# North Bayshore Master Plan: Multi-Modal Transportation Analysis

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FEHR PEERS

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# Executive Summary

This report presents the results of the Multi-Modal Transportation Analysis (MTA) for the North Bayshore Master Plan (NBS Master Plan). Except for the Amphitheatre District garage (SA-P-1), the NBS Master Plan area is within the North Bayshore District and the North Bayshore Precise Plan (NBPP) area, which is generally bounded by the Shoreline at Mountain View Regional Park in the north, US 101 to the south, Stevens Creek to the east, and San Antonio Road to the west. The NBS Master Plan land uses are bounded by Huff Avenue, Bayshore Freeway, Pear Avenue, Charleston Road, and Stevens Creek.

## Project Description

The NBS Master Plan includes a combination of land use, transportation infrastructure, district parking, and transportation demand management program improvements. To acknowledge the challenge of accessing North Bayshore by vehicle, and to be more compliant with the North Bayshore District Trip Cap Policy, the trip generation presented in this report utilizes the NBS Master Plan proposed transportation demand management (TDM) measures to achieve a 35% morning peak hour inbound single-occupancy vehicle (SOV) mode share at the driveways for all non-residential development. **Figure ES-1** shows the Master Plan boundary and location within the NBPP as well as the surrounding transportation network.

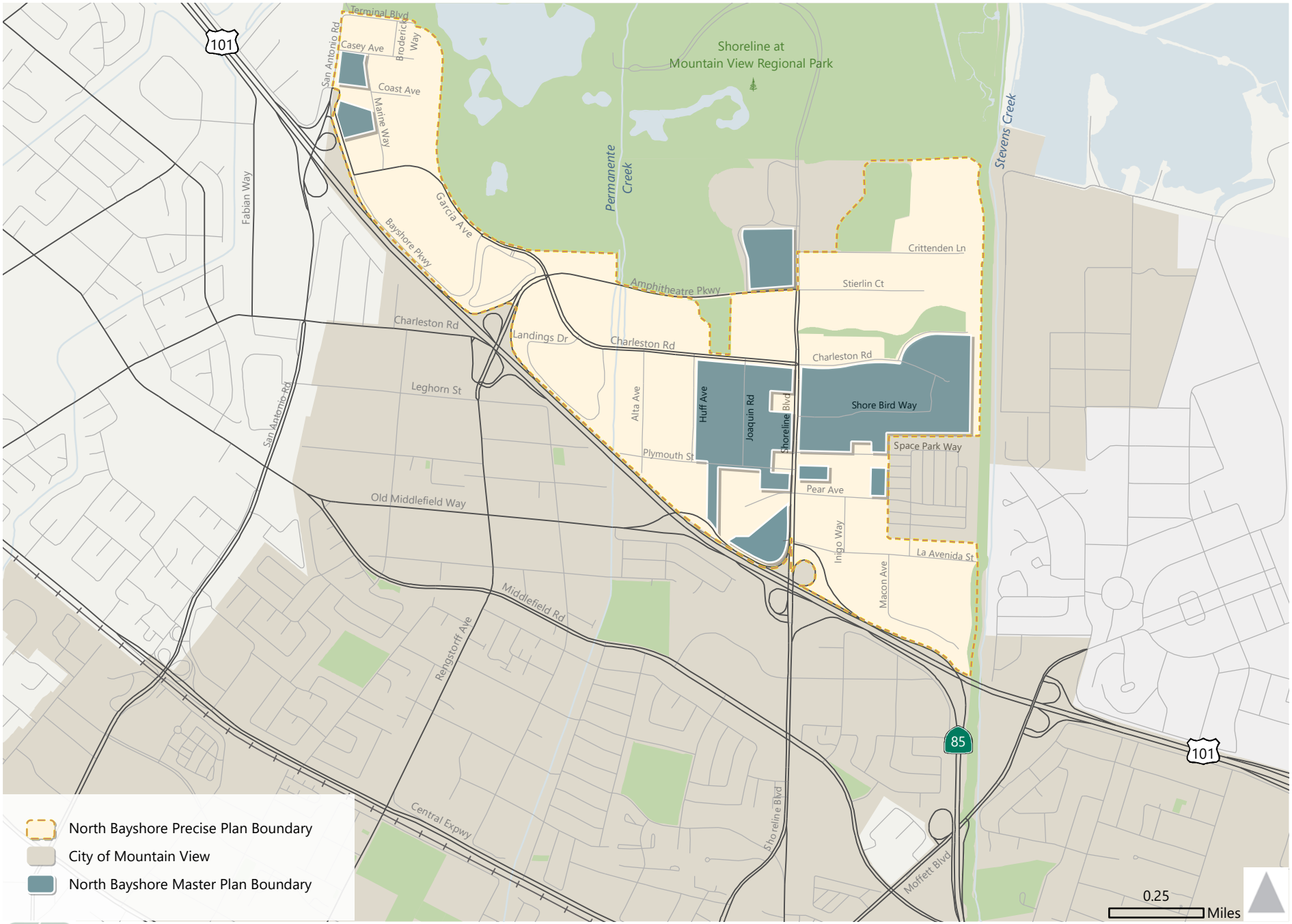



Figure ES-1

## North Bayshore Master Plan Location

## Land Use Program

The total change in residential, office, retail, hotel, and community uses are shown in **Table ES-1**. The Project also includes 240 public parking spaces and 10 parking spaces for the police operations station within the Amphitheater District Garage.

### Table ES-1: North Bayshore Master Plan Land Use Program: Building Size

| Land Use[1] | Units | Existing Conditions (2020)[2] [A] | Project Conditions (2030) [B] | Change [B-A=C] |
|---|---|---|---|---|
| Residential – Market Rate | Dwelling Units | 0 | 5,600 | 5,600 |
| Residential – Affordable | Dwelling Units | 0 | 1,400 | 1,400 |
| Office | Square Feet | 8,653 | 3,145,897 | 3,137,244 |
| Research & Development | Square Feet | 1,642,061 | 0 | -1,642,061 |
| Industrial | Square Feet | 92,497 | 0 | -92,497 |
| Retail/Commercial | Square Feet | 0 | 240,000 | 240,000 |
| Active Space Kiosks | Square Feet | 0 | 4,000[3] | 4,000 |
| Hotel | Rooms | 0 | 525 | 525 |
| Community Uses | Square Feet | 0 | 55,000[4] | 55,000 |
| Police Operations Station | Square Feet | 0 | 2,000 | 2,000 |

Notes:

1. Because it is not a programmed land use, the 240 public parking spaces and 10 parking spaces for the police operations station that are added to Amphitheatre District Parking Garage is not included in this building summary.
2. Existing Conditions is relative to 2020. Vacant buildings for 2020 include the 91,392 square feet at 1400 North Shoreline Boulevard, and the 30,520 square feet at 1220-1230 Pear Avenue. These vacant buildings at 1400 North Shoreline Boulevard and 1220-1230 Pear Avenue were not included in the 2020 baseline and therefore, do not show up as a demolished building credit.
3. The 4,000 square feet of active space kiosks identified in the Greenway Park West, Greenway Park East, and The Portal is a local serving use that is assumed not to generate separate vehicle trips during a typical day, but rather attract walking and biking trips from the surrounding land uses.
4. The 55,000 square feet of community uses is a local serving use that is assumed not to generate separate vehicle trips during a typical weekday, but rather attract walking and biking trips from the surrounding land uses. Weekend programming of the community uses would generate additional vehicle trips outside of the typical weekday.

Source: Fehr & Peers, 2023.

This project uses a combination of district parking and on-site parking for each land use. Each parking location will serve a combination of specified land uses. The parking location directly affects how vehicles travel on the local streets. The land use program is described by parking location in **Table ES-2**, and parking locations are shown in **Figure ES-3**.

## Table ES-2: North Bayshore Master Plan Land Use Program: Building Size and Parking Location

| Parking Location1 | Parking Spaces[2] | Residential: Market Rate (Dwelling Units) | Residential: Affordable (Dwelling Units) | Office (Square Feet)[3] | Retail/ Commercial Space (Square Feet) | Hotel (Rooms) |
|---|---|---|---|---|---|---|
| ***Joaquin Neighborhood*** | | | | | | |
| 1. District Garage (JN-P-1)[4,5,6] | 500 | 0 | 0 | 0 | 35,000 | 0 |
| 2. North On-Site Parking | 2,531 | 2,789 | 527 | 125,630 | 0 | 0 |
| 3. District Garage (JS-P-1)[5,6] | 700 | 0 | 0 | 224,707 | 25,000 | 275 |
| 4. South On-Site Parking | 746 | 720 | 294 | 25,000 | 0 | 0 |
| ***Shorebird Neighborhood*** | | | | | | |
| 5. District Garage (SB-P-1)[4,5,6] | 600 | 0 | 0 | 0 | 180,000 | 250 |
| 6. On-Site Parking | 1,826 | 1,832 | 328 | 162,160 | 0 | 0 |
| ***Pear Neighborhood*** | | | | | | |
| 7. On-Site Parking | 331 | 259 | 251 | 0 | 0 | 0 |
| ***Other Portions of the North Bayshore Master Plan*** | | | | | | |
| 8. Amphitheatre District Garage (SA-P-1)[7,8] | 4,584 | 0 | 0 | 2,165,980 | 0 | 0 |
| 9. Marine Way District Garage (MW-P-1 and MW-P-2) | 890 | 0 | 0 | 444,420 | 0 | 0 |
| ***Total of North Bayshore Master Plan*** | | | | | | |
| **Total** | **12,708** | **5,600** | **1,400** | **3,147,897** | **240,000** | **525** |

Notes:

1. Parking locations serve certain land uses, depending on land use location and district parking management policy.
2. Parking spaces based on "Updated Car Parking" summary provided on October 19, 2022. Allocation of residential, office, and retail/commercial on-site parking spaces assumes that vehicles will park close to their desired destination; therefore, the on-site parking is distributed based on the land use allocation by neighborhood.
3. Assumes 90% of the office parking is assigned to the district garages (JN-P-1, JS-P-1, SA-P-1, MW-P-1, and MW-P-2) and 10% to the on-site parking locations in each neighborhood. The district office parking is distributed to district parking locations based on the number of designated office parking spaces available per district garage. The on-site parking is distributed to parking locations based on amount of office land use in each neighborhood.
4. Also serves residential visitor parking.
5. The 4,000 square feet of active space kiosks identified in the Greenway Park West, Greenway Park East, and The Portal is a local serving use that would not generate vehicle trips during a typical day, but rather attract walking and biking trips from the surrounding land uses. Retail/commercial parking when needed for events or specific active use programming would be provided in JN-P-1, JS-P-1, and/or SB-P-1.
6. The 55,000 square feet of community uses is a local serving use that is assumed not to generate separate vehicle trips during a typical weekday, but rather attract walking and biking trips from the surrounding land uses. Community uses parking when needed for weekend events or specific active use programming would be provided in JN-P-1, JS-P-1, and/or SB-P-1.
7. The Amphitheatre District Parking Garage is the 4,334 parking spaces for the NBS Master Plan, 10 parking spaces for the police operations station, and 240 public parking spaces added to Amphitheatre District Parking Garage.
8. The office summary includes the 2,000 square foot police operations station.

Source: Fehr & Peers, 2023.

## Transportation Infrastructure and District Parking Improvements

Per the March 2022 *North Bayshore Framework Master Plan* with September 2022, December 2022, and January 2023 amendments, the project will also feature new streets and other transportation infrastructure (illustrated on **Figure ES-2**), as well as, district parking (illustrated on **Figure ES-3**). The transportation infrastructure and district parking improvements include the following:

- New streets:
    - Monarch Street is a proposed two-lane east-west Neighborhood Street with bicycle facilities that extends from Huff Avenue to Shoreline Boulevard. Monarch Street continues east of Shoreline Boulevard from Grove Street (new street) to Black Street. It will have a separated/buffered one-way bike lanes on each side of the street.
    - C Street is a proposed two-lane north-south Neighborhood Street that extends south of Plymouth Street. It will have a separated/buffered one-way bike lanes on each side of the street.
    - Grove Street is a proposed two-lane north-south Neighborhood Street that extends from Space Park Way to Shorebird Way. It will have a separated/buffered one-way bike lanes on each side of the street.
    - Manzanita Street is a proposed two-lane north-south Neighborhood Street that extends from Space Park Way to Charleston Road. It will have a separated/buffered one-way bike lanes on each side of the street.
    - Willow Street is a proposed two-lane north-south Neighborhood Street that extends from Monarch Street to Shorebird Way. It will have a separated/buffered one-way bike lanes on each side of the street.
    - Inigo Way is a proposed two-lane north-south Neighborhood Street that extends from Space Park Way to Charleston Road. It will have a separated/buffered one-way bike lanes on each side of the street.
    - Shorebird Way is proposed to be extended to the east as a Neighborhood Street to Black Street (new street). It will have a protected bidirectional cycle track on the north side of the street and a multi-use path will on the south side of the street.
    - Black Street is a proposed two-way Access Street at the east terminus of Monarch Street extending north to Shorebird Way. It will have a separated/buffered one-way bike lanes on each side of the street. North of Shorebird Way, Black Street is proposed to be a one-way street with will have pedestrian access, bicycle access, and emergency vehicle access.
- Modified streets:
    - Huff Avenue between Plymouth Street and Charleston Road will be modified to a Neighborhood Street to include two travel lanes and separated one-way bike lanes on each side of the street.
    - Joaquin Road between Plymouth Street and Charleston Road will be modified to a Neighborhood Street to include two travel lanes and a separated/buffered one-way bike lane on each side of the street.

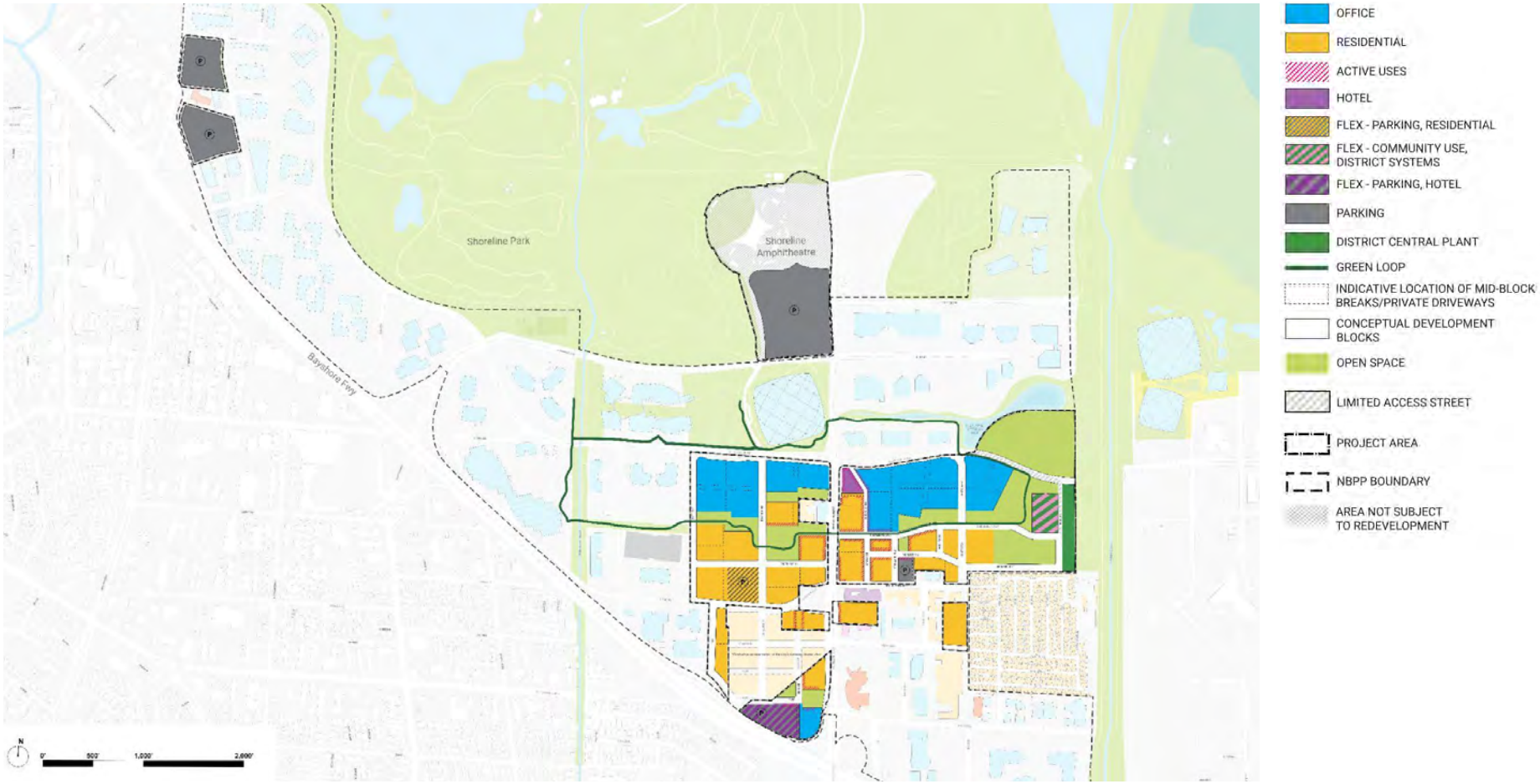
- Shoreline Boulevard will be modified to be a 5-lane transit boulevard. It will have a separated/buffered one-way bike lane on each side of the street north of Space Park Drive. Shorebird Way is proposed to be extended to the east as a Neighborhood Street to Monarch Street (new street). Shorebird Way has three Existing Street versions:
  - Shorebird Way 01 (Arrival) is a Neighborhood Street with one lane between Shoreline Boulevard and Manzanita Street. It will have the Green Loop, a bidirectional cycle track on one side of the street.
  - Shorebird Way 02 (Greenway) is a Neighborhood Street with one lane between Manzanita Street and Inigo Way. It will have a bidirectional cycle track on one side of the street.
  - Shorebird Way 03 (Wilds) is a 2-lane Neighborhood Street between Inigo Way and Black Street. It will have a protected bidirectional cycle track on the north side of the street and a multi-use path will on the south side of the street.
- Space Park Way will be modified to be a 2-lane Neighborhood Street. It will have a separated one-way bike lane on each side of the street.
- Charleston Road between Black Street and Inigo Way will be modified to a one-way street, with public pedestrian access, bicycle access, emergency vehicle access, and limited access for specific land uses proposed in the future.

