

OC Public Works Glassell Campus Stormwater LID Retrofit – PIN 24108

Prop 84 Storm Water Grant Program

Orange, California

Annual Update Summary - 2016

Background

OC Public Works Glassell Campus Stormwater Low Impact Development (LID) Retrofit Project (Project) site is a 9.4 acre complex consisting of three parcels, each with a building and surrounding parking lots (Figure 1), all owned by the Orange County Flood Control District (District). The campus is located in an industrial-commercial district in the City of Orange within the northern part of Orange County, California. Currently, 93% of the parcel is impervious surface with about 2% slope. The 85th percentile rain event (design storm) for the Project site is 0.85 inches in 24 hours. Most of the rainfall happens between November and April. Under the pre-development condition, a 0.85" rainfall would produce approximately 0.08" runoff at the Project site. This calculation is the basis for the design of the Project.

Based on the multi-year monitoring results, runoff from the Project site has high levels of heavy metals, oil and grease, suspended sediment, nutrient, and bacteria, typical for commercial-industrial land uses.

Project Description

The Project is designed to achieve 100% stormwater treatment and 85% retention for the design storm by constructing a series of LID best management practices (BMPs). The BMPs include cisterns, permeable paving, bioswales, underground cistern, flow-through planters, media filter planter boxes, and modular wetlands. Based on the International Stormwater BMP Database, these BMPs will also achieve an average 95% of load reduction for most of the pollutants, including bacteria, nutrient, metals, and suspended solids. To achieve the above quantitative performance, BMPs are designed for site conditions specific to each of the 17 subdrainage areas.

On a campus-wide scale, the existing above-grade green belt will be removed and replaced by below-grade bioretention swales. Impervious hardscape will be replaced by permeable concrete, porous asphalt or pervious pavers. Cisterns, flow-through planters, underground cisterns, and other modular BMPs will be strategically placed on the Project site. Rooftop runoff will be collected by cisterns or filtered by flow-through planters. Additional infiltration will be provided by more BMPs downstream for excess flows. Most of the stormwater runoff will pass through two or more BMPs before exiting the site, the last step being bioswales or filter media planter boxes to utilize their high pollutant removal efficiency. This 'treatment train' concept will ensure that the maximum pollutant load removal will be achieved.

The Project tasks are divided into the pre-construction, construction, and post-construction phases. Currently the Project is in the construction phase, which includes seven phases (Figure 2) and consists of the following: demolishing of existing hardscape and landscape; replacement of hardscape and landscape with LID BMPs, installation of water quality/flow monitoring elements and education/outreach components. The construction site will be maintained and monitored as per the Water Quality Management Plan (WQMP). The post-construction phase includes development of an education and outreach plan, an operation and maintenance plan; as-built drawings, and project closeout related tasks.

Project Status

The construction of the Project commenced in September 2015 as planned and will be conducted in 7 phases to ensure normal operation of then tenant agencies. As of June 30, 2016, the project construction has achieved approximately 65% completion with phases 1, 2, 4 and 5 completed and phase 6 started. An extension was requested in August 2016 to move the final Project completion date to May 31, 2017.

As of June 30, 2016, a total of \$2,631,474.51 Project expenditure was recorded, of which \$2,540,976.27 was invoiced to the State and \$90,498.24 was County match. These expenditures have been on pace as planned and County's portion will increase at a faster rate.

Project Assessment and Evaluation Plan Update

On May 18, 2015, the project PAEP (which is part of QAPP) was officially approved by State Board staff. Based on the project design parameters and as confirmed by the third-party review, the primary project performance targets will be met or exceeded. Some of the targets may be revised to make them more conservative, since the original calculations were based on average conditions. Because of active construction, no monitoring was conducted during the reporting period.

Other Project Updates

Project consultant Jian Peng and Chris Crompton attended the 16th International LID Conference in Beijing, China on June 26-29 and hosted two special sessions. The Project was featured in Jian's presentation.

The project signage design has started (see Figure 3 for the draft design of one of the signages). These signages will become an integral part of the public education and outreach effort for the Project.

From March to May 2016, Jian Peng participated in the US-Australia Digital Symposia on Low Impact Development during the reporting period and discussed the Project concept. The symposia consisted of five LID-focused themes with five-six (5-6) presentations each. All presentations are recorded and available on line. They will be used for future training and educational purposes.

During the reporting period, the Project team trained multiple OC Environmental Resources staff to be docents to give tours to visitors of the Project site. The Project was also featured at the 2016 OC Public Works Annual Open House on May 14, 2016 where over 200 guests participated. Project team also conducted 20 project site tours for more than 200 visitors during the reporting period. These visitors include NPDES coordinators of all cities in Orange County; environmental managers from University of California campuses; college students; researchers; contractors; international visitors; and general public.

