



DRIVABLE GRASS[®] Project Case Study - Permeable, Flexible and Plantable Concrete Pavement Product -

Project Location: Soil Retention Corporate Headquarters, Carlsbad, California

Project Funding: Soil Retention

Background: In an effort to prevent polluted stormwater runoff from entering the nearby Buena Vista lagoon, Soil Retention decided to retrofit their existing asphalt parking lot with their permeable, flexible, plantable pavement system called Drivable Grass[®] at the low point of the parking lot. The site is located on the southern California coastline in the City of Carlsbad, roughly 2,000 ft from the Pacific Ocean, and 1,000 ft from the Buena Vista Lagoon; which is a 223 acre wetland home to 103 bird species, 18 mammals, and frequented by fishermen.



Fig. 1 – Soil Retention Headquarters Parking Lot

Design: The main intent of the installation was to treat the first flush of stormwater runoff from the parking lot with biofiltration. The existing soils have low permeability, so only partial exfiltration can occur. A secondary consideration was to detain and store water during rainfall events so that it could be re-used for landscape irrigation. The Drivable Grass[®] installation had the following performance criteria: durable enough to withstand vehicle traffic on a daily basis, had to be planted for biofiltration of harmful pollutants, economical to install and maintain, and aesthetically pleasing.



Fig. 2 – Removal of Asphalt



Fig. 3 – Crushed Gravel Subgrade



Fig. 4 – Compaction of Subgrade

Construction: Installation and preparation of the sub grade of the site involved the removal of the existing asphalt and soil to a depth of two feet using a backhoe. Next, a geotextile was laid to separate the subgrade from the structural base and storage section (18" thick crushed rock with an estimated void ratio of 38 percent). A second geotextile layer was used to separate an additional 4 inch thick sand layer for turf grass roots to grow into. The Drivable Grass[®] was then installed in two foot by two foot mats, parking stalls were delineated with road dots (Bott's Dots), and the void spaces were infilled with grass seed and sand.



Fig. 5 – Tamped Sand Bedding



Fig. 6 – *Drivable Grass*[®] Installation



Fig. 7 – *Drivable Grass*[®] Installation



Fig. 8 – **Drivable Grass®** Installation



Fig. 9 – Installation of Bott's Dots



Fig. 10 – Finished Installation

Performance: One year later, the grass is growing vibrantly and there are no signs of rutting or product degradation despite continuous traffic five days a week. The current system has the capacity to capture and retain an estimated 363 cubic feet of stormwater runoff for an area composed of three parking stalls and a small driveway corner of Drivable Grass®. In order to comply with National Pollutant Discharge Elimination System (NPDES) requirements for stormwater treatment facilities in San Diego County, a volume-based facility must, "infiltrate, filter or treat the volume of runoff produced from a 24-hour 85th percentile storm event". In Carlsbad, CA, a 24-hour storm event would produce 0.6 inches of rain or roughly 360 cubic feet of water in the subject 20 car parking area and drive isle. Currently, there are no regulations for existing development in The City of Carlsbad. However, the state of Maryland is currently implementing similar installations / regulations for improving storm water quality.



Fig. 11 – Finished Project



Fig. 12 – Finished Project