

APPENDIX D: BAYFRONT CANAL/ATHERTON CHANNEL AND VISTA GRANDE CANAL PROJECT SUMMARIES

1. EXECUTIVE SUMMARY

The Bayfront Canal is located in the City of Redwood City (City), and runs from west to east adjacent to the former Cargill Redwood City Salt Ponds and just north of Highway 101. Storm runoff from the low-lying areas of the City, City of Menlo Park, and unincorporated regions in San Mateo County is pumped to the Bayfront Canal for ultimate discharge to the San Francisco Bay (Bay) by three existing pump stations. The Bayfront Canal merges with the Atherton Channel near Marsh Road and then outlets into Flood Slough through a tide control structure. Atherton Channel is the largest flow contributor to the Bayfront Canal and receives storm runoff from the City of Menlo Park, the Town of Atherton and Woodside, and unincorporated areas of San Mateo County. During larger rain events that coincide with higher tide elevations in Flood Slough, the runoff cannot discharge through the tide gates at the terminus of the Bayfront Canal because of the high tailwater elevation. The Canal does not have enough detention capacity, causing the canal to back up and flood property and streets.

The purpose of this feasibility assessment is to describe the proposed project, and the studies and analyses that went into developing the proposed project. The proposed project is primarily a flood mitigation measure with significant habitat enhancement opportunities. The proposed project will route flood flows from Bayfront Canal and Atherton Channel into managed ponds that are part of the Ravenswood Pond Complex portion of the South Bay Salt Pond (SBSP) Restoration Project. Storm runoff will flow into Ponds S5 and R5 during winter flood events.

The proposed project will mitigate the chronic and widespread flooding which occurs in the East Bayshore area of Redwood City, adjacent to the Bayfront Canal. These neighborhoods have a 60 year history of repetitive flood events, and the Project is needed to reduce the flooding frequency in the Bayfront Canal area and to reduce flood damage costs to the region. Without the Project, the region will continue to experience flooding of property, businesses, and streets, increasing the flood cost damages and endangering public health and safety. A flood damage reduction benefits analysis was performed for the project utilizing the DWR's Flood Rapid Assessment Model (F-RAM), and even though no dollar amount of benefit was attributed to habitat restoration, the net cost-benefit was still positive.

Components of the proposed project include:

- Construction of a lateral weir structure on Bayfront Canal, which will connect to an existing Cargill ditch and will include a trash rack and an operational gate for controlling the flows that enter the ponds.
- Modification of the existing Cargill ditch for improved flow conveyance to connect the Bayfront Canal lateral weir to the box culvert headwall at Marsh Road.
- Installation of two 4'x8' concrete box culverts connecting the headwall structure at Marsh Road to Pond S5.
- Construction of a box culvert headwall inlet and outlet structures for the two 4'x8' concrete box culverts.
- Modifications to the Pond S5 Forebay: excavation/deepening of this smaller portion of Pond S5 immediately adjacent to Flood Slough
- Construction of a tide-gate outlet structure connecting Ponds R5 and R4.
- Two additional structures that could potentially be added to better manage the circulation and water quality in the ponds during the dry summer season are being considered; one which connects Pond S5 to Pond R3, and one which connects the S5 Forebay to either Flood Slough or to the City of Menlo Park's pond immediately north of the S5 Forebay.

Ponds S5 and R5 have the unique opportunity to provide habitat enhancement value as managed ponds, and provide flood control simultaneously, both of which are SBSP Restoration Project goals (URS 2012). Currently, the S5 and R5 ponds are managed; dry during the summer months and wet (ponded) sporadically from rain events during the winter. The SBSP Environmental Impact Report (EIR) projected that Ponds S5 and R5 would be managed ponds at the completion of the restoration effort. The targeted species benefitting from a managed pond habitat in these ponds would be shorebirds and ducks. The managed ponds would be habitat for nesting, migration, and foraging. (EDAW et al. 2007) Because S5 and R5 are close to human disturbances and they are relatively small, they are also unlikely to function as snowy plover habitat. It is also to the SBSP Restoration Project's benefit to maintain Ponds S5 and R5 as managed ponds not open to tidal action, because for the existing pond berms to be breached, costly new flood control levees would have to first be created to adequately protect Highway 84 adjacent to the ponds.

