



Santa Clara Valley Water District

File No.: 19-0284

Agenda Date: 3/12/2019

Item No.: *6.1.

BOARD AGENDA MEMORANDUM

SUBJECT:

*Guadalupe River Project from Tasman Drive to Interstate 880 (District 3) (San Jose).

RECOMMENDATION:

*Add the Guadalupe River Project from Tasman Drive to Interstate 880 to the Fiscal Year 2020-2024 Capital Improvement Program (CIP) to evaluate possible alternatives to restore the design flow conveyance capacity of the Lower Guadalupe River.

SUMMARY:

History of flood protection improvements

In 1983, improvements on the Lower Guadalupe River, from the Union Pacific Railroad (UPRR) in Alviso to Highway 101 were constructed to provide 100-year flood protection. In March 1992, the District signed a Local Cooperative Agreement (LCA) with the U.S. Army Corps of Engineers (USACE), whereby the District agreed to operate and manage the Lower Guadalupe River to provide a 100-year flood protection, when the USACE Downtown Guadalupe River Flood Protection was completed in 2004.

Based on the field data collected from the January and March 1995 storm events, a hydraulic analysis in 1995 showed that the Lower Guadalupe River did not have the planned conveyance capacity as required by the Downtown Guadalupe River Project. Both vegetation growth and sediment deposition were identified as the main causes of reduction in channel capacity.

In 2004, the District completed additional flood protection improvements along the Lower Guadalupe River from Alviso Marina to Interstate 880 at the same time as the USACE completed construction of the Downtown Guadalupe River Flood Protection Project. The 2004 improvements included: vegetation management and sediment removal; levee rehabilitation; levee raising; floodwalls; maintenance roads and ramps; and replacement of the State Route 237 east-bound bridge over Guadalupe River. Together, the Lower Guadalupe River and Downtown Guadalupe River Flood Protection Projects removed 3,440 parcels from the floodplain.

Staff worked with USACE staff to ensure that the USACE requirement to provide conveyance of the 100-year flow through the Lower Guadalupe River Project would be met. On October 11, 2002,

USACE sent a letter confirming that the project was determined to be adequate for the required flow requirements and on December 15, 2005, USACE sent a letter verifying that the Lower Guadalupe River

Project satisfied USACE criteria for Federal Emergency Management Agency (FEMA) certification.

O&M guidelines and implementation

In 2007, USACE issued to the District an Operations, Maintenance, Repair, Replacement, & Rehabilitation Manual for the Guadalupe River Project (O&M manual). The O&M manual provides guidance for the inspection and maintenance requirements of both the Lower and Downtown Guadalupe River Projects. Based on the O&M manual, the District is to conduct periodic sediment removal and limited vegetation management in discreet locations in the channel and along the inboard levee slopes.

Since completion of construction in 2004, District staff has been conducting and continues to conduct stream maintenance activities along Lower Guadalupe River. Stream maintenance activities have included performing routine sediment removal and vegetation management, pursuant to the activities covered under the District's Stream Maintenance Program (SMP). Since 2005, the District has removed a cumulative 13,176 cubic yards of sediment in the Montague Expressway to Highway 101 reach of Guadalupe River over multiple years.

Vegetation management activities have included removal of invasive plants, removal of trees less than 6 inches in diameter at breast height (dbh), and routine pruning. For example, more than 19 acres of invasive plants were removed in the last two years between Montague Expressway and Trimble Road. An additional 9.35 acres of invasive plant management work is planned to start this summer in the reach between Highway 101 to Highway 880.

Recent findings

District staff proactively collects high water marks from significant storm events to monitor and evaluate the performance of completed capital improvement projects. For Lower Guadalupe River, staff also conducted topographic surveys and collected information on vegetation growth following the 2017 storm events. The collected information was used in hydraulic analyses, completed in 2018 to evaluate the flow conveyance capacity of the Lower Guadalupe River. Results of these analyses indicate that a section of the Lower Guadalupe River, from approximately upstream of Tasman Drive to Airport Parkway, no longer has conveyance capacity for the 100-year event for which it was designed. Under current conditions, a flow slightly above the 50-year event would overtop the levees and tops of banks between Montague Expressway and Airport Parkway.

The capacity of a channel to convey flow is determined by physical parameters including the channel's cross sectional area, depth of flow and the channel slope, and an empirical coefficient based on the channel's roughness, largely attributable to vegetative growth. The physical parameters are readily attainable with field surveying techniques; whereas the effect of vegetation on the conveyance of water is based more on experience, observation and practice. It appears that

assumptions used in the design hydraulic model relative to the success and density of the vegetative growth and the maintenance work that was subsequently permitted under the SMP did not match with the current conditions of the Lower Guadalupe River. Thus, the flood conveyance could not be maintained as designed.