- Parking will be composed of on-site parking and off-site District parking
  - Residents will use on-site parking, while residential visitors will use District parking garages.
  - 90% of office employees and visitors will use District parking garages, while 10% of office employees and visitors will use on-site parking.
- District parking at five locations within the Master Plan area include the following:
  - JN-P-1 (Joaquin North) is located at the southwest corner of Monarch Street and Joaquin Road within the Joaquin North neighborhood and contains approximately 500 parking spaces. JN-P-1 serves retail uses and hotel, neighborhood parks, open spaces, and residential visitor parking.
  - JS-P-1 (Joaquin South) is a 6-level parking garage location in the Joaquin South neighborhood that contains approximately 700 parking spaces. JS-P-1 serves office (450 parking spaces), and retail and hotel, neighborhood parks, and residential visitor parking (250 parking spaces).
  - SB-P-1 (Shorebird) is located at the northeast corner of Space Park Way and Manzanita Street within the Shorebird neighborhood and contains approximately 600 spaces. SB-P-1 serves hotel and active uses, neighborhood parks, open spaces, and residential visitor parking.
  - SA-P-1 (Amphitheatre) is a 6-level parking garage located at the northwest corner of Shoreline Boulevard and Charleston Road that contains approximately 4,584 parking spaces for the NBS Master Plan (4,334 parking spaces), the police operations station (10 parking spaces), and the public parking spaces (240 parking spaces). SA-P-1 serves office employee parking.
  - MW-P-1 & MW-P-2 (Marine Way) are 2- to 3-level parking garages along Marine Way that contain approximately 890 parking spaces. Both parking garages serve office uses.



- On-site parking within each neighborhood[1] includes the following:
    - Joaquin North neighborhood includes 2,531 on-site parking spaces for office, residential, retail, and active land uses.
    - Joaquin South neighborhood includes 746 on-site parking spaces for office, residential, retail and hotel land uses.
    - Shorebird neighborhood includes 1,826 on-site parking spaces for office, residential, retail, hotel, and active land uses.
    - Pear neighborhood includes 331 on-site parking spaces for residential, and retail land uses.

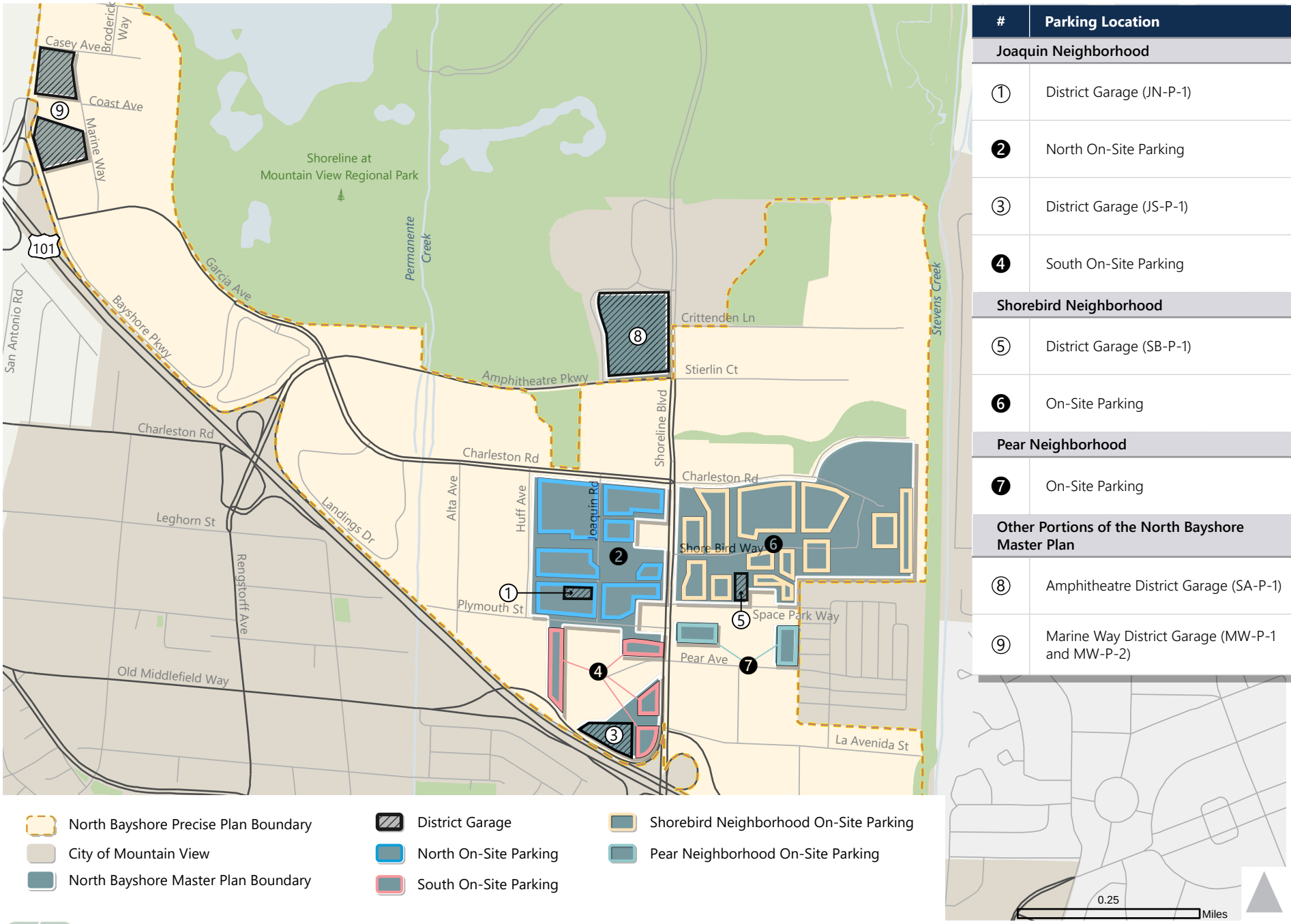
[1] Allocation of residential, office, and retail/commercial on-site parking spaces to each neighborhood assumes that vehicles will park close to their desired destination; therefore, the on-site parking is distributed based on the land use allocation by neighborhood.




Source: North Bayshore Framework Master Plan (December 2022)

Figure ES-2

## North Bayshore Master Plan - Land Use and Streets




| # | Parking Location |
|---|---|
| **Joaquin Neighborhood** | |
| ① | District Garage (JN-P-1) |
| ❷ | North On-Site Parking |
| ③ | District Garage (JS-P-1) |
| ❹ | South On-Site Parking |
| **Shorebird Neighborhood** | |
| ⑤ | District Garage (SB-P-1) |
| ❻ | On-Site Parking |
| **Pear Neighborhood** | |
| ❼ | On-Site Parking |
| **Other Portions of the North Bayshore Master Plan** | |
| ⑧ | Amphitheatre District Garage (SA-P-1) |
| ⑨ | Marine Way District Garage (MW-P-1 and MW-P-2) |

Figure ES-3

# North Bayshore Master Plan – Parking Locations

## Transportation Demand Management Program Measures

The proposed project will implement a TDM program to achieve a 35% morning peak hour inbound single-occupancy vehicle mode share at the development driveways (or district parking structures) for all non-residential development in the NBS Master Plan area. The project would implement various TDM measures consistent with the *North Bayshore Transportation Demand Management (TDM) Plan Guidelines* (2015) for non-residential development and the *North Bayshore Residential Transportation Demand Management Guidelines* (2018) for residential development. **Figure ES-4** shows the modeled morning inbound peak hour mode share for the North Bayshore Master Plans non-residential development, residential development, and total development at the driveways.

*Figure ES-4: Modeled Morning Inbound Peak Hour Mode Share for the North Bayshore Master Plan*


Notes: This mode split is measured at the driveways of all development of the North Bayshore Master Plan (includes new and redeveloped office development).

## Project Traffic Volumes

The NBS Master Plan daily driveway trip generation is shown in **Table ES-3**. The project driveway vehicle trip generation is based on the following information:

- **New Residential Development**: The new residential units are assumed to be a mix of 5,600 market rate units with an average size of 1.80 persons per household and a reduced parking supply rate of 0.65 spaces per dwelling unit, and 1,400 affordable housing units with an average size of 1.90 persons per household and a parking supply rate of 0.69 spaces per dwelling unit. This results in an estimate of 10,080 residents in the market rate units, 2,660 residents in the affordable housing units, and a total of 12,740 residents for the NBS Master Plan. The proposed residential uses would have a combined effective daily trip generation rate of approximately 3.78 daily vehicle trips per dwelling unit, 0.21 AM peak hour vehicle trips per dwelling unit, and 0.30 PM peak hour vehicle trips per dwelling unit.
- **New and Rebuilt Office Development**: The proposed office space is assumed to be 93% occupied (based on historical vacancy rates) at a density of 4.0 employees per 1,000 square feet gross floor area. This results in an estimate of 11,700 employees on site. The daily trip generation rate for new office uses in the NBS Master Plan area is 1.40 daily vehicle trips per employee, 0.20 AM peak hour vehicle trips per employee, and 0.17 PM peak hour vehicle trips per employee. This new office and other non-residential land uses are committed to achieving a 35% morning peak hour inbound single-occupancy vehicle mode share at the development driveways.
- **New Retail and Entertainment Development**: The proposed retail space is assumed to be 93% occupied at a density of 2.67 employees per 1,000 square feet gross floor area. This results in an estimate of 600 employees on site. The daily trip generation rate for new retail/entertainment uses in the NBS Master Plan is 16.3 daily vehicle trips per employee, 0.35 AM peak hour vehicle trips per employee, and 0.63 PM peak hour vehicle trips per employee.
- **New Hotel Development**: The proposed hotel space is assumed to have an employment density of 0.4 employees per room. This results in an estimate of 210 employees on site. The daily trip generation rates for new hotel uses in the NBS Master Plan are 4.79 daily vehicle trips per room, 0.23 AM peak hour vehicle trips per room, and 0.18 PM peak hour vehicle trips per room.
- **New Police Operations Station Development**: The proposed Police Operations Station is assumed to be 93% occupied (based on historical vacancy rates) at a density of 4.0 employees per 1,000 square feet gross floor area. This results in an estimate of 10 employees on site. The daily trip generation rate for new Police Operations Station land uses in the NBS Master Plan area is 1.40 daily vehicle trips per employee, 0.20 AM peak hour vehicle trips per employee, and 0.17 PM peak hour vehicle trips per employee.
- **Public Parking at SA-P-1**: The 240 public parking spaces at SA-P-1 are assumed to have a trip generation similar to Existing Conditions: 440 daily vehicle trips, 40 AM peak hour vehicle trips, and 40 PM peak hour vehicle trips.

## Table ES-3: Driveway Trip Generation with Project

| Land Use | Building Size | Service Population[1] | Daily Trips[1] | AM Peak Hour Trips[1] | | | PM Peak Hour Trips[1] | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | In | Out | Total | In | Out | Total |
| ***North Bayshore Master Plan*** | | | | | | | | | |
| Residential – Market Rate | 5,600 dwelling units | 10,080 | 21,560 | 280 | 900 | 1,180 | 990 | 690 | 1,680 |
| Residential – Affordable | 1,400 dwelling units | 2,660 | 4,930 | 60 | 200 | 260 | 220 | 160 | 380 |
| *North Bayshore Master Plan Residential Trips (A)* | | *12,740* | *26,490* | *340* | *1,100* | *1,440* | *1,210* | *850* | *2,060* |
| Office | 3,145,897 square feet | 11,700 | 16,360 | 2,070 | 280 | 2,350 | 330 | 1,700 | 2,030 |
| Commercial/Retail Space | 240,000 square feet | 600 | 9,720 | 130 | 80 | 210 | 180 | 190 | 370 |
| Active Space Kiosks[2] | 4,000 square feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hotel | 525 Rooms | 210 | 2,520 | 70 | 50 | 120 | 50 | 50 | 100 |
| Community Uses[3] | 55,000 square feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Police Operations Station | 2,000 square feet | 10 | 20 | 0 | 0 | 0 | 0 | 0 | 0 |
| Public Parking at SA-P-1 | 240 spaces | 0 | 440 | 20 | 20 | 40 | 20 | 20 | 40 |
| *North Bayshore Master Plan Non-Residential Trips (B)* | | *12,520* | *29,060* | *2,290* | *430* | *2,720* | *580* | *1,960* | *2,540* |
| **North Bayshore Master Plan Trips (A + B = C)** | | **25,260** | **55,550** | **2,630** | **1,530** | **4,160** | **1,790** | **2,810** | **4,600** |
| ***Existing Building Credit*** | | | | | | | | | |
| Office | 8,653 square feet | -30 | -90 | -10 | 0 | -10 | 0 | -10 | -10 |
| Research & Development | 1,642,061 square feet | -5,720 | -16,510 | -1,330 | -250 | -1,580 | -280 | -1,120 | -1,400 |
| Industrial | 92,497 square feet | -110 | -410 | -50 | -10 | -60 | -10 | -40 | -50 |
| Public Parking at SA-P-1 | 240 spaces | 0 | -440 | -20 | -20 | -40 | -20 | -20 | -40 |
| *Existing Building Credit (D)* | | *-5,860* | *-17,450* | *-1,410* | *-280* | *-1,690* | *-310* | *-1,190* | *-1,500* |
| ***Net Change*** | | | | | | | | | |
| **Net Increase (C + D = E)** | | **19,400** | **38,100** | **1,220** | **1,250** | **2,470** | **1,480** | **1,620** | **3,100** |

Notes:
1. Service population and daily trips rounded to the nearest 10.
2. The 4,000 square feet of active space kiosks identified in the Greenway Park West, Greenway Park East, and The Portal is a local serving use that is assumed not to generate vehicle trips.
3. The 55,000 square feet of community uses is a local serving use that is assumed not to generate separate vehicle trips during a typical weekday, but rather attract walking and biking trips from the surrounding land uses. Weekend programming of the community uses would generate additional vehicle trips outside of the typical weekday.

Source: Fehr & Peers, 2023.