Pond levels will be managed to maximize flood reduction benefits and to provide enhanced habitat for target species. Flood events would be directed into Ponds R5 and S5, and then discharged into Pond R4 for eventual discharge into the Ravenswood Slough and Bay. During and after flood events the ponds will discharge by gravity via the installed culverts. High tides will be blocked (with a gate) from entering the ponds and reducing detention capacity. During the dry season, the Bayfront Canal water will flow into Flood Slough as it currently does. The ponds will have a maintained depth of approximately one foot of water for shorebird and dabbling duck foraging. The gate between R5 and R4 can be opened periodically for tidal exchange and water circulation to maintain water quality in the pond. The gate will remain closed during high tides to protect CA Highway 84 from flooding.

Water quality analysis was performed during three rain events within the past year, at four locations along Bayfront Canal. The results were compared to the freshwater and marine water quality objectives (WQO) described in the San Francisco Basin Plan,. All grab sample results show the water located upstream of the tide gates is in compliance with all 1-hr average WQOs. Although grab and 1-hr (composite) average samples cannot be directly compared, the grab samples are a good indication of the water's compliance with the WQOs, and the sampling results indicate that the diverted Bayfront Canal water would comply with all WQOs going into the ponds. The City of Redwood City is active in regional stormwater planning and management efforts, and both the City of Redwood City and Atherton have stormwater detention policies beyond the requirements of the NPDES Municipal Permit in an effort to reduce peak flows to downstream creeks and channels.

Redwood City and local project partners could help fund such water control structures as it would benefit flood reduction and restoration efforts. Restoration goals for Ponds R5 and S5 could be partially achieved without freshwater input during the winter from Bayfront Canal as proposed in the EIR; however, the proposed project would further enhance habitat values for a longer period in any given year with freshwater input and circulation operations to maintain water quality within the ponds.

2. INTRODUCTION

2.1 Background

The Bayfront Canal is located in the City of Redwood City (City), and runs from west to east adjacent to the former Cargill Redwood City Salt Ponds and just north of Highway 101. Storm runoff from the low-lying areas of the City, City of Menlo Park, and unincorporated regions in San Mateo County is pumped to the Bayfront Canal for transport to the San Francisco Bay (Bay) by three existing pump stations. The Bayfront Canal merges with the Atherton Channel near Marsh Road and then outlets into Flood Slough through a tide control structure. The project location is illustrated in Figure 1-1. Atherton Channel is the largest flow contributor to the Bayfront Canal and receives storm runoff from the City of Menlo Park, the Town of Atherton and Woodside, and unincorporated areas of San Mateo County. During larger rain events that coincide with higher tide elevations in Flood Slough, the tide gates at the terminus of the Bayfront Canal prevent water from flowing into the Bay. The Canal does not have enough detention capacity, causing the canal to back up and flood property and streets.

After numerous studies and analyses (detailed in Sections 3.1 and 3.2), Redwood City is proposing the project described in this report to mitigate flooding near Bayfront Canal. The proposed project will route flood flows from Bayfront Canal and Atherton Channel into managed ponds that are part of the Ravenswood Pond Complex portion of the South Bay Salt Pond (SBSP) Restoration Project. Storm runoff will flow into Ponds S5 and R5 during winter flood events; the storm runoff and precipitation onto the ponds will help in creating a managed pond habitat for shorebirds and ducks to forage, nest, roost, and rest during migrations.

The City met with Regional Water Quality Control Board (RWQCB) staff and the SBSP Project Team on 12/17/2012 to discuss the proposed project concept. This feasibility assessment is intended to describe the proposed mitigation project and address concerns and questions raised during that meeting.

2.2 Purpose

The purpose of this feasibility assessment is to describe the proposed project, and the studies and analyses that went into developing the proposed project. The proposed project is primarily a flood mitigation measure with significant habitat enhancement opportunities.