The Project team, led by the Project Engineer Robert McLean, presented a poster titled 'OC Public Works Glassell Yard Campus Stormwater Low-Impact Development Project' at the 2015 California Stormwater Quality Association (CASQA) Annual Conference at Monterey, California.

As part of the public education and outreach effort and to maximize the value of the project site for stormwater-related research and education, the Project team collaborated with scientists at the University of California Irvine and their collaborators on the following projects:

1. The National Science Foundation's Partnerships for International Research and Education (PIRE) grant project (funding amount: \$4.8 million; led by Dr. Stanley Grant) focused on sustainable urban water systems including stormwater issues in both USA and Australia. The 2016 PIRE cohort toured the Project site on June 21, 2016.
2. The Project team has offered the Project site as a LID BMP demonstration/testing facility for the above institutions for research and educational activities for several grant applications:
 - a. Project funded: The group recently received a \$600,000 National Science Foundation Research Experiences for Teachers (RET) Program, on using the Project site to train 30 community college teachers for 8 weeks each year for a 3 year period. The training will focus on stormwater issues, biofilters, and water resource management. These teachers can then share their experiences and training to a large number of community college students for years to come. The cohort toured the Project site on June 21, 2016.
 - b. Project funding decision pending: University of California's Multicampus Research Program and Initiatives proposal titled "Fighting Drought with Stormwater" (\$1 million).