## Site Access and On-Site Circulation

This multi-modal site access, circulation, and parking evaluation of the NBS Master Plan evaluates the NBS Master Plan access and internal circulation for pedestrians, bicyclists, and vehicles. The plan also evaluates the consistency with the NBPP mobility policies, standards, and guidelines based on the Parking Layout and Circulation Plan site plans provided by the applicant. Based on the evaluation, the NBS Master Plan is constructing new facilities that improve the site access and circulation for pedestrians and bicyclists.

While the NBS Master Plan provides circulation throughout the Master Plan area, there were recommendations on the NBS Master Plan figures for consideration in refining the proposed pedestrian access and circulation:

1. Minimize the number of driveways along Shoreline Blvd from Charleston Rd to Plymouth St
2. Remove or modify pedestrian circulation to be consistent with Green Loop
3. Show pedestrian facility along Space Park Way and Manzanita St
4. Show pedestrian facility along Space Park Way and Grove St
5. Show pedestrian facilities on both sides of the Private St
6. Show pedestrian facilities on both sides of Manzanita St
7. Show north/south crossings at Plymouth Ave and Joaquin Rd
8. Show north/south crossings at Plymouth Ave and Huff Rd

While the NBS Master Plan provides bicycle circulation throughout the site, the NBS Master Plan should consider the below recommendations:

1. Show a bicycle facility connection to Monarch St
2. Charleston Rd west of Joaquin Rd: make Class IV separated one way cycle track to conform to cross section
3. Indicate connection at Inigo Way to south of Space Park Way
4. Indicate connection at Manzanita St to south of Space Park Way
5. Indicate connection at Grove St to south of Space Park Way
6. Indicate connection at Joaquin Rd to south of Plymouth St
7. Indicate connection at Huff Ave to south of Plymouth St
8. Indicate connection at Willow St to south of Monarch St
9. Indicate connection at Main St to south of B St

The NBS Master Plan was also evaluated for internal vehicle circulation. While the NBS Master Plan provides vehicle circulation throughout the site, we recommend the NBS Master Plan:

1. If center lane bus stops are to be used during peak hours, extend length of stops along Shoreline Boulevard south of Space Park Way. If operated during peak hours, stops should be long enough to accommodate 2-3 buses to allow for more efficient boarding and alighting. Exact length should be determined upon further study.
2. Provide vehicle right-of-way (ROW) in the northbound direction along the segment of Shoreline Boulevard between Pear Avenue and Space Park Way to account for additional storage capacity. This is consistent with the NBPP, which states that additional right-of-way can be provided along Shoreline Boulevard to accommodate site specific conditions. However, because the NBS Master Plan provides a general level of detail of the land use and transportation network, there may be a need to conduct additional transportation analysis during the PCP (Planned Community Permit) stage or post-construction phase and may require subsequent site specific transportation analysis to ensure that the roadway network and the project sites are designed and built to the City's specifications. In this future phase, reference the VTA Bus Stop & Passenger Design Criteria and Guidelines for bus stop sizing.

The NBS MP allocated 90% of the office parking to the five district parking locations (MW-P-1 & MW-P-2, JN-P-1, JS-P-1, SB-P-1, SA-P-1) within the NBS Master Plan area to reduce SOV commutes and increase land use efficiency; the remaining 10% is for on-site parking locations. We recommend the following elements:

1. Clarify the multimodal access strategy at the MW-P-1 and MW-P-2 district parking structure, including whether there are transit stops, for access to the NBS Master Plan site, micromobility, and bicycle and pedestrian connections.
2. Clarify the intersection design and phasing at the entrance to Amphitheatre Parking Garage from Amphitheatre Parkway.
3. Consider moving the active use parking on Shoreline Boulevard south of Shorebird Way to avoid Green Loop conflicts and use right-in-right-out access.

## Motor Vehicle Operations

Intersections within the project study area were analyzed to identify operations deficiencies and improvements rather than to determine environmental impacts within the meaning of CEQA. Deficiency criteria were presented in the City of Mountain View 2030 General Plan and Greenhouse Gas Reduction Program EIR. The level of service method, which is approved by the City of Mountain View and the VTA, analyzes a signalized intersection's operation based on average control delay per vehicle. The average control delay is calculated using Synchro 11 or TRAFFIX 8.0 analysis software and is correlated to a LOS designation.

## Intersections

Adverse effects or operational deficiencies on intersections were evaluated under Cumulative with Project Conditions. Where adverse intersection effects are identified, physical improvements are identified that would address the operational LOS and queuing deficiency. While many of the identified improvements may not fully address LOS deficiencies and these adverse effects may remain, they do improve intersection delays and/or queues. The identified improvements focus on improving the conflict points that most affect the gateway capacity, including conflict points between office and residential turn movements and gateway turn movements. However, the identified operational improvements may have secondary effects on pedestrian and bicycle travel, especially those that require addition of lanes and roadway widening that increased pedestrian crossing distances and associated pedestrian crossing times. Such effects could be in conflict with the NBPP's multimodal circulation goals; thus the City will need to balance the need for operational improvements with the NBPP Master Plan's overall circulation goals. These identified improvements do not preclude the City of Mountain View from establishing policies and programs to reduce the severity of the adverse effect on these facilities. Lastly, the final improvements will require coordination among multiple stakeholders to address the practical steps of implementing physical improvements, such as additional right of way. Intersections with deficiencies and improvements are summarized below in **Table ES-4.** For each deficient intersection, improvements that address level of service deficiencies are listed first, followed by improvements that address queuing deficiencies. The approaches for which the stated modifications may improve overall intersection motor vehicle operations are listed in northbound (NB), southbound (SB), eastbound (EB), and westbound (WB) approach order.

**Table ES-4: Intersection Deficiency and Improvement Summary**

| Intersection | | Deficiency Identified? | | Operational Improvements Recommended for Future Study[1] |
|---|---|---|---|---|
| | | Existing | Cumulative with Project Conditions | |
| 2 | San Antonio Rd / US 101 Northbound Ramps | No | Yes (AM Peak Hour) | **Intersection LOS Improvements**<br>Lane marking improvements to NB departure<br>**Intersection Queuing Improvements**<br>Turn pocket improvements to the WB approach |
| 4 | Rengstorff Ave / US 101 Northbound Ramps | No | Yes (AM and PM Peak Hour) | **Intersection LOS Improvements**<br>Geometric improvements to the NB, EB, and WB approaches<br>**Intersection Queuing Improvements**<br>Turn pocket improvements to the SB, EB, and WB approaches |
| 5 | Rengstorff Ave / US 101 Southbound Ramps | Yes (AM Peak Hour) | Yes (AM Peak Hour) | **Intersection LOS Improvements**<br>Geometric improvements to the NB and WB approaches<br>**Intersection Queuing Improvements**<br>Turn pocket improvements to the EB and WB approaches |

| Intersection | | Deficiency Identified? | | Operational Improvements Recommended for Future Study[1] |
|---|---|---|---|---|
| | | Existing | Cumulative with Project Conditions | |
| 6 | Rengstorff Ave / Leghorn St | No | Yes (AM and PM Peak Hour) | **Intersection LOS Improvements** Geometric improvements to the EB and WB approaches **Intersection Queuing Improvements** Turn pocket improvements to the NB and SB approaches |
| 9 | Huff Ave / Charleston Rd | No | No | **Intersection Queuing Improvements** Turn pocket improvements to the NB and WB approaches |
| 11 | Shoreline Blvd / Charleston Rd | Yes (PM Peak Hour) | Yes (AM and PM Peak Hour) | **Intersection LOS Improvements** Geometric improvements to the SB and EB approaches **Intersection Queuing Improvements** Turn pocket improvements to the NB, SB, EB and WB approaches |
| 13 | Huff Ave / Plymouth St | No | Yes (AM and PM Peak Hour) | **Intersection LOS Improvements** Geometric improvements to all approaches and intersection signalization |
| 14 | Joaquin Rd / Plymouth St | No | Yes (AM and PM Peak Hour) | **Intersection LOS Improvements** Geometric improvements to all approaches and intersection signalization |
| 15 | Shoreline Blvd / Space Park Wy | Yes (AM Peak Hour) | Yes (AM and PM Peak Hour) | **Intersection LOS Improvements** Geometric improvements to the NB, SB, and EB approaches and signal phasing improvements, dedicated bus signal phase **Intersection Queuing Improvements** Turn pocket improvements to the NB approach |
| 17 | Shoreline Blvd / Pear Ave | Yes (AM Peak Hour) | Yes (AM and PM Peak Hour) | **Intersection LOS Improvements** Geometric improvements to the NB and EB approaches and signal phasing improvements, including dedicated bus signal phase |
| 18 | Shoreline Blvd / La Avenida-US 101 Northbound Ramps | Yes (AM and PM Peak Hour) | Yes (AM and PM Peak Hour) | **Intersection LOS Improvements** Geometric improvements to the WB approach |
| 21 | Inigo Wy / La Avenida | No | Yes (AM and PM Peak Hour) | **Intersection LOS Improvements** Geometric improvements to the NB and EB approaches and intersection signalization |

Notes:

1. Potential operational improvements may have secondary effects on pedestrian and bicycle travel and the City will need to balance the need for operational improvements with the NBPP Master Plan's overall circulation goals before implementing any of the potential operational improvements.

Source: Fehr & Peers, 2023.

**Recommendations**

The following recommendations regarding the suggested intersection modifications are proposed to identify next steps that can be considered in conjunction with approval of the Master Plan and actions that can be taken to address future intersection deficiencies.

**San Antonio and Rengstorff / US 101 Interchanges (Intersections 1-6)** These suggestions should be reviewed through the current VTA / Caltrans San Antonio/Rengstorff Interchange project (PA & ED Phase). The suggested improvements can be considered for potential inclusion in the PA & ED study. A recommended project (or phases) for these two interchanges will be developed through the PA & ED and will be separately funded.

**Charleston Transit Boulevard (Intersections 7-10)** Evaluate the impact of turn lane extensions on median and bus lane operations. These modifications are not supported if additional right-of-way is required or if there are negative effects on the bus lane operation A decrease in the length of a dedicated bus lane for the benefit of vehicle operations is not consistent with Council priorities.

**Shoreline Intersections (Intersections 11, 15, 17)** Additional detailed analysis of these draft intersection improvements is needed to determine feasibility, operational benefits, and right-of-way impacts. Some proposals are not consistent with the advanced design of Priority Transportation Improvement projects and require additional property. Expansion of public right-of-way for the benefit of vehicle operations is not consistent with Council's current priorities.

The report indicates that even with priority transportation improvements and the NBPP improvements, with the addition of the project traffic, Shoreline Boulevard will operate with deficiencies, particularly during the evening peak hour for the southbound direction. Operations on Shoreline Boulevard indicates a need to develop additional strategies to better manage peak period congestion. A Shoreline Corridor Plan should be developed to identify traffic management strategies. Those strategies, after further evaluation, can be considered for future implementation in conjunction with Master Plan development phases. Funding is needed to develop the Corridor Plan and to implement the improvement strategies.

**Plymouth Street Intersections (Intersections 12-14)** The proposed right-of-way impacts of added turn lanes should be evaluated in conjunction with detailed intersection design at the individual project approval phase. Improvements should be consistent with street design approved through the North Bayshore Master Plan.

Signalization of Plymouth intersections is expected to be warranted in the future. Fair share contribution calculations are provided for City staff to develop fair share contributions for intersection improvements.

**Shoreline / US 101 Interchange (Intersections 18-21)** These suggestions should be coordinated with current plans for the Shoreline / US 101 Ramp Realignment project. In the near term, no changes to current projects are expected. Some improvements may be considered as a future phase with additional funding of improvements. Expansion of public right-of-way for the benefit of vehicle operations is not consistent with Council's current priorities.

Signalization of Inigo/La Avenida intersection may be warranted in the future. Fair share contribution calculations are provided for City staff to develop fair share contributions for intersection improvements.

## Traffic Calming

The NBS Master Plan will develop a dense and flexible street grid that allows for safe travel for all modes through the site. The new street grid will include new or retrofitted complete streets, pedestrian pathways, and multi-use trails integrated with the existing street network. This includes the Green Loop that provides pedestrian and bicycle connections within the NBS Master Plan area as well as the nearby trails and parks, the Social Spine that provides space for active uses and pedestrian connections within Shorebird, and a network of new off-street paths. In addition to adding new streets, the NBS Master Plan will retrofit several existing streets to increase the visibility of pedestrians and bicyclist, shorten crossing distances for pedestrians and bicyclists, and/or slow the speed of vehicles at mid-block and at intersections using traffic calming treatments, such as curb extensions, raised crosswalks or intersections, and tighter curb returns especially for the most local streets. Because most of the vehicles passing through the North Bayshore gateway will have an origin or destination within the North Bayshore District and because of its size, in the NBS Master Plan area, the project, at this time, is not considered to have an adverse effect on any of the three applicable criteria per Section 1.5/Table 5. However, because the NBS Master Plan provides a general level of detail of the land use and transportation network, there may be a need to conduct additional transportation analysis during the PCP (Planned Community Permit) stage or post-construction phase and may require subsequent site specific transportation analysis to ensure that the roadway network and the project sites are designed and built to the City's specifications.

## Pedestrian and Bicycle Operations

The proposed plan encourages pedestrian mobility through new streets and mid-block connections, which will enhance the pedestrian experience by reducing the scale of the urban grid to create a dense and flexible network and providing safe and direct pedestrian connections to neighborhood services, places of work, residences, amenities, parks and open space, and transit facilities. Pedestrian Quality of Service (PQOS), which illustrates the quality and walkability of sidewalk facilities, ranges from 1 to 5 (with 1 being the highest quality); however, the existing PQOS for the NBS Master Plan site ranges between a PQOS 4 and PQOS 5. The proposed NBS Master Plan will enhance the pedestrian conditions and improve PQOS by adding sidewalks, paths, the Social Spine, and the Green Loop for pedestrians. The project is not considered to have an adverse effect on any of the four applicable pedestrian criteria per Section 1.5/Table 5.

Bicycling level of traffic stress (LTS) is used to evaluate the quality of a person's experience while bicycling through a 1-4 scoring system, with 1 and 2 being low stress and preferred. Under Existing Conditions, bicycling level of stress along Shoreline Boulevard between Charleston Road and North Road is LTS 4 and is LTS 3 along Amphitheatre Parkway and Charleston Road. The rest of the NBS Master Plan site areas are LTS 1 and 2. A 3.7 mile off-street and on-street bicycle network is proposed to provide a variety of options for cyclists of all ages and capabilities. The bicycle network will include expansions of and enhancements

to existing bike facilities as well as new connections to the regional bike network. The addition of low stress bicycle network components improves the overall quality of the streets. Under Project Conditions, all streets are rated very good or good with respect to the bicycle LTS score. Bikeshare services should be integrated into transit stations to support last-leg connections. Because the NBS Master Plan provides a general level of detail of the land use and transportation network, there will be a need to conduct additional transportation analysis during the PCP (Planned Community Permit) stage and may require subsequent site specific transportation analysis to ensure that each mode of travel and the project site are designed and built to the City's specifications. The project, at this time, is not considered to have an adverse effect on any of the three applicable bicycle criteria per Section 1.5/Table 5.

## Parking

The parking in the existing plan area is characterized by surface parking lots that front/surround most individual buildings. The NBS Master Plan parking strategy proposes to relocate and consolidate the existing surface lots into centralized district parking facilities with a limited amount of parking retained at individual sites. The goal of the parking strategy is to reduce demand for parking by constraining supply and providing complementary TDM measures, shown in the TDM section (Chapter 13), and the Transportation Demand Program measures (Chapter 1.2.3). The NBS Master Plan includes five district parking locations within the NBS Master Plan area:

- JN-P-1 (Joaquin North) is located at the southwest corner of Monarch Street and Joaquin Road within the Joaquin North neighborhood and contains approximately 500 parking spaces. JN-P-1 serves active uses and hotel, neighborhood parks, open spaces, and residential visitor parking.
- JS-P-1 (Joaquin South) is a 6-level parking garage location in the Joaquin South neighborhood that contains approximately 700 parking spaces. JS-P-1 serves office (450 parking spaces) and retail and hotel uses (250 parking spaces).
- SB-P-1 (Shorebird) is located at the northeast corner of Space Park Way and Manzanita Street within the Shorebird neighborhood and contains approximately 600 spaces. SB-P-1 serves hotel and active uses as well as residential visitor parking.
- SA-P-1 (Amphitheatre) is a 6-level parking garage located at the northwest corner of Shoreline Boulevard and Charleston Road that contains approximately 4,584 parking spaces for the NBS Master Plan (4,334 parking spaces), the police operations station (10 parking spaces), and the public parking spaces (240 parking spaces). SA-P-1 serves office employee parking.
- MW-P-1 & MW-P-2 (Marine Way) are 2- to 3-level parking garages along Marine Way that contain approximately 890 parking spaces. Both parking garages serve office uses.

