SHORELINE REGIONAL PARK COMMUNITY RESPONSIBILITIES

Shoreline at Mountain View Regional Park

Shoreline at Mountain View Regional Park (Shoreline) is an approximately 750-acre recreation area and wildlife refuge located in the North Bayshore Area of the City of Mountain View. Shoreline is a unique regional destination offering a wide variety of recreation activities that can be enjoyed alongside protected wildlife species while being located over critical municipal infrastructure, including a closed and regulated landfill. Visitors from Mountain View and the Bay Area visit Shoreline to enjoy an 18-hole golf course (Shoreline Golf Links), 47-acre man-made lake (Shoreline Sailing Lake), two restaurants, a historic home museum (Rengstorff House), kite-flying area, and dog park. In addition, guests of Shoreline take advantage of the approximately nine miles of hiking, jogging, and bike trails that are maintained by the City, which includes a segment of the larger Bay Trail system that connects Sunnyvale to Palo Alto.

Shoreline at Mountain View is celebrating its 40th anniversary in 2023.

Shoreline Wildlife Preservation

The Shoreline Community is responsible for preserving and managing the wildlife habitat in the Shoreline at Mountain View Regional Park and other areas in North Bayshore, such as the Charleston Retention Basin and Shorebird Way egret/heron rookery. These areas greatly contribute to the biodiversity of the region and make North Bayshore a place of ecological significance due to the diversity of species, vegetation, and habitats located there.

Shoreline is the ecological "crown jewel" for Mountain View and the Bay Area, supporting at least 23 special-status species across eight types of habitat. These habitats are found in the various areas of Shoreline, which includes two tidal marshes, Vista Slope and Crittenden Hill, Coast-Casey Forebay, and Charleston Slough. The Charleston Retention Basin is 13 acres of recently restored wetland and riparian habitat that provides a high-quality breeding and foraging environment for many migratory songbirds. The Shorebird Way egret/heron rookery is a unique wildlife area in an otherwise urbanized setting, where a cluster of trees creates a regionally significant habitat as one of the largest egret colonies in the South Bay.

One of the protected wildlife species in Shoreline is the western burrowing owl. Shoreline is home to one of the four remaining successful nesting sites for the burrowing owl in Santa Clara County and is critical to the species' survival. In 2012, the City Council adopted the Burrowing Owl Preservation Plan to ensure continued protection of the species. On March 14, 2023, the City adopted the Shoreline Wildlife Management Plan (Plan) (Exhibit A) to complement the Burrowing Owl Preservation Plan. The Plan provides a practical and adaptive guiding document describing how existing management and maintenance guidelines fit within the Plan's larger framework of goals, interests, and strategies and recommending enhancement projects to further biodiversity in the Shoreline Community.

Sea Level Rise Study

Based on a 2012 sea level rise study, the City has developed a sea level rise program in response to the existing and anticipated future flood vulnerability at the northern part of the City, including areas south of U.S. 101. The San Francisco Bay Area is expected to be one of the most significantly impacted regions from sea level rise in North America. While the City is actively working with regional partners and exploring grant opportunities, there is not enough external funding to meet all jurisdictions' needs. As a result, the external funding sources are usually highly competitive, focus on specific elements and/or geographical areas, have limitations on the number and scope of projects they will support, and typically require cost-sharing. **With uncertainty on the availability and timing of limited external funding and the City's public health and safety responsibilities that include protection from the forces of nature, such as flooding from the Bay and creeks, the City needs to be prepared to fund improvements to protect the community from sea level rise.**

The 2012 sea level rise study projected a range of sea level rise scenarios and the anticipated impact on the Shoreline Community and City and presented a capital improvement program that includes projects such as levee improvements, pump station upgrades, and erosion protection. A range—8" (low) to 31" (high)—of sea level rise scenarios was used because there was, and continues to be, uncertainty about how much sea levels will rise over the study's 55-year planning horizon.

Project concepts and cost estimates were prepared to address both the low and high sea level rise scenarios. The study recommended, and Council approved, project implementation based on a "low-plus" planning scenario under which sea level rise projects would be designed to provide protection from the low projection with simple adaptability to meet the high scenario. For instance, levees would be constructed with a wider base that can accommodate a future increase in height.

With Federal, State, and other local agencies also addressing sea level rise in adjacent jurisdictions, assumptions were included in the study about the City partnering on projects and coordinating mitigation strategies. Examples of such projects include the California State Coastal Conservancy's South Bay Salt Pond (SBSP) Restoration Project (State and Federal), the Permanente Creek Flood Protection Project (Valley Water), and the Palo Alto Flood Basin (Federal, City of Palo Alto). The study estimated the City's cost of the projects to be $46 million (2012 dollars).

The 2012 study recommended a 10-year reassessment of the sea level rise scenarios and projects. The reassessment was completed in 2021 and reflects increased sea level rise estimates of 23" (low) to 42" (high) by 2070. The scope of work has increased for most projects to reflect the higher sea level rise estimates, and several projects have either been revised or added to reflect current developments. On June 22, 2021, Council directed staff to use the "high" sea level

rise protection for planning purposes and to take a number of actions to continue to implement the recommended projects.

The updated cost estimate for the recommended projects is $122 million in year-of-construction dollars. More information about projects with current status and cost estimates is included in Exhibit B. The anticipated inundation without mitigation is shown below in Figure 1. This Figure also shows substantial areas of flood hazard south of U.S. 101, including a portion of Crittenden Middle School.

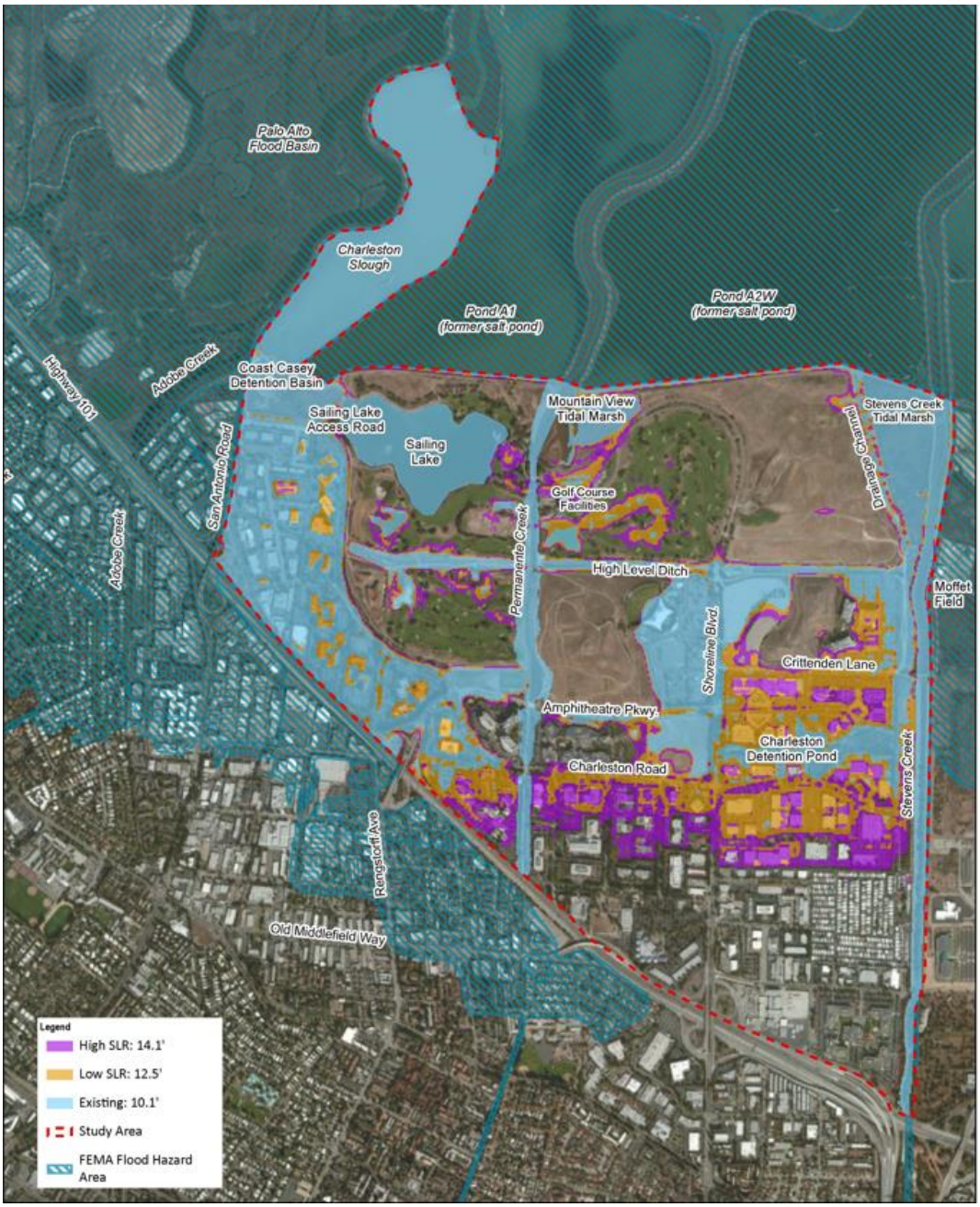

Figure 1: Sea Level Rise Inundation

Landfill Study

The City maintains 439 acres of buried refuse within a 650-acre closed regulatory landfill in and around Shoreline, as shown in Figure 2.

Figure 2: Closed Landfill

The decomposing refuse generates gas (primarily methane, a powerful greenhouse gas) and liquids (leachate), and the City is required by a variety of Federal, State, and local regulations to protect air and water quality from these impacts of the closed landfill. The City is also required by law to demonstrate the financial ability to maintain these protections. The major control systems operated and maintained by the City include the soil cap, which minimizes gas release to the atmosphere; the wells, pipes, and pumps that collect the gas for destruction or use for electric generation; the flare station and two microturbines that destroy the gas; a liquid control system that removes contaminated liquid from the refuse; and a groundwater control system that prevents contaminated groundwater from leaving the site. The 2012 study included other infrastructure in the landfill area, including Shoreline Sailing Lake, Shoreline Boulevard within Shoreline at Mountain View (constructed over refuse that settles, causing roadway damage), and Shoreline Athletic Fields (also constructed over buried refuse).

Funding needs include ongoing maintenance and regulatory compliance as well as capital expenditures for installation and replacement of infrastructure. Because approximately 82% of the refuse was placed by the City as part of the Solid Waste enterprise, this portion of ongoing maintenance is funded through the Solid Waste Fund. The remainder, as well as major capital expenses, are funded by the Shoreline Community.

The 2012 landfill study (which was prepared in 2012 and presented to the City Council in 2013) estimated annual operating costs over a 10-year period, major capital expenses (including beyond the 10-year time frame), and potential financial obligations from unforeseen or catastrophic events. Costs were then allocated between the Shoreline Community and Solid Waste Fund based on current practice. At the time of the 2012 study, annual operating costs allocated to the Shoreline Community were approximately $740,000 in Fiscal Year 2013-14, escalating to approximately $1,530,000 in Fiscal Year 2022-23. Major capital expenditures include replacement of the flares, lake supply pump station, microturbines, and construction equipment as well as reconstruction of Shoreline Boulevard. The flares and construction system have since been replaced, and the microturbine replacement is funded.

Staff recently updated the costs for the landfill major capital projects and schedules for remaining projects identified in the 2012 study. The total estimated cost of the remaining capital projects is $19 million. More information about the 2012 Landfill Study is included as Exhibit C.

North Bayshore Circulation Study

Recent transportation planning in the North Bayshore Area has largely been associated with the preparation (2014) and amendment (2017) of the North Bayshore Precise Plan (NBPP). The NBPP established land use, allowable development, targets for transportation modes, and other key parameters that allowed for detailed planning of transportation infrastructure. The key projects are identified as Priority Transportation Improvements and include a wide variety, including active transportation to convey pedestrians and bicyclists to and through the area, and a limited number of street improvements to eliminate bottlenecks and increase roadway efficiency. Several of these projects are in the design or construction stage, while others have not yet been started.

The North Bayshore Circulation Study, completed in December 2021, addressed transportation issues not fully evaluated in the NBPP and reviewed and updated the NBPP Priority Transportation Improvements. More information is available in the June 8, 2021 and December 7, 2021 Council reports, which are included as Exhibits D and E.

The estimated total cost for the 5-, 10-, and 20-year priority transportation improvements is approximately $487 million. Of this amount, $140 million is already funded, and $132 million is anticipated in impact fees and community benefits paid by developers. **The amount that developers can be required to pay is limited by the nexus study that establishes a reasonable relationship between new development and the needs and costs of the planned improvements.** Per State law, new development can only be required to pay for the share of the

improvements that their development will need to use; they cannot be required to pay for improvements that address existing traffic problems or beyond their fair share for improvements that benefit other users. It is anticipated that $215 million will be needed from the Shoreline Community.

Additional transportation projects that support the Shoreline Community but are not NBPP priority transportation improvements are included in the City's Capital Improvement Program (CIP). Examples of such projects include an adaptive traffic signal system on Rengstorff Avenue, improvements to Stevens Creek and Permanente Creek Trails, upgrades to traffic signals, and other improvements. In addition to the Shoreline Community, funding for these projects is from a variety of sources including grants, City capital funding (Construction/Conveyance Tax and CIP Reserve), and other sources. The total estimated Shoreline Community contribution to these projects is $52 million.

Exhibits:
A. Shoreline Wildlife Management Plan Council Report, Dated March 14, 2023
B. 2021 Sea Level Rise Study Council Report, Dated June 22, 2021
C. 2012 Landfill Study Council Report, Dated February 5, 2013
D. North Bayshore Circulation Study Council Report, Dated June 8, 2021
E. North Bayshore Circulation Study Council Report, Dated December 7, 2021

City of Mountain View

COUNCIL REPORT

DATE: March 14, 2023

CATEGORY: New Business

DEPT.: Community Services

TITLE: **Shoreline Wildlife Management Plan**

RECOMMENDATION

Adopt the 2023 Shoreline Wildlife Management Plan (Attachment 1 to the Council report).

BACKGROUND

The City Council identified the development of a Shoreline Wildlife Management Plan (SWMP or Plan) as an item on the City Council Fiscal Years 2019-21 Work Plan. As part of the Fiscal Year 2020-21 budget process, funding was approved to develop the SWMP, and, after conducting a Request for Proposals (RFP), H.T. Harvey & Associates was selected as the City's consultant in June 2021, largely due to their knowledge and expertise in a wide range of biological and design disciplines required to perform high-quality ecological projects and their experience working in the vicinity of Shoreline at Mountain View (Shoreline) and the surrounding region, which has given them intimate knowledge of the special-status species at Shoreline.

During the development of the City's Fiscal Year 2021-22 Strategic Roadmap, Council created seven strategic priorities, one of which is "Sustainability and Climate Resilience." Under this priority, Council included a project to: "Consolidate and update existing plans into a comprehensive Shoreline Wildlife Management Plan."

Following this direction, the SWMP consolidates existing plans and documents (regional, State, and Federal) that regulate wildlife and habitat at Shoreline into one comprehensive plan that complements the 2012 Shoreline Burrowing Owl Preservation Plan. In addition, the SWMP provides recommendations for future habitat enhancement projects and establishes best practices for landscape and habitat management within the Plan's area.

PUBLIC INPUT PROCESS

As part of the process for developing the SWMP, the consultant, with City staff input, created an annotated outline of the Plan that was based on ecological and environmental data that had been historically collected at Shoreline. The outline provided the sections and subsections of the Plan

along with short descriptions of what information would be conveyed. The document facilitated a robust public input process and helped stakeholders, the public, and the Parks and Recreation Commission (PRC) better understand the purpose and parameters of the SWMP.

PRC Meeting—March 9, 2022

The annotated outline was presented to the PRC on March 9, 2022 and kicked off the public input process for the SWMP. The meeting was held virtually, and key stakeholders were invited to attend and provide initial comments. It was an opportunity for the consultant and staff to further explain the purpose and direction of the Plan while allowing for initial comments and questions that would help develop the next steps of the public input process. Attachment 3 is the memo and annotated outline from that meeting. The PRC, public, and stakeholders were generally supportive of the direction of the SWMP based on the presentation and annotated outline.

Stakeholder Meetings

Following the March 9, 2022 PRC meeting, the consultant and staff virtually met with members of key stakeholder organizations in June and July 2022, including the Audubon Society, Sierra Club, Citizens Committee to Complete the Refuge, GreenSpacesMV, and Urban Wildlife Research Project. Since many of the participants in these meetings had also attended the PRC meeting, the discussions focused on specific topics or feedback and enabled the consultant and staff to learn what additional elements the representatives wanted explored for the Plan as well as an opportunity for the consultant and staff to explain why the outline established specific parameters for the Plan. A number of common themes began to arise, which are summarized later in this report.

Webpage and Survey for the General Public

As part of the public input process, a webpage was created for the general public to learn more about the SWMP and provide feedback through a survey that was posted in July and August 2022. The webpage included a short video summarizing the SWMP with a link to download the annotated outline. The survey had six questions with the final one asking if the individual would be interested in volunteering at Shoreline and to provide their contact information. The survey received 147 responses, and the five-minute video was viewed 460 times. An analysis of the results was provided by H.T. Harvey & Associates to identify the common themes and determine how those correlate to the feedback received from the PRC and stakeholders.

Public Input Trends from PRC, Stakeholders, and the Survey

Through all parts of the public input process, the feedback was positive, and the direction of the SWMP was supported. A recurring theme was to add and expand certain elements of the Plan

due to the important topics that it addresses. In all three parts of the input process, the most common feedback included:

- Expand the boundaries of the Plan's area outside of Shoreline's boundaries by either including specific areas in the North Bayshore or the entire North Bayshore Area in the Plan;

- Expand the size and distance of the corridors in the Plan's area, especially regarding to the major creeks (Stevens Creek and Permanente Creek) that run through the Plan's area;

- Include an additional umbrella species that is not a bird species;

- Include nonprotected species that are special to Shoreline, such as the black-tailed jackrabbit or gray fox; and

- Expand upon the conflicting uses and activities between humans and wildlife, especially regarding infrastructure and maintenance needs, future projects by the City, contractors, or partner organizations, and recreational uses of Shoreline.

In addition, through the PRC and stakeholder meetings, the consultant and staff received substantial feedback to consider:

- Determine metrics, timelines, and priorities for the enhancement projects; and

- Explore ways to educate the public (signage or programs) and engage existing organizations to help with education efforts.

PRC Meeting—February 15, 2023

After conducting the public input process, the draft SWMP was presented to the PRC on February 15, 2023. The PRC was provided the specific changes that were made from the annotated outline based on the feedback that staff and the consultant received. Every stakeholder group that was engaged during the public input process was represented at the meeting. The PRC and the stakeholders generally supported the draft SWMP. Stakeholders provided comments, including a request for more stringent guidelines be placed on human activities, such as maintenance, projects and recreation. Attachment 2 includes related PRC documents from the February 15, 2023 meeting.

The PRC forwarded the following recommendations to the City Council regarding the SWMP:

- Recommend the City Council adopt the SWMP;

- As part of the adoption of the Plan, include an annual update presentation to the PRC; and

- Recommend prioritizing the erosion control project at the Sailing Lake Island.

ANALYSIS

The SWMP focuses on the distinctive aspects that make Shoreline a special place in the City and the South Bay, including the diversity of species, vegetation, and habitats that are currently found at this unique location in Mountain View. The Plan achieves this by reviewing and consolidating the various regulations and codes for wildlife and habitats at Shoreline. It also provides recommendations for best practices for maintenance operations and proposes future projects for habitat and landscape preservation, restoration, or enhancement.