2.3 Scope of Work

This feasibility study documents the need for the project and discusses initial concerns regarding the project. The following is discussed:

- flooding history;
- reason for project;
- proposed project including culvert size/alignment, detention pond details, frequency/durations/volumes of flows into ponds, connection to Bay;
- water quality test results;
- mitigations (first flush, debris, boom, etc.);
- site controls already implemented by Redwood City and Atherton as part of their Regional NPDES Permit;
- status of the project.

3. PROJECT DESCRIPTION

3.1 Historical Flooding Background

One of the goals of the Project is to mitigate the chronic and widespread flooding which occurs in the East Bayshore area of Redwood City, adjacent to the Bayfront Canal. These neighborhoods have a 60 year history of repetitive flood events, with 38 significant flood events from 1951 through 2011, which corresponds to significant flooding about every 1.6 years on average (Goettel & Assoc., 2011). All of these events involved substantial street flooding with road closures, and 13 of the 38 flood events were larger events that also included flood damage to homes. In addition to these significant events, there are also minor nuisance flooding events that typically occur two or three times per year within the lowest elevation areas of the East Bayshore area. (Goettel & Assoc., 2011)

The Project is needed to reduce the flooding frequency in the Bayfront Canal area during heavy rains and high tides and to reduce flood damage costs to the region. Without the Project, during heavy rain events, the region will continue to experience flooding of property, businesses, and streets, increasing the flood cost damages and endangering public health and safety.

3.2 Flooding Analyses

The City has previously investigated the flooding in the Bayfront Canal area and potential flood mitigation actions in the following engineering reports and data:

- Bayfront Canal and South Bay Salt Ponds S5/R5 Flood Mitigation Feasibility Study (M&N, 2012);
- Opportunities and Constraints for Ravenswood Pond Complex, South Bay Salt Ponds Restoration, Phase II (URS, 2012);
- Bayfront Canal Improvement Project, Hydrology and Hydraulics Report (WRECO, 2011);
- Fifth Avenue Stormwater Pump Station Upgrade, Flood Mitigation Project Benefit-Cost Analysis Report (Goettel & Associates Inc., 2011);
- Basin “H” Storm Water Flow Monitoring Study (V&A, 2011);
- Bayfront Canal Improvement Project, Design Development Alternatives Analysis Report (Winzler and Kelly, 2003);
- Atherton Creek at Haven Court Hydrology Study (Schaaf and Wheeler, 2002);
- Summary of Past Work on Fifth Avenue Storm Drain System Letter (BKF, 1993);
- Data Correction Letter (BKF, 1988);
- Fifth Avenue Storm Drain System Investigation (BKF, 1983).

Based on the conclusions of these prior investigations, the proposed alternative is to route flood flows from the Bayfront Canal and Atherton Channel into managed ponds that are part of the Ravenswood Pond Complex and the South Bay Salt Ponds Restoration Project. With the project, flood flows from the Bayfront Canal will bypass around the Flood Slough tide gate and be routed into Ponds S5 and R5.

3.3 Project Components

The Bayfront Canal/Atherton Channel Flood Improvement Project will mitigate chronic and widespread flooding of the Canal and Channel neighborhoods by routing flood flows into managed ponds that are part of the Ravenswood Pond Complex portion of the South Bay Salt Ponds Restoration Project. This will provide detention for the Bayfront Canal and Atherton Channel drainage areas, and redirected runoff will be used to enhance managed pond habitat in Ponds R5 and S5. The South Bay Salt Pond Restoration Project is in the planning phase of project development and can foreseeably include the Bayfront Canal/Atherton Channel Project in their future plans. Components of the proposed project include:

- Installation of two 4'x8' concrete box culverts connecting Bayfront Canal to Pond S5.
- Construction of a lateral weir structure on Bayfront Canal, which will include a trash rack and an operational gate for controlling that the flows that enter the ponds (as discussed in Section 5.1)
- Construction of box culvert headwall inlet and outlet structures for the two 4'x8' concrete box culverts.
- Modification of the existing Cargill ditch for improved flow conveyance to connect the Bayfront Canal lateral weir to the box culvert headwall at Marsh Road
- Modifications to the Pond S5 Forebay: excavation/deepening of this smaller portion of Pond S5 immediately adjacent to Flood Slough
- Construction of a tide-gate outlet structure connecting Ponds R5 and R4.