In addition to the district parking locations, the NBS Master Plan includes office and residential on-site parking locations within the NBS Master Plan area. To lower office workers' dependency on SOV, the NBS Master Plan provides 90% of the office parking in district office parking garages SA-P-1, JS-P-1, and the Marine Way garages (MW-P-1 and MW-P-2), and only 10% of the office parking in office on-site parking locations adjacent to the office buildings.

The NBS Master Plan parking strategy proposes to relocate and consolidate the existing surface lots into centralized district parking facilities with a limited amount of surface parking retained at individual sites. A total of 12,708 parking spaces are proposed, including 7,274 in district parking and 5,434 in on-site parking locations. Of these 4,550 are allocated for residential uses, 6,587 to office uses and 1,203 to retail/visitor, and 368 to hotel uses. Each parking location will serve different land uses and thus affect how vehicles travel on the local streets. **Table ES-5** shows the proposed parking supply by location and land use. The NBP Master Plan meets the proposed parking maximum provided per the NBPP.

**Table ES-5: Parking Locations**

| Parking Location | Parking Spaces[1] | Residential Parking | Office | Retail/Visitor | Hotel |
|---|---|---|---|---|---|
| 1. District Garage (JN-P-1) | 500 | 0 | 0 | 500 | 0 |
| 2. District Garage (JS-P-1) | 700 | 0 | 450 | 57 | 193 |
| 3. District Garage (SB-P-1) | 600 | 0 | 0 | 425 | 175 |
| 4. Amphitheatre District Garage (SA-P-1) | 4,584 | 0 | 4,584 | 0 | 0 |
| 5. Marine Way District Garage (MW-P-1 and MW-P-2) | 890 | 0 | 890 | 0 | 0 |
| 6. On-site parking | 5,434 | 4,550 | 663 | 221 | 0 |
| **Total** | **12,708** | **4,550** | **6,587** | **1,203** | **368** |

Source: Fehr & Peers, 2023.

The carshare vehicle requirement for office/research and development land uses is a minimum of three parking spaces per building site for carshare operators. For residential land use, the carshare vehicle requirement is at least one carsharing space for residential parking lots with over 50 parking spaces and at least two carsharing spaces plus 1 space for every 200 additional spaces for residential lots 200 and over. Dedicated carshare spaces will be provided in all garages in the NBS Master Plan area. For office parking, this includes a minimum of 3 car share spaces in each office parking lot. For residential parking, this includes at least 1 space for residential lots over 50 spaces and at least 2 spaces for residential lots over 200 spaces, plus 1 for every additional 200 dwelling units. Car share spaces may also be clustered in centralized locations. The NBS Master Plan's provision of carshare spaces in all parking locations would meet the NBPP requirements.

The project would provide sufficient bicycle parking spaces including short-term and long-term parking for office, retail, and residential uses to meet the NBPP requirements.

1. The project, at this time, is not considered to have an adverse effect on any of the four applicable parking criteria per Section 1.5/Table 5.

## Transportation Demand Management

The NBS Master Plan will implement a TDM program to achieve a 35% morning peak hour inbound single-occupancy vehicle mode share at the development driveways (or district parking structures) for all non-residential development in the NBS Master Plan area. The NBS Master Plan's TDM Plan is a description of Google's approach to reducing vehicle trips by offering employees and residents transportation choices to meet the City's policy requirements and sustainability goals. The TDM Plan describes City of Mountain View transportation policies related to TDM and serves as a guide on how Google will implement the TDM Plan and monitor its success. Specifically, the TDM Plan would implement various TDM measures consistent with the *North Bayshore Transportation Demand Management (TDM) Plan Guidelines* (2015) for non-residential development and the *North Bayshore Residential Transportation Demand Management Guidelines* (2018) for residential development. The TDM plan is a living document that will be reviewed and updated over time to respond to employee behavior and transportation programs. The TDM Plan would implement a variety of TDM measures categorized in the following six TDM programs (Summary from Figure 4.1.5 on Page 25 of the NBS Master Plan TDM Plan; TDM reduction relative to an existing 67.5% SOV mode share)[2]:

- *Active Mobility* (Estimated TDM Reduction of *15%*)
    - *Walk/bike from shorebird residential; bicycle parking, shower and changing facilities; bicycle sharing; bicycle incentives; on-site bicycle repair facilities; bicycle buddy programs; bicycle giveaway program.*
- *Ridesharing and Car Sharing* (Estimated TDM Reduction of *5%*)
    - *Priority parking for carpools and vanpools; rideshare matching services; subsidized or free vanpools or carpools; expanded carpool matching; and car sharing.*
- *Shuttle and Transit* (Estimated TDM Reduction of *30%*)
    - *Shuttle services [including midday service and commute peak hour]; pre-tax commuter benefits; and commuter shuttle services [ranging from long haul, first-last mile connections, and public transit hubs].*
- *Flexible Work Schedule* (Estimated TDM Reduction of *2%*)
    - *Flexible work schedules, and emergency ride home*
- *Marketing* (Estimated TDM Reduction of *2%*)
    - *On-site transportation coordinator; membership in the TMA; marketing and information.*
- *Site Design and Other Measures* (Estimated TDM Reduction of *10%*)
    - *Parking cashout; parking supply; [unbundled parking; parking pricing]; on-site amenities and services; funding district-wide services, other TDM measures.*

With this TDM Plan in mind, this chapter evaluates the NBS Master Plan's conformance with the North Bayshore District Trip Cap Policy for each of the three gateways at San Antonio Road, Rengstorff Avenue,

[2] *North Bayshore Transportation Demand Management (TDM) Plan Guidelines* (2015) for non-residential development and the *North Bayshore Residential Transportation Demand Management Guidelines* (2018)

and Shoreline Boulevard, the three gateways combined, and the recommended North Bayshore District Trip Cap Policy trip targets where the Rengstorff and Shoreline gateways are combined. For the recommended North Bayshore Trip Cap Policy at Shoreline Boulevard and Rengstorff Avenue combined, the vehicle volume is less than the trip target during both peak periods and the NBS Master Plan is in conformance with the recommended North Bayshore Trip Cap Policy trip targets. Because the NBS Master Plan provides a general level of detail of the land use and transportation network, there will be a need to conduct additional transportation analysis during the PCP (Planned Community Permit) stage and may require subsequent site-specific transportation analysis to ensure that each mode of travel and the project site are designed and built to the City's specifications.

## Conclusion

The NBS Master Plan provides a general level of detail of the land use, transportation network, and project sites; therefore, there may be a need to conduct additional transportation analysis during the PCP (Planned Community Permit) stage and may require subsequent site-specific transportation analysis to ensure that each project site's access and circulation, parking, and multimodal operations are designed and built to the City's specifications.

The report indicates that even with priority transportation improvements and the NBPP improvements, with the addition of the project traffic, Shoreline Boulevard will operate with deficiencies, particularly in the evening peak hour for the southbound direction. Operations on Shoreline Boulevard indicates a need to develop additional strategies to better manage peak period congestion. A Shoreline Corridor Plan should be developed to develop traffic management strategies. Those strategies, after further evaluation, can be considered for future implementation in conjunction with Master Plan development phases. Funding is needed to develop the Corridor Plan and help fund the improvement strategies.

In addition, implementation of the NBS Master Plan would result in adverse operational effects at several study intersections and would require intersection improvements to address the adverse effects. Because the project would contribute trips to the North Bayshore District, fair share contribution calculations are provided for City staff to develop fair share contributions for intersection improvements recommended in this report. Intersections with deficiencies and improvements are summarized in **Table ES-4** and in more detail in **Table 27** in **Chapter 8.** The peak hour fair share contributions of the NBS Master Plan are also included in **Table 27.** City staff intends to average the AM and PM peak hour fair share contribution estimates to determine the overall project contribution.

# 1. Introduction and Project Description

This report presents the results of the Multi-Modal Transportation Analysis (MTA) for the North Bayshore Master Plan (NBS Master Plan). Except for the Amphitheatre District garage (SA-P-1), the NBS Master Plan area is within the North Bayshore District and the North Bayshore Precise Plan (NBPP) area, which is generally bounded by the Shoreline at Mountain View Regional Park in the north, US 101 to the south, Stevens Creek to the east, and San Antonio Road to the west. The NBS Master Plan land uses are bounded by Huff Avenue, Bayshore Freeway, Pear Avenue, Charleston Road, and Stevens Creek.

The NBS Master Plan includes a combination of land use, transportation infrastructure, district parking, and transportation demand management program improvements.[3] To acknowledge the challenge of accessing North Bayshore by vehicle and to be more compliant with the North Bayshore District Trip Cap Policy, the trip generation analysis presented in this report assumes the NBS Master Plan Transportation Demand Management (TDM) measures achieve a 35% morning peak hour inbound single-occupancy vehicle (SOV) mode share at the driveways for all non-residential development. **Figure 1** shows the NBS Master Plan boundary and location within the NBPP as well as the surrounding transportation network.

This chapter discusses the MTA project context and analysis approach, project description, study area, analysis scenarios, report organization, and criteria for determining adverse effects.

## 1.1 Project Context and Analysis Approach

The purpose of the MTA is to perform a supplemental MTA that builds upon the *Final Subsequent Environmental Impact Report for the North Bayshore Precise Plan (NBPP)* (certified in November 2017) and the *NBPP Transportation Impact Analysis (TIA)* (July 2017). The MTA will conduct an evaluation of the internal street design, site access, and circulation with an emphasis on the pedestrian and bicycle access to the district parking and shuttle/transit stops along Charleston. To assess the effects of the district parking, focused vehicle operations and/or queuing analysis will be conducted at the four district parking structures within the NBS Master Plan area and the North Bayshore gateways. The MTA will also include an evaluation of the NBS Master Plan's consistency with the North Bayshore District Trip Cap Policy, the North Bayshore Circulation Study, and site-specific Transportation Demand Management (TDM) Plan Policy requirements.

[3] As allowed by the NBPP, the master planning process provides a coordinated and integrated approach to larger developments or areas under certain conditions. The process allows the City to achieve key Precise Plan objectives, while allowing projects flexibility and an administrative process focusing on key development objectives. The master planning process is outlined in section 3.5.2 of the NBPP.

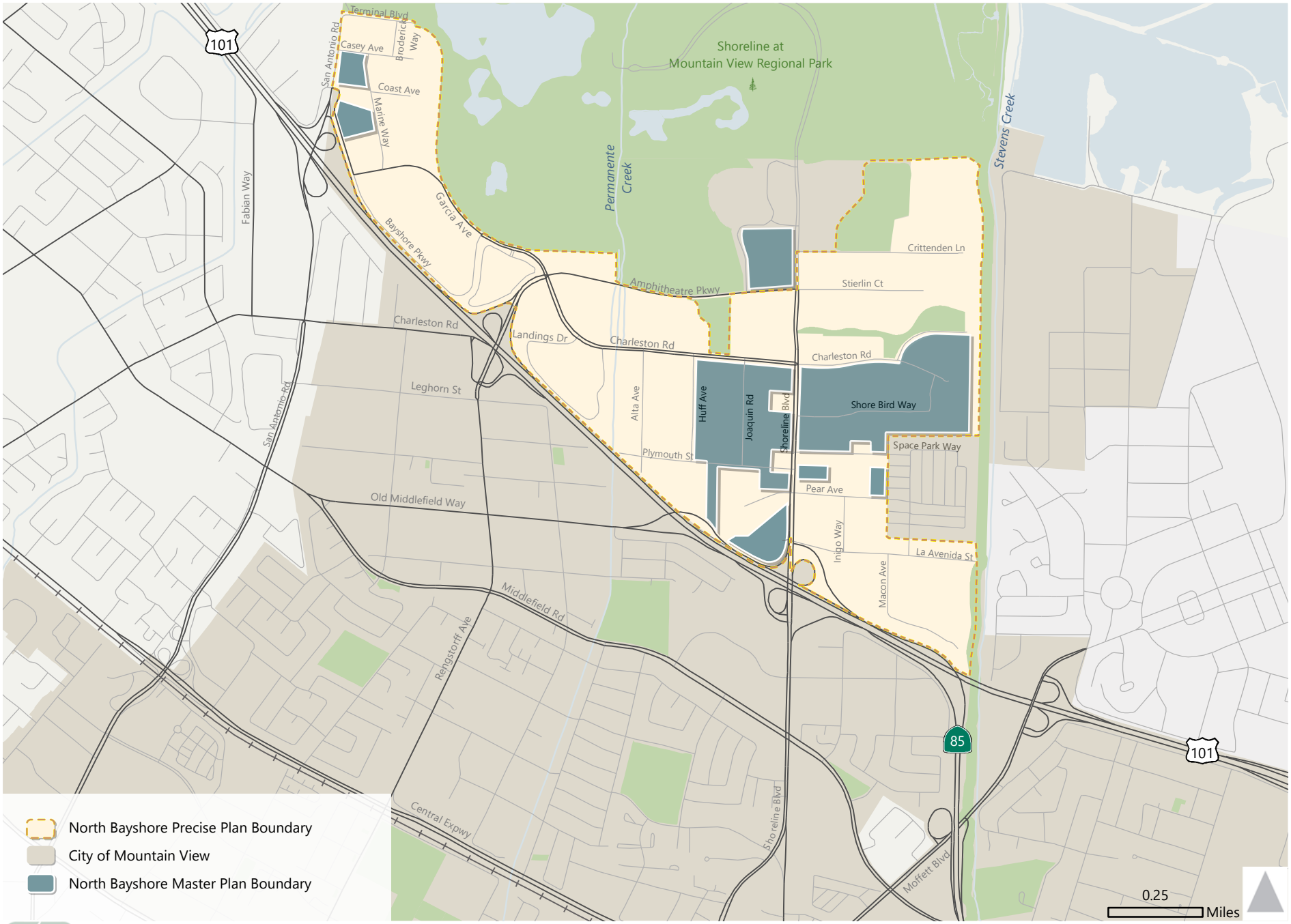



Figure 1

# North Bayshore Master Plan Location

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The NBPP includes development standards, such as allowable land uses and parking requirements, and identifies new public improvements for the area. The NBPP complete streets and land use policies were developed to support active transportation and transit usage. The Mountain View 2030 General Plan envisions North Bayshore as a sustainable high-technology employment center with mixed land use and protected open spaces.

The previously completed NBPP TIA includes a transportation analysis for the entire NBPP area consistent with the transportation analysis requirements for a "very large land use project" outlined in the City of Mountain View's *Multi-Modal Transportation Analysis Handbook* (February 2021). The NBPP TIA included the following analysis to evaluate all modes of travel, including pedestrian, bicycle, transit, and vehicle modes:

- Vehicle level of service for freeways and intersections
- Transit delay analysis by route
- Light rail and bus capacity analysis
- Bicycle level of traffic stress for the street network in and near the NBPP area
- Pedestrian and bicycle walk shed analysis from the light rail stations
- Pedestrian and bicycle Quality of Service evaluation to evaluate the effects of transportation improvements

This MTA supplements the NBPP TIA, with guidance suggesting the following:

- Assess multi-modal site access using qualitative analysis methods
- Review and provide comments on the North Bayshore Framework Master Plan
- Perform motor vehicle operation analysis to identify vehicle intersection operational issues at the North Bayshore gateways attributed to the NBS Master Plan
- Summarize pedestrian and bicycle operations and multi-modal transportation improvements to address adverse effects on the transportation system near the shuttle and transit stops along Charleston Road and Shoreline Boulevard and near the district parking
- Determine the NBS Master Plan's consistency with transportation and parking policies and design elements of the NBPP
- Determine the NBS Master Plan's consistency with the driveway trip targets and the North Bayshore District Trip Cap Policy

## 1.2 Project Description

As described below, the NBS Master Plan includes a land use program, transportation infrastructure and district parking improvements, and transportation demand management program measures. The NBS Master Plan describes an area covering approximately 151-acres which represents the land to which the North Bayshore Framework Master Plan applies. This Master Plan and related documents reference the vision, guiding principles, and planning controls set by the North Bayshore Precise Plan (NBPP).