Plan Area

The SWMP examines the species and habitats found within Shoreline as well as two locations outside of Shoreline but within the North Bayshore Area. The two locations outside of Shoreline are the Egret Rookery off Shorebird Way and the Charleston Retention Basin. These two locations were added to the boundaries of the plan area based on the outcomes of the public input process.

The Plan focuses on these three areas because of their unique aspects that differ from the rest of the City regarding species and habitats found there. In addition, the City has the responsibility and control over the maintenance practices and types of projects at these locations as well as the ability to monitor, which will maximize the effectiveness of the SWMP. The Plan acknowledges adjacent restoration and development activities as well as regional implications of biodiversity within Shoreline, but it concentrates the regulations and maintenance and enhancements to within Shoreline and the two nearby areas.

Plan Outline and Purpose by Section

Section 1 of the SWMP provides an overview of the Plan and details how the SWMP fits into a framework of plans, regulations, and goals at Shoreline, such as landfill maintenance requirements or sea level rise considerations.

Section 2 consolidates the existing regulations and codes that govern the management practices of the protected species of plants and animals found within the plan area. While it does not cover every legal precedent and code, the regulatory framework that is provided focuses on the most pertinent Federal, State, and regional regulations and references additional regulations and legal decisions that may also govern individual or smaller numbers of species.

After providing the regulatory framework, Sections 3 through 8 of the Plan provide descriptions and locations of the various species and habitats in the Plan area along with management and enhancement recommendations that will benefit those species. Information, such as the management and enhancement recommendations, is purposely repeated in multiple sections so that an individual does not have to read through the whole document in order to collect all of the information. Staff believes this layout will facilitate use of the document by the public, contractors, staff, and community partners when trying to obtain information from the SWMP.

Sections 3 through 5 provide overviews of the types of habitat and species found in the plan area. Section 3 provides a summary of each habitat's location, vegetation, wildlife, and management recommendations. This Section is intended for readers who are interested in specific habitat or specific location of the plan area. Section 4 summarizes the special-status species in the plan area that fall under the management dictated in Section 2's regulatory framework. Table 1 in Section 4 is intended to be used with Sections 2 and 3 so that a reader can correlate habitats to species and the regulatory framework. Then, since avian species are so prevalent and diverse within the plan area, Section 5 focuses on the specifics around nesting activity and how that interrelates with habitats, human activity, and developed areas (buildings) in the plan area.

Section 6 provides five umbrella species that represent the various types of habitat found at Shoreline. While Section 3 focuses on summarizing the habitats, Section 6 explains how species benefit from the various habitats and ties the benefits of habitat enhancement and management more directly to wildlife and details how the same recommendations can benefit these species. Each umbrella species is meant to serve as a representative for the other species that benefit from the habitat and enhancements. They are not the sole focus of projects and maintenance practices but demonstrate more clearly how the SWMP will benefit species in the plan area. Throughout the public input process, a recurring theme was the desire to add a fifth umbrella species that was not an avian (bird) species. Therefore, a fifth species, the monarch butterfly, was added to the SWMP, which is an invertebrate representing the grasslands habitat. This habitat was originally not represented in Section 6 because it is extensively covered in the 2012 Burrowing Owl Preservation Plan. However, the consultant and staff agreed with the feedback that a fifth species representing grasslands habitat is still important to address in the SWMP while referencing the 2012 Burrowing Owl Preservation Plan. Given recent concerns about western monarch butterfly populations and that conservation efforts for this species are already under way at Shoreline, the monarch butterfly was a good candidate for addition as a nonavian umbrella species. Section 7 discusses the management of invasive and nuisance species as well as pathogens that may adversely affect the species and habitats at Shoreline.

While Sections 3 through 7 provide information about the interrelation between species and habitats and the benefits of habitat management and enhancements, Section 8 focuses on the actual management, enhancement, and restoration opportunities by providing the prioritization and details of those opportunities. Through the public input process, it was recommended that timelines and measurable results be included with the enhancement and restoration projects.

Due to the extensive permitting, coordination, and resources needed for some of these opportunities, the SWMP provides a prioritization of projects rather than specific timelines.

The implementation of these recommendations are viewed in three types of activities or projects. The first group is maintenance and management practices that staff are already following. The SWMP puts the practices into writing for the various habitats not covered by the 2012 Burrowing Owl Preservation Plan. The second group of activities and projects are achievable with current funding, resources, and volunteer groups, such as some of the landscaping or habitat restoration projects. An example of this Group 2 project is the pollinator habitat being installed in Shoreline through the Mayor's Monarch Pledge. The third group of activities and projects are the long-term projects that may require permitting, engineering, design, and construction considerations. Since all of the opportunities in Section 8 are important, the prioritization indicated in the SWMP details the workload and timing considerations rather than level of importance. In addition, as habitat enhancements and restoration projects are pursued, their success will be measured through current and additional monitoring. The information from this monitoring will be provided annually to the PRC.

Section 9 of the SWMP addresses wildlife connectivity and the important corridors within the Plan area. Because the majority of wildlife corridors within the Plan area are comprised of one of the types of habitat already addressed in the Plan, Section 9 details corridor locations in conjunction with Section 3 for projects and opportunities for enhancement. One recurring theme that arose during the public input process but was not included in the SWMP was the desire to include Stevens Creek and Permanente Creek in the North Bayshore Area or further. The consultant and staff reviewed inclusion of these important corridors but limited their inclusion to Stevens Creek Tidal Marsh and the section of Permanente Creek within Shoreline for two reasons. First, these waterways require extensive permitting and coordination with multiple stakeholders for any maintenance work or projects. Because they are ultimately the responsibility of another organization, the City did not want to dictate the activities for these waterways. Secondly, the habitat and wildlife within the creeks would greatly increase the scope of the SWMP to a level believed to be ineffective for the desired goals of the SWMP.

Lastly, Sections 10 through 12 focus on the management practices of staff, contractors, and other organizations that work and conduct projects within the Plan's area. These sections also highlight the maintenance and projects required for infrastructure, buildings, and recreation areas that are required within the Plan area and details the processes to follow to minimize impacts on wildlife and habitat. Sections 11 and 12 reflect information and practices that are already adopted through the 2012 Burrowing Owl Preservation Plan.

Reporting and Adaptive Management

The SWMP summarizes and identifies the annual reporting requirements that are already being conducted as required by regulatory agencies. The SWMP will not create new reporting

requirements but, rather, clarifies the framework with which current reporting can measure the effectiveness of habitat management and monitoring at Shoreline. Through this annual reporting, the City will be able to determine if additional or modified practices or projects are needed in the Plan's area. In addition, as regulations are updated, new management practices are implemented, and grant opportunities and projects with community partners arise, it is anticipated that the SWMP will be updated. Therefore, the sections and layout of the Plan are designed to be adaptive.

Based on direction from the PRC, staff will provide a presentation annually reflecting the information from the monitoring and annual reporting.

FISCAL IMPACT

The Community Services Department was provided $60,000 in funding to create the SWMP as part of the Fiscal Year 2020-21 Adopted Budget. This funding was encumbered in Fiscal Year 2020-21; therefore, no additional appropriation is needed. Based on the landscape, restoration, and management opportunities that are identified in the SWMP, staff is not recommending an additional budget at this time. If a future project requires extra resources, staff will request that one-time funding through the Capital Improvement Program to be paid by the Shoreline Fund. In addition, the City is exploring grant opportunities and partnerships with organizations that may provide volunteers and additional resources in order to achieve some of the proposed projects.

CONCLUSION

The Shoreline Wildlife Management Plan is an item on the City Council Strategic Work Plan to consolidate existing regulations governing habitat and wildlife in Shoreline at Mountain View, the North Bayshore Egret Rookery, and the Charleston Retention Basin. The SWMP also provides recommendations for the management and enhancement activities and projects to benefit the species and habitats in the plan area. The SWMP was developed after an extensive public input process by staff and the consultant, and the final SWMP provides valuable information for the public, staff, contractors, and community partners. Upon adoption by City Council, the Plan will complement the 2012 Burrowing Owl Preservation Plan and will be used within a framework of plans and regulations that govern Shoreline to help maintain and enhance habitat while achieving other goals such as recreation uses, infrastructure needs, and landfill preservation.

ALTERNATIVES

1. Do not adopt the Plan.

2. Provide feedback to the consultant and staff and request the Plan be brought back with changes to either the PRC or City Council.

3. Provide other direction to staff.

PUBLIC NOTICING

Agenda posting and shared on City's webpage dedicated to Shoreline Wildlife Management Plan. A copy of this report was provided to stakeholder groups engaged in the public input process.

Prepared by:

Brady Ruebusch
Shoreline Manager

Brenda Sylvia
Assistant Community Services Director

Approved by:

John R. Marchant
Community Services Director

Kimbra McCarthy
City Manager

BR-BS/AF/6/CAM
240-03-14-23CR
202503

Attachments:
1. Draft 2023 Shoreline Wildlife Management Plan
2. February 15, 2023 Parks and Recreation Commission Meeting Items
3. March 9, 2022 Parks and Recreation Commission Meeting Items

COUNCIL REPORT

CITY OF MOUNTAIN VIEW

DATE: June 22, 2021

CATEGORY: New Business

DEPT.: Public Works

TITLE: **2021 Shoreline Sea Level Rise Study Update, Project 21-54**

RECOMMENDATION

1. Direct staff to use the high sea level rise risk level for the City's sea level rise planning, Capital Improvement Program, and funding efforts.

2. Direct staff to proceed with the next steps presented in this Council report.

BACKGROUND

The City of Mountain View lies on the alluvial plain of Santa Clara Valley with the ground surface descending from the hills south of the City to the San Francisco Bay (Bay). The area north of U.S. 101, including the North Bayshore Area, is a low-lying area and is subject to flooding due to stormwater runoff and high tides and is, therefore, sensitive to sea level rise impacts (Figure 1).

Even without sea level rise, some properties in the area are within the Federal Emergency Management Agency's (FEMA's) 100-year special flood hazard zone and subject to special construction and insurance requirements.

Figure 1: North Bayshore Area Map

North Bayshore Area—Existing Flood Risk

Flood risk for the area north of U.S. 101 is presented from three water bodies: the Bay from the north, Permanente Creek from the west, and Stevens Creek from the east. Each is discussed briefly below.

San Francisco Bay

North of Shoreline at Mountain View Regional Park, the City is bounded by three ponds that were constructed for salt production. One pond (Charleston Slough) was purchased by the City for wetland restoration. The other two ponds (Pond A1 and Pond A2W) are owned by the United States Fish and Wildlife Service (USFWS) and are part of the South Bay Salt Pond Restoration Project (Salt Pond Project) that is being managed by the California State Coastal Conservancy. Limited coastal flood and sea level rise protection are provided by the levees that surround these ponds, which are not constructed to the standards required for certification by FEMA.

The outer (Bay-side) levees will be breached as part of the Salt Pond Project, increasing wave action and potential erosion along the City's Bay front. The Salt Pond Project will also bolster the levees along Ponds A1 and A2W with installation of a gently sloped upland Habitat Transition Zone from the City's landfill towards the Bay. The Habitat Transition Zone will provide habitat for marsh wildlife as well as wave energy attenuation that will protect the levees.

Charleston Slough lies between Pond A1 and the Palo Alto Flood Basin (PAFB) and is protected from the Bay by an outboard levee, with tide gates regulating the flow of Bay water to the slough. The City has the following three management objectives at Charleston Slough:

1. Tidal Marsh Restoration: When the City acquired Charleston Slough from the Leslie Salt Company in 1980, the City inherited a mitigation requirement from the San Francisco Bay Conservation and Development Commission (BCDC) to restore 53 acres of tidal marsh within the parcel. The restoration effort has been challenging, and the City is working with BCDC on the effort.

2. Water Supply for the Sailing Lake: The Sailing Lake intake pump station, located at the southern limit of the slough, provides water supply to the Sailing Lake to maintain the lake water quality.

3. Flood Management: The levees along the southern edge of Charleston Slough and along the western edge of Charleston Slough are low and, therefore, provide limited protection. The tide gates and levees around Charleston Slough provide some level of flood protection but are not sufficient under anticipated sea level rise conditions. The existing floodplain in North Bayshore is connected to the floodplain of the City of Palo Alto and the PAFB. Therefore, any coastal flood risk management measures will need to connect and be coordinated with improvements along PAFB in order to provide continuous protection along the shared shoreline between the two cities.

Permanente Creek

The Permanente Creek levees are not accredited by FEMA, and some areas within North Bayshore are subject to flooding from Permanente Creek. In recent years, Valley Water's (formerly Santa Clara Valley Water District) Permanente Creek Flood Protection Project improved sections of floodwalls and levees along Permanente Creek between U.S. 101 and Shoreline at Mountain View, but additional levee improvements are needed for anticipated sea level rise conditions.

Stevens Creek

Levees exist on both sides of Stevens Creek from U.S. 101 to Crittenden Lane, protecting Mountain View to the west and Moffett Field/Sunnyvale to the east. These levees were accredited by FEMA as providing protection from the 100-year flood event under existing conditions. Additional improvements are needed for the levees north of Crittenden Lane that were not accredited by FEMA to protect against existing and anticipated sea level rise conditions.

2012 Sea Level Rise Study

In 2012, in response to the existing flood risk for the North Bayshore Area and the anticipated sea level rise risk, the City developed the Shoreline Regional Park Community Sea Level Rise Study Feasibility report and Capital Improvement Program report (2012 Study). The 2012 Study proposed a sea level rise planning horizon of Year 2067, projected the future water surface elevations at the Bay with both high and low sea level rise projections under a 100-year event, estimated the coastal flood vulnerabilities in North Bayshore, and developed a Sea Level Rise Capital Improvement Program (CIP) to address the existing and the projected Year 2067 coastal flood risk.

Recognizing that there is some uncertainty regarding how much the sea level will rise, the 2012 Study adopted the following two scenarios to bracket the low and high ends of the range.

- Low Sea Level Rise. Eight inches (8″) of sea level rise between 2000 and 2067 (1% still water level = 11.3′ North American Vertical Datum (NAVD)).

- High Sea Level Rise. Thirty-one inches (31″) of sea level rise between 2000 and 2067 (1% still water level = 13.2′ NAVD).

The 2012 Study recommended, and Council approved, project implementation based on a "Low-Plus" planning scenario under which Sea Level Rise CIP projects will be designed to provide protection from the Low projection (8″ of sea level rise) with simple adaptability to meet the High scenario. For instance, levees would be constructed with a wider base that can accommodate a future increase in height. Each scenario is shown diagrammatically in Figure 2.

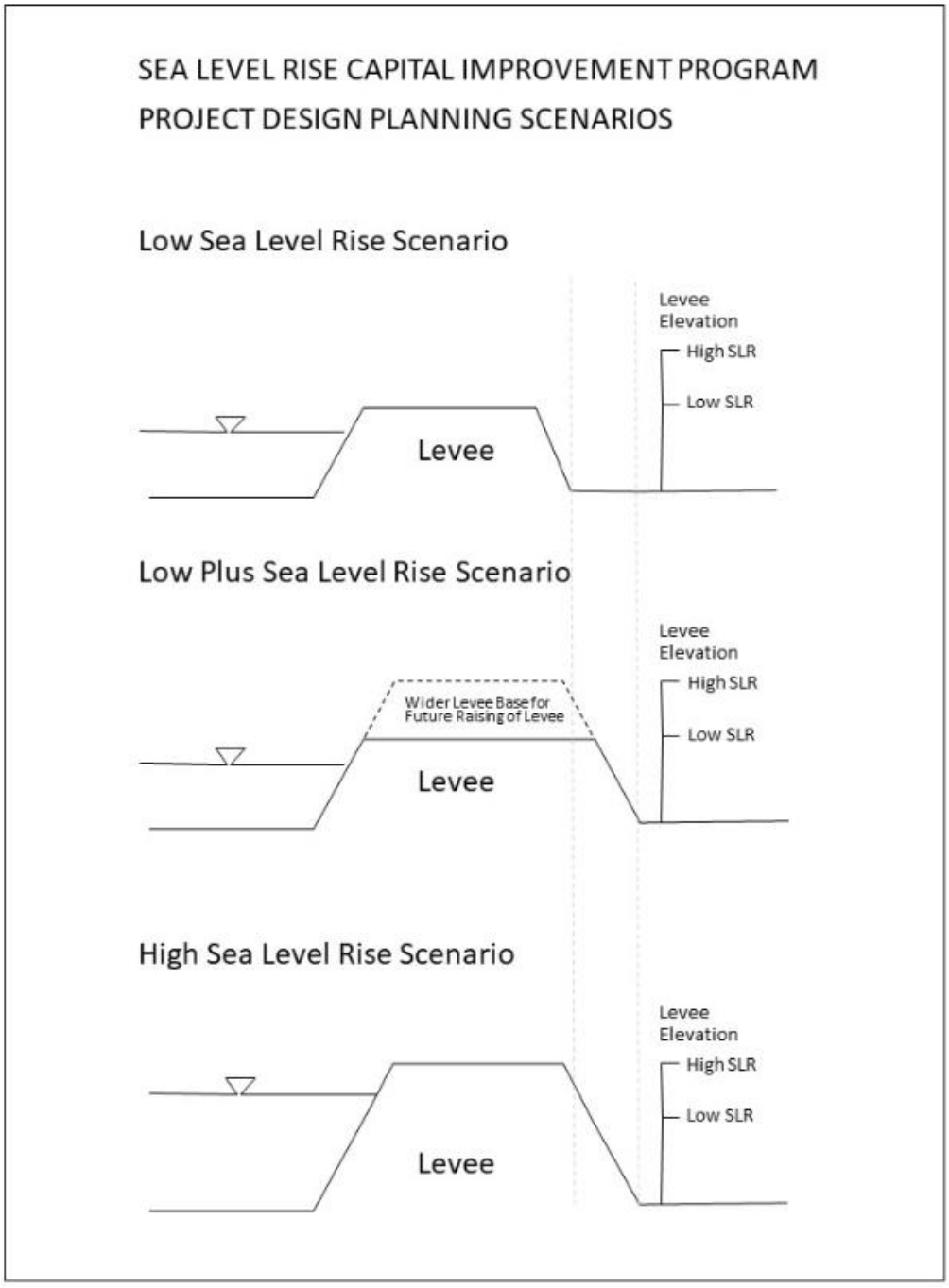

Figure 2: Sea Level Planning Scenarios

The Sea Level Rise CIP includes 12 projects to address impacts from sea level rise, primarily improvements to levees and pump stations (see Table 1). The 2012 estimate value of the 12 Sea Level Rise projects was $45.7 million.

Table 1: Sea Level Rise CIP Projects from 2012 Study

2012 Study Project Number	Project	Coastal Flooding	Coastal Erosion	Fluvial Flooding	Infrastructure Reliability	Interior Drainage	Sea Level Rise Planning	Low Plus Sea Level Rise Scenario Estimated Cost ($ in millions in 2012 value)
1	Charleston Slough and PAFB Levee Improvement	X						$15.53
2	Coast-Casey North Levee Improvement	X	X					$3.54
3	North Landfill Erosion Protection		X					$9.61
4	Permanente Creek Levee and Floodwall Improvements			X				$5.53
5	Golf Course Facilities High Ground Augmentation	X						$3.63
6	Lower Stevens Creek Levee Improvements	X		X	X			$1.49
7	Coast-Casey Pump Station Improvement					X		$2.32
8	Lower Permanente Creek Storm Drain Improvements					X		$2.61
9	Sailing Lake Access Road Improvement				X			$0.17
10	Sailing Lake Intake Pump Station Modification				X			$0.69
11	Charleston Slough Tide Gate Improvement	X			X			$0.06
12	Sea Level Rise Assessment						X	$0.50
TOTAL PLANNING LEVEL COST ESTIMATE								**$45.67**

The North Bayshore Precise Plan incorporated the sea level rise considerations from the 2012 Study into land use planning design guidelines. It includes levee design, storm drainage improvements, and the minimum finished floor elevation in the low sea level rise inundation zone to account for sea level rise.