Flood flows from the Bayfront Canal will bypass the Flood Slough tide gate and will be routed into Ponds R5 and S5 of the Ravenswood Pond Complex. A lateral weir structure will be constructed in Bayfront Canal upstream of the existing Flood Slough tide gates. This lateral weir structure will connect to an existing Cargill ditch adjacent to Bayfront Canal; the ditch will be excavated to increase the flow capacity. The open channel will convey flows to the box culvert headwall at Marsh Road, which are connected to Pond S5.

The design may include a controlled inflow and outflow system so that the rate of flow coming in and out of the Ponds is managed automatically by the size of the culverts. The design can incorporate desired residence times of retained water within the pond. The outflow structure from the ponds can be gate controlled with ball valves to prevent tidal inflow during high tides and allow outflow during low tides.

Prior to R4 being open to tidal influences, routed stormwater from Ponds R5 and S5 would be directed into R4. A culvert would be installed in Ravenswood Slough from R4 until such time R4 is restored to tidal action. Pond R4 cannot be breached until flood control is built up on the levee between R4 and R3, so there will likely be a delay between the proposed project and Pond R4 tidal restoration. Once R4 becomes tidal, operation of the culvert will no longer be necessary.

The State Coastal Conservancy (SCC) and the U.S. Fish and Wildlife Service (FWS) expressed the desire to have additional inlet/outlet structures in Ponds R5 and S5 to better manage the circulation and water quality in the ponds during the dry summer season. Therefore, two additional structures could potentially be incorporated into the proposed project; one which connects Pond S5 to Pond R3, and one which connects the S5 Forebay to either Flood Slough or to the City of Menlo Park's pond immediately north of the S5 Forebay.



Legend

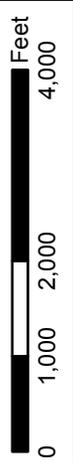
- Bayfront Canal
- Atherton Channel
- Ponds S5 and R5
- Pond R3

Notes: NAIP aerial photos dated 7-14-09 and 6-27-09

Figure 1-1. Project Location Map



**Bayfront Canal and
Salt Ponds S5/R5
Feasibility Study**



Draft EIR/EIS

Vista Grande Drainage Basin Improvement Project

The City of Daly City (Daly City), as the Lead Agency under the California Environmental Quality Act (CEQA), and the National Park Service (NPS), as the Lead Agency under the National Environmental Policy Act (NEPA) have prepared a Draft Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) evaluating the environmental impacts of, and alternatives to, the proposed Vista Grande Drainage Basin Improvement Project (Project).

The proposed Project would improve stormwater drainage and minimize flooding risk, provide a water source for Lake Merced management, improve recreational access and reduce litter deposition at the beach below Fort Funston, and maximize the use of existing infrastructure and rights-of-way. The Project has the following components:

- Improvements within the Vista Grande Basin storm drain system upstream of the Vista Grande Canal (Canal);
- Partial replacement of the existing Canal to incorporate a gross solid screening device, a constructed treatment wetland, and diversion and discharge structures to route some stormwater (and authorized non-stormwater) flows from the Canal to Lake Merced and to allow lake water to be used for summer treatment wetland maintenance;
- Modification of the existing effluent gravity pipeline so that it may be used year round to convey treated effluent from the nearby North San Mateo County Sanitation District Wastewater Treatment Plant (WWTP) to the existing outlet and diffuser by gravity, and abandoning the force main pipeline;
- Modification of the existing lake overflow structure to include an adjustable weir and siphon that allows water from the lake to flow into the Canal and Vista Grande Tunnel (Tunnel);
- Replacement of the existing Tunnel to expand its hydraulic capacity and extend its operating lifetime and replacement of the Lake Merced Portal to the Tunnel; and
- Replacement of the existing Ocean Outlet structure and a portion of the existing 33-inch submarine outfall pipeline that crosses the beach at Fort Funston.