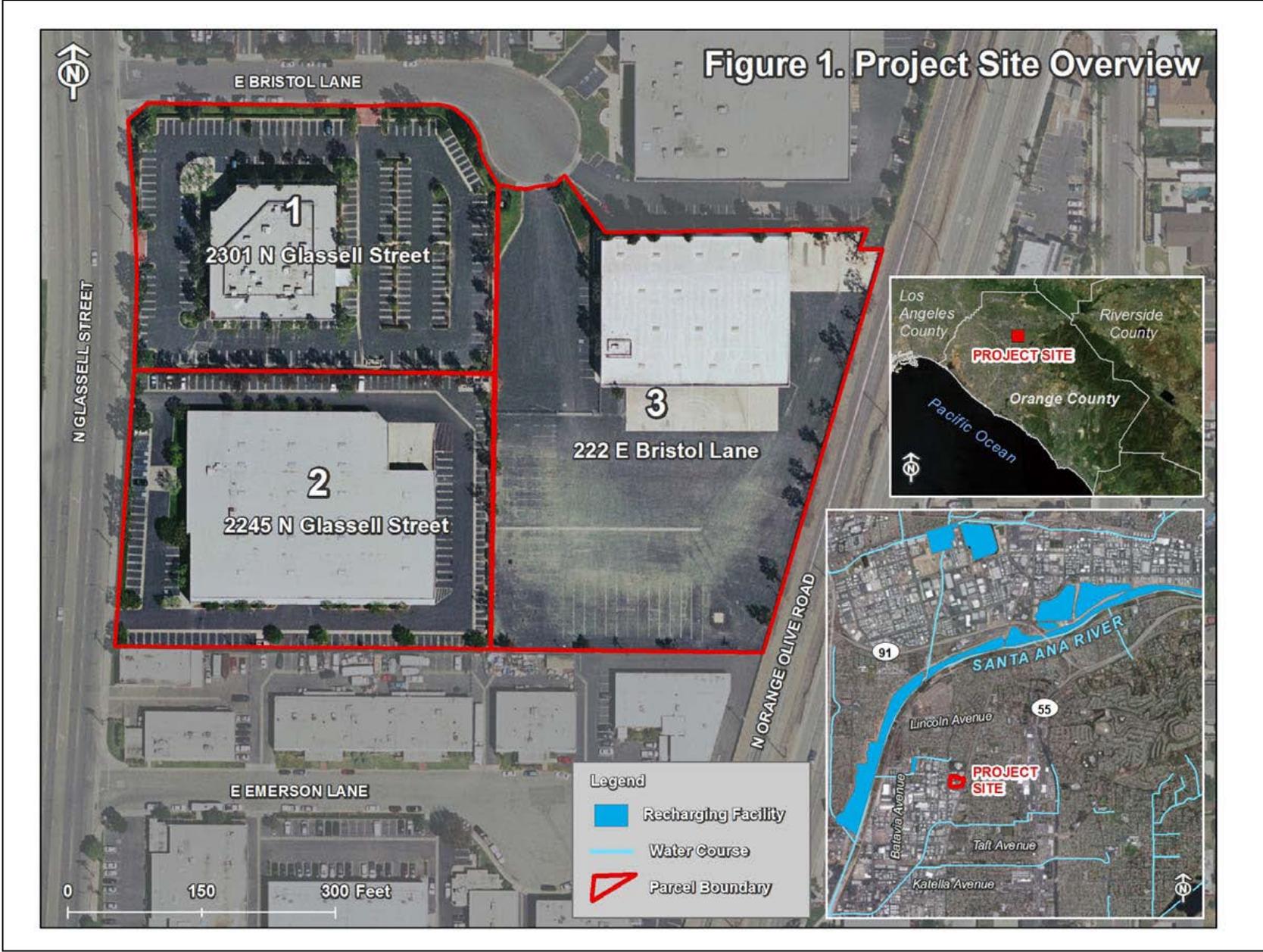


Figure 2. Construction phasing plan

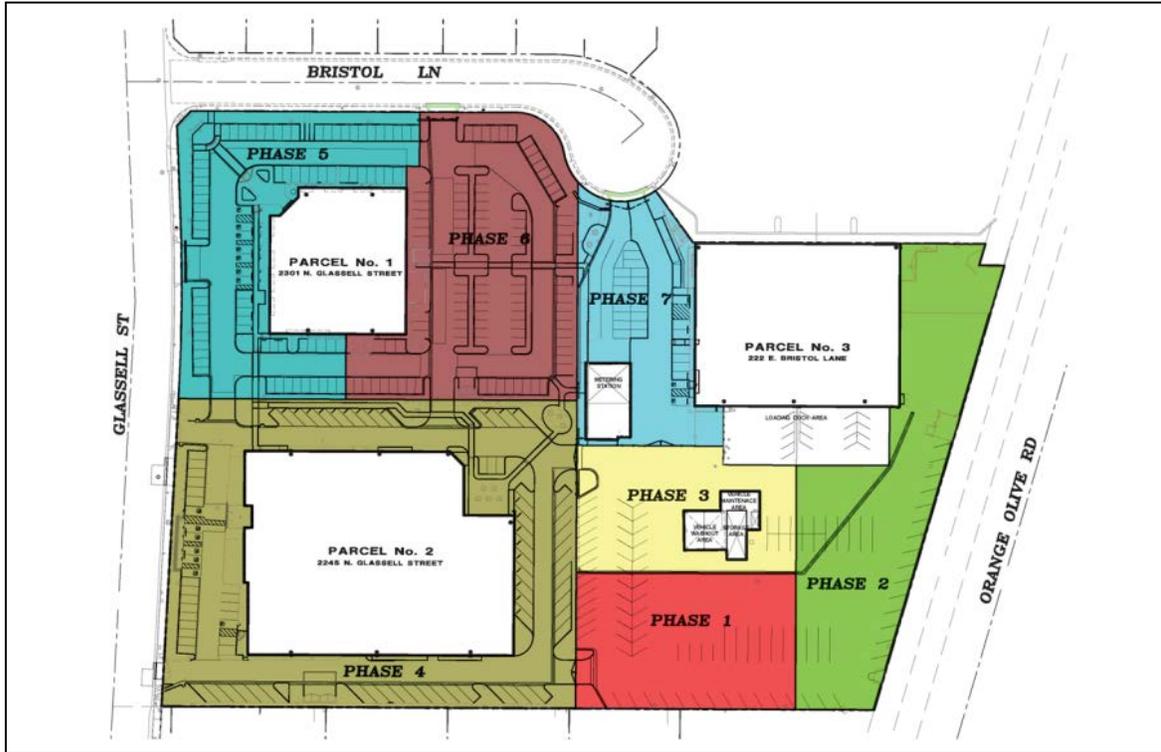


Figure 3. Example of Project signage (1 of 5)

OC Public Works Glassell Campus Prop 84 Low Impact Development Stormwater Retrofit Project

INNOVATION *inspired by* NATURE: An Overview

This project is a real-life example of how we can use nature-inspired filtration methods to solve major urban problems. This 9-acre campus was renovated with a series of low impact development (LID) features that act as a sponge to hold, clean, and drain water in a natural way. By bringing nature back into urban landscapes, we can reduce water pollution in a sustainable manner, conserve valuable natural resources, and improve the health of our community and environment.

Key Results

- Improves water quality within the Santa Ana watershed by diverting 95% of pollutants from entering the storm drain
- Captures and stores stormwater in cisterns for on-site landscape usage
- Promotes water infiltration to the ground, increasing drinking water supply
- Tests performance of permeable surfaces and drought-resistant plants
- Models the benefits of low-impact development for a greener future

MAP LEGEND

- Permeable Pavement
- Pervious Concrete
- Porous Asphalt
- LID Feature
- Bioswale
- Conventional Parking
- Informational Signs
- Pedestrian Walkways

FUNDED IN PART BY THE STATE WATER RESOURCES CONTROL BOARD THROUGH PROP 84 STORMWATER GRANT

Figure 4. Tour of the Project site by the members of the Stormwater Monitoring Coalition’s LID Technical Advisory Group on May 25, 2016



Figure 5. Project site photo as of May 19, 2016 showing active construction of Phase 4