Regional Planning Efforts

Staff has been coordinating closely with members of other agencies working on regional efforts that affect the City's sea level rise mitigation efforts.

Phase II of the Salt Pond Project will restore Pond A1 and Pond A2W to tidal marshes and reestablish tidal flow connection with South San Francisco Bay by breaching segments of outboard levees. The proposed gently sloped Habitat Transition Zone will reduce erosion risk along the City shoreline, which is a vulnerability under anticipated sea level rise conditions. The design of the improvements to Pond A2W is 90% complete, and staff is working with the Salt Pond project team to complete design, project agreements, and logistics of hauling a significant amount of soil for construction of the Habitat Transition Zone. Construction is scheduled to start in summer 2021, with material hauling through Shoreline at Mountain View to stockpile soil in Pond A2W. The final design and the project agreements are anticipated to be complete before the end of 2021, which will be followed by full construction work at Pond A2W.

Staff has also been coordinating with the United States Army Corps of Engineers (USACE), Valley Water, the City of Palo Alto, and other agencies on the South San Francisco Bay Shoreline Project (Shoreline Project) at the PAFB. Led by USACE, the project team is currently working on environmental clearance and studying the feasibility of various options. The option chosen will affect the City's plans for protection in this area, so close coordination is warranted.

Table 2 provides the status of the City's 2012 Sea Level Rise CIP projects, and how they relate to the Salt Pond Project and Shoreline Project.

Table 2: 2012 Sea Level Rise CIP Project Status

Project		Status
Projects that are City-led and independent of Salt Pond Project and Shoreline Project		
4	Permanente Creek Levee and Floodwall Improvements	Pending, future project.
5	Golf Course Facilities High Ground Augmentation	Pending, future project.
6	Lower Stevens Creek Levee Improvements	In design, estimated construction start in 2024.
8	Lower Permanente Creek Storm Drain Improvements	Pending, future project.

Project		Status
9	Sailing Lake Access Road Improvement	Design is completed. Construction scheduled to start in fall 2021 and complete early 2022.
12	Sea Level Rise Assessment	In progress.
Projects coordinated with Salt Pond Project		
2	Coast-Casey North Levee Improvement	In design, estimated construction start with Pond A1.
3	North Landfill Erosion Protection	In analysis, coordinating with Salt Pond team on project timing and phasing.
10	Sailing Lake Intake Pump Station Modification	In design, estimated construction to start with Project 2—Coast-Casey Levee Improvement.
Projects to be coordinated with Shoreline Project		
1	Charleston Slough and PAFB Levee Improvement	Pending, project need and project scope depend on PAFB improvement plan.
7	Coast-Casey Pump Station Improvement	Pending, project scope depends on PAFB improvement plan
11	Charleston Slough Tide Gate Improvement	Tide gate repair proceed in Fiscal Year 2021-22, long-term improvements depend on PAFB improvement plan and Charleston Slough mitigation project.

ANALYSIS

Since 2012, projections for sea level rise have been updated and regional planning efforts have progressed.

Updated Sea Level Rise Scenarios

The latest update by the California Ocean Protection Council's State of California Sea-Level Rise Guidance 2018 Update (OPC 2018 Guidance) provides new estimates and planning resources for coastal communities to develop strategies to address sea level rise adaptation.

The OPC 2018 Guidance projected a 66% probability that the sea level rise in Year 2070 will be at or below 23" and considered this to be a low risk aversion scenario. It also projected a 0.5% probability that the sea level rise in 2070 will be at or above 42" and considered this to be a medium-to-high risk aversion scenario. The increased sea level rise projection is a reflection of the increasing rate of ice loss from Greenland and the Antarctic ice sheets, improved scientific understanding and modeling of sea level rise, and change in sea level rise with consideration of different greenhouse gas emissions scenarios.

Based on the updated sea level rise projections and their estimated exceedance probabilities, the low and high ends of the sea level rise scenarios are updated as follows:

- Low Sea Level Rise. Twenty-three inches (23") of sea level rise between 2000 and 2070 (1% still water level = 12.5' NAVD).

  2012 Study: Eight inches (8") of sea level rise between 2000 and 2067 (1% still water level = 11.3' NAVD).

- High Sea Level Rise. Forty-two inches (42") of sea level rise between 2000 and 2070 (1% still water level = 14.1' NAVD).

  2012 Study: Thirty-one inches (31") of sea level rise between 2000 and 2067 (1% still water level = 13.2' NAVD).

With the latest projections, the planning year has been updated from 2067 to 2070, which equates to an approximately 50-year planning horizon and is in line with the sea level rise projection time steps presented in the OPC 2018 Guidance.

Updated Sea Level Rise Study

With new sea level rise projections, information available from the City's 2019 Storm Drain Master Plan and progress on the City's and regional efforts, staff updated the 2012 Study by reanalyzing sea level rise impacts to the City and updating the CIP project list.

In this sea level rise study update, it is assumed the Salt Pond Project will proceed as planned, but the analysis did not include implementation of the regional Shoreline Project (unless noted) due to the uncertainties related to that project's scope, timing, and funding.

The sea level rise study update mapped the 100-year coastal floodplain under existing conditions and the two projected sea level rise scenarios (Figure 3). Based on this new

analysis, the scope and cost estimate of each project in the 2012 Study are updated under two scenarios:

- Low-Plus Sea Level Rise Scenario: Improvements to provide 100-year flood protection with 23" of sea level rise by Year 2070, but with a wider levee base sized for the high sea level rise scenario so additional fill can be more easily added at a later time.

- High Sea Level Rise Scenario: Improvements to provide 100-year flood protection with 42" of sea level rise by Year 2070.

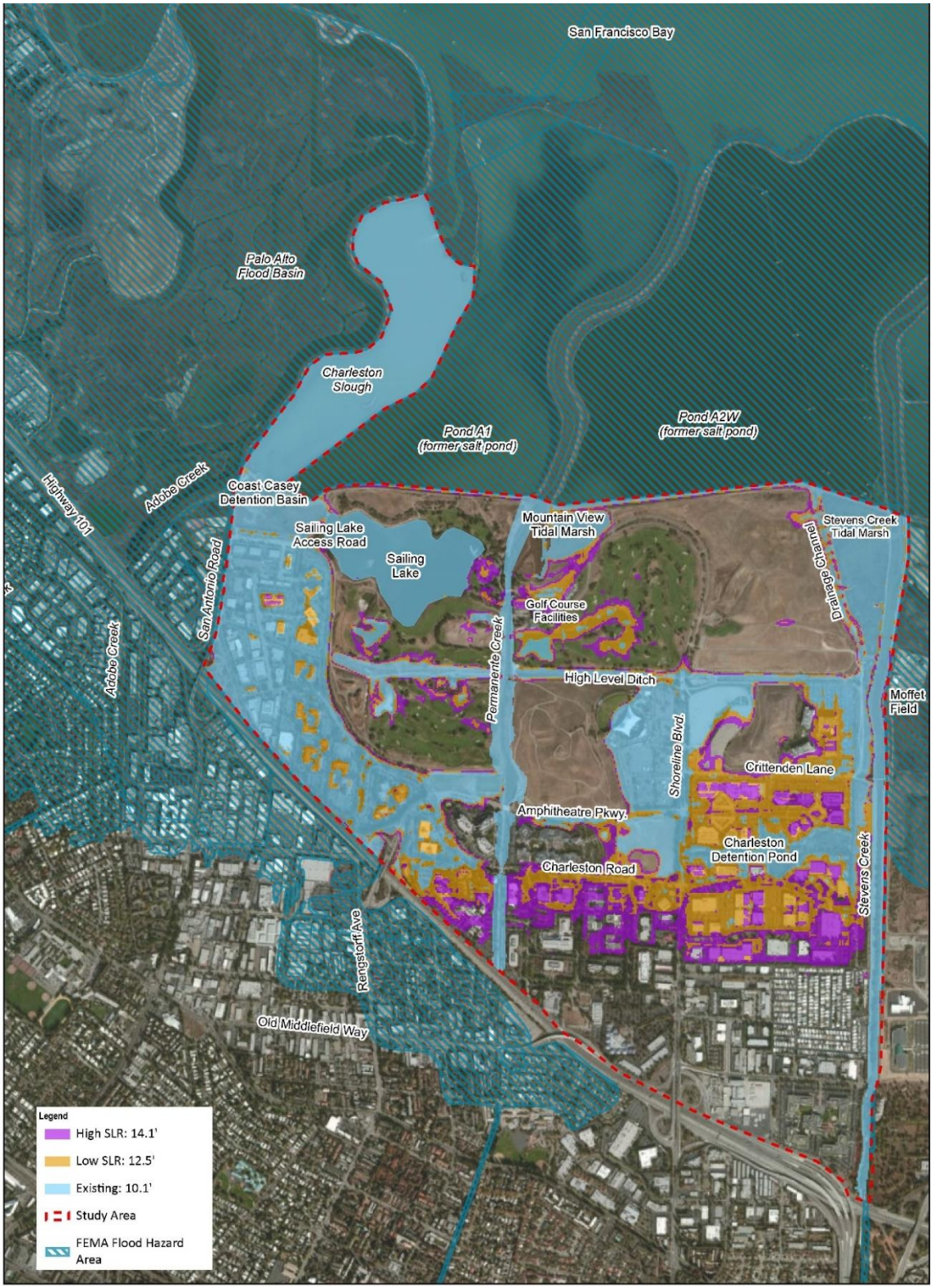

Figure 3: Year 2070 Projected Sea Level Rise Inundation Map

The updated 2021 Sea Level Rise CIP projects are shown in Figure 4 and Table 3. In general, the updated Sea Level Rise CIP has a similar list of projects, but the scope of work has increased for most projects due to the higher sea level rise projections and design elevations. Construction cost estimates have increased accordingly. Two new projects have been added, and additional modifications to the scopes of some projects are made, as described below.

- Project 11: Charleston Slough Tide Gate Improvement is updated, and the scope of work will be expanded to include the mitigation requirements to meet the BCDC tidal marsh vegetation requirements in Charleston Slough. Project 11 will be renamed "Charleston Slough Mitigation Project."

- Project 12: Sea Level Rise Assessment and Monitoring is updated to include an important element to monitor sea level rise impacts to the North Bayshore Area and City infrastructure and will develop a series of performance-based criteria to plan and schedule the implementation of specific Sea Level Rise CIP projects.

- A new Project 13: Crittenden Pump Station Improvement is added. Based on recommendations from the 2019 Storm Drain Master Plan, this project will decommission the Charleston Pump Station and route stormwater flow from the Charleston Detention Basin to Crittenden Pump Station. This project will improve the interior drainage system and provide a single discharge to Stevens Creek.

- A new Project 14: As-needed Storm Drain Improvements is added. This project provides as-needed interior drainage improvements, such as backflow prevention at the creek outfalls to address potential sea level rise impacts.

The updated 2021 Sea Level Rise CIP planning level program cost estimate in 2021 dollars is as follows:

- Low-Plus Sea Level Rise Scenario = $86.7 million

- High Sea Level Rise Scenario = $96.6 million

Figure 4: 2021 Sea Level Rise Capital Improvement Program Projects

Staff recommends updating the City's sea level rise planning guidance to the new High Sea Level Rise scenario, with 42" of sea level rise by Year 2070 for the following reasons:

- Considering that this is a regional challenge, using design parameters that are consistent with other local projects is recommended. Both the Salt Pond Project and Shoreline Project use this scenario for project planning and design. The California Ocean Protection Council Strategic Plan to Protect California's Coast and Ocean 2020-2025 outlined a target to ensure California's coast is resilient to at least 3.5' (42") of sea level rise by 2050.

- The sea level rise projection has been trending up with each revision. Research in this field will continue, and staff does not anticipate that estimates will be reduced.

Table 3 provides the updated Sea Level Rise CIP projects with planning level cost estimates for the High Sea Level Rise Scenario. Also provided are estimated time frames for project implementation.

Table 3: Updated Sea Level Rise CIP Project Budget Timeline

Project		Estimated Cost ($ in millions)*			
		Total	**5 Year**	**10 Year**	**10+ Year**
1	Charleston Slough and PAFB Levee Improvement	$30.98			$43.7
2	Coast-Casey North Levee Improvement	$6.93	$4.9	$2.5	
3	North Landfill Erosion Protection	$4.91	$2.9	$2.3	
4	Permanente Creek Levee and Floodwall Improvements	$7.35			$10.4
5	Golf Course Facilities High Ground Augmentation	$4.05			$5.7
6	Lower Stevens Creek Levee Improvements	$9.01	$7.2	$2.1	
7	Coast-Casey Pump Station Improvement	$6.39	$1.3	$6.1	
8	Lower Permanente Creek Storm Drain Improvements	$6.72			$9.5
9	Sailing Lake Access Road Improvement	$2.68	$2.7		
10	Sailing Lake Intake Pump Station Modification	$2.40	$0.5	$2.3	
11	Charleston Slough Restoration	$4.22	$3.4	$1.0	
12	Sea Level Rise Assessment and Monitoring	$0.50		$0.6	
13	Crittenden Pump Station Improvement	$7.30	$1.5	$6.9	
14	As-needed Storm Drain Improvements	$3.17			$4.5
COST ESTIMATE AT EACH PLANNING TIME STEP		**-**	$24.3	$23.8	$73.7
TOTAL COST ESTIMATE IN PRESENT VALUE		**$96.61**	$24.3	$20.1	$52.3

* The Total and 5-Year Estimated Costs are based on present value. The 10-Year and 10+ Year Estimated Costs are based on 2026 and 2031 future value, respectively, using a 3.5% annual rate.

Staff will continue to cooperate with other agencies that are studying or implementing projects associated with sea level rise to ensure common analysis and develop cost-effective solutions for the City and other agencies.

NEXT STEPS

Staff proposes the following next steps for sea level rise planning for the City:

- Update the design criteria of the existing Sea Level Rise CIP projects that are currently in progress based on the 2070 High Sea Level Rise planning scenarios, where feasible.

- For the pending and upcoming Sea Level Rise CIP projects, prepare feasibility analysis and develop performance-based criteria to prioritize the projects and develop an implementation plan and schedule.

- Assess potential changes in long-term groundwater impacts due to sea level rise, especially the need to revisit its potential effects to the closed landfill operation at Shoreline at Mountain View.

- Develop recommendations to update the City policy on sea level rise adaptation.

- Continue to participate and collaborate on regional planning efforts and projects.

- Identify additional funding sources for Sea Level Rise CIP implementation.

- Monitor sea level rise impacts to the City and update the Sea Level Rise CIP in five years.

FISCAL IMPACT

This study does not have an immediate financial impact. However, it is anticipated that over the ensuing years, it may be necessary to issue long-term debt to fund a number of significant capital projects. Individual projects are funded through the City's CIP.

The recommended updated list of Sea Level Rise CIP projects is estimated to cost $121.8 million in year-of-construction dollars. Of this amount, $11 million is currently funded in the CIP. Although staff will continue to seek outside funding sources and partnering opportunities, it is anticipated that the Shoreline Regional Park Community Fund will be the primary source for the remaining $110.8 million required to complete the projects.

CONCLUSION

The 2021 Shoreline Sea Level Rise Study Update provides a framework to plan the projects required to manage the flood risk to the City due to projected sea level rise. Under the High Sea Level Rise scenario, the overall planning level program cost is estimated at $96.6 million in present value ($121.8 million in year of construction dollars). While there are opportunities to reduce the City's share via collaboration with regional projects, cost-sharing, and grant funding, there are uncertainties on these funding sources. There are also uncertainties associated with sea level rise planning, including the projection and timing of sea level rise, scope, funding, and timing of regional projects that would affect the City's planning efforts.

Coordination with other agencies is essential because the coastal floodplain in North Bayshore is connected across jurisdictional boundaries. Staff will continue to implement projects that are under way, prioritize and recommend projects for funding as appropriate, and continue to seek outside funding sources and partnering opportunities.

ALTERNATIVES

1. Direct staff to modify this report.

2. Provide other direction.

PUBLIC NOTICING—Agenda posting.

Prepared by:

Raymond Wong
Senior Project Manager

Lisa Au
Assistant Public Works Director

Approved by:

Dawn S. Cameron
Public Works Director

Kimbra McCarthy
City Manager

RW-LA/EP/6/CAM
931-06-22-21CR-1
200460

cc: CSD, APWD—Arango, SMA—Doan, F/c (21-54)

DATE: February 5, 2013

TO: Honorable Mayor and City Council

FROM: Michael A. Fuller, Public Works Director

VIA: Daniel H. Rich, City Manager

TITLE: **Shoreline Landfill Master Plan**

STUDY SESSION MEMO

CITY OF MOUNTAIN VIEW

PURPOSE

The purpose of this Study Session memorandum is to: (1) summarize the findings of the Shoreline Landfill Master Plan and provide an overview of the estimated long-term funding obligations for the landfill; and (2) obtain Council direction on incorporating funding strategies for ongoing landfill operations and maintenance, and capital costs into the Fiscal Year 2013-14 budget and 10-year projections.

The Shoreline Landfill Master Plan estimates that routine operations and maintenance costs will range from the current annual expenditure of $3.1 million to $4.3 million in 2022-23, and that replacement capital costs for nonroutine periodic will total $1.9 million over the same time period.

BACKGROUND

In March 2011, the City committed to perform three studies to assess long-term obligations for the Shoreline Regional Park Community. The studies address transportation and circulation improvements, protection from flooding associated with sea level rise, and postclosure landfill management responsibilities. This Study Session memorandum summarizes the findings of the Shoreline Landfill Master Plan, which studied postclosure landfill obligations. The Master Plan is available online at *http://laserfiche.mountainview.gov/Weblink/ElectronicFile.aspx?docid=64137&dbid=0*.

The City maintains 439 acres of buried refuse located at three sites in the North Bayshore Area: the 544-acre site (containing 350 acres of waste) and the Vista site (65 acres of waste) in Shoreline at Mountain View; and the Crittenden site (24 acres of waste) located near the intersection of Crittenden Lane and Shoreline Boulevard (see Attachment 1—Location Map). The sites ceased receiving waste in 1981, 1993, and 1988 respectively. A large portion of the 544-acre site is covered by the Shoreline Golf Links;

the Vista site includes the Shoreline Amphitheatre and open space, and the Crittenden site is comprised of open space and parking.

The decomposing refuse generates gas (primarily methane) and liquids (leachate), and the City is required by a variety of Federal, State, and local regulations to protect air and water quality from impacts of the closed landfill. The City is also required by law to demonstrate certain financial ability to maintain these protections. The major control systems operated and maintained by the City include:

- The landfill cap, consisting of layers of dirt and clay, and designed to minimize gas emissions to the atmosphere, minimize stormwater infiltration into the refuse, maintain stormwater drainage, and isolate waste from the ground surface.

- A gas collection and control system, which collects and transports gas generated by decomposing refuse to the Shoreline Flare Station, two microturbines the City uses to generate electricity, and power-generating facilities at nearby Google sites.

- The Shoreline Flare Station, which incinerates landfill gas to destroy toxics and minimize greenhouse gas emissions.

- A liquid collection system, which collects and pumps leachate from the landfill cells to the City's sanitary sewer for treatment at the Palo Alto Regional Water Quality Control Plant.

- A groundwater migration control system, which ensures groundwater flows toward the landfill to minimize groundwater contamination by leachate. The groundwater is collected and sent to the Palo Alto Regional Water Quality Control Plant for treatment or discharged to surface water, depending on the composition of the water and regulatory requirements.