Operational components of the Project would include management of water surface elevations in Lake Merced and a Lake Management Plan that includes operations and water quality monitoring protocols. In addition, the Project includes NPS execution of a special use permit for construction activities within Golden Gate National Recreation Area (GGNRA) lands and the expansion of the right-of-way to accommodate the replacement Ocean Outlet structure.

In addition to the proposed Project, this EIR/EIS considers two action alternatives consisting of variations of the design and siting of Project components, and one No Project/No Action alternative.

- The Tunnel Alignment Alternative would replace the proposed Project's Tunnel improvement and Lake Merced (East) Portal components with an entirely new tunnel approximately up to 50 feet to the south of the existing Tunnel in an alignment to be determined following additional geotechnical investigation, and a different east portal at a location that would be determined by the final alignment. The new tunnel would run west from a new east portal at the existing Canal to a new or rehabilitated Ocean Outlet structure. The components of the Tunnel Alignment Alternative could be paired with the proposed Canal components, or could be paired with the alternative Canal components described for the Canal Configuration Alternative.
- The Canal Configuration Alternative would minimize changes to the existing Canal while still allowing for some discharges to Lake Merced. This alternative would relocate the diversion structure described for the proposed Project to the southern (upstream) end of the Canal and relocate the box culvert close to the southern end of Impound Lake. The diversion structure would replace the first approximately 350 feet of the Canal, and the rest of the Canal would be unchanged except as needed for the Lake Merced Tunnel Portal. Furthermore, the wetland cell size would be reduced compared to the proposed Project design. The components of the Canal Configuration Alternative could be paired with the proposed Tunnel or with the alternative Tunnel and East Portal components described for the Tunnel Alignment Alternative.

- The No Project/No Action Alternative would not construct any physical component of the proposed Project and none of the proposed operational changes to stormwater routing would be made. The Lake Management Plan would not be implemented, and the NPS would not grant a special use permit.

Analysis of environmental impacts associated with the proposed Project identified potentially significant impacts in the following areas: aesthetics, air quality, biological resources, cultural resources, geology and soils, hazards and hazardous materials, hydrology and water quality, noise and vibration, paleontological resources, and transportation and traffic. Growth inducement potential and cumulative impacts are also addressed in the Draft EIR/EIS. For environmental impacts determined to be significant or potentially significant, mitigation measures have been identified to reduce those impacts. No mitigation would reduce significant and unavoidable impacts to the historic Canal and Tunnel.

The Draft EIR/EIS, prepared pursuant to CEQA and NEPA, is available for public review at the Daly City Office of the City Clerk, and at the Westlake Branch of the Daly City Public Library (275 Southgate Avenue, Daly City) and the Merced Branch of the San Francisco Public Library (155 Winston Drive, San Francisco).

PUBLIC MEETING: Daly City will hold a Public Meeting to provide an opportunity for the public and regulatory agencies to learn about the Project and be informed about how to submit comments on the adequacy and accuracy of the Draft EIR/EIS on May 26, 2016: 7:00 p.m. to 9:00 p.m. at the City Council Chambers, 333 90th Street, Daly City, CA.

PUBLIC REVIEW PERIOD: All comments on the Draft EIR/EIS must be received by July 1, 2016 to receive written responses from the lead agencies in the Final EIR/EIS. Submit comments in writing to:

City of Daly City, Department of Water and Wastewater Resources
Attention: Patrick Sweetland, Director
153 Lake Merced Blvd.
Daly City, CA 94015
E-mail: psweetland@dalycity.org

DECISION PROCESS: Following the public review period and responses to comments on the Draft EIR/EIS, Daly City will issue a Notice of Availability (NOA) of the Final EIR/EIS and publish the Final EIR/EIS. Daly City then will consider whether to certify the EIR and approve the Project. It is noted that Daly City may consider approval of the Project, or an alternative to the Project within the range of alternatives considered. Concurrently, the NPS will submit the Final EIR/EIS to the USEPA and publish a NOA in the Federal Register. No fewer than 30 days after publication of that NOA, the NPS will issue a Record of Decision (ROD) for the Project.