### 1.2.1 Land Use Program

The NBS Master Plan would allow for the following land use changes as compared to what was on the ground in 2020.

- 7,000 residential units
    - 5,600 market rate dwelling units with a mix of 60% studio and 1-bedroom, and 40% 2- and 3-bedrooms with a residential parking supply of 0.65 spaces per dwelling unit.
    - 1,400 affordable rate dwelling units with a mix of 25% each of studio, 1-bedroom, 2-bedrooms, and 3-bedrooms and a residential parking supply rate of 0.69 spaces per dwelling unit.
        - 1,050 affordable rate residential units will be facilitated via land dedication for stand-alone affordable housing.
        - 350 affordable rate residential units will be provided as inclusionary units within the market-rate residential buildings.
- 3,145,897 square feet of office space with a parking supply rate of 2.0 spaces per 1,000 square feet
    - 1,280,774 additional square feet of office building space
    - 8,653 square feet of existing office space to be retained
    - 1,642,061 square feet of research & development rebuilt as office space
    - 92,497 square feet of industrial rebuilt as office space
    - 121,912 square feet of vacant development rebuilt as office space[4]
- 240,000 square feet of retail/commercial space
- 4,000 square feet of active space kiosks[5]
- 525 hotel rooms
- 55,000 square feet of community uses[6]
- 2,000 square foot police operations station with 10 parking spaces dedicated to the police department in the Amphitheatre parking garage (SA-P-1)

[4] Vacant buildings for 2020 include the 91,392 square feet at 1400 North Shoreline Boulevard and 30,520 square feet at 1220-1230 Pear Avenue.

[5] The 4,000 square feet of active space kiosks identified in the Greenway Park West, Greenway Park East, and The Portal is a local serving use that is assumed not to generate vehicle trips.

[6] The 55,000 square feet of community uses is a local serving use that is assumed not to generate separate vehicle trips during a typical weekday, but rather attract walking and biking trips from the surrounding land uses. Weekend programming of the community uses would generate additional vehicle trips outside of the typical weekday.

The total change in residential, office, retail, hotel, and community uses is shown in **Table 1**. The Project also includes 240 public parking spaces and 10 police operations station parking spaces within the Amphitheater District Garage.

**Table 1: North Bayshore Master Plan Land Use Program: Building Size**

| Land Use[1] | Units | Existing Conditions (2020)[2] [A] | Project Conditions (2030) [B] | Change [B-A=C] |
|---|---|---|---|---|
| Residential – Market Rate | Dwelling Units | 0 | 5,600 | 5,600 |
| Residential – Affordable | Dwelling Units | 0 | 1,400 | 1,400 |
| Office | Square Feet | 8,653 | 3,145,897 | 3,137,244 |
| Research & Development | Square Feet | 1,642,061 | 0 | -1,642,061 |
| Industrial | Square Feet | 92,497 | 0 | -92,497 |
| Retail/Commercial | Square Feet | 0 | 240,000 | 240,000 |
| Active Space Kiosk | Square Feet | 0 | 4,000[3] | 4,000 |
| Hotel | Rooms | 0 | 525 | 525 |
| Community Uses | Square Feet | 0 | 55,000[4] | 55,000 |
| Police Operations Station | Square Feet | 0 | 2,000 | 2,000 |

Notes:

1. Because it is not a programmed land use, the 240 public parking spaces and 10 parking spaces for the police operations station that are added to Amphitheatre District Parking Garage is not included in this building summary.
2. Existing Conditions is relative to 2020. Vacant buildings for 2020 include the 91,392 square feet at 1400 North Shoreline Boulevard, and the 30,520 square feet at 1220-1230 Pear Avenue. These vacant and fenced off, the buildings at 1400 North Shoreline Boulevard and 1220-1230 Pear Avenue were not included in the 2020 baseline and therefore, do not show up as a demolished building credit because they are not occupied buildings.
3. The 4,000 square feet of active space kiosks identified in the Greenway Park West, Greenway Park East, and The Portal is a local serving use that is assumed not to generate separate vehicle trips during a typical day, but rather attract walking and biking trips from the surrounding land uses.
4. The 55,000 square feet of community uses is a local serving use that is assumed not to generate separate vehicle trips during a typical weekday, but rather attract walking and biking trips from the surrounding land uses. Weekend programming of the community uses would generate additional vehicle trips outside of the typical weekday.

Source: Fehr & Peers, 2023.

This project uses a combination of district parking and on-site parking for each land use. Each parking location will serve a combination of specified land uses. The parking location directly affects how vehicles travel on the local streets. The land use program is described by parking location in **Table 2** and the parking locations are shown in **Figure 3.**

## Table 2: North Bayshore Master Plan Land Use Program: Building Size and Parking Location

| Parking Location[1] | Parking Spaces[2] | Residential: Market Rate (Dwelling Units) | Residential: Affordable (Dwelling Units) | Office (Square Feet)[3] | Retail/ Commercial Space (Square Feet) | Hotel (Rooms) |
|---|---|---|---|---|---|---|
| ***Joaquin Neighborhood*** | | | | | | |
| 1. District Garage (JN-P-1)[4,5,6] | 500 | 0 | 0 | 0 | 35,000 | 0 |
| 2. North On-Site Parking | 2,531 | 2,789 | 527 | 125,630 | 0 | 0 |
| 3. District Garage (JS-P-1)[5,6] | 700 | 0 | 0 | 224,707 | 25,000 | 275 |
| 4. South On-Site Parking | 746 | 720 | 294 | 25,000 | 0 | 0 |
| ***Shorebird Neighborhood*** | | | | | | |
| 5. District Garage (SB-P-1)[5,6] | 600 | 0 | 0 | 0 | 180,000 | 250 |
| 6. On-Site Parking | 1,826 | 1,832 | 328 | 162,160 | 0 | 0 |
| ***Pear Neighborhood*** | | | | | | |
| 7. On-Site Parking | 331 | 259 | 251 | 0 | 0 | 0 |
| ***Other Portions of the North Bayshore Master Plan*** | | | | | | |
| 8. Amphitheatre District Garage (SA-P-1)[7,8] | 4,584 | 0 | 0 | 2,165,980 | 0 | 0 |
| 9. Marine Way District Garage (MW-P-1 and MW-P-2) | 890 | 0 | 0 | 444,420 | 0 | 0 |
| ***Total of North Bayshore Master Plan*** | | | | | | |
| **Total** | **12,708** | **5,600** | **1,400** | **3,147,897** | **240,000** | **525** |

Notes:

1. Parking locations serve certain land uses, depending on land use location and district parking management policy.
2. Parking spaces based on "Updated Car Parking" summary provided on October 19, 2022. Allocation of residential, office, and retail/commercial on-site parking spaces assumes that vehicles will park close to their desired destination; therefore, the on-site parking is distributed based on the land use allocation by neighborhood.
3. Assumes 90% of the office parking is assigned to the district garages (JN-P-1, JS-P-1, SA-P-1, MW-P-1, and MW-P-2) and 10% to the on-site parking locations in each neighborhood. The district office parking is distributed to district parking locations based on the number of designated office parking spaces available per district garage. The on-site parking is distributed to parking locations based on amount of office land use in each neighborhood.
4. Also serves residential visitor parking.
5. The 4,000 square feet of active space kiosks identified in the Greenway Park West, Greenway Park East, and The Portal is a local serving use that would not generate vehicle trips during a typical day, but rather attract walking and biking trips from the surrounding land uses. Retail/commercial space parking when needed for events or specific active use programming would be provided in JN-P-1, JS-P-1, and/or SB-P-1.
6. The 55,000 square feet of community uses is a local serving use that is assumed not to generate separate vehicle trips during a typical weekday, but rather attract walking and biking trips from the surrounding land uses. Community uses parking when needed for weekend events or specific active use programming would be provided in JN-P-1, JS-P-1, and/or SB-P-1.
7. The Amphitheatre District Parking Garage is the 4,334 parking spaces for the NBS Master Plan, 10 parking spaces for the police operations station, and 240 public parking spaces added to Amphitheatre District Parking Garage.
8. The office summary includes the 2,000 square foot police operations station.

Source: Fehr & Peers, 2023.

### 1.2.2 Transportation Infrastructure and District Parking Improvements

The project will also feature new streets and other transportation infrastructure (illustrated on **Figure 2**), and district parking (illustrated on **Figure 3**) including the following:

- New streets:
    - Monarch Street is a proposed two-lane east-west Neighborhood Street with bicycle facilities that extends from Huff Avenue to Shoreline Boulevard. Monarch Street continues east of Shoreline Boulevard from Grove Street (new street) to Black Street. It will have a separated/buffered one-way bike lanes on each side of the street.
    - C Street is a proposed two-lane north-south Neighborhood Street that extends south of Plymouth Street. It will have a separated/buffered one-way bike lanes on each side of the street.
    - Grove Street is a proposed two-lane north-south Neighborhood Street that extends from Space Park Way to Shorebird Way. It will have a separated/buffered one-way bike lanes on each side of the street.
    - Manzanita Street is a proposed two-lane north-south Neighborhood Street that extends from Space Park Way to Charleston Road. It will have a separated/buffered one-way bike lanes on each side of the street.
    - Willow Street is a proposed two-lane north-south Neighborhood Street that extends from Monarch Street to Shorebird Way. It will have a separated/buffered one-way bike lanes on each side of the street.
    - Inigo Way is a proposed two-lane north-south Neighborhood Street that extends from Space Park Way to Charleston Road. It will have a separated/buffered one-way bike lanes on each side of the street.
    - Shorebird Way is proposed to be extended to the east as a Neighborhood Street to Black Street (new street). It will have a protected bidirectional cycle track on the north side of the street and a multi-use path will on the south side of the street.
    - Black Street is a proposed two-way Access Street at the east terminus of Monarch Street extending north to Shorebird Way. It will have a separated/buffered one-way bike lanes on each side of the street. North of Shorebird Way, Black Street is proposed to be a one-way street with will have pedestrian access, bicycle access, and emergency vehicle access.
- Modified streets:
    - Huff Avenue between Plymouth Street and Charleston Road will be modified to a Neighborhood Street to include two travel lanes and separated one-way bike lanes on each side of the street.
    - Joaquin Road between Plymouth Street and Charleston Road will be modified to a Neighborhood Street to include two travel lanes and a separated/buffered one-way bike lane on each side of the street.
    - Shoreline Boulevard will be modified to be a 5-lane transit boulevard. It will have a separated/buffered one-way bike lane on each side of the street north of Space Park Drive.

- Shorebird Way is proposed to be extended to the east as a Neighborhood Street to Monarch Street (new street). Shorebird Way has three Existing Street versions:
  - Shorebird Way 01 (Arrival) is a Neighborhood Street with one lane between Shoreline Boulevard and Manzanita Street. It will have the Green Loop, a bidirectional cycle track on one side of the street.
  - Shorebird Way 02 (Greenway) is a Neighborhood Street with one lane between Manzanita Street and Inigo Way. It will have a bidirectional cycle track on one side of the street.
  - Shorebird Way 03 (Wilds) is a 2-lane Neighborhood Street between Inigo Way and Black Street. It will have a protected bidirectional cycle track on the north side of the street and a multi-use path will on the south side of the street.
- Space Park Way will be modified to be a 2-lane Neighborhood Street. It will have a separated one-way bike lane on each side of the street.
- Charleston Road between Black Street and Inigo Way will be modified to a one-way street, with public pedestrian access, bicycle access, emergency vehicle access, and limited access for specific land uses proposed in the future.

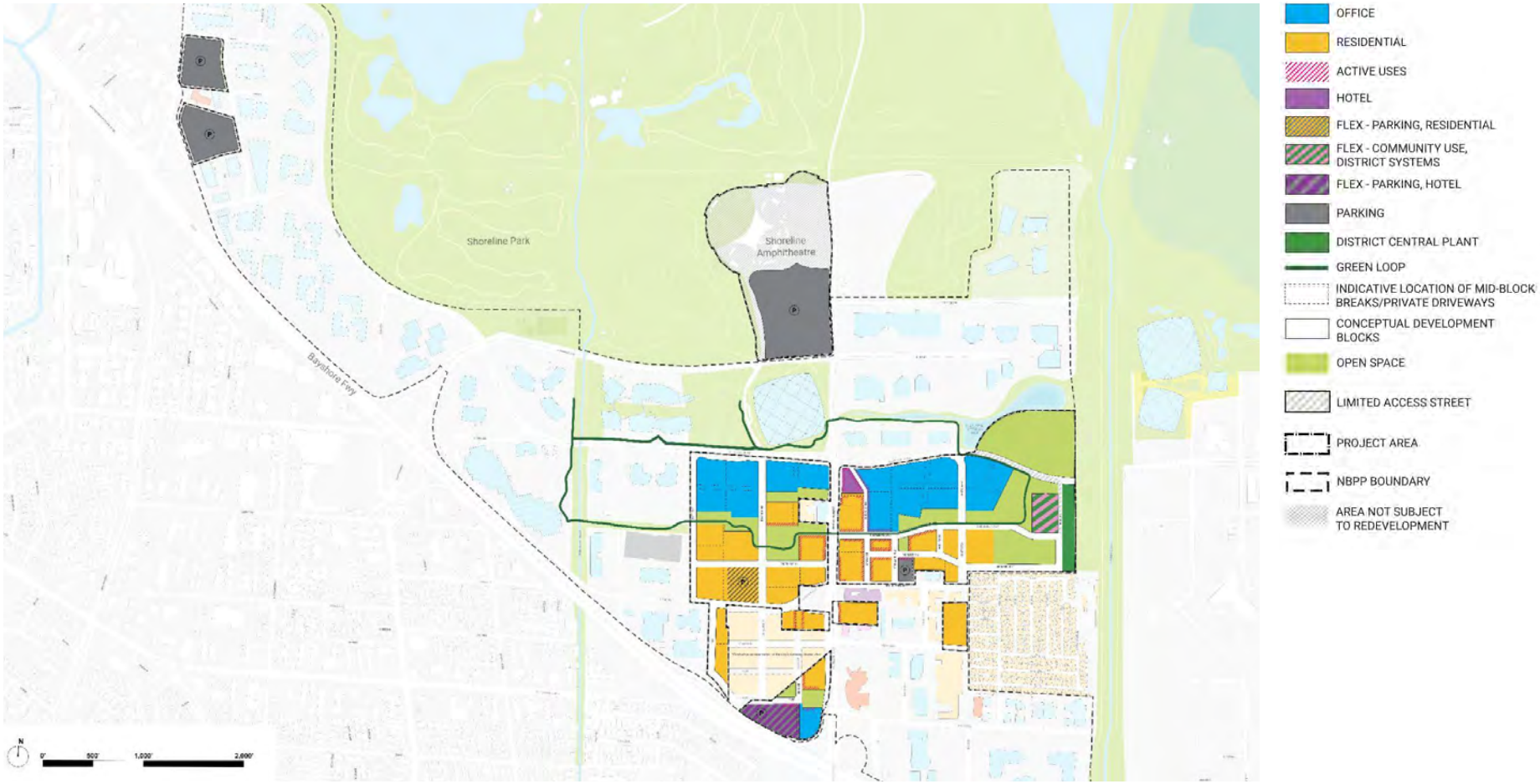
- Parking will be composed of on-site parking and off-site District parking
  - Residents will use on-site parking, while residential visitors will use District parking garages.
  - 90% of office employees and visitors will use District parking garages, while 10% of office employees and visitors will use on-site parking.
- District parking at five locations within the Master Plan area include the following:
  - JN-P-1 (Joaquin North) is located at the southwest corner of Monarch Street and Joaquin Road within the Joaquin North neighborhood and contains approximately 500 parking spaces. JN-P-1 serves retail uses and hotel, neighborhood parks, open spaces, and residential visitor parking.
  - JS-P-1 (Joaquin South) is a 6-level parking garage location in the Joaquin South neighborhood that contains approximately 700 parking spaces. JS-P-1 serves office (450 parking spaces), and residential visitor parking, retail uses and hotel, neighborhood parks, and residential visitor parking (250 parking spaces).
  - SB-P-1 (Shorebird) is located at the northeast corner of Space Park Way and Manzanita Street within the Shorebird neighborhood and contains approximately 600 spaces. SB-P-1 serves hotel, active uses, neighborhood parks, open spaces, and residential visitor parking.
  - SA-P-1 (Amphitheatre) is a 6-level parking garage located at the northwest corner of Shoreline Boulevard and Charleston Road that contains approximately 4,584 parking spaces for the NBS Master Plan (4,330 parking spaces), the police operations center (10 parking spaces), and the public parking spaces (240 parking spaces). SA-P-1 serves office employee parking.