In addition to landfill-specific operations, the study includes analyses of the Sailing Lake, the Shoreline Lake Supply Pump Station, Shoreline Boulevard (within Shoreline at Mountain View), the sewage pump station, stormwater pump stations, and the irrigation pump station (which supplies irrigation water to the golf course), and maintenance of the athletic field site (which has been approved but is not yet constructed). Although not associated with postclosure operations, the cost of operating and maintaining the Sailing Lake, the Shoreline Lake Supply Pump Station, and Shoreline Boulevard are funded from the Shoreline Community Fund. These facilities may also be affected by regulatory changes, nonroutine events, or impacted by ongoing landfill operations. Costs for the sewage pump station, stormwater pump

stations, and the irrigation pump station are not included in long-term funding estimates as costs for these facilities are charged to utility enterprise funds.

Funding of Maintenance and Operations Costs

Landfill Postclosure operations are funded from both the Solid Waste Fund and Shoreline Community Fund. Operation and maintenance costs for the 544-acre and Vista sites are funded from the Solid Waste Fund as revenue from previous landfilling operations at these sites was allocated to the Solid Waste Fund to benefit rate payers. The City did not deposit refuse at the Crittenden site (all waste was deposited while the site was held by previous owners), and operating costs have been charged to the Shoreline Community Fund. The split in operating cost based on current practice is approximately 82 percent Solid Waste Fund (544-acre and Vista sites) and 18 percent Shoreline Community Fund (Crittenden site). Major capital project costs for the landfill sites are funded from the Shoreline Community Fund. A $23 million Shoreline Community bond issue in 1993 funded replacement of most of the gas system at the landfill, groundwater extraction systems, and construction of the surface caps on the Vista and Crittenden sites.

This current funding strategy was used to allocate future costs between the Solid Waste Fund and the Shoreline Community Fund in the long-term budget presented in Attachment 2, which details annual costs allocated to each fund from Fiscal Year 2013-14 through Fiscal Year 2022-23. Budgets for future years have been increased at an inflationary rate of 3.5 percent. Budgets from Fiscal Year 2023-24 through the end of the study period are provided in Table 1 of the Shoreline Landfill Master Plan.

DISCUSSION

The City is required to maintain the landfill and mitigate environmental hazards until the landfill is no longer a threat to human health, safety, and the environment. For purposes of this study, the anticipated remaining maintenance period is 30 years. This estimate is based on the anticipated additional time that the decomposing refuse will continue to generate methane.

The Landfill Master Plan divided analysis of the landfill funding obligations into three major topics, each of which is described below.

1. Routine Maintenance, Operation, and Engineering

2. Nonroutine and Periodic Activities

3. Unexpected and Catastrophic Events

ROUTINE MAINTENANCE, OPERATION, AND ENGINEERING

Routine maintenance and operation of the landfill is performed by a combination of City staff and specialized contractors. Following is a summary of these activities and associated costs for Fiscal Year 2013-14, unless otherwise noted.

Landfill Operation: $1.3 million

Landfill maintenance and operation is performed by the Landfill Postclosure Operation of the Public Works Department, and includes the activities listed below.

- Operating, maintaining, and repairing the gas collection and control system, including gas lines, pumps, and valves;
- Performing ongoing air quality and emissions monitoring, and providing data to consultants for regulatory reporting;
- Inspecting, maintaining, and repairing the landfill cap;
- Operating and maintaining the Flare Station; and
- Working with Shoreline at Mountain View staff to construct and maintain burrowing owl habitats.

Landfill Engineering: $1.1 million

Landfill engineering functions are performed by the Engineering and Environmental Compliance (EEC) Section of Public Works and include the activities listed below. The EEC staff is responsible for the design and permitting of all landfill systems to ensure postclosure activities meet various regulations and permit requirements. Funding for Engineering is also split between the Solid Waste Fund and Shoreline Community Fund.

- Review and oversight of annual infrastructure capital improvement projects;
- Landfill Systems Semiannual Startup, Shutdown, and Malfunction Report;
- Bay Area Air Quality Management District (BAAQMD) Emissions Reports;

- BAAQMD Annual Landfill Gas Production Reports;
- Environmental Protection Agency (EPA) Annual Compliance Certification Reports;
- Flare and Microturbine Annual Performance Source Tests;
- Local Enforcement Authority (LEA) Quarterly Structure Monitoring Reports;
- LEA Perimeter Probes (emissions monitoring) Reports to LEA;
- Annual EPA Greenhouse Gas Reporting;
- Annual National Pollutant Discharge Elimination System (NPDES) Stormwater and Leachate Discharge Monitoring Reports;
- Ongoing reviews of project plans to assess impacts to and from the landfill; and
- Regional Water Quality Control Board Semiannual Groundwater Monitoring Reports.

Shoreline Lake Water Supply Operations: $180,000

Operations include operation and maintenance of the Shoreline Lake Water Supply system.

Annual Capital Projects: $414,000

Annual capital projects fund routine repairs and replacements, including:

- Major repairs on the landfill cap;
- Major repairs to the gas collection and leachate collection systems;
- Drainage problems and settlement damage on Shoreline at Mountain View pathways and roadways; and to provide pathway, roadway, and parking amenities; and
- Repairs and replacements for Shoreline at Mountain View water, sewer, and storm drain systems; and the water system supplying Shoreline at Mountain View.

Synthetic Turf Repair: $25,000

The City is preparing to construct athletic fields on a portion of the 544-acre site. The cost to maintain the existing landfill gas collection and control system and final cover on the athletic field site is included in the City's current cap maintenance and operational and capital budgets, but there will be incremental costs for turf and infrastructure repair when landfill-related work affects the athletic fields. Examples include settlement of the field surface due to refuse decomposition and periodic repair of the underlying landfill infrastructure.

Additional Stormwater Monitoring: $6,000

Stormwater discharges at the closed landfill are monitored as required by the State Water Resources Control Board (SWRCB) permit. The SWRCB is revising the permit and proposing additional requirements, including more reporting and training, water quality measures, additional actions in response to exceeding standards, and increased monitoring and sampling frequencies. The study includes a one-time cost of programmatic changes of $71,000, although the timing of this expense is to be determined.

Burrowing Owl Specialist: $58,000

A Burrowing Owl Preservation Plan was accepted by the City Council on October 23, 2012 and included a recommendation to increase the half-time Burrowing Owl Specialist position to full-time. The Burrowing Owl Specialist supports landfill maintenance activities by performing regular surveys for owl activity, evaluating work areas prior to construction to minimize impacts to owls, and advising maintenance staff on practices that are in compliance with wildlife regulations.

Shoreline Boulevard Maintenance: $119,000 (Fiscal Year 2015-16)

Shoreline Boulevard (within the park boundary) was originally constructed in the late 1970s with portions of the pavement constructed over buried refuse. Differential settlement has affected Shoreline Boulevard since its construction, causing ponding water and uneven pavement. Shoreline Boulevard and the associated roadside pathways require periodic maintenance, and costs for this work are budgeted intermittently beginning in Fiscal Year 2015-16.

Fuel Supplement for Flares: $18,000 (Fiscal Year 2033-34)

The amount of landfill gas generated from the decomposing refuse will continue to decline and ultimately approach the minimum capacity of the flares. Because the City will continue to be required to collect and incinerate landfill gas, it may be necessary to purchase natural gas to supplement the landfill gas flow to ensure effective gas destruction. Although the need for supplemental fuel may be eliminated by regulatory changes or technological improvements, this expense is budgeted on an ongoing basis beginning in Fiscal Year 2033-34 at an estimated annual cost of $18,000, increasing in succeeding years.

Shoreline Amphitheatre Gas Collection and Control System: $813,000 Capital Cost (Fiscal Year 2025-26); $656,000 Annual Costs Beginning Fiscal Year 2025-26

The Shoreline Amphitheatre is built on a portion of the Vista site and includes a separate gas collection and control system and dedicated landfill gas flares. The Master Plan includes an assumption that the City's lease with Shoreline Amphitheatre partners could end in 2025, at which time the City would assume responsibility for gas system and flare operation.

REPLACEMENT/CAPITAL PROJECTS: NONROUTINE AND PERIODIC ACTIVITIES

The Shoreline Landfill Master Plan includes an analysis of significant events and infrastructure replacements that will affect Landfill Postclosure and Shoreline at Mountain View operations. These activities would be funded as capital improvement projects from the Shoreline Community Fund unless otherwise noted. The most significant items are discussed below.

Increased Groundwater Extraction Costs: $188,000 (Fiscal Year 2013-14)

The City is nearing completion of a project to rehabilitate approximately 3,800' of trunk sewer line that crosses portions of the 544-acre site. The rehabilitation will extend the life of the sewer lines by approximately 50 years and reduce infiltration of groundwater into the sewer. As infiltration into the sewer line lowered the amount of groundwater removed by the extraction wells, modifications to the groundwater extraction system may be required in response to new groundwater levels. This capital project would construct two additional groundwater wells.

Flare Replacement: $937,000 (Fiscal Year 2013-14)

The Shoreline Flare Station, which began operation in 1989, was designed to process large gas flows generated by the landfill. Gas generation has gradually declined from 3,000 c.f.m. to the current level of 900 c.f.m. The current amount of gas incinerated at the Flare Station is further reduced to about 500 c.f.m. as gas is also consumed by generators at Google sites and the City's microturbines.

The Flare Station is comprised of three flares and is oversized for the current gas generation volume. All three flares are at the end of their useful lives and replacement parts are becoming difficult to obtain. Flare replacement will ensure the City can meet gas destruction requirements through the remaining life of the landfill postclosure operation.

Microturbines: $286,000 (Fiscal Year 2021-22)

The City operates two landfill gas-fuel microturbines which generate electricity for the Sewage Pump Station, Flare Station, and Irrigation Pump Station. The microturbines were placed into service in 2012 and are scheduled for replacement in Fiscal Year 2021-22. Approximately 25 percent of the total cost of $1,145,000 will be charged to the Shoreline Community Fund; the remainder of the project cost will be budgeted in utility enterprise funds.

Shoreline Lake Supply Pump Station: $4.9 million (Fiscal Year 2026-27)

The current pump station is approximately five years old and may require substantial replacement upon reaching the end of its anticipated life of 20 years. Assuming 65 percent of the system will require replacement (e.g., the discharge system may not need replacement), the estimated capital cost in Fiscal Year 2026-27 will be approximately $4.9 million.

Shoreline Boulevard Maintenance and Reconstruction: $9.4 million (Fiscal Year 2036-37)

The costs for periodic maintenance of Shoreline Boulevard (within the park boundary) are noted above. A major reconstruction is anticipated to occur in Fiscal Year 2036-37 at a projected cost of $9.4 million.

Construction Equipment Replacement: $160,000 (Fiscal Year 2013-14), $80,000 (Fiscal Year 2020-21), and $212,000 (Fiscal Year 2022-23)

The City owns heavy equipment for landfill maintenance such as a backhoe, bulldozer, motor grader and dump truck, and miscellaneous smaller vehicles. Periodic replacement of this equipment is necessary.

UNEXPECTED AND CATASTROPHIC EVENTS

The study includes an analysis of potential financial impacts from unexpected and catastrophic events, including changes in groundwater monitoring requirements, natural disasters, and sea level rise. Based on a review of the Shoreline area, no impacts are anticipated from seiche (a standing wave in an enclosed or partially enclosed body of water), tsunamis, wildfires, or underground landfill fires. Findings and financial considerations of the most significant events are discussed below.

Flooding and Precipitation: $1.6 million

Flooding can be caused by a large storm event or failures in nearby dams or levees, causing damage to the landfill cap, drainage systems, landfill infrastructure, and facilities located within the flood zone. Stormwater and wastewater facilities, as well as portions of the landfill, are located in 100-year and 500-year flood zones. In the event of a 100-year or 500-year flood, portions of the landfill infrastructure, as well as wastewater and stormwater pump stations, could flood. In the event of a 100-year or 500-year flood, estimated costs for repairing the gas collection and control systems, the Crittenden groundwater migration control system, the Sailing Lake Pump Station, and the administration and maintenance buildings total $1.6 million.

Earthquake: $11.3 million

A major earthquake is likely to be the most costly foreseeable catastrophic event. Earthquake damage can be caused by ground motion, liquefaction, or fault rupture. The study analyzed the effect of the Maximum Credible Earthquake, which is "the maximum earthquake that appears capable of occurring under the presently known tectonic framework." Such an earthquake would have a magnitude of approximately 8.05 on the moment magnitude scale (which is similar to the Richter scale).

The study does not anticipate any impacts to any landfill facilities from ground motion or fault rupture. However, the landfill is located in areas of moderate to very high liquefaction susceptibility (California Geologic Survey, 2006). In a major earthquake, widespread localized ground failures, including large-scale movement of landfill

slopes, ground cracking, and/or sand boils are expected. Widespread failure of pipes and landfill gas wells and leachate extraction systems are also anticipated. The discontinuous nature of the potentially liquefiable soils will likely limit these failures to isolated areas across the site, yet numerous failures should be expected.

Liquefaction resulting from a major earthquake is anticipated to damage approximately 15 percent of the drainage control system and 5 percent of the landfill cap, and will require regrading on approximately 20 percent of the landfill surfaces. Additionally, due to high liquefaction potential at the Crittenden and Vista sites, and very high potential in the northern portion of the 544-acre site, approximately 30 percent of the gas collection and control system may be damaged. Other potential impacts from a large earthquake include the need to replace the Crittenden groundwater sump to ensure control of groundwater flows, replacement of large portions of the groundwater monitoring systems, replacement of the Shoreline Lake Supply Pump Station, replacement of the Shoreline Fueling Station, and repair of the Shoreline Administration and Maintenance Facility.

Estimated seismic repair and replacement costs are $11.3 million and are detailed in Section 4 of the Shoreline Landfill Master Plan.

SUMMARY

The Shoreline Landfill Master Plan provides an analysis of long-term funding obligations associated with the City's closed landfills. Funding obligations include ongoing maintenance and operating costs, replacement capital projects for nonroutine and periodic activities, and potential catastrophic events.

Maintenance and operation of the landfill infrastructure will be required for many years to protect people and the environment from the byproducts of the decomposing refuse. Funding for these activities is split between the Solid Waste Fund (approximately 82 percent) and the Shoreline Community Fund (approximately 18 percent). Maintenance and operating costs are approximately $3.1 million annually and are expected to increase with inflation over the life of the landfill.

Nonroutine and periodic activities are generally capital projects to replace infrastructure that is beyond its useful life or has failed as a result of landfill subsidence, or is otherwise related to the landfill. Such activities are estimated to cost approximately $1.9 million over the next 10 years. Capital costs have traditionally been funded from the Shoreline Community Fund.

A major earthquake is likely the most costly catastrophic event at the landfill. The estimated cost to repair damage from such an event is approximately $11.3 million. Staff recommends, as part of the Fiscal Year 2013-14 budget process, that a reserve be created to set aside funding for a catastrophic event.

RECOMMENDATION

Staff recommends:

1. Council ask questions and seek clarification on the Shoreline Landfill Master Plan;

2. Direct staff to incorporate financial obligations identified in the Shoreline Landfill Master Plan in the Fiscal Year 2013-14 budget process; and

3. Direct staff to develop a catastrophic reserve as part of the Fiscal Year 2013-14 budget process.

PUBLIC NOTICING

Distribution to Education Enhancement Joint Powers Authority members and agenda posting.

MAF/5/CAM
905-02-05-13SS-E

Attachments: 1. Location Map
2. Ten-Year Cost Projection—Solid Waste and Shoreline Community Fund

cc: PCE—Sajjan, SLCM, SCE—Wong

Attachment 1

Operating and Capital Budgets
Fiscal Year 2013/14 through Fiscal Year 2022/23
Solid Waste Fund / Shoreline Community Fund

ATTACHMENT 2

BUDGET																				
Budget Item	**2013 - 2014**		**2014 - 2015**		**2015 - 2016**		**2016 - 2017**		**2017 - 2018**		**2018 - 2019**		**2019 - 2020**		**2020 - 2021**		**2021 - 2022**		**2022 - 2023**	
Funding Source	**Solid Waste Fund**	**Shoreline Community Fund**	**Solid Waste Fund**	**Shoreline Community Fund**	**Solid Waste Fund**	**Shoreline Community Fund**	**Solid Waste Fund**	**Shoreline Community Fund**	**Solid Waste Fund**	**Shoreline Community Fund**	**Solid Waste Fund**	**Shoreline Community Fund**	**Solid Waste Fund**	**Shoreline Community Fund**	**Solid Waste Fund**	**Shoreline Community Fund**	**Solid Waste Fund**	**Shoreline Community Fund**	**Solid Waste Fund**	**Shoreline Community Fund**
ROUTINE MAINTENANCE AND MONITORING COSTS PROJECTIONS [1]																				
Landfill Engineering [2]	$1,085,958	$52,440	$1,123,967	$54,275	$1,163,305	$56,175	$1,204,021	$58,141	$1,246,162	$60,176	$1,289,778	$62,282	$1,334,920	$64,462	$1,381,642	$66,718	$1,430,000	$69,053	$1,480,050	$71,470
Landfill Operations [2,12]	$1,150,689	$156,102	$1,190,963	$161,566	$1,232,648	$167,220	$1,275,790	$173,073	$1,320,442	$179,131	$1,366,658	$185,400	$1,414,491	$191,889	$1,463,998	$198,605	$1,515,237	$205,557	$1,568,271	$212,751
Shoreline Cap Maintenance/Repairs (CIP Fund) [3,4]	$127,476	-	$131,938	-	$136,556	-	$141,335	-	$146,282	-	$151,402	-	$156,701	-	$162,186	-	$167,863	-	$173,738	-
Landfill Gas/Leachate System Repairs (CIP Fund) [3]	$127,476	-	$131,938	-	$136,556	-	$141,335	-	$146,282	-	$151,402	-	$156,701	-	$162,186	-	$167,863	-	$173,738	-
Shoreline Pathway, Roadway, Parking Improvements (CIP Fund) [3,5]	-	$148,258	-	$153,447	-	$158,818	-	$164,377	-	$170,130	-	$176,085	-	$182,248	-	$188,627	-	$195,229	-	$202,062
Shoreline Infrastructure Maintenance (CIP Fund) [3,6]	-	$10,391	-	$10,755	-	$11,131	-	$11,521	-	$11,924	-	$12,341	-	$12,773	-	$13,220	-	$13,683	-	$14,162
Sailing Lake Water Supply System Operations & Maintenance [7]	-	$179,245	-	$185,519	-	$192,012	-	$198,732	-	$205,688	-	$212,887	-	$220,338	-	$228,050	-	$236,032	-	$244,293
Amphitheater O&M of Final Cover, GCCS, LCRS [8,12]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Repair of Synthetic Turf and Other Infrastructure due to Settlement in the Athletic Fields [9]	$25,000	-	$25,875	-	$26,781	-	$27,718	-	$28,688	-	$29,692	-	$30,731	-	$31,807	-	$32,920	-	$34,072	-
Fuel Supplement for Flares [10]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Shoreline Boulevard Maintenance	-	-	-	-	-	$118,769	-	-	-	-	-	-	-	-	-	$141,060	-	-	-	-
Additional Annual Cost for Compliance with draft 2012 IGP [11]	$5,644	$297	$6,046	$103	$6,046	$318	$6,258	$329	$6,477	$341	$6,704	$353	$6,939	$365	$7,182	$378	$7,434	$391	$7,694	$405
Burrowing Owl Specialist [13]	$54,625	$2,875	$56,537	$2,976	$58,516	$3,080	$60,564	$3,188	$62,684	$3,299	$64,877	$3,415	$67,148	$3,534	$69,498	$3,658	$71,930	$3,786	$74,448	$3,918
Subtotal (Routine Maint./Mon.)	***$2,576,868***	***$549,608***	***$2,667,264***	***$568,641***	***$2,760,408***	***$707,523***	***$2,857,021***	***$609,361***	***$2,957,017***	***$630,689***	***$3,060,513***	***$652,763***	***$3,167,631***	***$675,609***	***$3,278,499***	***$840,316***	***$3,393,247***	***$723,731***	***$3,512,011***	***$749,061***
FISCAL YEAR SUBTOTAL	***$3,126,476***		***$3,235,905***		***$3,467,931***		***$3,466,382***		***$3,587,706***		***$3,713,276***		***$3,843,240***		***$4,118,815***		***$4,116,978***		***$4,261,072***	
REPLACEMENT/CAPITAL IMPROVEMENT COSTS PROJECTIONS [14]																				
Landfill Gas System																				
Flares	-	$937,221	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Microturbines	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$286,282	-	-
Shoreline Boulevard Reconstruction [15]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sailing Lake Water Supply System	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Expected Events																				
Additional GW Extraction Wells to Accommodate Sewer Pipeline Liner System [16]	-	$188,403	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Retrofit of the Amphitheater LFG System [17]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
One-Time Improvements - Compliance with draft 2012 IGP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Construction Equipment	-	$159,754	-	-	-	-	-	-	-	-	-	-	-	-	-	$79,665	-	-	-	$212,113
Subtotal (Replacement)	***$0***	***$1,285,378***	***$0***	***$0***	***$0***	***$0***	***$0***	***$0***	***$0***	***$0***	***$0***	***$0***	***$0***	***$0***	***$0***	***$79,665***	***$0***	***$286,282***	***$0***	***$212,113***
TOTAL POST-CLOSURE MAINTENANCE COSTS [18]	**$2,576,868**	**$1,834,986**	**$2,667,264**	**$568,641**	**$2,760,408**	**$707,523**	**$2,857,021**	**$609,361**	**$2,957,017**	**$630,689**	**$3,060,513**	**$652,763**	**$3,167,631**	**$675,609**	**$3,278,499**	**$919,981**	**$3,393,247**	**$1,010,013**	**$3,512,011**	**$961,174**
FISCAL YEAR TOTAL	***$4,411,854***		***$3,235,905***		***$3,467,931***		***$3,466,382***		***$3,587,706***		***$3,713,276***		***$3,843,240***		***$4,198,480***		***$4,403,260***		***$4,473,185***	

