will not be confounded by residual agricultural chemicals.

Irrigation Source

The site is irrigated with El Paso municipal reclaimed water, which has elevated salinity. This is an ongoing management consideration.

Elevated sulfur at MGTURF2-C (486 ppm versus 10-30 ppm optimal) and elevated electrical conductivity (1.46 mmho/cm) are consistent with prolonged irrigation using high-TDS reclaimed water. A current water quality analysis from El Paso Water is recommended to inform long-term irrigation management.

Sample Inventory

Lab ID	Field ID	Sample ID	Depth	Analysis Type	Date of labs
47566	MG001	MGTURF1-C	2-4"	Haney + PLFA	12/18/2025
47567	MG002	MGTREE1-C	4-8"	Haney + PLFA	12/18/2025
1014	MG003	MGTURF2-C	0-7"	Standard Chemistry	1/12/2026
1015	MG004	MGTREE2-C	0-7"	Standard Chemistry	1/12/2026

Diagnostic Findings

Soil Chemistry

Parameter	MGTURF1-C	MGTREE1-C	MGTURF2-C	MGTREE2-C	Optimal
pH	7.8	7.9	8.0	7.9	6.0-7.0
EC (mmho/cm)	0.53	0.89	1.46	0.63	<1.0
Organic Matter (%)	0.9	0.8	0.9	0.9	3.0-5.0
Excess Lime	HIGH	HIGH	HIGH	HIGH	None-Low

Interpretation:

- **pH:** All sites are alkaline (pH 7.8-8.0), reducing micronutrient availability
- **Salinity:** All sites exceed plant stress threshold, requiring salt management
- **Organic Matter:** All sites critically deficient at less than one-third of minimum target
- **Lime Buffering:** HIGH ratings indicate pH correction will be slow and difficult

Micronutrient Availability:

Iron (5-13 ppm) and manganese (1.4-6.1 ppm) are severely limited by the alkaline pH. At pH >7.5, these nutrients convert to plant-unavailable forms regardless of total concentration. Ornamental plantings—*particularly trees*—are at high risk of interveinal chlorosis (yellowing between leaf veins) without targeted micronutrient management. Standard soil-applied iron is ineffective at this pH; chelated forms (Fe-EDDHA) are required.

Soil Health Indicators (Haney Test)

Parameter	MGTURF1-C	MGTREE1-C	Interpretation
Soil Respiration (ppm CO ₂ -C)	8.0	8.8	Very Low (<10)
Soil Health Calculation	3.59	3.10	Below threshold (>7.0)
Microbially Active C (%)	8.6%	12.1%	Well below ideal (50-75%)
C:N Ratio	10.04	9.41	Good (8-15 ideal)

Soil respiration of 8.0-8.8 ppm indicates 'Very Low' microbial activity. The soil biology is severely depleted.

Positive indicator: The C:N ratio of 9.4-10.0 is within the ideal range, meaning added organic amendments will be metabolized efficiently.

Microbial Community (PLFA Analysis)

Parameter	MGTURF1-C	MGTREE1-C	Reference
Total Biomass (ng/g)	499.5	655.1	<500 Very Poor; 500-1000 Poor
AMF (Mycorrhizal Fungi)	0.0	0.0	Should be present for trees
Protozoa	0.0	0.0	Should be present
Fungi:Bacteria Ratio	0.26	0.56	0.25-0.35 Good

Zero Arbuscular Mycorrhizal Fungi (AMF) detected. Trees planted without mycorrhizal associations will have limited nutrient uptake and drought tolerance.

Interpretation:

- **Microbial Biomass:** Biomass falls in 'Very Poor' to 'Poor' range
- **Zero AMF:** Trees cannot form essential symbiotic relationships for phosphorus uptake
- **Zero Protozoa:** Missing bacterial grazers impairs nitrogen cycling
- **Community Health:** Existing microbes are healthy; the problem is population size, not health

