NW3.4 – Maintain wetland and surface water functions.

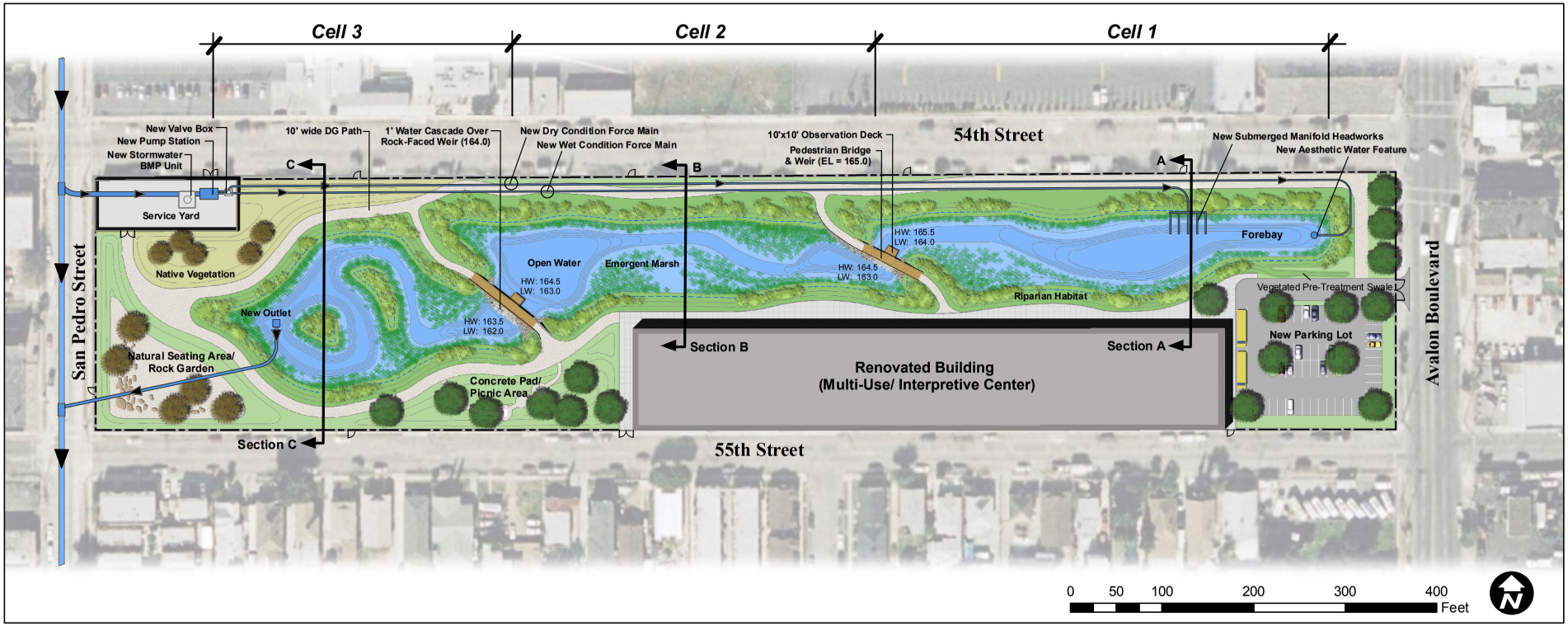
Level of Achievement:
RESTORATIVE

Summary:
The project significantly reduced impervious cover by transforming a previously paved site to an urban park. A wetland with riparian and emergent marsh habitat was created at the center of a densely populated urban community. The project is designed to divert stormwater runoff from the adjacent 63" storm drain and use the runoff as a resource to sustain the constructed wetland and its natural habitat. In addition to the treatment wetland, a pre-treatment hydrodynamic separator is designed to remove sediment, trash, oil and grease from a 525-acre watershed. As a result, natural water hydrology is not disrupted and water quality is enhanced by reducing pollutant loads to the impaired waters of Los Angeles.

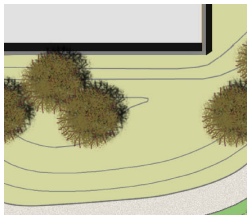
Supporting documentation:

- Proposed site plan
- Photos of constructed wetland
- Section 6.0 – Stormwater Treatment from Pre-Design Report

Proposed site plan

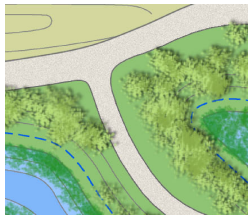


Rock Garden Area

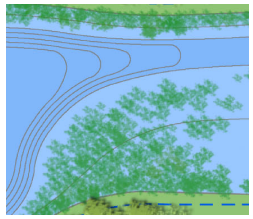


Native Vegetation Area

Park/Picnic Area



Riparian Habitat



Emergent Marsh Habitat

Cell 3 Enlargement

Preliminary Site Plan

City of Los Angeles Proposition O
South Los Angeles Wetlands Park

Photos of constructed wetland

Section 6.0 – Stormwater Treatment from Pre-Design Report

6.0 STORMWATER TREATMENT

The Wetland Park will reduce the introduction of pollutants generated from urban runoff to receiving waters by implementing a series of stormwater BMPs. The project BMPs include a vegetated swale, a hydrodynamic separator unit, and a treatment wetland. The project will provide pretreatment of diverted storm drain flow by a hydrodynamic separator unit and subsequent treatment through a three-cell constructed wetland prior to release back into the stormwater conveyance system. Runoff from precipitation and irrigation on the project site (9-acres) will be designed to flow into the treatment wetland. Additionally, a vegetated swale will border the parking lot and direct runoff flows from the parking lot into the wetland (Figure 6-1).