Operating and Capital Budgets
Fiscal Year 2013/14 through Fiscal Year 2022/23
Solid Waste Fund / Shoreline Community Fund

ATTACHMENT 2

Notes:

1 Budget amounts shown for 2012 are approved budget amounts. A 3.5% inflation factor is applied for years 2013 to 2042 to arrive at a projected budget amount.
2 2012 Budget allocation is referenced from the Revised Budgets (Non-Adjusted) Landfill and Eng 2008 thru 2012 (Appendix C).
3 2012 Budget allocation is referenced from the Adopted Capital Improvement Projects, FY 2011-12 within the August 29, 2011 City of Mountain View Memorandum to the City Council regarding Adopted Fiscal Year 2011-12 Capital Improvement Program (Appendix C).
4 Includes some road and pathway repairs.
5 Assumes that approximately 80% ($138,400) of the total CIP funding allocation ($173,000) for this budget item is for landfill related improvements and 20% of the total funding for this line item is for non-landfill improvements.
6 The total CIP funding allocation is $216,000 or approximately $48,700 after separating the sailing lake water supply system operations and maintenance. Assumes that approximately 20% of the total CIP funding allocation ($48,700) for this budget item is for landfill related improvements and 80% of the total funding for this line item is for non-landfill improvements.
7 Budget allocation is referenced from the Shoreline Lake Water Supply System Operation and Maintenance - Index 225596 Budget 2006-2012 Table (Appendix C).
8 Assumes that the City of Mountain View will take over the maintenance of the landfill related components of the amphitheater when the lease agreement with Live Nation ends on December 31, 2025.
9 Assumes that the City of Mountain View will incur the operation and maintenance cost of the additional landfill related components of the athletic field (i.e. repair of synthetic turf/pavement (e.g. curb and gutter)/subdrains due to settlement) when the facility opens in the year 2014. The cost to maintain the final cover, landfill gas collection/control system, and existing drainage structures that are currently located within the site of the athletic field is assumed to be currently funded by the City's existing landfill operations/engineering budget and CIP funding, therefore, this cost is not included in this budget item. Assumes that all other facilities maintenance activities (e.g. non-landfill related synthetic turf repair and periodic synthetic turf replacement, building maintenance) are included in a separate City recreations fund.
10 Assumes that the quality and quantity of methane gas will decrease beyond the threshold to efficiently operate the flares without fuel supplement in the year 2034 and that the City of Mountain View will have to start incurring the fuel supplement costs. Assumes $50/day in 2034 with an increase to approximately $750/day in 2042.
11 Assumes that the City will incur additional annual cost to comply with the draft 2012 Industrial General Permit (IGP) for storm water, which is assumed to be effective in 2013.
12 Due to the progressive decommissioning of the GCCS, it is expected that beginning in 2025, costs will drop as follows; 10% in 2025, 20% in 2030, 30% in 2035, and 40% in 2040.
13 Assumes that 50% of the total cost ($115,000/year) to maintain a burrowing owl specialist full-time comes from the landfill operations fund and the remaining 50% is not landfill related.
14 Costs beyond 2012 are adjusted using a San Francisco Area Engineering News Record Construction Cost Index of 3.2%.
15 Total reconstruction cost was calculated by using a per linear feet reconstruction cost (total project cost of Project 04-38 [$2,682,000 as stated in the council report agenda dated June 19, 2007, attached] divided by the total linear feet of Shoreline Boulevard that was reconstructed [3,500 linear feet]) and multiplying it by the total linear feet of Shoreline Boulevard (assumed to be approximately 4,780 linear feet based on the site's topography map, from the Permanente Creek bridge to the gate house). Assumes a 30-year reconstruction/replacement period.
16 Assumes that two additional groundwater extraction wells will be installed in 2014 (see Section 3.3.4 for details).
17 Assumes that 45 (2/3 of the existing wells) vertical wells will require replacement (including headers and laterals).
18 Estimated costs for unexpected increases in groundwater monitoring costs and for catastrophic events (e.g. earthquake, flood) are not included in this table due to the uncertainty of the occurrences of these types of events. City staff will bring a proposal forward to the City Council with recommended options for addressing these potential contingency costs.

COUNCIL REPORT

CITY OF MOUNTAIN VIEW

DATE: June 8, 2021

CATEGORY: New Business

DEPT.: Public Works

TITLE: **North Bayshore Circulation Feasibility Study**

RECOMMENDATION

1. Approve revisions to the North Bayshore Priority Transportation Improvements, bicycle and pedestrian elements, and gateway vehicle trip-cap policies for incorporation into the North Bayshore Circulation Feasibility Study.

2. Receive a status report on the Congestion Pricing Study being conducted as part of the North Bayshore Circulation Feasibility Study.

BACKGROUND

The North Bayshore Precise Plan (NBPP), adopted in 2014 and amended in 2017, envisions commercial and residential growth in North Bayshore while minimizing additional vehicle capacity through the three gateway corridors. In support of this vision, a number of multi-modal transportation improvements are being implemented, in conjunction with Transportation Demand Management (TDM) programs, to support a 45% mode share of drive-alone into and out of the area. A cap on the number of peak-hour vehicles traveling through the gateways has been established, and volumes are measured semiannually.

On December 4, 2018, Council approved a contract with TJKM Transportation Consultants to conduct the North Bayshore Circulation Feasibility Study (Circulation Study). The purpose of the Circulation Study is to address the additional transportation issues identified in the 2017 NBPP and to develop a strategy that supports the full build-out of the NBPP. Jim Lightbody, through a contract with James Lightbody Consulting, is providing project management services for this study.

During 2019 and 2020, the Circulation Study consultant team developed a traffic simulation model (VISSIM model), evaluated the feasibility of proposed transportation projects, and supported the analysis of the Google Landings project and Gateway Master Plan.

At a May 12, 2020 Study Session, Council reviewed two priority transportation projects that were identified in the NBPP 2017 amendment that would potentially augment the improvements embedded in the original 2014 NBPP. These gateway improvement projects were evaluated through the Circulation Study and included a new transit bridge over Stevens Creek and a potential Charleston Road connection under U.S. 101 at Rengstorff Avenue. The Circulation Study identified feasible options for a Stevens Creek transit bridge and an alternative Rengstorff Avenue improvement. Council did not support further development of the Stevens Creek transit bridge but was open to consideration of a pedestrian and bicycle bridge. The Council was also open to further investigation of an alternative Rengstorff Avenue project, which realigns the freeway on and off-ramps to provide better operations and additional capacity.

On December 8, 2020, Council approved adding a feasibility study of congestion pricing to the scope of work for the Circulation Study. Congestion pricing was identified in the 2017 NBPP as a potential tool to better manage traffic.

On March 23, 2021, Council approved a NBPP nonresidential Bonus Floor Area Ratio (FAR) requalification request of 1.3 million square feet from Google LLC (Google). This was accompanied by review of the Google Preliminary North Bayshore Master Plan for office, housing, open space, and other uses located on over 122 acres of their property within and outside the gateway area. Google is expected to submit a formal Master Plan application by fall 2021.

The final Circulation Study recommendations will be coordinated with review of the Google and Gateway Master Plans. This report focuses on several initial recommendations that will help support the remaining analysis and provides a status report on the congestion pricing feasibility study.

ANALYSIS

In early 2020, prior to COVID-19 conditions, gateway monitoring showed that peak traffic volumes were approaching gateway capacity, particularly on Shoreline Boulevard in the morning and Rengstorff Avenue in the afternoon. At the same time, the single-occupancy vehicle (SOV) rate averaged 56%, which is around what it has been over the past five years, indicating little progress toward the 45% target.

Several office developments have been approved with a 45% SOV requirement, and some are nearing occupancy (e.g., Microsoft, Charleston East). Additional infrastructure projects are under way and are expected to be completed in the next two to five years. Previous traffic scenarios conducted in the Circulation Study have shown that the

combination of new office trips and completed infrastructure will result in reaching capacity at the Shoreline Boulevard and Rengstorff Avenue gateways.

At this time, it is difficult to predict post-COVID new-normal conditions. There may be a period of time when traffic demand remains below the early 2020 conditions. However, as employers reopen, even with lower office density and greater work from home, it is expected that traffic congestion will return to earlier levels. Employers will want to make productive use of their full building spaces, and it is possible they will require most employees to be present on certain days to maximize workplace collaboration. Another factor is reduced transit use and increased vehicle use as a result of the pandemic. Continued gateway monitoring will be needed to track traffic levels through the gateways.

Preliminary Transportation Strategy

The Gateway Master Plan and the proposed Google Master Plan are defining the NBPP final development phase. Remaining NBPP development over the next 10 to 15 years will include up to 1,550,000 square feet of office space and up to 9,850 new housing units. This development will be supported by completion of the planned street and greenway system and complemented by expanded local-serving retail. The Plans envision a highly walkable community, with many employees living nearby or arriving by transit or other nonvehicle modes.

The additional planned office will add over 6,000 employees. New housing will also add peak-period vehicle trips. Without offsetting actions to reduce existing and future vehicle trips, these new trips will overwhelm the gateway capacity. These offsetting actions include full implementation of the vehicle trip-reduction strategies already planned for in the NBPP, including:

- Reduce existing and approved vehicle trips by meeting or bettering the 45% single-occupancy vehicle (SOV) mode-share target;

- Internalize commute trips through the development of new housing;

- Complete the walkable street network and separated bike facilities called for in the NBPP; and

- Add transportation infrastructure identified as Priority Transportation Improvements to improve roadway operations and add gateway capacity.

The Circulation Study results to date, however, show that new vehicle reduction and other strategies will be needed to supplement these existing efforts to meet the gateway vehicle trip cap policies. Potential new strategies include:

- Require future office development to further reduce SOV mode share below 45%, potentially as low as 35%;
- Minimize parking supply through a district parking strategy;
- Additional Priority Transportation Improvements, primarily at the Rengstorff Avenue gateway; and
- Potentially manage gateway trips with congestion pricing.

Next steps to complete the Circulation Study will include additional transportation simulations based on the land use and transportation plans proposed in the Gateway and Google Master Plans. The analysis will be coordinated with the detailed review of the Google Master Plan. Council review of final recommendations is planned for late 2021.

Priority Transportation Improvements

The Priority Transportation Improvements identified in the NBPP are key projects that benefit North Bayshore development and support policies such as the mode-shift target and gateway trip-cap requirements. Several priority projects are under development and will be completed in the next few years. These include:

- Shoreline Reversible Bus Lane and protected bike lanes between Middlefield Road and Pear Avenue;
- Plymouth Street/Space Park Way realignment and Bus Lane extension and cycle track from Pear Avenue to Plymouth Street/Space Park Way;
- U.S. 101/Shoreline Boulevard Off-Ramp Realignment;
- Charleston Transit Boulevard and protected bike lanes; and
- U.S. 101 at Shoreline Boulevard Bicycle/Pedestrian Bridge and cycle track extension to Pear Avenue.

One objective of the Circulation Study is to review and update the remaining projects and identify appropriate new projects. The initial step for this objective is to evaluate a

potential U.S. 101 undercrossing at Rengstorff Avenue and a transit/pedestrian/bicycle bridge across Stevens Creek, both of which were identified in the 2017 NBPP for further feasibility analysis. The results of the evaluation were provided at a Study Session on May 12, 2020, and based on Council direction, staff dropped further evaluation of both projects but continued to include review of a new Stevens Creek pedestrian/bicycle bridge and a modified U.S. 101/Rengstorff Avenue Ramp Realignment project. The analysis of the original and revised projects is provided in Attachment 1.

Over the last year, the Circulation Study has further analyzed the current Priority Transportation Improvement list and identified projects that expand on the original list to support the build-out of the NBPP. The projects recommended to be added to the Priority Transportation Improvements are as follows:

- **Shoreline Boulevard Reversible Bus Lane Extension from Plymouth Street/Space Park Way to Charleston Road**—This project will close a gap in the bus lane on Shoreline Boulevard, providing a direct connection to the Charleston Road bus lanes. With public and private bus service expected to significantly increase, this extension will reduce merging conflicts with regular traffic lanes. Not originally included due to potential impacts on median trees, it should be evaluated to determine the transit benefits.

- **U.S. 101/Rengstorff Avenue Ramp Realignment and Rengstorff Avenue to Landings Drive**—These two related projects will realign the northbound U.S. 101/Rengstorff Avenue ramps and provide a new access road into North Bayshore by constructing a connection from Landings Drive to the new Rengstorff Avenue ramp signal. A preliminary analysis of this ramp realignment concept has been conducted, including analysis with the VISSIM simulation model. This analysis indicated potential value in improving the operation and capacity of the Rengstorff Gateway. The benefits of these projects include:

  - Adding capacity to the Rengstorff Gateway, potentially up to 800 peak hour vehicles, and diverting traffic from Charleston Transit Boulevard, improving conditions for both transit operations and the bicycle and pedestrian use of the Charleston Transit Boulevard.

  - Eliminating a merging problem on Rengstorff Avenue at the northbound U.S. 101 off-ramp that constricts traffic flow and impedes the ability of the Rengstorff Avenue/Charleston Road intersection to operate at full capacity.

  - Improving bicycle and pedestrian safety by reducing conflicts with high-speed on- and off-ramp traffic.

- **Bus Lane Enhancements**—This project will create a new connection from the bus lane to southbound U.S. 101, which will further support the effectiveness of the Shoreline Boulevard Bus Lane.

- **Stevens Creek Trail Connections**—Permanent, all-weather, Americans with Disabilities Act (ADA) compliant connections from the North Bayshore Green Loop to the Stevens Creek Trail will help expand active transportation use. Google is proposing to construct two connections at Charleston Road and Shorebird Way as part of the Master Plan. This project provides a third connection to the retention basin trail.

- **Congestion Pricing Implementation**—Should a decision be made to implement congestion pricing, this project will purchase and install detection equipment and other related infrastructure.

- **Stevens Creek Bicycle/Pedestrian Bridge at Charleston Road**—Originally included in the Plans as part of a potential transit bridge, a bike and pedestrian bridge would provide an improved connection to new housing and office development at NASA/Moffett Field.

- **La Avenida Bicycle/Pedestrian Bridge over Shoreline Boulevard**—This project would extend the planned U.S. 101 bridge across Shoreline Boulevard onto La Avenida. It would connect to protected bike lanes on La Avenida and the Stevens Creek Trail and would also reduce pedestrian and bicycle traffic delays at the Shoreline Boulevard/La Avenida intersection.

In addition, several projects listed as Priority Transportation Improvements in the 2017 NBPP have been partially completed, are incorporated into other projects, or will be completed through approved or expected development. These projects have been dropped from the recommended revised list of Priority Transportation Improvements.

A list and map of the recommended revised list of the Priority Transportation Improvements are provided in Table 1 and Figure 1, respectively. This list includes the projects from the 2017 NBPP that are not yet completed and the new projects described above. The projects are also grouped into recommended 5-year, 10-year, and 20-year timelines based on an assessment of project needs that best support planned phases of development.

Table 1: North Bayshore Priority Transportation Improvements Recommended 2021 Update

ID No. on Map	Project	Est. Cost ($ millions)*
5-Year Projects		
1	Charleston Transit Boulevard (Phases 2/3)	43.3
2	Plymouth Street/Space Park Way Connection	59.5
3	U.S. 101 at Shoreline Boulevard Bicycle/Pedestrian Bridge	30.3
4	U.S. 101 Shoreline Boulevard Off-Ramp Realignment	31.4
5	Shoreline Corridor Bus Lane—Middlefield Road to Pear Avenue	22.1
6	Frontage Road from Landings Drive to Permanente Creek	3.6
7	Transit Center Upgrades, including Grade Separation *(not on map)*	5.0
10-Year Projects		
8	Shoreline Corridor Cycle Track (North of Plymouth Street)	19.9
9	Bus Lane Extension from Plymouth Street/Space Park Way to Charleston Road (New)	4.9
10	Frontage Road Extension—Permanente Creek to Plymouth Street	50.1
11	Rengstorff Avenue to Landings Drive (new connection) (New)	50.2
12	U.S. 101/Rengstorff Ramp Realignment (New)	22.0**
13	Bus Lane Enhancements (New)	5.5
14	Stevens Creek Trail Connections (New)	1.1
15	Congestion Pricing Implementation *(not on map)* (New)	5.0
20-Year Projects		
16	Garcia-CRAG to Bayshore/San Antonio Protected Bikeways	4.9
17	Rengstorff-CRAG across U.S. 101 to Leghorn Protected Bikeways and Sidewalk (requires bridge replacement)	20.0**
18	San Antonio-Bayshore to U.S. 101 Protected Bikeways and Sidewalk (requires bridge replacement)	20.0**
19	Amphitheatre-Shoreline to CRAG—Cycle Track and Widen to Four Lanes	10.3
20	Stevens Creek Bicycle/Pedestrian Bridge at Charleston Road (New)	36.6
21	La Avenida Bicycle/Pedestrian over Shoreline (New)	40.9

* Cost is escalated to year of construction.
** Matching funds for Federal or State grant funding.

