

ONSITE BIORETENTION AND STORMWATER MANAGEMENT USING **DEEPROOT® SILVA CELLS®** THE BOULEVARD, DUBLIN CALIFORNIA

An Integrated Solution to Manage Stormwater and Promote Healthy Tree Growth

The Project

One of the newest urban communities in Northern California is the **Boulevard in Dublin, California**. This unique development boasting 20 housing types in 11 neighborhoods, encourages connectivity without a car through its multi-modal trails and enriched landscaping. With its electric vehicle (EV) charging stations, sustainable landscaping, and advanced green-home designs, the developer and owner, **Brookfield Residential** required an integrated solution to manage onsite bioretention and stormwater management to meet the requirements of the **Alameda County Clean Water Program**. The Program complies to the strict regulations of the **Federal Clean Water Act** by preventing anything other than rainwater from entering the storm drains in the Alameda urban neighborhoods.

The 189-acre community has been developed on a vacant area of the **Camp Parks** military training base, home to a semi-active mobilization and training center for U.S. Army Reserve personnel. The massive commercial and residential development is home to 1,995 residential units, 200,000 square feet of commercial space, a 30-acre park and an elementary school. Brookfield Residential required a traditional bioretention solution within a structural element, so water treatment could occur under parking bays and sidewalks.

DeepRoot was able to meet both the above ground community space, and below ground water quality needs with the **DeepRoot® Silva Cell® system**. The system directly supports the C3 requirements set out by the provision to manage urban runoff, pollutant abatement, and stormwater management. Over **6,000 DeepRoot Silva Cells** have been installed to meet the Regional Water Quality Board's C3 provision and will support the healthy growth of **400 trees**. This provision requires the limitation of PCBs, mercury, oils, and sediment being discharged from the municipal storm sewer system into the Alameda Creek, which flows into the San Francisco Bay.

