Canopy Walk

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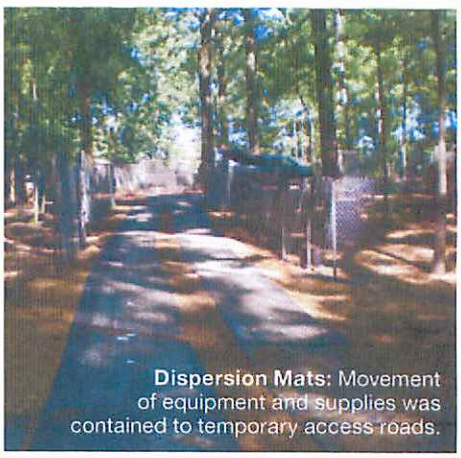
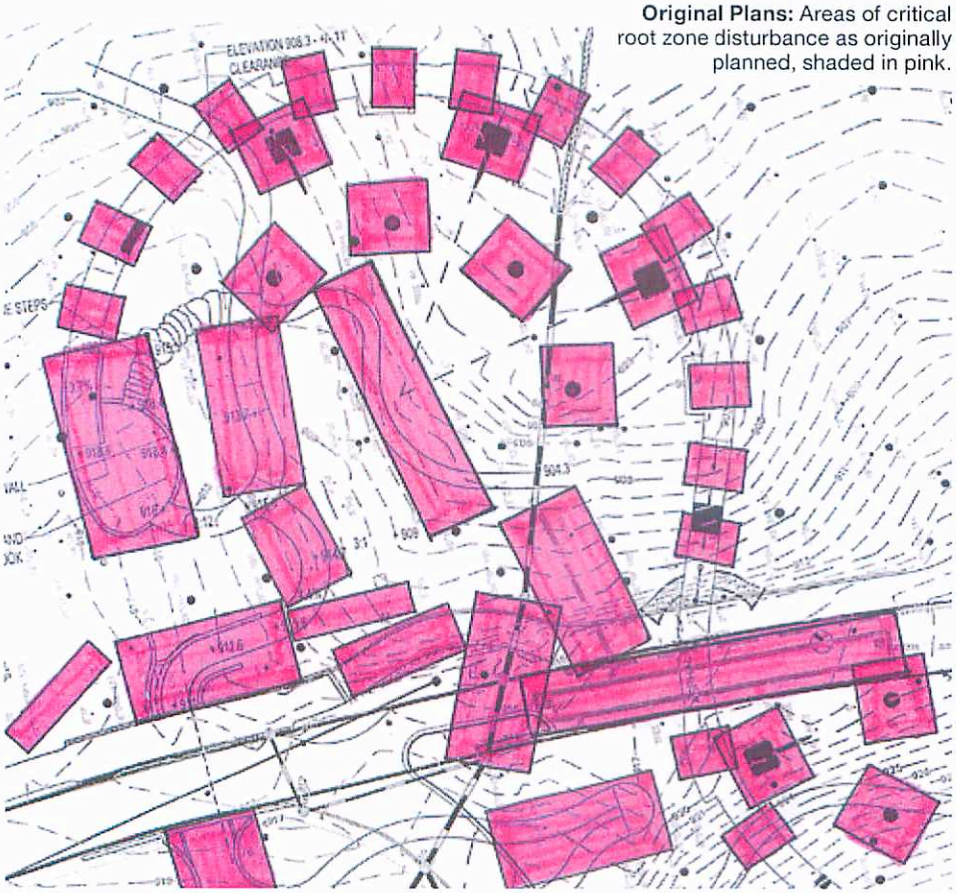
The Atlanta Botanical Garden near downtown Atlanta, Georgia, owned about 10 acres of native woodlands adjacent to the main entrance drive to their facilities. This area, known as Storza Woods, was filled with mature Oaks and Poplars that had basically been left untouched for over 100 years. Plans were developed that would connect this property to the existing gardens and create a new Woodland Garden for visitors to enjoy. The central feature of the final design was a suspension bridge that connected a sidewalk trail in the older garden to the woodlands by bridging over the entrance drive and slowly descending to grade. This bridge formed a 600' long, 12' wide raised sidewalk held up by 4 tall masts strategically placed within the curved radius of the walkway. It was an engineering masterpiece that would allow visitors to stroll up to 40 feet in the air within the canopies of magnificent old hardwood trees. To add emphasis to this dramatic effect, the bridge was ultimately named the "Canopy Walk."



Dispersion Mats: Movement of equipment and supplies was contained to temporary access roads.