    MW-P-1 & MW-P-2 (Marine Way) are 2- to 3-level parking garages along Marine Way that contain approximately 890 parking spaces. Both parking garages serve office uses.



- On-site parking within each neighborhood[7] is include the following:
    - Joaquin North neighborhood includes 2,531 on-site parking spaces for office, residential, retail, and active land uses.
    - Joaquin South neighborhood includes 746 on-site parking spaces for office, residential, retail and hotel land uses.
    - Shorebird neighborhood includes 1,826 on-site parking spaces for office, residential, retail, hotel, and active land uses.
    - Pear neighborhood includes 331 on-site parking spaces for residential, and retail land uses.

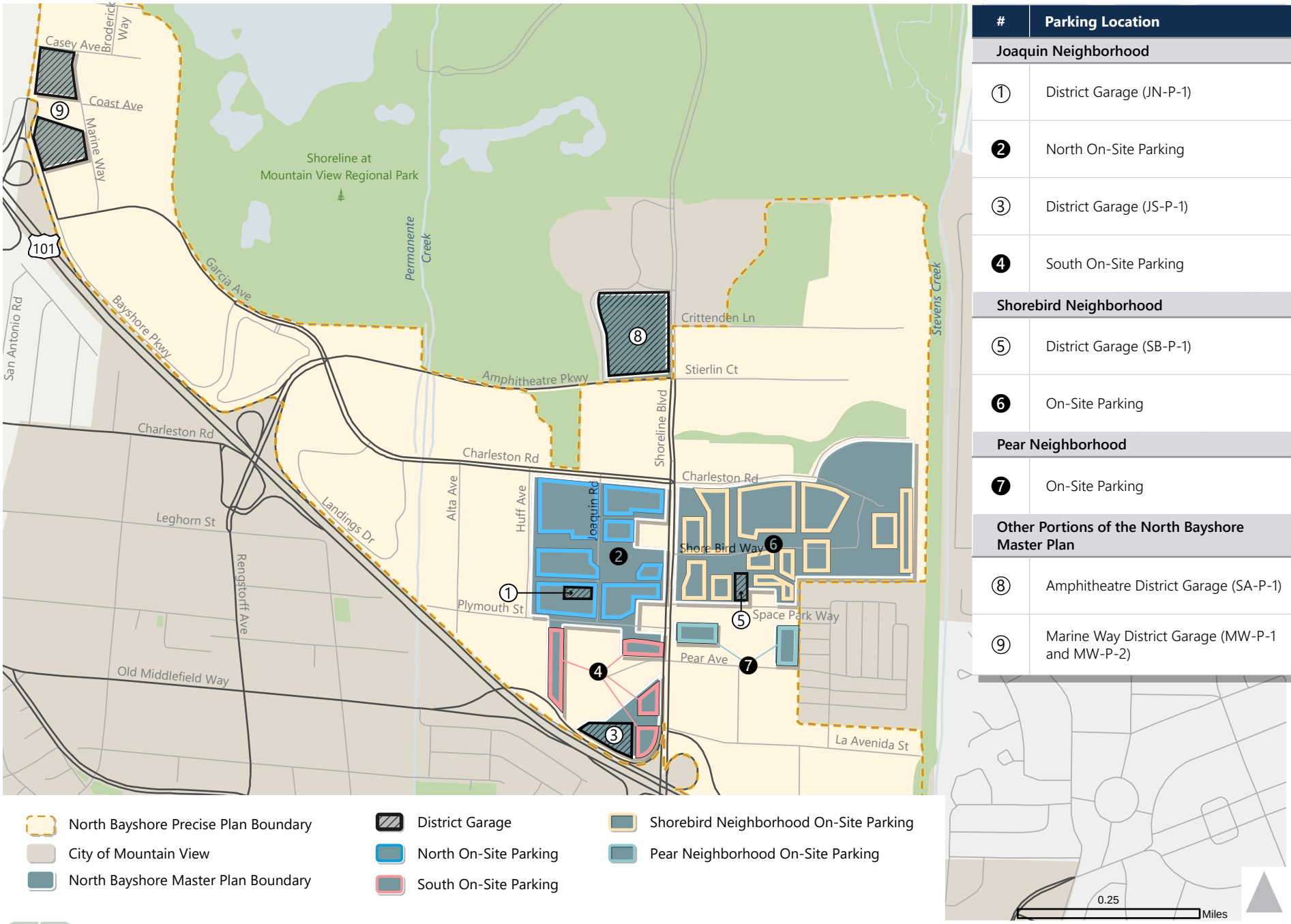
[7] Allocation of residential, office, and retail/commercial on-site parking spaces to each neighborhood assumes that vehicles will park close to their desired destination; therefore, the on-site parking is distributed based on the land use allocation by neighborhood.




Source: North Bayshore Framework Master Plan (December 2022)

Figure 2

# North Bayshore Master Plan - Land Use and Streets




| # | Parking Location |
|---|---|
| **Joaquin Neighborhood** | |
| ① | District Garage (JN-P-1) |
| ❷ | North On-Site Parking |
| ③ | District Garage (JS-P-1) |
| ❹ | South On-Site Parking |
| **Shorebird Neighborhood** | |
| ⑤ | District Garage (SB-P-1) |
| ❻ | On-Site Parking |
| **Pear Neighborhood** | |
| ❼ | On-Site Parking |
| **Other Portions of the North Bayshore Master Plan** | |
| ⑧ | Amphitheatre District Garage (SA-P-1) |
| ⑨ | Marine Way District Garage (MW-P-1 and MW-P-2) |

Figure 3

# North Bayshore Master Plan – Parking Locations

### 1.2.3 Transportation Demand Management Program Measures

The proposed project will implement a TDM program to achieve a 35% morning peak hour inbound single-occupancy vehicle mode share at the development driveways (or district parking structures) for all non-residential development in the NBS Master Plan area. The project would implement various TDM measures consistent with the *North Bayshore Transportation Demand Management (TDM) Plan Guidelines* (2015) for non-residential development and the *North Bayshore Residential Transportation Demand Management Guidelines* (2018) for residential development.

At a minimum, the non-residential TDM plan includes the following existing measures:

- Priority parking for carpools and vanpools
- Pre-tax commuter benefits
- On-site employee transportation coordinator to serve as a liaison between the employer/property owner and the Transportation Management Association (TMA) and to oversee the TDM program
- Bicycle parking, showers, and changing facilities as defined in the bicycle parking and amenities and standards
- Short-term bicycle parking
- Shared bicycles, if a bikeshare service is not present in North Bayshore
- Telecommute/flexible work schedule program
- Guaranteed ride home program
- Membership in the TMA
- Carpool matching services
- Shuttle services to connect employees to local transit services
- Marketing of TDM programs to employees

Additional TDM measures are encouraged and may be necessary to achieve the project's mode share and vehicle trip target. The non-residential TDM program includes the following optional TDM measures:

- Parking cash-out
- Parking supply, including priced parking
- Subsidized or free vanpools or carpools
- Biking incentives
- On-site bike repair facilities
- Bike buddy program
- Bike loaner program
- Expanded carpool matching
- Commuter shuttle services
- Car sharing
- On-site amenities and services
- Funding district wide services

The residential development will also include the following TDM measures:

- Unbundled parking
- Membership in the TMA
- Short- and long-term secure bike parking
- Dedicated on-site car-share spaces
- On-site car-share vehicles (optional)
- Residential bikeshare (optional)
- Scooter-share program (optional)

## 1.3 Study Area

This MTA evaluates the potential transportation effects of the NBS Master Plan. The NBS Master Plan area is within the North Bayshore District and the NBPP, which is generally bounded by the Shoreline at Mountain View Regional Park in the North, US 101 to the South, Stevens Creek to the East, and San Antonio Road to the West.

### 1.3.1 Study Intersections

To evaluate the NBS Master Plan's effect on roadway facilities, a total of 21 intersections were selected in consultation with City of Mountain View staff and guidance from the City of Mountain View's *Multi-Modal Transportation Analysis Handbook* (February 2021). These locations are under the City of Mountain View or Palo Alto's jurisdiction (refer to **Figure 4** for study locations):

1. San Antonio Rd / Bayshore Pkwy*
2. San Antonio Rd / US 101 Northbound Ramps
3. Rengstorff Ave-Amphitheatre Pkwy / Garcia Ave-Charleston Rd
4. Rengstorff Ave / US 101 Northbound Ramps
5. Rengstorff Ave / US 101 Southbound Ramps
6. Rengstorff Ave / Leghorn St
7. Landings Dr / Charleston Rd
8. Alta Ave / Charleston Rd
9. Huff Ave / Charleston Rd
10. Joaquin Rd / Charleston Rd
11. Shoreline Blvd / Charleston Rd
12. Alta Ave / Plymouth St
13. Huff Ave / Plymouth St
14. Joaquin Rd / Plymouth St
15. Shoreline Blvd / Space Park Wy
16. Shoreline Blvd / Plymouth
17. Shoreline Blvd / Pear Ave
18. Shoreline Blvd / La Avenida – US 101 Northbound Ramps
19. Shoreline Blvd / US 101 Southbound Ramps
20. Shoreline Blvd / Space Park Way-Plymouth St. (future intersection)
21. Inigo Wy / La Avenida

    * Denotes Palo Alto intersection.

Preliminary on-site intersection control recommendations are provided for the following intersections:

- Huff Ave / Monarch St
- Huff Ave / Plymouth St (Int. 13)
- C St / Plymouth St
- Joaquin Rd / Monarch St

- Joaquin Rd / Plymouth St (Int. 14)
- Shoreline Blvd / Monarch St
- Grove St / Shorebird Wy
- Grove St / Monarch St
- Grove St / Space Park Wy
- Manzanita St / Shorebird Wy
- Manzanita St / Monarch St
- Manzanita St / Space Park Wy
- New North-South St / Monarch St
- New North-South St / Space Park Wy
- Inigo Wy (West) / Space Park Wy
- Willow St / Shorebird Wy
- Willow St / Monarch St
- Inigo Wy / Charleston Rd
- Inigo Wy / Shorebird Wy
- Inigo Wy / Monarch St
- Inigo Wy (East) / Space Park Wy
- Shorebird Wy / Charleston Rd

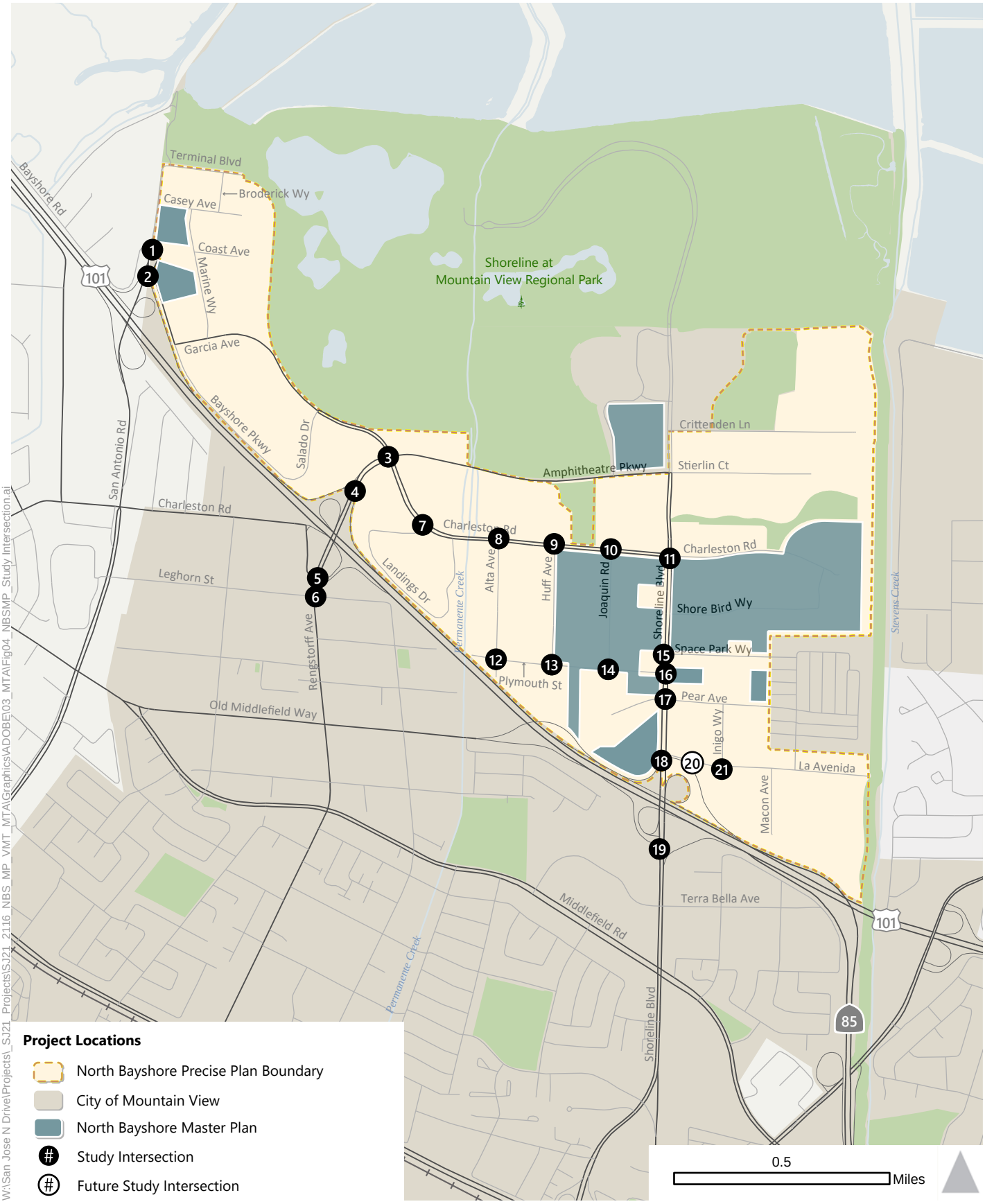



Figure 4

## North Bayshore Master Plan – Study Intersections

## 1.4 Analysis Scenarios

The analysis was conducted during the morning peak hour occurring between 7:00 and 9:00 AM and the evening peak hour occurring between 4:00 and 6:00 PM for the following scenarios (refer to **Table 3** for a summary of the scenario inputs):

- **Scenario 1: Existing Conditions** – Existing gateway counts (February 2020) and travel characteristics from the *North Bayshore Transportation Monitoring Report and Near-Term Growth Assessment* (May 2020) report.
- **Scenario 2**: **Cumulative Conditions with NBPP Growth and the North Bayshore Master Plan Achieving a Modified Site-Specific TDM Plan Policy Goal with a Historical Vacancy Rate and Rengstorff Connector (Cumulative with Project Conditions) –** Cumulative travel behavior based on the City of Mountain View travel model and the 2007 Association of Bay Area Governments (ABAG) land use projections for adjacent jurisdictions and planned and funded transportation system improvement in the *Valley Transportation Plan (VTP) 2040*. Within the NBPP boundary, this scenario includes the following:
    - The NBPP growth with the NBS Master Plan from Existing Conditions (2020):
        - 9,098 residential units
            - 7,605 market rate dwelling units
            - 1,493 affordable rate dwelling units
        - 5,587,216 square feet of office space
            - 3,487,472 additional square feet of office building space
            - 1,900,011 square feet of research & development rebuilt as office space
            - 199,733 square feet of industrial rebuilt as office space
        - 343,496 square feet of retail/commercial land uses (retail, restaurant, or service commercial)
        - 725 hotel rooms
        - 98,000 square foot athletic club
        - 88,500 square foot theater
    - The North Bayshore transportation improvements presented in **Figure 5** and listed in **Table 4**.
    - The locations of the development projects are presented in **Figure 6** and **Table 5** presents a summary of their associated land use assumptions (which in some cases involve demolition of existing buildings as well as construction of new buildings).
    - Non-NBS Master Plan market rate residential housing mix of 70% studio and 1-bedroom apartments and 30% 2- and 3-bedroom apartments with a residential parking supply rate of 0.6 spaces per dwelling unit.

