

Lake Leota Storm Water Quality Retrofit Project

City of Woodinville

Grant No. G1200575

Project Construction: September 2014 – April 2015

Final Total Project Cost: \$853,000

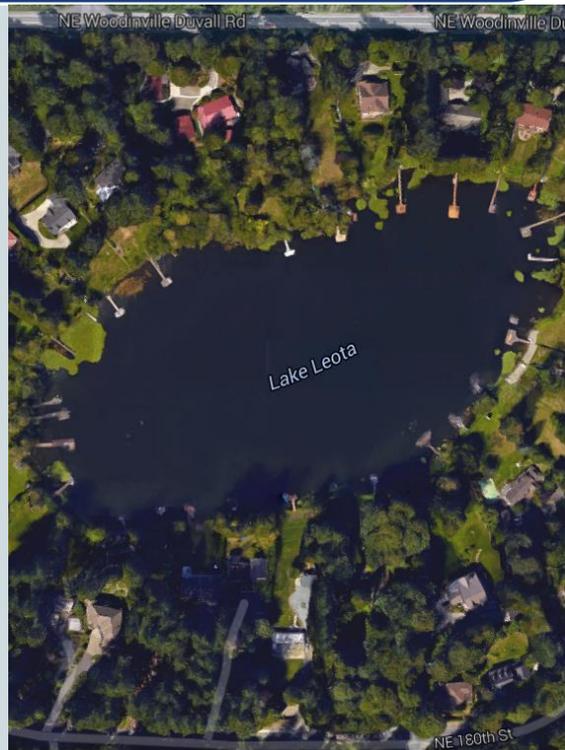
Final Ecology Grant or Loan Contribution: \$639,750

Project Description

Based on data collected by the Lake Leota Community Club as part of the King County Lake Stewardship Program, the conditions in Lake Leota rank in the mid-range of mesotrophic on the trophic scale, with moderate nutrient levels. Lake Leota has moderate phytoplankton populations with Bluegreen algae as a minor component of the community and Golden algae as the dominant. Residents also report that milfoil has produced a wide band around the edge of the lake which is beginning to impact access to the open water.

The potential pollutant loading sources to Lake Leota are both point sources (such as failing septic systems) and non-point sources (such as runoff from roadways and residential developments or residential fertilizer applications). Water quality conditions in Lake Leota (algae growth, milfoil) indicate that nutrient levels are a concern to adjoining residences. Based on the pollutant loads, the water quality systems chosen for this project includes a filtering technology (via plant uptake, soils and media) to remove nutrients from storm water runoff prior to discharge to the lake.

To provide storm water treatment from contributing onsite and off-site basins prior to discharging into Lake Leota, precast bioretention systems have been strategically placed along the north and south sides of NE 180th Street.



Lake Leota Aerial View



Bioretention Filtration Structure, providing enhanced treatment to offsite storm water

Project Accomplishments

There were three primary goals for the water quality and environmental outcome of this project; protect and restore water quality of multiple receiving water bodies, reduce pollutant load and Total Suspended Solids (TSS), and increase public awareness of environmental issues and actions regarding storm water and water quality.

The first two goals were accomplished by strategically placing General Use Level Designation (GULD) Technology Assessment Protocol - Ecology (TAPE) - approved bioretention systems. To collect onsite storm water: NE 180th ST has been overlaid and super-elevated, directing street runoff to the North, where it flows along the new concrete curb and receives treatment from the bioretention filtration structures before entering the new conveyance system. To collect offsite water: The existing ditches have been re-graded to direct offsite water into bioretention filtration structures for treatment prior to entering the new conveyance system. All bioretention structures were sized to filter a minimum of 91% of the entire contributing runoff volume. Additionally, each bioretention structure has a high flow bypass structure to collect any excess water during a major storm event.

Water Quality and Environmental Outcomes

The area within the project site includes the contributing area to the south outfall of Lake Leota. The basin covers 95 acres, of which 67 acres are within the City of Woodinville city limits. The improvement project is confined to the City limits, but will provide treatment for the basin areas upstream of NE 180th Street, including areas outside of the City boundary. Lake Leota is within the Bear Creek basin and the Cold Creek sub-basin.