Original Plans: Areas of critical root zone disturbance as originally planned, shaded in pink.

As plans and budgets were being finalized, it became apparent that construction of this complex steel and concrete structure presented a threat to the survival of the very trees it was intended to feature. Spence Rosenfeld, ASCA Registered Consulting Arborist and President of Arborguard Tree Specialists, was asked to review the plans and help protect the trees during construction. After a quick study of the construction drawings, it became clear to Rosenfeld that if construction moved forward as planned there would be catastrophic impact to the critical root zones of nearly all of the trees within the woodlands. Construction methods had to be redirected in order to prevent root damage and protect the trees during construction. With a final budget and construction schedule already in place, the task seemed almost insurmountable.

First, Rosenfeld mapped out the critical root zones of every tree and began lengthy discussions with the Owner,

Photos in order from top to bottom:

Piers and Helical Anchors (far shot): Providing ground support for temporary walkway scaffolding.

Piers and Helical Anchors (close shot): Providing ground support for temporary walkway scaffolding.

Project Manager, General Contractor, several Subcontractors, Engineers, Landscape Architects, Irrigation Specialists, and many others, to study every construction procedure and how it would affect the trees and soils. Then, he divided the project into "impact phases," each of which introduced several innovative construction and arboricultural techniques designed to reduce impact and prevent damage. Ultimately, over 650 tons of steel and concrete would be assembled within a few feet of 30" to 40"diameter trees, along with grade changes and underground utility installations. A brief outline of some of the modifications and procedures utilized during the project includes:

- Temporary access roads were located and built using suspended timbers and AlturnaMats®, to disperse weight from materials and 40-ton cranes moving within the root zones. Movement was contained within tight corridors lined with thousands of feet of 6' tall chain-link tree protection fence.

- Original plans called for massive 16'x16' wide concrete slabs to anchor the masts that held up the structure and backstays. After lengthy discussion, these were re-engineered to use an alternative method of support. Final anchoring was completed using drilled 7" wide micropiles instead of massive slabs, which reduced impact for anchoring by over 99%.

- To hold the walkway in place before the final suspension cables were installed,

Photos in order from top to bottom:

Air-Spade® for helical anchor 1: Blowing soil off root system prior to helical anchor insertion.

Left: Air-Spade® for helical anchor 2: Threading helical anchor through exposed roots.

Right: Air-Spade® for utility lines: Blowing soil off root system to thread utility lines underneath.

Micropiles (before): Eliminating 12'x12' underground concrete slab.

Micropiles (after): Completed micropile anchor.

a scaffold system made up of 16 scaffold towers was necessary. Originally, these were to be built on graded slabs to provide a flat base, which required extensive grading. Instead, they were installed using helical anchors to straddle roots, reducing the impact by over 98% in these areas. To further reduce root loss during the installation of the helical anchors, an Air-Spade® was utilized to blow soil off areas where anchors were needed. Once tree roots were exposed, it was then possible to hand thread anchors through the root system.

- Instead of traditional utility line installation, where a backhoe would be used to trench through roots, an Air-Spade® was used to excavate around and below dense root mats so utility lines could be threaded below the roots. Air-Spade® excavation was used for the main electric line and substation connections, as well as most irrigation main lines.

- Subsurface drain lines were replaced with dry, hand-laid creek beds and surface flumes that became attractive visual features, adding to the interest and beauty of the gardens. In one case, a 14' deep by 12" wide drain line, which would have cost over $100K, was eliminated and replaced with a much less expensive surface flume, while preserving 7 massive native Poplars.

Photos in order from top to bottom:

Root Bridging (before): Constructing walkways above-ground.

Root Bridging (after): Completed above-ground walkway.

Below—Project Completion: Completed Canopy Walk.

- Numerous retaining walls were designed to support surface sidewalks, allowing access deep into the woods. To replace traditional wall installation requiring extensive footings and root damage, all walkway construction was done above grade. This process, known as "root bridging," involved laying geotextile fabric on grade and adding layers of expanded slate aggregate on top, forming a solid sub-base on top of which sidewalks were built. In some cases the sidewalks were "stapled" to the ground using long helical anchors to stabilize them, as an alternative to retaining walls with footings.

- A comprehensive Soil Therapy and Tree Health Care Program was implemented utilizing a battery of organic soil amendments and root stimulants to improve tree vitality and stimulate root regeneration.

The Canopy Walk project required dozens of onsite meetings and hundreds of hours of consultation, often doing battle with construction traditionalists. The stunning results prove that through innovative planning, design, and construction, it is possible to build while protecting native trees.