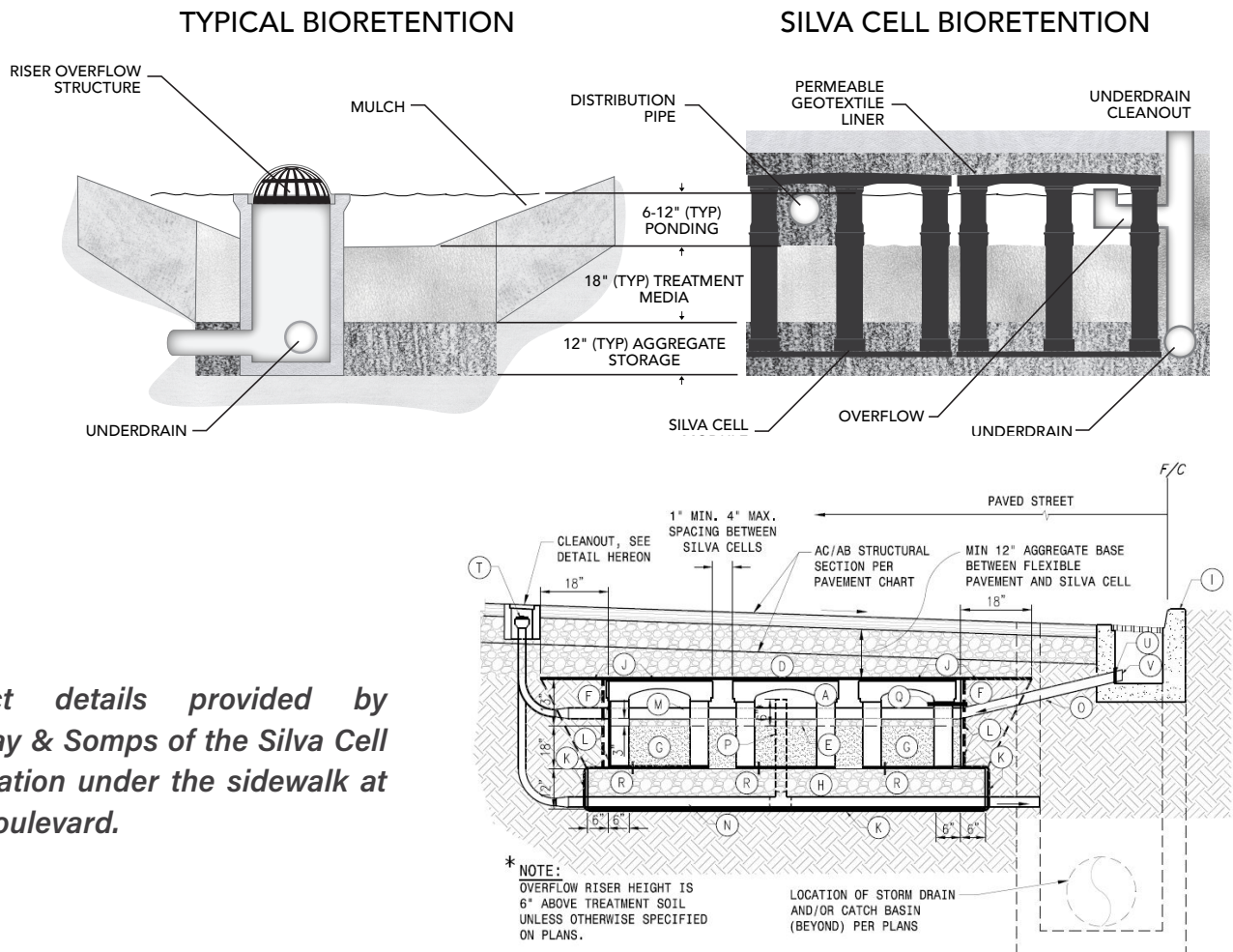


Stormwater Management Using DeepRoot Silva Cells

The Civil Engineers for this very large project, **Mackay & Soms** and **Ruggeri Jensen Azar**, were required to design a solution that ensured all runoff from impervious areas be directed into a treatment area before leaving the site.

This was achieved by redirecting the stormwater runoff through the DeepRoot Silva Cells and bio-treatment soil contained within the Silva Cells. The required calculation for sizing these areas is 4% of the impervious square footage that flows to the treatment area. Silva cells were included in the designer's hydraulic modeling to reduce the size of the hydromodification system put in place to meter the post-project flows to pre-project levels. Reduction in flows were only considered in the range of 10% of the 2-year storm up to the 10-year storm, which is the required range for hydromodification controls.

DeepRoot Silva Cell Bioretention Equivalency



Project details provided by Mackay & Soms of the Silva Cell installation under the sidewalk at The Boulevard.

TYP. SILVA CELL INSTALLATION IN PAVEMENT
NTS

DeepRoot Silva Cells

The Deeproot Silva Cell is a modular suspended pavement system that integrates water, soil and tree roots and delivers on-site stormwater management through bioretention.

“The DeepRoot Silva Cells allowed for bioretention treatment to occur under impervious areas, which was not previously an option;” said **Colette L’Heureux, Associate Engineer at Mackay & Soms**. “Bioretention basins have traditionally been surface treatments that required landscaped areas around the site. The Boulevard neighborhood in Dublin had very little common landscape areas for us to put treatment into. Without DeepRoot Silva Cells, housing would have been lost in order to create enough bioretention areas in the landscape to conform to the requirements of the Alameda County Clean Water Program”.



About DeepRoot

DeepRoot Green Infrastructure develops solutions to enhance urban forests and surrounding watersheds in city streets, parking lots, campuses, and other heavily paved areas. DeepRoot® Silva Cell®, our flagship product, is an underground framework for containing lightly compacted soil that supports large trees and absorbs runoff from rain, increasing air and water quality, reducing energy loads, mitigating the heat island effect, and nurturing trees for a long life in their communities. Headquartered in San Francisco with locations in Vancouver and London, DeepRoot has more than forty years’ experience helping trees thrive in cities, nurturing over 10,000 trees in the built environment around the world.