The system will be designed to function during two hydrologic conditions; wet weather and dry weather. An overview of operation under each weather condition is provided below. See Figures 6-4 and 6-5 for system configuration.

Dry Weather Condition

During the dry season, when runoff is minimal, all runoff flowing in the mainline in San Pedro Street will be diverted to the wetland via a diversion structure and lateral. Runoff will be pre-treated by a hydrodynamic separator and pumped into the wetland by a low flow pump system via a low flow force main along the northern edge of the property.

Runoff will enter the wetland via low flow distribution headworks located in the forebay of the wetland. Runoff will mix with permanent pool wetland water, flow through the first wetland cell, and slowly discharge into the downstream cell through a control orifice. At low flow rates the estimated nominal residence time may range from 50-120 days. Influent storm water will diffuse pollutants throughout the wetland allowing for mixing and treatment. Aeration may also be used in the treatment cells to assist with mixing and oxygenation. Water will exit the wetland at the western portion of cell 3 through an outlet structure and discharge into the storm drain main in San Pedro Street.

Surface applied irrigation will be evenly applied to the riparian habitat along the periphery of the wetland. In addition to sustaining the habitat, the surface applied irrigation will help prevent water stagnation and promote aeration in shallow wetland zones.

Wet Weather Condition

During the wet season, a portion of stormwater runoff will be diverted from the mainline in San Pedro Street via the same diversion structure described above. Runoff will flow through the hydrodynamic separator and fill the pump station's wet well. The low flow system will be de-energized via a level controller and the high flow pump system will be energized. Runoff will be pumped to the wetland via a high flow force main along the northern edge of the property.

Runoff will be discharged through manifold headworks located in the forebay of the wetland. The velocity of water at the forebay shall not exceed scour/erosive velocities at any location in the wetland. Turbidity and sediment transport shall be minimized.

During a storm event, runoff will be pumped into the wetland until the wetland reaches its maximum treatment volume of approximately 2.1 acre-ft. As the water surface elevation rises, water will begin to discharge over weirs at the downstream ends of cells 1 and 2. When the maximum combined treatment volume is reached, level controls in the wetland will de-energize the high flow pump system. The treatment volume will be discharged via orifice between approximately 24-72 hours. A detailed analysis shall be conducted at the design phase to determine the actual detention time. High flow pumps will be reactivated after all or a portion of the treatment volume has been discharged. The estimated maximum inflow to the wetland shall be between 12-16 cfs based on site and hydraulic constraints and preliminary computations. The City of Los Angeles Bureau of Engineering and Bureau of Sanitation agree that a maximum inflow to the wetland shall not exceed 15 cfs (correspondence included as Appendix F).

In the event that the full treatment wetland receives more direct rainfall than the outlet structure is capable of discharging due to a downstream catastrophic failure in the 63" pipe in San Pedro Street, or otherwise, the wetland park shall be graded such that storm water can surface discharge into 55th Street. The water level in this scenario shall not be higher than the finished floor of any buildings on site in accordance with Los Angeles County Department of Pubic Works flood protection requirements.

6.1 Diversion & Pre-Treatment

To prevent clogging in the pump system and the transport of trash, debris, and grease into the wetland park, a pre-treatment system will be installed as shown in Figure 6-2. The pre-treatment system will provide a central location for the removal of trash, debris and grease. The pre-treatment structures shall be regularly maintained, and shall be accessible to maintenance staff via the new maintenance yard.

6.1.1 Diversion Structure

To divert water from the storm drain mainline in San Pedro Street, a diversion structure shall be installed just south of the intersection of San Pedro Street and 54th Street. Diversion will create a minor hydraulic energy loss, which may result in an increase in pressure and/or water surface elevation upstream of the point of diversion. A drop-type diversion structure with the opening at the floor of the storm drain shall be used to minimize hydraulic energy loss. A hydraulic analysis will be performed during the design phase to identify energy loss.

Storm water in excess of the pump system's design capacity (12-16 cfs) shall bypass the pre-treatment system at the diversion structure and continue onto the existing 63" storm drain south of the proposed diversion structure. This will occur when the mainline flow

exceeds the design flow and the wet well is full, allowing no additional water to enter the pre-treatment system.

6.1.2 Hydrodynamic Pretreatment

Trash, debris, sediments, oil, and grease will undergo pretreatment prior to entering the wetland. This will be achieved with a continuous deflection separator or a hydrodynamic separator prior to entering the pump station.

Hydrodynamic separators are designed for removal of a set of specified pollutants. The storm water diverted from the main storm drain in San Pedro Street will be conveyed to the hydrodynamic separator's diversion chamber. A diversion weir then guides the flow into the unit's separation chamber where a vortex is formed using the hydraulic energy of the stormwater flow. The vortex separates much of the suspended solids, which settle into a sump where they remain until removed during periodic maintenance. Floatable and neutrally buoyant debris are retained by the stationary separation screen, which resists blockage due to the washing vortex.

The partially treated stormwater then moves out of the separation chamber and passes beneath an oil baffle, which skims oil off the top of the water surface.

The hydrodynamic separator will require periodic maintenance throughout the year. Access to the hydrodynamic separator will be provided via the maintenance yard in the northwest corner of the property.