Proposed treatment facilities will provide Enhanced Treatment of storm water runoff per Ecology standards with a minimum goal of removing 80 percent of TSS and a higher rate of removal of heavy metals. The baseline removal goal for heavy metals is greater than 30 percent removal of dissolved copper and 60 percent removal of dissolved zinc. The proposed treatment system also provides an average of greater than 50 percent removal of total phosphorus, and 30 percent removal of total nitrogen, which reduces total nutrients associated with algal/bacterial blooms. The removal mechanism for nickel and lead are similar to that of copper and zinc, so removal efficiency of these heavy metals would also be expected. These units also have documented removal efficiencies for bacterial with average removal rates greater than 50 percent for fecal coliform and E. coli.

The Next Step for Continued Success

This project provides water quality treatment to all surface storm water runoff entering Lake Leota south of Woodinville-Duvall Road. As a separate project, the City's contributing area to Lake Leota to the north is being addressed for water quality treatment through the Woodinville-Duvall Road Improvement Project.

The City will perform routine maintenance to the Bioretention Filtration Structures without further grant funding. This maintenance includes: inspection of the Bioretention Filtration Structures, filter media evaluation and recharge as necessary, plant health evaluation and pruning or replacement as necessary, and removal/disposal of foreign debris, silt, mulch and trash.

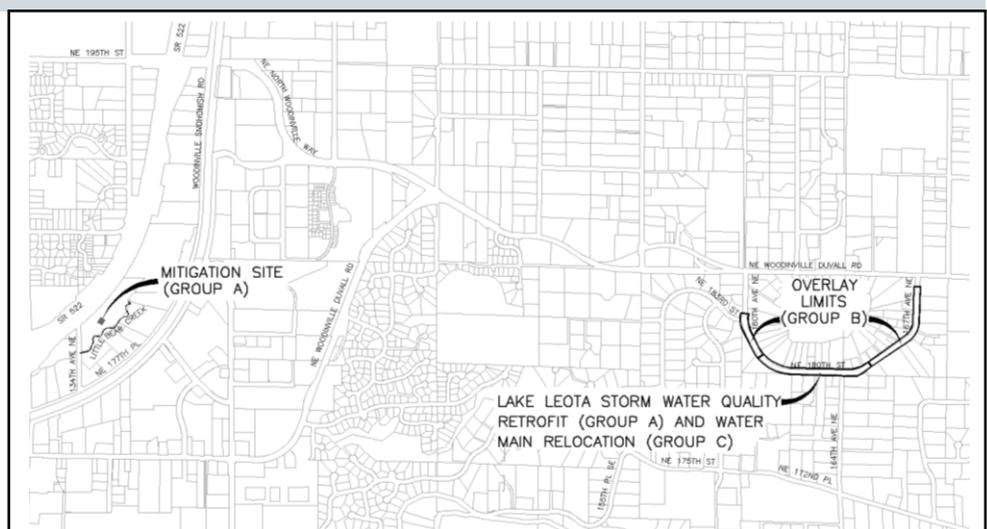
Part of the Lake Leota Storm Water Quality Project included a public outreach and educational campaign designed to inform residents within the Lake Leota watershed of the construction project and provide the residents with information about what they can do to protect and improve water quality. This will be the key element to the continued success of the water quality improvements for Lake Leota.

Lessons Learned

The existing outfall to Lake Leota is on private property and as the water exited the outfall pipe it traveled approximately fifty feet through a very poorly defined channel full of fine sediment deposits. So during major storm events, the storm water would agitate the built up sediment and create a large sediment plume as it washed into the lake. As the project improvements were confined within the right-of-way, improving this outfall was outside the scope of the project. It was an unexpected success when the homeowner removed the sediment from the channel (just below the outfall pipe) and stabilized it.

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Lake Leota Storm Water Quality Retrofit Vicinity Map