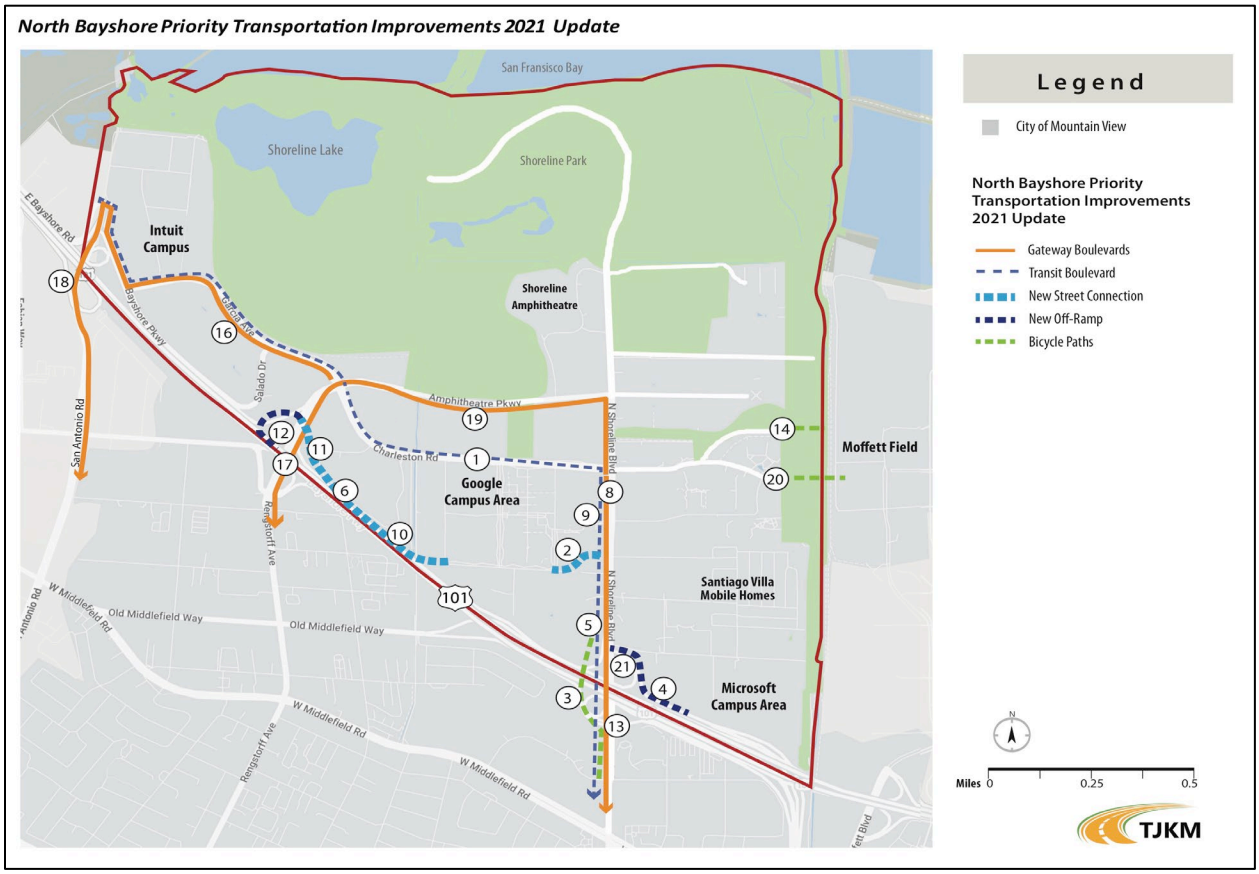

Figure 1: North Bayshore Priority Transportation Improvements Recommended 2021 Update

Attachment 2 provides more detailed project descriptions and a comparison to the 2017 NBPP Priority Transportation Improvements list.

The estimated cost of the updated projects is approximately $487 million in future (year of construction) dollars. Currently, about $140 million is already programmed into the five-year Capital Improvement Program (CIP) for these priority projects. Approximately 17% of this $140 million has come from North Bayshore Impact Fees, 80% from the Shoreline Regional Park Community (SRPC) Fund (including bonds), and 3% from other sources, including community benefits.

The remaining $347 million is expected to be funded from North Bayshore Impact fees, community benefits, and the SRPC Fund. With the anticipated $37 million in impact fees and community benefits for transportation purposes from the Landings Office project, the offer of $35 million in community benefits from the Google Master Plan for the Charleston Transit Boulevard construction, and additional future impact fees, it is anticipated that up

to $215 million in SRPC funds will be needed for full build-out of the Priority Transportation Improvements.

Bicycle and Pedestrian Projects and Programs

The Circulation Study includes an evaluation of the current NBPP bicycle and pedestrian programs and facilities. This study (Attachment 3) was conducted by Alta Planning + Design, a subconsultant on the TJKM team. The study includes:

- An evaluation of current and future bicycle and pedestrian plans, including an estimate of future Bicycle Level of Traffic Stress (BLTS) and Pedestrian Quality of Service (PQOS);

- An estimate of future pedestrian and bicycle use resulting from increased jobs and housing and meeting NBPP mode-share targets (minimum 10% of commute trips); and

- Identification of potential locations where additional capacity may be needed.

The NBPP identifies street typologies that serve specific land use and mobility needs in North Bayshore. The typologies include gateway Boulevards (e.g., Shoreline Boulevard), Neighborhood Streets, Access Streets, and Service Streets. Each includes traffic lanes, sidewalks, and bicycle provisions designed to best accommodate the roadway functions.

A key conclusion of the study is that, when fully developed, the NBPP pedestrian and bicycle facilities will be highly supportive of the North Bayshore vision and will serve high future bicycle and pedestrian volumes.

The study also includes a few recommendations that would enhance the current plan. The recommended revisions to the planned pedestrian and bicycle facilities include:

- Modify sidewalk width on Access Streets from 5′ to 6′.

- Ensure that sufficient bicycle capacity is provided on Charleston Road and Shorebird Way, east of Shoreline Boulevard, through a combination of protected bikeways and cycle tracks. These improvements should be included in the Google Master Plan.

- Ensure better bicycle connections to the east (NASA) and west (Palo Alto). Planned bicycle bridges across Stevens Creek will provide the NASA connections. Palo Alto connections should be identified through the current Valley Transportation Authority (VTA) study of the U.S. 101/San Antonio Road interchange.

- Implement additional protected intersections, primarily along Shoreline Boulevard.

- Provide the option on gateway boulevards to construct two-way protected bikeways (i.e., cycle tracks) only on one side of streets and provide a one-way protected bikeway on the other side. Currently, the NBPP calls for two-way cycle tracks on both sides. However, the study determined the additional capacity with two-way cycle tracks on both sides of the street is not needed. This strategy is already reflected in current designs for the protected bikeways on Shoreline Boulevard and Charleston Road.

- Explore strategies to address capacity constraints along Stevens Creek and Permanente Creek Trails, including improvements to parallel routes.

The Bicycle/Pedestrian Advisory Committee (B/PAC) reviewed and provided feedback on the North Bayshore Pedestrian and Bicycle Use Analysis and Infrastructure Recommendations presented at December 2, 2020 and March 31, 2021 meetings. The B/PAC members concurred with the methodology presented for the study and were generally supportive of the proposed pedestrian and bicycle infrastructure recommendations. The B/PAC requested staff to further pursue efforts with Valley Water (formerly the Santa Clara Valley Water District) on the use of both sides of the levee to greatly enhance the capacity of the trail system. Some B/PAC members expressed concerns about narrow trail width at the U.S. 101 undercrossing and low demand shown on the Bay Trail. Currently, the study does not include improvements for widening the trail undercrossing, which would have to be pursued separately due to the complexity of multi-jurisdiction involvement.

Gateway Vehicle Trip Cap Policies

The 2014 NBPP established a vehicle trip cap at the combined three gateways in the morning inbound and afternoon outbound three-hour peak periods. The purpose of the trip cap was to ensure that gateway trips remained below capacity and that districtwide TDM strategies were being achieved. Semiannual monitoring was initiated to determine compliance with the trip cap. Per the NBPP, if the cap is exceeded on two successive monitoring periods, North Bayshore development is considered out of compliance, and penalties, such a restriction on building permits, may be implemented.

The 2014 NBPP established the cap at 18,850 vehicles in the morning and 16,630 in the afternoon. The original intent was to measure compliance across all three gateways in the peak period. Subsequently, however, the Council narrowed that to compliance at each individual gateway and then later just the peak hour at each gateway.

Through the 2017 NBPP, which added housing, the trip cap was converted to a two-way measure. This was based on the idea that outbound housing trips in the morning would reduce inbound capacity (by taking away green traffic signal time). The result was that morning inbound trip capacity was reduced, even before any housing trips were added. The new cap was used starting with the 2017-18 monitoring reports. The 2017 NBPP also exempted residential trips from the trip cap.

In 2018, the monitoring showed that the new trip cap was exceeded on Shoreline Boulevard. The North Bayshore companies and the Mountain View Transportation Management Association (TMA) raised concerns about how the gateway cap was being applied and the implications of restricting building permits for entitled projects. In response, City staff brought the issue back for Council direction. The Council decision was to consider both the original 2014 one-way trip cap and the revised two-way trip cap in the regular monitoring reports, which is what was provided in the 2019 and 2020 reports. The spring 2020 report, which included peak traffic conditions pre-COVID-19, indicated that peak-hour traffic was at or above capacity on Shoreline Boulevard in the morning and on Rengstorff Avenue in the afternoon.

No monitoring was conducted in fall 2020 or spring 2021 due to the reduced traffic volumes at the gateways with the COVID-19 public heath directive to maximize work from home. However, as more businesses have resumed on-site work, traffic volumes are already increasing, and it is anticipated that traffic could be near prepandemic levels by this fall. The semiannual gateway monitoring will resume in fall 2021.

Policy Issues and Recommended Revisions

Since the gateway capacities were first established in 2014, there have been no substantial changes to North Bayshore gateway streets. However, several projects will be completed in the near future. These projects (such as the U.S. 101/Shoreline Ramp Realignment and Plymouth/Space Park Realignment) will add capacity and may also modify the current capacity. In response, the Circulation Study is reviewing the estimated existing and future capacities that are used in evaluating compliance with the trip cap. Recognizing that the NBPP states that the City Council may adjust the trip cap in the future to respond to changes in conditions, the Circulation Study will be proposing gateway capacity modifications appropriate for the review of the Google and Gateway Master Plans.

However, the current policies related to how the capacity is defined, compliance is determined, and the cap is enforced could hinder the City's vision for the North Bayshore Area. For instance, restricting building permits for commercial/office development may lead to delays in housing production. These policies could be modified to provide more

flexibility in achieving compliance while also supporting the City's interest in moderating traffic volumes at the gateways.

To consider revisions to the trip-cap policies, it is useful to consider how traffic operates. On any given roadway, as peak vehicle demand approaches the capacity of the roadway, vehicles will back up and travel times will extend. The actual traffic volume will not substantially exceed capacity, but drivers may change their travel to avoid the resulting delays. Those changes could include traveling at a different time, using a different route, or taking a different mode.

With gateway monitoring set to resume in fall 2021 and the upcoming City review of the proposed Google Master Plan, staff recommends that Council approve the following revisions to the trip-cap policies:

- Trip-cap monitoring—The monitoring should continue to measure peak-period trips in both directions at each gateway as well as mode-share trends.

- Trip-cap definition—Base the trip cap on the defined capacity in the peak direction only (i.e., inbound in the morning, outbound in the afternoon). While future housing trips may possibly impact peak direction trips, any impact is uncertain and may not occur for several years. Gateway capacity can be adjusted in the future if needed to reflect any capacity impact.

Staff also recommends that the Circulation Study further analyze the following potential revisions to the trip cap policies for Council's consideration as part of the final Circulation Study report:

- Trip cap compliance—Two potential changes for measuring compliance:

  - Compare actual trips with the gateway capacity for the three-hour peak period, rather than peak hour. Using the one-hour peak reduces compliance to the single highest demand hour for the one week of monitoring. The semiannual monitoring is a snapshot in time that does not show how drivers may change their travel time within the peak period to avoid new delays.

  - Combine Shoreline Boulevard and Rengstorff Avenue gateways in measuring compliance. As indicated in the spring 2020 monitoring report, the Shoreline Boulevard gateway was over capacity by 60 vehicles in the morning two-way peak hour but under capacity by 610 vehicles in the afternoon two-way peak hour. The Rengstorff Avenue gateway, on the other hand, was under capacity by 400 vehicles in the morning but over capacity by 70 vehicles in the afternoon.

It is likely that drivers adjusting their travel between these two gateways and district parking plans may actually further promote such adjustments from day to day. Combining the Shoreline Boulevard and Rengstorff Avenue gateways for compliance monitoring may more closely reflect actual travel patterns and could provide additional compliance flexibility. The San Antonio Road gateway, which was under capacity by 300 and 750 vehicles in the morning and afternoon, respectively, could continue to be measured separately.

- Trip cap enforcement—Changes should also be considered for the trip-cap enforcement provisions to avoid unintentional consequences of delaying housing and other amenities envisioned in the 2017 NBPP. Potential revisions to the enforcement policy may be considered in conjunction with the approval of the Google Master Plan and further development through the Gateway Master Plan.

Congestion Pricing

In early 2021, the study to assess the feasibility of implementing congestion pricing in North Bayshore was started. Congestion pricing is a tool to manage traffic that typically involves charging a fee for driving in a specific area. It has been used in Europe and Asia for more than a decade, and numerous North American cities, including San Francisco, are currently studying its feasibility. Attachment 4 is a fact sheet summarizing the study's approach.

In the case of North Bayshore, congestion pricing could help the district meet its gateway vehicle trip cap and the SOV target, and support planned growth and economic development. As of May 2021, the feasibility study project team has completed the following key steps:

- Stakeholder Engagement—Engaged approximately 30 key stakeholders, including local business owners, parks and recreation representatives, large employers, affordable housing developers, and VTA staff. Stakeholders raised questions and concerns about the impacts to employees and residents, equity and exemptions, use of net revenue, and coordination with regional tolling efforts.

- Existing Conditions—Developed an existing conditions assessment of mobility and traffic congestion in North Bayshore. Key findings highlighted the current and proposed growth plans, issues and opportunities with the existing multi-modal system, challenges in meeting the existing trip cap, and the threats of planned growth with a "business-as-usual" transportation system.

- Goals Framework—Developed a draft goals framework for congestion pricing that outlines goals and key performance indicators for a potential program. The goals include congestion reduction, equity, economic development, and environment/health. A congestion pricing program would strive to find the right balance among those goals.

- White Papers—The project team drafted three white papers on peer approaches to key congestion pricing considerations, including Finances, Equity, and Technology and Administration.

A project website has been created (available at https://www.mountainview.gov/depts/pw/transport/transportation_planning/north_bayshore_circulation_study.asp) to provide an overview of the project, public review of the above documents, and a mechanism for public comments and questions.

The next steps for the study are to develop program options and conduct a screening analysis on various congestion pricing program designs to determine which, if any, designs could be successfully implemented in North Bayshore.

This feasibility study will be completed later than 2021. If congestion pricing is determined to be feasible, additional planning, program design and analysis, and policy action will need to occur after this study is completed and prior to implementation.

FISCAL IMPACT

The North Bayshore Circulation Feasibility Study, Project 19-54, is funded with $1,462,000 from the Shoreline Regional Park Community Fund. The recommended actions have no fiscal impact on the study budget.

The recommended revised list of Priority Transportation Improvements includes up to eight new projects. It also updates the cost estimates for all projects to year of construction and included a review of past cost estimates to more accurately reflect the level of funding required. An additional $347 million beyond what is currently funded in the CIP will be needed over the next 20 years to deliver the Priority Transportation Improvements, including up to $215 million from the SRPC Fund.

CONCLUSION

The Circulation Study will provide updated direction on the transportation strategies needed to support the development plans called for in the NBPP. In advance of the final Circulation Study recommendations later this year, approval of a revised Priority

Transportation Improvement list, pedestrian and bicycle elements, and certain gateway trip-cap policies will help guide completion of the Circulation Study and support review of the Gateway and Google Master Plans.

ALTERNATIVES

1. Do not approve all or some of the revisions to the Priority Transportation Improvements list.

2. Modify or do not approve recommendations for the bicycle and pedestrian elements.

3. Modify or do not approve revisions to the gateway vehicle trip-cap policies.

4. Provide other direction to staff.

PUBLIC NOTICING

In addition to the City's standard agenda posting requirements, notices were distributed to the persons who have signed up on the project website for updates and information, previous business and/or community meeting participants, and other interested parties.

Prepared by:

Dawn S. Cameron
Public Works Director

Approved by:

Kimbra McCarthy
City Manager

DSC/EP/1/CAM
939-06-08-21CR
200328

Attachments:
1. Evaluation of Infrastructure Alternatives
2. Priority Transportation Projects 2021 Update
3. Bicycle and Pedestrian Technical Memo
4. Congestion Pricing Fact Sheet

COUNCIL REPORT

CITY OF MOUNTAIN VIEW

DATE: December 7, 2021

CATEGORY: New Business

DEPT.: Public Works

TITLE: **North Bayshore Circulation Study**

RECOMMENDATION

Approve the North Bayshore Circulation Study Draft Report (Attachment 1), including the list of recommendations in this Council report.

BACKGROUND

The North Bayshore Precise Plan (NBPP), adopted in 2014 and amended in 2017, envisions commercial and residential growth in North Bayshore while minimizing additional vehicle capacity through the three gateway corridors. In support of this vision, a number of multi-modal transportation improvements are being implemented, in conjunction with Transportation Demand Management (TDM) programs, to support reductions in single-occupant vehicles (SOV) into and out of the area. A cap on the number of peak-hour vehicles traveling through the gateways has been established, and volumes are measured semiannually.

On December 4, 2018, Council approved a contract with TJKM Transportation Consultants to conduct the North Bayshore Circulation Feasibility Study (Circulation Study). The purpose of the Circulation Study is to address the additional transportation issues identified in the 2017 NBPP and to develop a strategy that supports the full build-out of the NBPP. Jim Lightbody, through a contract with James Lightbody Consulting, is providing project management services for this Circulation Study.

Initially, the Circulation Study consultant team developed a traffic simulation model (VISSIM model), evaluated the feasibility of proposed transportation projects, and supported the analysis of the Google Landings project and Gateway Master Plan.

At a May 12, 2020 Study Session, Council reviewed the feasibility of two priority transportation projects that were identified in the NBPP 2017 amendment that would potentially augment the improvements embedded in the original 2014 NBPP:

- A new transit bridge over Stevens Creek—The Circulation Study identified feasible options for a Stevens Creek transit bridge. Council did not support further development of the Stevens Creek transit bridge but was open to consideration of a pedestrian and bicycle bridge.

- A potential Charleston Road connection under U.S. 101 at Rengstorff Avenue—Due to access problems and the very high estimated project cost, staff recommended against proceeding with further development of the Charleston Undercrossing. In its place, staff recommended an alternative Rengstorff Avenue improvement. Council agreed to further investigation of this alternative Rengstorff Avenue project, which realigns the freeway on- and off-ramps to provide better operations, particularly for the Charleston transit corridor, and additional capacity through improved gateway throughput.

On December 8, 2020, Council approved adding a feasibility study of congestion pricing to the scope of work for the Circulation Study. Congestion pricing was identified in the 2017 NBPP as a potential tool to better manage traffic.

On March 23, 2021, Council approved a NBPP nonresidential Bonus Floor Area Ratio (FAR) requalification request of 1.3 million square feet from Google. This was accompanied by review of the Google Preliminary North Bayshore Master Plan for office, housing, open space, and other uses located on over 122 acres of their property within and outside the Gateway area. Google submitted a formal Master Plan application in September 2021.

On June 8, 2021, Council received a report on the Circulation Study and approved an updated list of NBPP Priority Transportation Improvements (Figure 1 and Table 1). In approving this revised list, the City Council provided its intent that the list was to be a living document that would be reviewed periodically and revised as needed. Council also approved revisions related to the gateway trip cap policies and the NBPP pedestrian and bicycle element at the June 8 meeting.