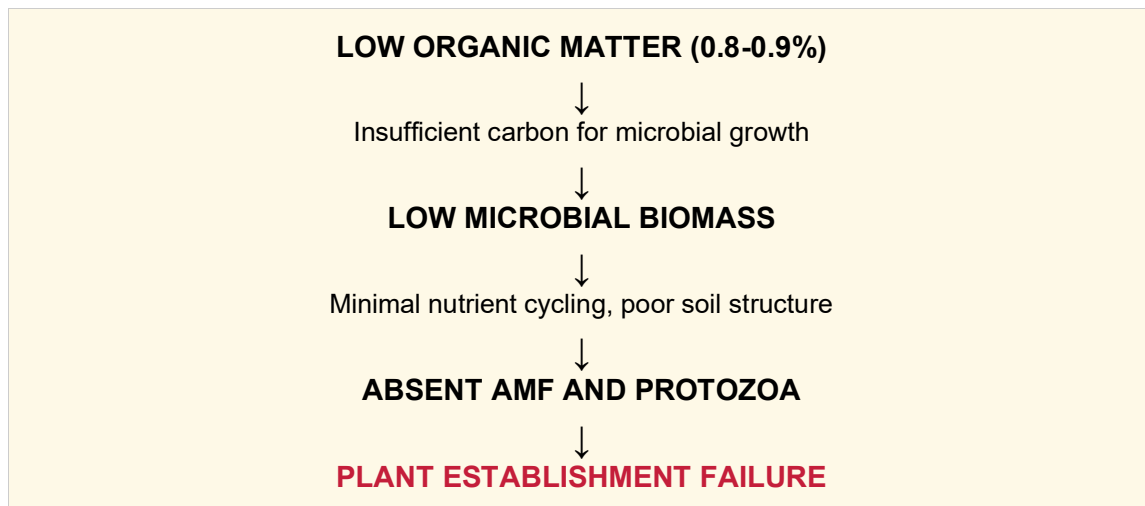
Molecular Confirmation (16S rRNA Sequencing)

Nanopore 16S rRNA gene sequencing confirmed the PLFA findings, detecting an Actinomycete-dominated community and arid-adapted taxa (Thermoleophilia, including Conexibacter and Solirubrobacter species) consistent with the site's alkaline, low-organic-matter conditions. Ammonia-oxidizing archaea (Candidatus Nitrososphaera) were detected, indicating some nitrogen cycling capacity remains. These baseline molecular profiles will be compared against post-remediation sequencing to document community-level response to treatment.

For your full sequencing results, please contact the Aurum Tech team at info@aurumbio.tech.

Root Cause Analysis

The diagnostic findings reveal a predictable cascade of soil degradation:



The primary constraint is critically low organic matter, which has cascaded into depleted microbial biomass, absent mycorrhizal fungi, and impaired nutrient cycling. Secondary factors include alkaline pH with strong buffering, salt accumulation from reclaimed water irrigation, and resulting micronutrient unavailability.

Site-Specific Priorities

Site	Primary Constraint	Secondary Constraint
MGTURF1-C	Very low biomass	Potassium deficiency
MGTREE1-C	Zero AMF + Low phosphorus	Very low biomass
MGTURF2-C	Salt stress (EC 1.46)	Low biomass
MGTREE2-C	Low biomass	Zero AMF

Recommendations

Remediation Approach

Successful remediation requires addressing the root cause (low organic matter) rather than treating symptoms. A symptom-based approach of repeated fertilizer applications would perpetuate a high-input, high-maintenance system.

Aurum Tech recommends a system-building approach using biochar-based carbon restoration. Biochar addresses multiple constraints simultaneously:

- Permanent increase in soil organic carbon (persists for centuries)
- Porous structure provides habitat for microbial colonization
- Increases water-holding capacity (critical for El Paso climate)
- Improves cation exchange capacity for nutrient retention
- Buffers ionic stress from saline irrigation water

Combined with quality compost, mycorrhizal inoculation at planting, and targeted salt management for all sites, this approach will restore the soil's capacity to cycle nutrients internally—resulting in lower long-term maintenance requirements.

Expected Outcomes

With proper implementation, Aurum Tech expects:

- Soil respiration increase from 8 ppm to >20 ppm within first growing season
- Microbial biomass increase from 500-650 ng/g to >1,000 ng/g
- Detectable AMF colonization in tree roots by 3 months post-planting
- Organic matter increase from 0.9% to >1.5% in Year 1
- Reduced irrigation requirements (15-25%) after establishment
- Successful ornamental establishment with reduced chlorosis

Timeline

Estimated timeline from authorization to plantable conditions: 10-12 weeks, including amendment charging, incorporation, and soil equilibration.

Next Steps

Aurum Tech recommends the following immediate actions:

- Obtain irrigation water quality analysis from El Paso Water
- Finalize landscape design to determine tree/shrub counts
- Coordinate implementation schedule with overall project timeline

Dr. Joshua Ortiz-Guzman

Signature: 
Date: 21/01/2026

Prepared by Aurum Tech, LLC | El Paso, Texas | January 2026