- NBS Master Plan market rate residential housing (mix of 60% studio and 1-bedroom apartments and 40% 2- and 3-bedroom dwelling units) with a reduced residential parking supply rate of 0.65 spaces per dwelling unit.
- NBS Master Plan affordable residential housing mix of 25% studio, 1-bedroom, 2-bedroom, and 3-bedroom dwelling units with a reduced parking supply rate of 0.69 spaces per dwelling unit.
- Existing non-Google development (6% of non-residential development) achieves 69%[8] morning peak hour inbound single-occupancy vehicle mode share.
- Existing Google, future Google, and future non-Google non-residential development achieving a 35% morning peak hour inbound single-occupancy vehicle mode share (94% of non-residential development).[9] The NBS Master Plan will achieve the 35% SOV per its project description. This scenario assumes the remainder of existing and future Google development will achieve the 35% SOV too.
- Non-residential development includes a mixed-use trip reduction applied to existing and future development to account for the additional residential opportunities in North Bayshore that allow some current workers to live nearby.
- All North Bayshore non-residential development includes a 7% historical vacancy rate.[10]
- NBS Master Plan parking at a ratio of 2.0 parking spaces per 1,000 square feet of office space.
- On-site and District parking as shown in the NBS Master Plan (e.g., JS-P-1, JN-P-1, SA-P-1, SB-P-1, MW-P-1, and MW-P-2) (refer to **Figure 3**).

[8] The 69% morning peak hour inbound single-occupancy vehicle mode share is derived from the observed 80% mode share (*Intuit Building 20 Vehicle Trip Generation and Mode Share Monitoring* memorandum, Fehr & Peers, May 2019) with an adjustment for internalized trips of North Bayshore employees living and working in North Bayshore.

[9] Certain approved non-Google projects in North Bayshore have been conditioned to achieve a 45% morning peak hour inbound single-occupancy vehicle mode share. Per staff direction, these projects were evaluated using the 35% standard for this analysis.

[10] A vacancy rate expresses the portion of building square footage that is unoccupied. A vacancy rate allows owners to offer non-residential development options to meet a tenant's needs at a market rate price without over supplying non-residential development. Based on conversations with local real estate brokers during the General Plan and City of Mountain View travel model update, City staff established a 7% historical vacancy rate. This vacancy rate has been used in previous versions of the North Bayshore Precise Plan transportation analysis and the City of Mountain View General Plan transportation analysis.

## Table 3: Summary of Scenario Characteristics

| Characteristic | Unit | Scenario 1: Existing Conditions | Scenario 3: Cumulative with Project Conditions |
|---|---|---|---|
| ***North Bayshore Precise Plan Land Use Program*** | | | |
| Residential Units | Dwelling Units | Refer to **Table 13** for Total Building Area in North Bayshore | 9,098 |
| *Market Rate* | *Dwelling Units* | | *7,605* |
| *Affordable* | *Dwelling Units* | | *1,493* |
| Office | Square Feet | | 5,587,216 |
| *New Office* | *Square Feet* | | *3,590,985* |
| *Rebuilt R&D or Industrial as New Office* | *Square Feet* | | *1,996,231* |
| Retail/Commercial[1] | Square Feet | | 343,496 |
| Hotel Rooms | Rooms | | 725 |
| Athletic Club | Square Feet | | 98,000 |
| Theater | Square Feet | | 88,500 |
| Shoreline at Mountain View Growth | Daily Trips | | 0 |
| ***North Bayshore Transportation Improvements*** | | | |
| Transportation Improvements | Refer to **Table 4** for the Priority Transportation Improvements by Scenario | | |
| **Housing Characteristics** | | | |
| Studio and 1-Bedroom Dwelling Units | Percent | N/A | 70/60/50[2] |
| 2- and 3-Bedroom Dwelling Units | Percent | | 30/40/50[2] |
| Residents Parking Supply Rate[3] | Spaces per Dwelling Unit | | 0.60/0.65/0.69[2] |
| ***Morning Peak Hour Inbound Single Occupancy Mode Share for Non-Residential Development*** | | | |
| Existing Non-Google Development | Percent | 80[4] | 69 |
| Future Non-Google Development | Percent | N/A | 35[5] |
| Existing Google Development | Percent | 50[6] | 35 |
| Future Google Development | Percent | N/A | 35 |
| Effective District-Wide | Percent | 53[7] | 37[8] |
| ***Historical Vacancy Rate*** | | | |
| Vacancy Rate[9] | Percent | 0.5 | 7 |

Notes:

1. Retail/Commercial uses include retail, restaurant, and service commercial land use.
2. Non-NBS Master Plan market rate residential housing mix/NBS Master Plan market rate residential housing mix/NBS Master Plan market rate residential housing mix.
3. Residents parking supply rate does not include residential visitor parking supply.
4. Based on *Intuit Building 20 Vehicle Trip Generation and Mode Share Monitoring* memorandum, May 2019.

5. Certain approved non-Google projects in North Bayshore have been conditioned to achieve a 45% morning peak hour inbound single-occupancy vehicle mode share. Per staff direction, these projects were evaluated using the 35% standard for this analysis.
6. Based on Google employee mode share survey, adjusted to reflect mode share for all trips (in addition to employee trips) that occur at non-residential developments.
7. Effective district-wide morning peak hour single-occupancy vehicle rate derived from spring 2020 North Bayshore District Transportation Monitoring and Near-Term Growth Assessment (May 2020), North Bayshore Framework Master Plan Appendix C: TDM Plan (August 2021), and employment weightings of approximately 11% non-Google development and 89% Google development provided by City staff.
8. Effective district-wide morning peak hour single-occupancy vehicle rate for Scenario 3 is based on employment weightings of approximately 6% for existing non-Google development, 14% for future non-Google development, 52% for existing Google development, and 28% for future Google development.
9. A vacancy rate expresses the portion of building square footage that is unoccupied.

Source: City of Mountain View travel model and Fehr & Peers, 2023.

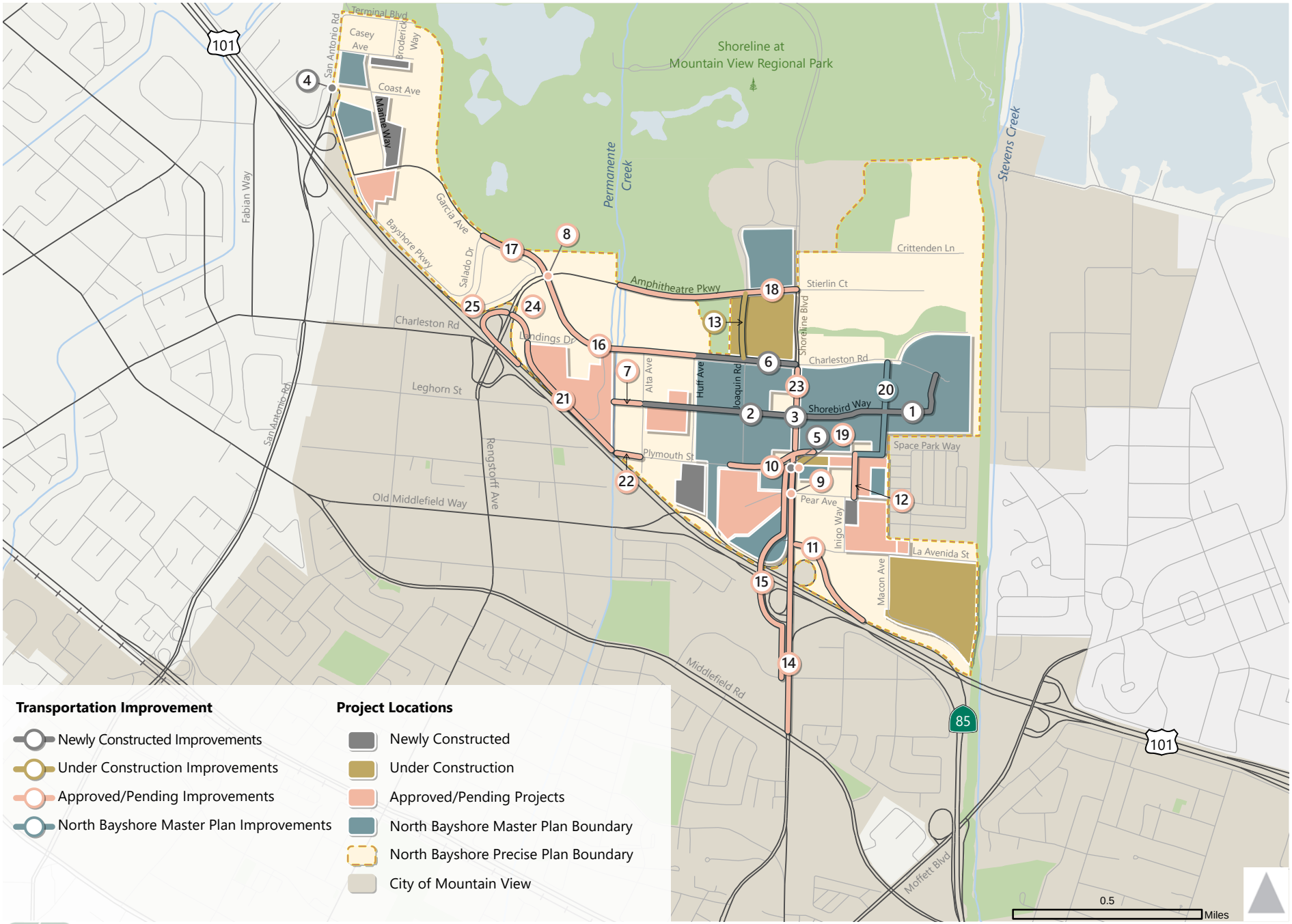



Figure 5

# North Bayshore Precise Plan Transportation Improvement Projects

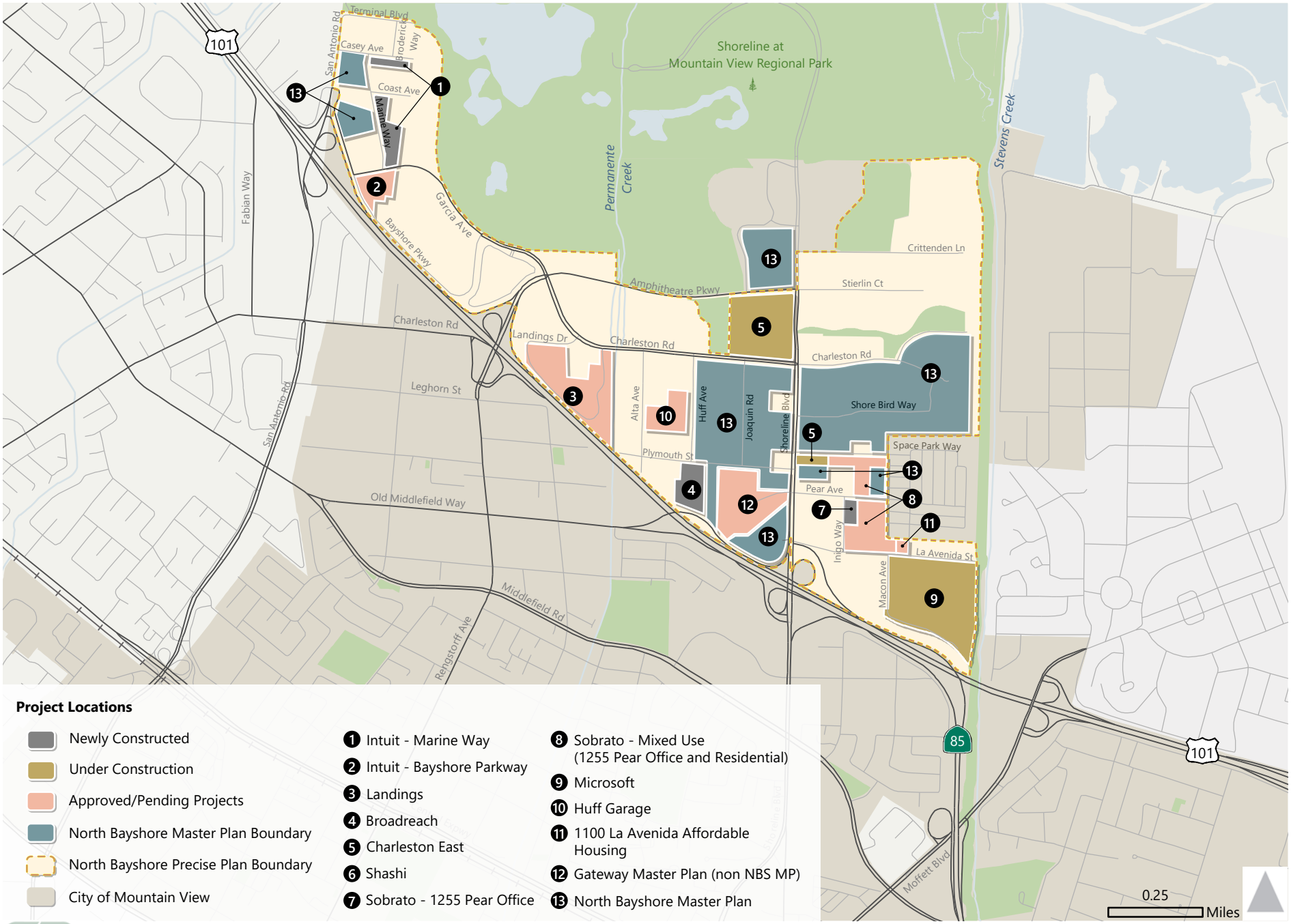



Figure 6

# North Bayshore Precise Plan Growth Project Locations

**Table 4: North Bayshore Precise Plan Transportation Improvements**

| ID | Facility | Extent of Improvement | Description of Improvement | Source of Improvement[1] | Circulation Study[2] | Used in Scenario(s) |
|---|---|---|---|---|---|---|
| 1 | East-West Bicycle connection | Shoreline Blvd to Stevens Creek Trail (between Charleston Rd and Plymouth St) | Buffered bicycle lanes. | NBPP T-6 | | All Scenarios (1 and 2) |
| 2 | East-West Greenway Connection #1 | Alta Ave and Shoreline Boulevard (between Charleston Rd and Plymouth St) | Multiuse path. | NBPP T-6 | | All Scenarios (1 and 2) |
| 3 | Shoreline Blvd Signalized Bicycle Crossing | East-West Greenway #2 at Shoreline Blvd | Signalized bicycle crossing at Shoreline Blvd. | NBPP T-9 | | All Scenarios (1 and 2) |
| 4 | San Antonio Rd and Bayshore Pkwy | At intersection | Provide additional northbound right-turn lane storage (240 feet) and eastbound left-turn lane storage (130 feet). Reconfigure the eastbound approach with a separate left-turn lane and a shared through-right-turn lane. (The City implemented a modified westbound approach with a left-turn lane, and a shared left-through-right lane) | NBPP EIR Mitigation | | All Scenarios (1 and 2) |
| 5 | Shoreline Boulevard and Plymouth Street | At Intersection | Signalize intersection | Other City Improvement | | Scenario 1 |
| 6 | Charleston Road | Charleston Road between Huff Avenue and Shoreline Boulevard | Charleston Road Transit Corridor improvements | NBPP T-3 | C-1 | All Scenarios (1 and 2) |
| 7 | East-West Greenway Connection #1 | Alta Avenue to Landings Office Development | Multiuse path | NBPP T-6 and Landings Development Improvement | | Scenario 2 |