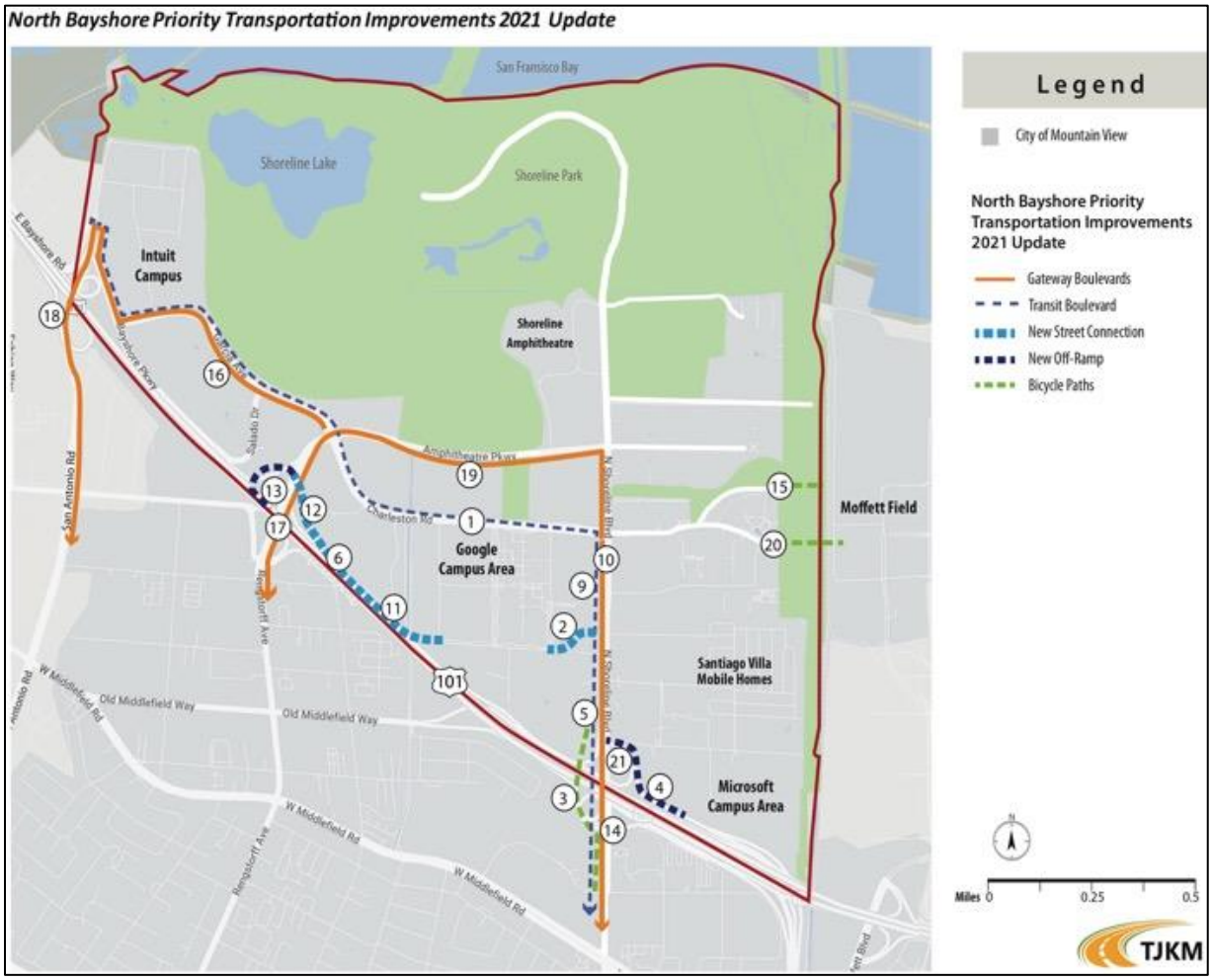

Figure 1: North Bayshore Priority Transportation Improvements (June 2021)

Table 1: North Bayshore Priority Transportation Improvements - June 2021 Update

ID No. on Map	Project	Est. Cost ($ millions)*
5-Year Projects		
1	Charleston Transit Boulevard (Phases 2/3)	43.3
2	Plymouth/Space Park Connection	59.5
3	U.S. 101 at Shoreline Bicycle/Pedestrian Bridge	30.3
4	U.S. 101 Shoreline Off-Ramp Realignment	31.4
5	Shoreline Corridor Bus Lane—Middlefield to Pear	22.1
6	Frontage Road from Landings Drive to Permanente Creek	3.6
7	Transit Center Upgrades, including Grade Separation *(not on map)*	5.0
8	Congestion Pricing Implementation *(not on map)* (New)	5.0
10-Year Projects		
9	Shoreline Corridor Cycle Track (North of Plymouth)	19.9
10	Bus Lane Extension from Plymouth/Space Park to Charleston (New)	4.9
11	Frontage Road Extension—Permanente Creek to Plymouth	50.1
12	Rengstorff to Landings Drive (new connection) (New)	50.2
13	U.S. 101/Rengstorff Ramp Realignment (New)	22.0**
14	Bus Lane Enhancements (New)	5.5
15	Stevens Creek Trail Connections (New)	1.1
20-Year Projects		
16	Garcia-CRAG to Bayshore/San Antonio Protected Bikeways	4.9
17	Rengstorff-CRAG across U.S. 101 to Leghorn Protected Bikeways and Sidewalk (requires bridge replacement)	20.0**
18	San Antonio-Bayshore to U.S. 101 Protected Bikeways and Sidewalk (requires bridge replacement)	20.0**
19	Amphitheatre-Shoreline to CRAG—Cycle Track and Widen to Four Lanes	10.3
20	Stevens Creek Bicycle/Pedestrian Bridge at Charleston (New)	36.6
21	La Avenida Bicycle/Pedestrian over Shoreline (New)	40.9

* Cost is escalated to year of construction.
** Matching funds for Federal or State grant funding.

ANALYSIS

The Circulation Study, identified as an implementation strategy in the NBPP, focused on the gateway traffic impacts of various strategies to reduce SOV trips, including policies to further reduce vehicle trips and meet TDM goals as well as potential additional infrastructure. The Circulation Study analyzed the full development of the NBPP and did not specifically address incremental development phases.

A primary focus of the Circulation Study was to identify and evaluate additional strategies needed to maintain compliance with the NBPP gateway trip cap policies. New strategies are needed since, with the increased number of jobs and residents in the NBPP, the current policy to achieve a 45% SOV rate was determined to be insufficient to meet the gateway trip cap target. Potential strategies explored and discussed in the Circulation Study include:

- Updated Priority Transportation Improvements to support increased use of non-SOV modes, improve traffic operations, and add limited gateway capacity;

- Review of gateway trip cap policies and development of potential revisions, including an update of estimated gateway capacity;

- Analysis of reduced SOV strategies including traffic simulations;

- Review of NBPP modal strategies (active transportation, transit, transportation demand management) that support SOV reductions and development of potential improvement strategies; and

- Feasibility of congestion pricing as a potential tool to help reduce gateway vehicle traffic.

The Circulation Study also considered that COVID-19 has created some uncertainty regarding future travel patterns and the potential post-COVID characteristics of peak vehicle traffic for the North Bayshore gateways. While remote work and greater commute travel flexibility may benefit peak-period trip cap compliance, sustained reduced use of transit and carpooling may result in greater SOV rates. The actual impacts on travel patterns may not be known for several years. Where practical and prudent, the Circulation Study has recommended phasing in or deferring some strategies and improvements, while monitoring the postpandemic travel conditions with a final recommendation that the Circulation Study be updated in three to five years.

The Draft Final Circulation Study Report is provided in Attachment 1. As noted in the Background section of this Council report, some elements of the Circulation Study were presented to Council in May 2020 and June 2021 for review and approval. This Council report discusses and makes recommendations for the following remaining elements:

- Gateway Trip Cap Strategy
- Congestion Pricing
- Modal Strategies

Gateway Trip Cap Strategy

The gateway trip cap, established in the 2014 NBPP, is the most important policy for managing the number of vehicles in North Bayshore. Other complementary strategies, such as the SOV rate targets, are designed to ensure that vehicle trips remain below the trip cap as the NBPP is fully implemented.

The process for measuring compliance with the trip cap has been adjusted several times since 2014. Currently, including the Council action taken on June 8, 2021, compliance is measured twice a year in the peak direction of traffic (i.e., inbound in the morning, outbound in the afternoon). Monitoring reports cover both the a.m. and p.m. peak hour and the three-hour peak period for all three gateways. However, currently only the peak hour at each individual gateway is measured for compliance.

New office projects must demonstrate and commit to strategies that will maintain compliance with the trip cap. Residential projects are exempted from having to demonstrate compliance with the trip cap. The most recent pre-COVID monitoring (February 2020) showed that peak traffic was at or above capacity on Shoreline Boulevard in the morning and on Rengstorff Avenue in the afternoon.

Trip Cap Policies and Recommended Revisions

The Circulation Study placed a primary focus on the gateway trip cap policies and potential compliance since that policy is the most effective way to manage vehicle trips in North Bayshore. Analysis of the trip cap included the potential for planned or future transportation infrastructure projects to impact gateway capacity.

To consider revisions to trip cap policies, it is useful to consider how traffic operates. On any given roadway, as peak vehicle demand approaches the capacity of the roadway, vehicles will back up, and travel times will extend. The actual traffic volume will not

substantially exceed capacity, but, over time, drivers may change their travel to avoid the resulting delays. Those changes could include traveling at a different time, using a different route, or taking a different mode.

The following recommended changes to the trip cap policy address several issues defining the trip cap and measuring compliance:

1. Trip cap monitoring—The twice-yearly gateway monitoring program should continue in order to track post-COVID traffic and compliance trends. The monitoring should measure peak period trips in both directions at each gateway as well as mode-share trends.

2. Trip cap definition and compliance—Two changes are recommended in addition to the previously approved recommendation to monitor compliance based on the one-way peak direction:

    a. Compliance should be measured by comparing actual trips with the gateway capacity for the three-hour peak period as opposed to just the peak hour.

    b. Compliance should be measured by combining the Shoreline Boulevard and Rengstorff Avenue gateways. The San Antonio Road gateway should continue to be measured separately.

    These two adjustments allow the trip cap to more closely reflect actual travel patterns and provide additional compliance flexibility.

3. Trip cap enforcement—Currently, if the cap is reached on two successive monitoring periods, North Bayshore development is considered out of compliance and penalties, such as a restriction on commercial building permits, may be implemented. As commercial and housing development in North Bayshore are linked, a restriction on issuing commercial building permits could lead to unintended consequences of delaying or preventing achievement of the housing and complete neighborhoods vision of the NBPP.

    Staff recommends an alternative approach that focuses more on the TDM effectiveness of approved projects. In particular, if an employer is seeking a building permit, the policy should require higher levels of TDM for all the applicant's employees in North Bayshore, and higher financial penalties should be applied for not achieving the required compliance. This would be more effective in encouraging SOV compliance and provide funding for other modal strategies by the Mountain View Transportation Management Association (MTMA) or others.

4. Gateway capacities—Since the gateway capacities were first established in 2014, there have been no substantial changes to North Bayshore gateway streets. However, several projects will be completed in the near future that will add capacity and may also modify the current capacity (e.g., the U.S. 101 Shoreline Ramp Realignment). The NBPP states that the City Council may adjust the trip cap in the future to respond to changes in conditions, such as the completion of new infrastructure projects.

   The Circulation Study conducted an independent assessment of current gateway capacity estimates and developed future estimated capacities associated with the Priority Transportation Improvements. Based on the results of this assessment (Attachment 2), capacity adjustments for the Shoreline Boulevard and Rengstorff Avenue gateways are recommended as the transportation improvements are completed (see Tables 2 and 3). No changes are proposed for the San Antonio Road gateway at this time. This assessment also recommended the revisions discussed above to use the peak period and combine the Shoreline Boulevard and Rengstorff Avenue gateways for gateway trip cap compliance.

   The gateway capacities for future infrastructure can be used for the transportation analysis of development proposals. Their use for compliance would only occur when the infrastructure projects are completed.

Table 2: Recommended a.m. Gateway Capacity

Trip Cap Factor & Adjustments	AM Inbound Vehicle Trips					
	Shoreline		Rengstorff		Shoreline + Rengstorff	
	Peak Hour	Peak Period	Peak Hour	Peak Period	Peak Hour	Peak Period
Current Trip Cap (2014)	2,490	6,720	2,960	7,990	5,450	14,710
Recommended Trip Cap (Peak Period Adjustment = 3X Peak Hour)	No change	7,470	No change	8,880	No change	16,350
Shoreline Bus Lane + NB RT at Pear Ave + Plymouth/Space Park Realignment (+100 peak hr.; +300 peak period)	2,590	7,770			5,550	16,650
Shoreline/US 101 NB Off-Ramp Realignment (+620 peak hr.; +1,860 peak period)	3,210	9,630			6,170	18,510
CRAG Intersection Turn Lanes (No Change)			2,960	8,880	6,170	18,510
Rengstorff/US 101 NB Ramp Realignment at Landings Frontage Road (+740 peak hr.; +2,220 peak period)			3,700	11,100	6,910	20,730
All Improvements Combined	3,210	9,630	3,700	11,100	6,910	20,730

Source: Gateway Trip Cap Study for the North Bayshore Area, Hexagon Transportation Consultants

Table 3: Recommended p.m. Gateway Capacity

Trip Cap Factor & Adjustments	PM Outbound Vehicle Trips					
	Shoreline		Rengstorff		Shoreline + Rengstorff	
	Peak Hour	Peak Period	Peak Hour	Peak Period	Peak Hour	Peak Period
Current Trip Cap (2014)	2,730	7,380	2,090	5,630	4,820	13,010
Recommended Trip Cap (Peak Period Adjustment = 3X Peak Hour) (+290 for Rengstorff in peak hour)	No change	8,190	2,380	7,140	5,110	15,330
Shoreline Bus Lane + NB RT at Pear Ave + Plymouth/Space Park Realignment (No Change)	2,730	8,190			5,110	15,330
Shoreline/US 101 NB Off-Ramp Realignment (+290 peak hr.; +870 peak period)	3,020	9,060			5,400	16,200
CRAG Intersection Turn Lanes (+360 peak hr.; +1,080 peak period)			2,740	8,220	5,760	17,280
Rengstorff/US 101 NB Ramp Realignment at Landings Frontage Road (+340 peak hr.; +1,020 peak period)			3,080	9,240	6,100	18,300
All Improvements Combined	3,020	9,060	3,080	9,240	6,100	18,300

Source: Gateway Trip Cap Study for the North Bayshore Area, Hexagon Transportation Consultants

5. Revising language related to specific operations of the gateways in the NBPP – The NBPP is a land use policy document for the future vision of development and infrastructure in the North Bayshore area. However, it contains details regarding operational analysis of the gateway related to trip capacity that may be revised and adjusted based on change in travel behavior or as new infrastructure is built, which necessitate revisions to the NBPP. Staff recommends revising the NBPP to remove the operational details and specifics while leaving in the key policy language related to reducing SOV and increasing other modes of travel.

If Council agrees with the above recommendations, staff can move forward with implementing the policy in future studies. The specific revisions to the NBPP to implement these recommended changes can be brought for Council consideration in 2022.

Strategies for Trip Cap Compliance with New Development

Previously, the analysis of trip cap compliance for proposed new office developments added estimated new vehicle trips to existing trips, comparing those trips to the gateway capacity. Currently, however, there is uncertainty about the potential post-COVID characteristics of peak vehicle traffic. As a result, it is difficult to provide a definitive analysis and recommendations regarding strategies for achieving the gateway trip cap. Instead, the Circulation Study has identified several factors and options that may determine the needed strategies, including:

- Remote work impacts—Currently, office space occupancy is still low (estimated at 25% in the Bay Area and probably lower in North Bayshore), but companies are anticipating a return to work in early 2022. What is unknown is how that return translates to peak vehicle demand. Factors in play include:

  - The continuing or permanent impact of remote work—How will office space be used on a daily basis (e.g., dedicated versus "hot" desks, where employees can use any available work station)?

  - Commute travel—How much flexibility will companies allow in terms of commute travel? Previously, nearly all commutes occurred in the peak periods. How many trips will shift to off-peak hours or just a few days a week?

  - Office space impacts—It can be expected that new office space will be fully utilized, potentially by using hybrid remote work models to increase the number of employees who will work in the new office space. Will remote work mean that new space may be phased over a longer time period?

  - Transit and carpool use—Will COVID-19 result in more SOV commutes, potentially offsetting other benefits of remote work?

  While remote work and greater commute travel flexibility may benefit peak-period trip cap compliance, actual impacts may not be known for several years and cannot be assumed at this time. Ongoing gateway monitoring will help determine the benefit, if any.

- SOV reductions—The NBPP SOV target of 45% for new office projects does not appear to sufficiently reduce vehicle trips to meet the trip cap. This is due, in part, to the added residential, retail, and entertainment trips expected in the peak period, especially the p.m. peak. However, new North Bayshore residents could help further

reduce the gateway SOV rate to the extent that they also work in North Bayshore and primarily walk or bike to work.

Staff recommends a strategy to require a lower SOV rate in the range of 35% to 40% for both existing and future employees on any new development. The lower rate could partially rely on a substantial number of internalized trips using active transportation once housing is fully developed. A reduced SOV requirement would ensure that their TDM program helps with compliance toward trip targets regardless of the level of internalization.

The lower SOV rate would be required through updated TDM requirements for the development. The transportation analysis of individual developments should determine any strategies, in addition to the lower SOV rate, that are needed to help achieve compliance with the trip cap.

- Gateway operational and capacity improvements—Implementation of the Priority Transportation Improvements provide multiple benefits towards trip cap compliance. Some projects help achieve greater transit and active transportation use. Others add gateway capacity and/or provide operational benefits that help utilize the available capacity.

  The most impactful project is the Rengstorff Connector project, which combines several individual Priority Transportation Improvements to provide an alternative connecting route from Rengstorff Avenue along Landings Drive connecting to Plymouth Street (see Figure 2). The VISSIM simulation analysis indicated potential value in improving operations along the Rengstorff Avenue gateway by reducing bottlenecks and leveraging the already planned frontage road. Other benefits of this project include:

  - Diversion of vehicle traffic from the Charleston Transit Boulevard, improving conditions for both transit operations and the bicycle and pedestrian use of the Charleston Transit Boulevard.

  - Elimination of a merging problem on Rengstorff Avenue at the northbound U.S. 101 off-ramp that constricts traffic flow and impedes the ability of the Rengstorff Avenue/Charleston Road intersection to operate at full capacity.

  - Improved safety for bicycles and pedestrians by reducing conflicts with high-speed on- and off-ramp traffic along Rengstorff Avenue.

- Enhancement of throughput on the Rengstorff Gateway without widening Rengstorff Avenue, helping with compliance of the gateway trip cap.

The cost for the full project from the U.S. 101 ramp realignment to the crossing of Permanente Creek will exceed $100 million and will require substantial right-of-way acquisition and Caltrans support; it is also around 10 years away. The project could be delivered in phases with a focus first on the U.S. 101 ramp realignment and new roadway connection from Rengstorff Avenue to the new Landings Drive frontage road, which will be upgraded as part of the Landings office development. This segment would improve active transportation conditions along Rengstorff Avenue, improve gateway throughput, and divert some traffic off of the Charleston Corridor.

Prior to pursuing this project, however, the U.S. 101 ramp realignment segment must first be studied as part of a VTA-led U.S. 101/San Antonio/Rengstorff interchange project. VTA is expected to start the Caltrans Project Approval and Environmental Document (PAED) process for this interchange project using Measure B funds in 2022. The PAED process will take two years. This gives the City time to review post-COVID conditions and better understand the project requirements and costs prior to making a final decision to proceed with design and construction of this project.

- Congestion pricing—This is another potential tool that is discussed below. Congestion pricing involves charging for gateway access and could potentially help reduce vehicle trips in order to meet the trip cap.