1. Hydraulic Model Roughness Coefficients

As stated, roughness coefficients are determined based on industry practice and observations over time. The original design hydraulic model channel roughness (i.e., Manning's n-values) assumptions were used to develop the Lower Guadalupe O&M guidelines. The roughness coefficients in the model were reasonable if all the vegetation maintenance could be maintained except for the non-vegetation management zones where the roughness coefficients assumed in the original hydraulic model are lower than recent storm events have shown.

2. Stream Maintenance

While it was recognized in the planning and design phase of the Lower Guadalupe River Flood Protection Project that maintenance would be required, the magnitude of the maintenance effort was not as well understood then as it is today. There are conditions in SMP 1 and SMP 2 permits that don't allow full implementation of the maintenance requirements and that make vegetation management of this project challenging. SMP 1 permits did not allow removal of trees greater than 6-inch dbh. SMP 2 permits allow removal of trees greater 6-inch but less than 12-inch dbh but there are associated mitigation requirements and annual and ten-year program limits. The removal of trees greater than 12-inch dbh is prohibited. Some of the vegetation management practices described in the O&M manual were not allowed in previous and existing SMP permits and are also not consistent with arboricultural practice.

The channel design includes areas along the low flow channel and in planted mitigation areas where vegetation management is restricted. The success of vegetative growth in these restricted areas has grown thicker than expected, exceeding the roughness assumptions used in design.

Because SMP permits do not provide coverage for vegetation that exceeds specific size thresholds (i.e., greater than or equal to 12 inches dbh), and vegetation management in restricted areas has exceeded growth expectations, the vegetation in Lower Guadalupe River exceeds the design thresholds; and the District has not been able to conduct all the vegetation management work needed to convey the 100-year flood flow with freeboard under the previous or current SMP.

Current staff actions:

The District is actively exploring options to restore the river to 100-year flow capacity, but there are many challenges ahead. Preliminary assessments indicate that vegetation removal as permitted under the existing SMP alone will not be enough to restore the design conveyance.

Staff's current plan of action is as follows:

1. February/March 2019: investigate options for immediate interim measures, such as temporary flood barriers, that can be taken next winter to contain the 100-year flow.
2. February/March 2019: manage the water level in Lexington Reservoir which flows into Los Gatos Creek and eventually to the Lower Guadalupe River so that flood risk from large storm events, such as 100-year, can be reduced.
3. Summer 2019 (and subsequent years): continue removing sediment deposition and vegetation growth pursuant to current stream maintenance permits.
4. February 2019 to December 2020: conduct an environmental evaluation and request permits from regulatory agencies, such as the U.S. Army Corps of Engineers, the San Francisco Bay Regional Water Quality Control Board, and California Department of Fish and Wildlife, to remove vegetation in alignment with design roughness coefficients to help restore the flow conveyance. Staff will also prepare an alternatives analysis and environmental evaluation of additional measures, such as construction of a floodwall or levee raising to re-establish flow conveyance capacity and freeboard for a 100-year event.
5. December 2020 to March 2021: complete design of additional flood protection features and/or additional vegetation management, obtain regulatory permits for construction, and advertise for construction.
6. June 2021 to December 2022: complete construction of additional flood protection features and/or complete additional vegetation activities.

Since there is a higher flood risk than previously understood, District staff is closely monitoring the river and has taken action to coordinate with the cities of San Jose and Santa Clara regarding the monitoring of water levels and notifications of hot spots along the river during high-flow events.

The District is coordinating with the cities to conduct outreach in the areas at greater risk of flooding than previously known.

Next Steps:

Upon receiving Board approval of the staff recommendation, staff will propose a new project in the FY 2020-2024 Capital Improvement Program that begins in FY 2020 to evaluate possible options to restore design flow conveyance capacity and present a staff-recommended project for Board consideration. It is estimated that an evaluation report with a staff-recommended project will take 9 to 12 months to complete.

FINANCIAL IMPACT:

If approved by the Board, it is anticipated that the project will be included in the FY 2020-2024 CIP and the estimated cost of \$1,000,000 of the evaluation will be funded by the Watershed and Stream Stewardship Fund.

CEQA:

The recommended action does not constitute a project under CEQA because it does not have a potential for resulting in direct or reasonable foreseeable indirect physical change in the environment.

ATTACHMENTS:

*Handout 6.1-A, Location Map

UNCLASSIFIED MANAGER:

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