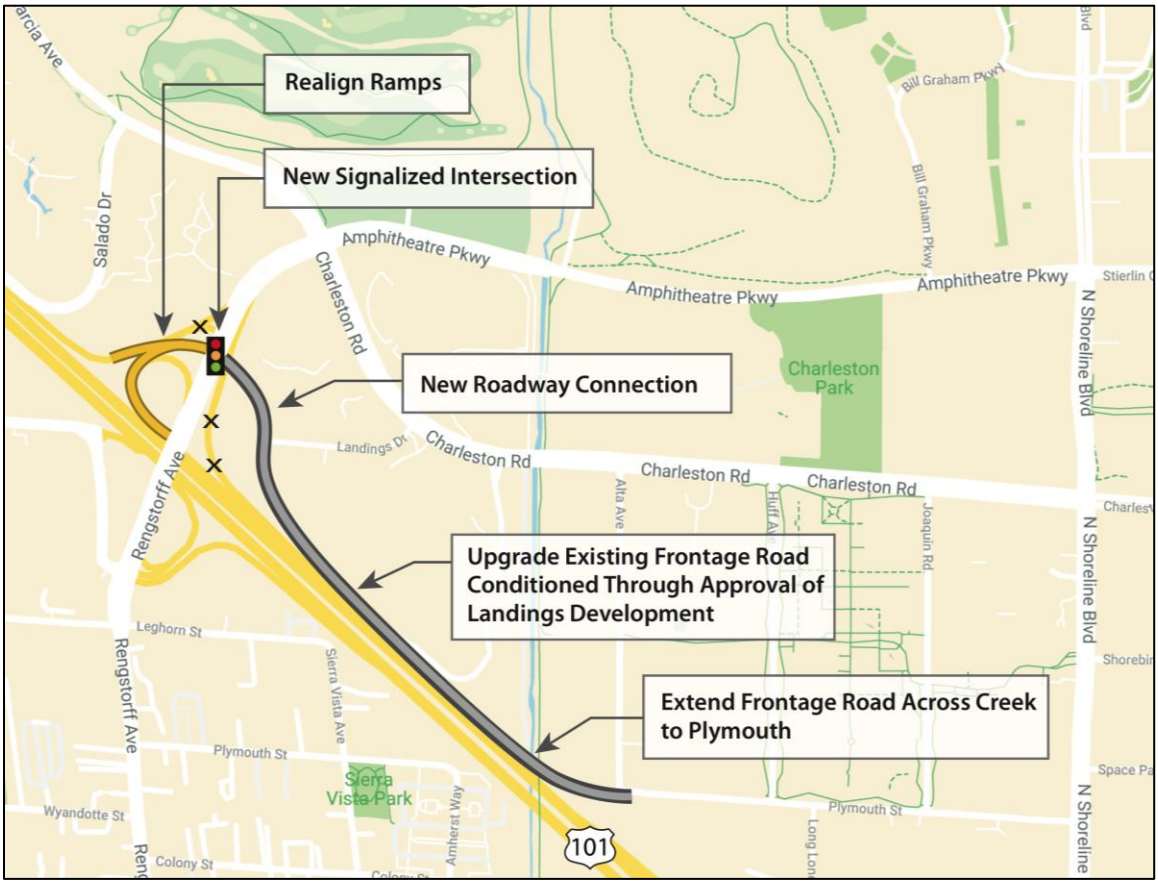

Figure 2: Rengstorff Connector Project

Trip Cap Analysis

While it may take several years to determine the right combination of the above strategies, the Circulation Study evaluated a representative scenario to better understand the potential trade-offs. This analysis was based on the estimated gateway demand and capacity with the full development of the NBPP. The analysis focused primarily on the Shoreline Boulevard and Rengstorff Avenue gateways since there were limited changes at the San Antonio Road gateway.

Key assumptions for this scenario included:

- A reduced 35% SOV target for existing Google offices and a 35% SOV target for all new office development in North Bayshore;
- All Priority Transportation Improvements completed; and
- A return to pre-COVID traffic conditions.

Details of this analysis are shown in the attached Circulation Study report. Key conclusions include:

- With these assumptions, vehicle trips are expected to be in compliance with the trip cap in the a.m. peak period. However, trips may exceed the cap in the p.m. peak period, particularly on Shoreline Boulevard.

- The Rengstorff Avenue gateway performs adequately with the Rengstorff Connector project but would be over capacity without that project.

- Additional operational improvements are needed to support demand on southbound Shoreline Boulevard in the afternoon. Alternatively, other demand management strategies may be needed.

- Peak-hour vehicle trips at all gateways (including San Antonio Road) would increase to about 8,000 trips in the a.m. (a 26% increase) and about 7,500 in the p.m. (a 42% increase).

In summary, the results of this Circulation Study analysis indicate that an SOV rate as low as 35% may be needed for all new commercial development in North Bayshore supplemented by Priority Transportation Improvements and other strategies to be in compliance with the gateway trip cap, assuming a return to pre-COVID traffic conditions. As noted earlier, staff recommends a strategy to require a lower SOV rate in the range of 35% to 40% for both existing and future employees on any new development, providing flexibility to consider changing post-COVID travel patterns. The appropriate combination of strategies, in addition to the SOV rate requirement, should be determined in the review and approval of individual projects.

Congestion Pricing Feasibility Study

The NBPP includes a provision for considering congestion pricing as a tool for managing the gateway trip cap. The following section from the NBPP Mobility Element describes congestion pricing and considerations for potential implementation:

- Congestion pricing involves charging motorists a user fee to drive in specific, congested areas during periods of peak demand to help eliminate or reduce related delays to acceptable levels. The net revenues generated can be used to fund transportation improvements to support shifts in travel behavior, such as transit service, roadway improvements, and bicycle and pedestrian projects. The congestion pricing system can be designed to exempt certain people or vehicles as

necessary. For example, license plate recognition can exempt North Bayshore residents or visitors to Shoreline at Mountain View.

- If the North Bayshore employer TDM program requirement and trip cap do not reduce the number of vehicle trips to less than the established a.m. peak period vehicle trip cap, the City may implement a congestion pricing system. Before implementing congestion pricing, further study and community outreach will be required.

The Circulation Study studied the feasibility of congestion pricing as a potential tool for managing vehicle traffic entering and exiting North Bayshore. This feasibility study (Attachment 3) explored the potential design of this tool and explored its benefits and impacts. The study process included:

- Goals—The Circulation Study identified a balance of several goals for congestion pricing to succeed. These include congestion reduction, economic development, equity, and health and the environment.

- Pricing—The congestion pricing feasibility study modeled different pricing levels and their resulting potential for trip reduction. A key assumption was that a system in Mountain View would, to the extent possible, integrate with existing Bay Area Toll Authority (BATA) infrastructure to minimize City administrative requirements.

- Outreach—Before and after the technical evaluation, the study team conducted stakeholder interviews with North Bayshore employers and others who could be impacted by congestion pricing. The scenarios evaluated in the feasibility study were informed by these conversations and designed to be potentially successful while attempting to minimize adverse impacts identified by stakeholders.

- Scenarios—After an initial screening, four scenarios were selected for more detailed evaluation (Figure 3). These scenarios were based on a cordon pricing approach, with variations in pricing direction, time of day, and the inclusion of focused discounts (cordon pricing generally refers to a demarcated boundary "cordoning off" the specific congested pricing zone). All scenarios assumed exemptions for North Bayshore residents and transit vehicles. The evaluation also tested the sensitivity of factors, such as the success in lowering the baseline SOV rate and travel behavior elasticity.

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Pricing type	Cordon pricing			
Pricing direction	Inbound	Inbound	Peak directional (inbound in AM, outbound in PM)	Peak directional (inbound in AM, outbound in PM)
Pricing parameters	**AM peak only** (8:00 - 11:00 AM)		**Peak periods only** (8:00 - 11:00 AM and 4:00 - 7:00 PM)	
Day of week	Weekdays			
Discounts	None	- Low-income drivers (50% discount) - HOV 2+ (carpool, 100% discount) - HOV 3+ (TNC, 100% discount)	None	- Low-income drivers (50% discount) - HOV 2+ (carpool, 100% discount) - HOV 3+ (TNC, 100% discount)
Exempt vehicles	Vehicles registered to pricing zone residents, public and private transit vehicles, emergency vehicles.			

Figure 3: Congestion Pricing Scenarios

Conclusions Regarding a Potentially Suitable Program

The scenario evaluation identified a potentially suitable congestion pricing program that may best balance the identified goals. The program includes:

- Pricing only inbound a.m. trips between 8:00 a.m. and 11:00 a.m. on weekdays. Restricting the pricing to the morning peak period would target the hours with the greatest percentage of office commuters and, at least partially, mitigate impacts to noncommute trips.

- Fully exempt residents and transit vehicles.

- Further study of possible discounts (e.g., carpools, low-income drivers). A definitive conclusion about discounts was not made since more information is needed regarding the number of eligible trips and how they would be affected by pricing. There are also administrative challenges related to integration of a Mountain View system with Bay Area Express Lanes and questions about enforcement roles and responsibilities.

- A per-trip charge in the range of $5 to $13 to keep trips below the trip cap.

- A likely SOV trip rate reduction of 2% to 5%.

The technical evaluation, along with stakeholder discussions, identified several issues, concerns, and challenges that should be considered, including:

- Some employer concerns (Microsoft and Intuit, particularly) that pricing will be an obstacle to attracting employees. North Bayshore is home to primary Silicon Valley offices for those firms.

- The impact on lower-income service workers, especially at major companies.

- The impact on event attendees at the Computer History Museum and users of Shoreline at Mountain View.

- The effect on hiring restaurant and retail workers, many of whom likely need to arrive when pricing is in effect.

- Potential challenges leasing future service and retail spaces (e.g., grocery stores and pharmacies) to support the residential population.

- Impacts on construction workers.

Costs and Financing Opportunities

Capital costs to implement congestion pricing at the three gateways are estimated at $30 million. These costs include physical infrastructure for roadside detection as well as administrative provisions, likely through a contract with the BATA or Santa Clara Valley Transportation Authority (VTA). Because congestion pricing provides a revenue stream, it may be possible to finance the capital costs.

Operating costs for administering the program, processing payments, and enforcement are estimated at $7 million annually. A greater number of discounts and exemptions would likely increase costs due to increased processing costs. Expected revenue would be at least $12 million and could be substantially higher.

As a result, the evaluation estimated congestion pricing would break even in three to eight years, at which point cumulative net revenue would have exceeded capital[1] and operating costs, and be available to fund other programs, potentially directed at mode-shift programs or equity strategies. Funding these types of programs could also occur at program outset, although this possibility would depend on the financing approach used.

[1] Financing costs were not included in this analysis.

Implementation Issues/Next Steps

Congestion pricing for an area (as opposed to typical bridge and highway tolling) has yet to be implemented in the United States. At this time, New York City is the closest to implementing such as a system. The cities of San Francisco, Seattle, Portland, and others are exploring areawide congestion pricing systems but are still in study phases. There remain many implementation issues related to regulatory approvals, addressing equity, administration, enforcement, etc., that are still are under study by these other cities.

While congestion pricing in North Bayshore appears to be feasible, its value may depend on other factors, such as post-COVID traffic conditions, the pace of new development, the success of further SOV reduction efforts, and progress on Priority Transportation Improvements. In addition, there could be advantages in learning from the experiences of other cities before proceeding.

As a result of the feasibility study, it is recommended that further development of a North Bayshore congestion pricing program be deferred as the following tasks are pursued:

- Expand the gateway monitoring and surveys to better understand potential program impacts on peak-hour and peak-period trips that are not serving major employers.

- Closely track experiences with congestion pricing in the Bay Area and elsewhere to better understand the tool's effectiveness, potential equity programs, and challenges.

- Monitor gateway trip cap compliance and SOV reduction progress as new development occurs and postpandemic travel patterns emerge to determine when or if additional planning for congestion pricing should occur. The timeline for implementation of congestion pricing is four to six years to get legal approval, develop administrative agreements, and construct physical structures.

Modal Strategies

A key strategy for achieving the NBPP transportation goals is to greatly enhance alternative modes, including public transit, active transportation, and other TDM programs. The NBPP has strong facilities and programs, particularly for cyclists and pedestrians who are envisioned to take most of the internal commute and other trips. The Circulation Study reviewed the NBPP modal strategies and recommended additional actions that would help the lower proposed SOV rate. These include the pedestrian and bicycle recommendations approved by Council on June 8, 2021.

Transit Strategies

A high level of transit use is essential for achieving NBPP goals. While private company-operated shuttles have been successful in reducing peak-period vehicle use, more publicly available transit service will be needed to support the planned North Bayshore population and to help further reduce commute vehicle trips. Transit is also a critical element for achieving low automobile ownership since not all trip destinations will be located in North Bayshore.

Currently, the only public transit service available is VTA Line 40, operating all day, every 30 minutes, and the MTMA's MVgo shuttles, which operate in peak hours only. This level of service does not provide North Bayshore with a high-quality transit corridor, which requires 15-minute service from 7:00 a.m. to 10:00 a.m. and 4:00 p.m. to 7:00 p.m., as well as 20-minute frequency the rest of the day.

North Bayshore would benefit from the designation as a transit-rich area. According to State legislation, this is defined as the area within one-half mile of a high-quality bus corridor. While not sufficient today, higher-frequency service would allow essentially all of North Bayshore to become a transit-rich area and qualify for additional grant funding programs that can help enhance the vision for North Bayshore.

Expanded transit service, such as more frequent VTA service and expanded MTMA service, will be particularly important for serving the planned residential community, which is planned for low levels of parking and automobile utilization. Additional dedicated funding will likely be needed to support expanded service.

Recommended transit strategies include:

- Integrate and expand the MVgo and Mountain View Community Shuttle services, including an all-day frequent downtown connection.

- Work with VTA to increase Line 40 service frequency.

- Explore a potential VTA/MTMA connection to the NASA/Bayshore light rail station.

- Advocate for express/limited stop-light rail service from the BART Milpitas station.

- Work with the Metropolitan Transportation Commission (MTC) on a potential future regional bus program and with VTA on development of the State Route 85 corridor transit service.

TDM Strategies

TDM programs, administered by individual employers along with the MTMA, are an essential component for NBPP efforts to lower the SOV rate. They include complementary programs supporting other modal strategies. The NBPP developed TDM Guidelines for both office and residential projects that have been required for already approved projects. However, future projections for vehicle demand, including impacts of the Google Master Plan, will require updates to the current guidelines. The Circulation Study consultant team reviewed these guidelines and provided proposed updates (Attachment 4). Key recommendations for revising the TDM Guidelines include:

- Require new office developments to meet a lower SOV rate that will encompass increased internal trips and stronger TDM programs.

- Address management of district parking, requiring new monitoring methods.

- Require annual employee surveys to track progress on SOV targets.

- Strengthen the role and supporting resources for the MTMA in order to implement districtwide TDM programs.

- Develop new enforcement mechanisms and penalties that will help ensure that TDM programs are effective and SOV targets are achieved.

Summary of Recommendations

Listed below is a compilation of the Circulation Study recommendations that were discussed in this Council report. These recommendations are in addition to the recommendations approved by the City Council on June 8, 2021 related to the NBPP Priority Transportation Improvements and pedestrian and bicycle plans:

1. In addition to the previously approved recommendation to monitor compliance based on the one-way peak direction, modify gateway trip cap policies to revise the time period and locations for compliance and update gateway capacity estimates as follows:

    a. Continue the twice-yearly gateway monitoring program in order to track post-COVID traffic and compliance trends. The monitoring should measure peak period trips in both directions at each gateway as well as mode-share trends.

b. Expand the monitoring as new growth occurs to better understand characteristics of peak traffic, use of non-SOV modes, and trip characteristics of new residents.

c. Measure compliance by comparing actual trips with the gateway capacity for the three-hour peak period as opposed to just the peak hour.

d. Measure compliance by combining the Shoreline Boulevard and Rengstorff Avenue gateways. The San Antonio Road gateway should continue to be measured separately.

e. Adjust the Shoreline Boulevard and Rengstorff Avenue gateway capacities as the new infrastructure projects are completed as shown in Tables 2 and 3.

2. Develop new financial-based penalties for noncompliance with individual project vehicle trip caps and/or the gateway trip cap.

3. Establish a lower SOV rate in the range of 35% to 40% for both existing and future employees on any new development. The transportation analysis of individual developments should determine any strategies, in addition to the lower SOV rate, that are needed to help achieve compliance with the trip cap.

4. In the near term, complete the design and construction of the Priority Transportation Projects already in process as quickly as possible. For the major Priority Transportation Improvements not yet started, advance the planning and initial design phases through the Capital Improvement Program (CIP) to prepare them to move into construction when needed.

5. Proceed with the next planning phase for the Rengstorff Connector project, including the Caltrans Project Approval and Environmental Documentation (PAED) process for the Rengstorff Avenue interchange component (recently funded through the VTA Measure B program). Planning work will take approximately two years, during which time the City can review post-COVID conditions and better understand the project requirements and costs prior to making a final decision to proceed with design and construction of this project.

6. Plan and advocate for expanded public transit service so that North Bayshore is designated as a transit-rich area and work with VTA and the MTMA on strategies for service expansion.

7. Defer a decision on a congestion pricing program while monitoring other Bay Area tolling activities, gathering information about potential impacts, and establishing traffic thresholds or other factors that could support future implementation.

8. Update the NBPP to reflect approved Circulation Study recommendations, including:

   - Priority Transportation Improvements;
   - Gateway trip cap policies;
   - Bicycle and pedestrian policies and plans;
   - Implementation policies, including issuance of building permits and financial penalties for TDM noncompliance;
   - TDM requirements for development; and
   - Revise language regarding trip caps and compliance to retain the broad policies and remove specifics of monitoring and operations.

9. Update the Circulation Study in three to five years to review transportation strategies and confirm specific gateway trip cap policies.

FISCAL IMPACT

North Bayshore Circulation Feasibility Study, Project 19-54, is funded with $1,462,000 from the Shoreline Regional Park Community Fund. The recommended actions have no fiscal impact on the study budget.

Some of the recommendations in the Circulation Study report will require funding and staffing resources. These include implementing the Priority Transportation Improvements, continuing the gateway monitoring, revising the NBPP, advocating and planning for increased transit, and updating the Circulation Study in five years. Funding requests for these projects and initiatives will be considered by Council as part of the CIP and annual budget process.

CONCLUSION

The Circulation Study has provided updated direction on the transportation strategies needed to support the development plans called for in the NBPP. Circulation Study

recommendations include approval of a revised Priority Transportation Improvement list, updates to the pedestrian and bicycle elements, and modifications to gateway trip cap policies. The Circulation Study also recommends revisions to the NBPP and additional implementation strategies for monitoring transportation and development over the next few years. Upon Council approval of the recommendations, staff will begin to implement the updated policies to review development and implement infrastructure projects in the North Bayshore. Additionally, staff will bring back revisions to the NBPP to reflect the approved revisions in 2022.

ALTERNATIVES

1. Modify or do not approve the North Bayshore Circulation Study.

2. Provide other direction.

PUBLIC NOTICING

In addition to the City's standard agenda posting requirements, notices were distributed to the persons who have signed up on the project website for updates and information, previous business and/or community meeting participants, and other interested parties.

Prepared by:

Dawn S. Cameron
Public Works Director

Approved by:

Kimbra McCarthy
City Manager

DSC/EP/6/CAM
939-12-07-21CR-1
201342

Attachments:
1. Final Draft North Bayshore Circulation Study
2. Gateway Trip Cap Study for the North Bayshore Area, Hexagon Transportation Consultants
3. North Bayshore Congestion Pricing Feasibility Study, Nelson\Nygaard Consulting Associates (Executive Summary and Final Report)
4. North Bayshore TDM Guidelines Peer Review, Alta Planning and Design