| ID | Facility | Extent of Improvement | Description of Improvement | Source of Improvement[1] | Circulation Study[2] | Used in Scenario(s) |
|---|---|---|---|---|---|---|
| 8 | Rengstorff Ave-Amphitheatre Pkwy and Garcia Ave-Charleston Rd | At Intersection | Signal timing modifications | Other City Improvement | | Scenario 2 |
| 9 | Shoreline Blvd and Pear Ave | At intersection | Construct a separate northbound right-turn lane with 300-foot storage pocket. Modify the westbound approach as a left-turn lane and one shared through-right lane with east/west split phasing. | NBPP EIR Mitigation | C-5 | Scenario 2 |
| 10 | Plymouth St Realignment | At the new intersection of Shoreline Blvd and Plymouth St-Space Park Way | Re-align Plymouth St with Space Park Way with signalization and protected phasing. (Eastbound and westbound left turn and shared through-right; Northbound approach with two left turns, one shared through-right; and southbound approach with left turn, one through, one shared through-right). The two northbound left-turn lanes should be 425 feet long to minimize queue spillback during the morning peak hour. | NBPP T-5 | C-2 | Scenario 2 |
| 11 | Shoreline Blvd / US 101 Northbound Off-Ramp | La Avenida to US 101 Mainline | Re-align US 101 off-ramp to Shoreline Blvd with removal of the east leg from US 101. Creation of a new intersection of La Avenida and US 101 northbound ramps east of Shoreline Boulevard with two northbound left-turn lanes and two northbound right-turn lanes. | NBPP T-16 | C-4 | Scenario 2 |
| 12 | Local north-south street | La Avenida and Space Park east of Shoreline Blvd | Two-lane street with bicycle lanes and sidewalks (with dog leg). | NBPP T-10 and Sobrato Development Improvement | | Scenario 2 |
| 13 | Joaquin Rd | Charleston Rd to Amphitheatre Pkwy | Two-lane street with bicycle lanes and sidewalks. | Charleston East Development Improvement | | Scenario 2 |
| 14 | Shoreline Boulevard Reversible Transit Lane | Pear Avenue to Middlefield Road | Center-running, reversible transit lane extending from Middlefield Avenue north to Pear Avenue. Remove signalized Shoreline Boulevard and Plymouth Street intersection (Project 5) | NBPP T-17 and T-18 | C-5 | Scenario 2 |

| ID | Facility | Extent of Improvement | Description of Improvement | Source of Improvement[1] | Circulation Study[2] | Used in Scenario(s) |
|---|---|---|---|---|---|---|
| 15 | US 101 Bicycle and Pedestrian Path | Terra Bella Ave to Plymouth St | Multiuse path | NBPP T-1 and T-8 | C-3 | Scenario 2 |
| 16 | Charleston Road | Huff Avenue to Amphitheatre Pkwy | Charleston Road Transit Corridor improvements | NBPP T-3 | C-1 | Scenario 2 |
| 17 | Charleston Road | Amphitheatre Pkwy to Salado Drive | Charleston Road Transit Corridor improvements | NBPP T-4 | C-1 | Scenario 2 |
| 18 | Amphitheatre | Permanente Creek Trail to Shoreline Boulevard | Amphitheatre Parkway widening from three-lane street (one eastbound lane and two westbound lanes) to a four-lane street (two lanes in each direction). | NBPP T-14 | C-19 | Scenario 2 |
| 19 | Shoreline Boulevard and Plymouth Street | At Intersection | Add a second northbound left-turn lane | NBPP EIR Mitigation and Landings Development Improvement | | Scenario 2 |
| 20 | Inigo Way Extension | Space Park Way to Charleston Road | Two-lane Neighborhood Street with sidewalk and buffered bicycle lanes at the minimal | NBPP T-10 | | Scenario 2 |
| 21 | Frontage Road | Landings Drive to Permanente Creek | Two-lane Access Street with sidewalk and buffered bicycle lanes at the minimal | NBPP T-11 | C-6 | Scenario 2 |
| 22 | Frontage Road | Permanente Creek to Alta Avenue | Two-lane Access Street with sidewalk and buffered bicycle lanes at the minimal | NBPP T-11 and Landings Development Improvement | C-11 | Scenario 2 |
| 23 | Shoreline Boulevard Reversible Transit Lane | Charleston Road to Plymouth Street-Space Park Way | Center-running, reversible transit lane extending from Charleston Road and Plymouth Street-Space Park Way. | Circulation Study | C-10 | Scenario 2 |
| 24 | Rengstorff Connector – Frontage Road | Landings Drive extended to Rengstorff Avenue | Landings Drive extended as a two-lane street to Rengstorff Avenue and forms the eastern leg of a new interchange intersection. | Circulation Study | C-12 | Scenario 2 |



| ID | Facility | Extent of Improvement | Description of Improvement | Source of Improvement[1] | Circulation Study[2] | Used in Scenario(s) |
|---|---|---|---|---|---|---|
| 25 | Rengstorff Connector – US NB Ramp Realignment | US 101 Ramp Realignment | US 101 direct off-ramps and on-ramps realigned. | Circulation Study | C-13 | Scenario 2 |

Notes:

1. From Figure 55: Priority Transportation Improvements and Table 27: Priority Transportation Improvements in the *North Bayshore Precise Plan* (2017), *Final Subsequent Environmental Impact Report for the North Bayshore Precise Plan* (2017) or stated development improvement.
2. From Figure 5: North Bayshore Priority Transportation Improvement and Table 1: North Bayshore Priority Transportation Improvements – Approved 2021 Update in the *North Bayshore Circulation Study* (December 2021).

Source: Fehr & Peers, 2023.

**Table 4: North Bayshore Building Size of New Projects and Demolition/Remodel of Existing Buildings (Changes from 2020)**

| Project | Industrial (s.f.) | Recreation (s.f.) | Multi-Family (Dwelling Units) | Hotel (Rooms) | Office (s.f.) | R&D (s.f.) | Restaurant (s.f.) | Retail (s.f.) | Service (s.f.) |
|---|---|---|---|---|---|---|---|---|---|
| ***Approved and Under Construction Projects*** | | | | | | | | | |
| Intuit (Bayshore Parkway) | | | | | +178,600 | | | | |
| Microsoft | | | | | +643,680 | | | | |
| Sobrato - 1255 Pear Ave. Mixed-Use Office and Residential | | | +223 | | +231,210 | | | | |
| Sashi Hotel | | | | +200 | | | +4,400 | +4,000 | |
| Charleston East | | | | | +595,000 | | | +10,000 | |
| 1100 La Avenida Affordable Housing | -3,723 | | +93 | | | -8,726 | | | |
| Landings and Huff Garage | | | -4 | | +799,482 | -249,224 | | +10,096 | |
| **Net Total Approved and Under Construction Projects** | **-3,723** | | **312** | **200** | **2,447,972** | **-257,950** | **4,400** | **24,096** | |
| ***Pending Projects*** | | | | | | | | | |
| Gateway Master Plan (Non-Google) | | +100,000 | +1,786 | | | | +75,000 | | |
| **Net Total Pending Projects** | | **100,000** | **1,786** | | | | **75,000** | | |
| ***Project (North Bayshore Master Plan)*** | | | | | | | | | |
| North Bayshore Master Plan (Total Uses) | | +55,000[1] | +7,000 | +525 | +3,147,897[2] | | | +240,000[3] | |
| North Bayshore Master Plan (Demolished Uses) | -92,497 | | | | -8,653 | -1,642,061[4] | | | |
| **North Bayshore Master Plan (Project) (Net New)** | **-92,497** | **55,000** | **7,000** | **525** | **3,139,244** | **-1,642,061** | **0** | **240,000** | |

| Project | Industrial (s.f.) | Recreation (s.f.) | Multi-Family (Dwelling Units) | Hotel (Rooms) | Office (s.f.) | R&D (s.f.) | Restaurant (s.f.) | Retail (s.f.) | Service (s.f.) |
|---|---|---|---|---|---|---|---|---|---|
| ***Total Changes from 2020*** | | | | | | | | | |
| Total New Development | | 155,000 | 9,098 | 725 | 5,595,869 | | 79,400 | 264,096 | |
| Total Demolished Development | -96,220 | | | | -8,653 | -1,900,011 | | | |
| **Total** | **-96,220** | **155,000** | **9,098** | **725** | **5,587,216** | **-1,900,011** | **79,400** | **264,096** | |

Notes:

1. The 55,000 square feet of community uses is a local serving use that is assumed not to generate separate vehicle trips during a typical weekday, but rather attract walking and biking trips from the surrounding land uses. Weekend programming of the community uses would generate additional vehicle trips outside of the typical weekday.
2. The 2,000 square foot police operations station is included in the NBS Master Plan office land use summary.
3. The 4,000 square feet of active space kiosks identified in the Greenway Park West, Greenway Park East, and The Portal is a local serving use that is assumed not to generate vehicle trips during a typical day, but rather attract walking and biking trips from the surrounding land uses and are not included in this summary.
4. Existing Conditions is relative to 2020. Vacant buildings for 2020 include the 91,392 square feet at 1400 North Shoreline Boulevard, and the 30,520 square feet at 1220-1230 Pear Avenue. These vacant buildings at 1400 North Shoreline Boulevard and 1220-1230 Pear Avenue were not included in the 2020 baseline and therefore, do not show up as a demolished building credit.

Source: Fehr & Peers, 2023.

## 1.5 Criteria For Determining Adverse Effects

The criteria for determining adverse effects are presented in the *Multi-Modal Transportation Analysis Handbook* and are summarized in **Table 5**.

### Table 5: Criteria for Determining Adverse Effects and Operational Deficiencies

| Criteria # | Determination of Adverse Effect and Operational Deficiency |
|---|---|
| ***Site Access and Circulation*** | |
| 1 | Project designs for pedestrian, bicycle, and automobile on-site circulation, access, loading, and parking areas fail to meet City or industry standard design practices. |
| 2 | The project fails to provide adequate accessibility for services and delivery trucks on site, including access to truck loading areas. |
| ***Motor Vehicle Operations*** | |
| 3 | City Signalized Intersection: Intersection operations degrade from an acceptable level to an unacceptable level. |
| 4 | City Signalized Intersection: Exacerbates unacceptable operations by increasing the average critical delay by four seconds or more and increasing the critical volume-to-capacity (V/C) ratio by 0.01 or more. |
| 5 | City Signalized Intersection: Increases the V/C ratio by 0.01 or more at an intersection with unacceptable operations when the change in critical delay is negative (i.e., decreases). This can occur if the critical movements change. |
| 6 | City Unsignalized Intersection: Adverse effects are said to occur when the addition of project traffic causes the average intersection delay for an all-way stop-controlled intersection, or the worst movement/approach for a side-street stop-controlled intersection, to degrade to LOS F and the intersection satisfies the peak hour traffic signal warrant from the California Manual of Uniform Traffic Control Devices (MUTCD) (2014). |
| ***Traffic Calming and Neighborhood Intrusion*** | |
| 7 | A project meets the threshold set by the City's adopted Neighborhood Traffic Management Program (NTMP). |
| 8 | Traffic calming devices or other traffic control is identified in an adopted plan. |
| 9 | In conformance with the City's Vision Zero Policy, projects proactively implement traffic calming devices to meet the City's multi-modal and safety goals. |
| ***Pedestrian Operations*** | |
| 10 | The project fails to provide accessible and safe pedestrian connections between buildings and adjacent streets and transit facilities. |
| 11 | A project disrupts existing or planned pedestrian facilities or conflicts with adopted City non-auto plans, guidelines, policies, or standards. |
| 12 | The project adds trips to an existing transportation facility (e.g., sidewalk) that does not meet current design standards. |
| 13 | The project increases vehicle trips to a roadway with a Pedestrian Quality of Service (PQOS) score of 3 or more. |
| ***Bicycle Operations*** | |
| 14 | The project disrupts existing or planned bicycle facilities or conflicts with adopted City non-auto plans, guidelines, policies, or standards. |
| 15 | The project adds trips to an existing transportation facility (e.g., bikeway) that does not meet current design standards. The project increases vehicle trips to a roadway with a bicycle Level of Traffic Stress (BLTS) score of 3 or 4. |
| 16 | The project does not connect to the city's low-stress (LTS 1 to 2) bike network. |
| ***Parking*** | |
| 17 | The project increases off-site parking demand in the project area. |
| 18 | The project proposes more parking than allowed by the City's Zoning Code. |
| 19 | The project parking results in significant spillover into adjacent neighborhoods. |
| 20 | Parking reduction requires parking study to demonstrate effective parking management and adequate parking to serve project. |

Source: City of Mountain View MTA Handbook – Version 1.0 (February 2021), Table 4.

## 1.6 Report Organization

The following chapters are included in this report to meet City requirements for evaluating transportation effects of the NBS Master Plan:

- **Chapter 2 – Relevant Transportation Agencies, Plans, and Policies** lists the City of Mountain View's General Plan polices; the City-specific land use and transportation plan goals, policies, and standards; and the federal, state, regional, and county jurisdictions plans that could be affected by this project. The City policy conformance assessment evaluates if the project would conflict with such plans and policies.
- **Chapter 3 – Existing Conditions** describes the transportation system near the project site, including the surrounding roadway network; morning and evening peak hour turning movement volumes at the study intersections; existing bicycle, pedestrian, and transit facilities; intersection levels of service; freeway segment levels of service; and field observations.
- **Chapter 4 – Site Access and On-Site Circulation** describes project access and circulation for all travel modes. This evaluation focuses on accessibility for all users, multi-modal access and circulation, existing street facilities, emergency vehicle access, and loading areas for various vehicle types.
- **Chapter 5 – Traffic Forecasts** summarizes the forecast methods including the driveway and North Bayshore gateway trip generation, and City of Mountain View travel model overview.
- **Chapter 6 – Motor Vehicle Operations Methods** describes the traffic analysis used for the operation analysis chapters.
- **Chapter 7 – Cumulative Conditions** presents Cumulative Conditions with NBPP Growth and the North Bayshore Master Plan Achieving a Modified Site-Specific TDM Plan Policy Goal, with a Historical Vacancy Rate and Rengstorff Connector within the NBPP boundary.
- **Chapter 8 – Adverse Motor Vehicle Effects and Improvements** describes the project's effects on intersection operations and identifies improvements to address adverse effects caused by the project.
- **Chapter 9 – Traffic Calming** describes whether the street layouts and the traffic calming features within the project conform with the NBPP requirements.
- **Chapter 10 – Pedestrian Operations** provides supplemental pedestrian facilities analysis by highlighting the pedestrian NBPP transportation improvements that are near the project site and summarizing the potential increase in pedestrian activity due to this project. This chapter also summarizes accessible paths from streets, a pedestrian shed analysis, and parking lots to building entrances for this project.
- **Chapter 11 – Bicycle Operations** provides supplemental bicycle facilities analysis by highlighting the NBPP bicycle transportation improvements that are near the project site and summarizing the potential increase in bicycle activity due to this project. This chapter also summarizes a bicycle shed analysis for this project site.
- **Chapter 12 – Parking Assessment** describes the existing parking facilities and conditions and the project's parking management strategies and parking supply. The project parking supply is summarized and compared to the parking requirements.
- **Chapter 13 – Transportation Demand Management** describes the TDM plan, the trip generation by land use, and the peak hour vehicle trip generation at each of the three gateways under Cumulative with Project Conditions.

# 2. Relevant Transportation Agencies, Plans, and Policies

This chapter provides a summary of regional circulation and transportation plans that are relevant to this project. The *Metropolitan Transportation Commission's (MTC) Regional Transportation Plan* provides a roadmap for accommodating projected household and employment growth in the nine-county Bay Area by 2040 as well as a transportation investment strategy for the region. The *Santa Clara Valley Transportation Authority (VTA) VTP 2040 Plan* describes all major projects in Santa Clara Valley over the next 20 years. The *Santa Clara Countywide Bicycle Plan*'s primary goal was to make it easier and safer for people to bike when traveling from one city to the next in Santa Clara County. The *Congestion Management Program Monitoring and Conformance Report* sets state and federal funding priorities for transportation improvements affecting the Santa Clara County Congestion Management Program (CMP) transportation system.

The *City of Mountain View General Plan 2030* includes mobility goals aimed to enhance travel by all modes by encouraging use by non-auto modes and thus reduce vehicle trips. *AccessMV: Comprehensive Modal Plan* is a multi-modal plan to provide a consistent vision for the city's multi-modal transportation network. The *Mountain View Vision Zero Policy* is policy to eliminate fatal traffic collisions in Mountain View by 2030. The *North Bayshore Precise Plan* implements the General Plan's goals and policies for the North Bayshore Change Area and establishes the area's land use and development regulations. The *North Bayshore Circulation Study* is an advisory document that resulted in recommendations for the Priority Transportation Improvements, single-occupancy vehicle trip rate for non-residential development, and a modified North Bayshore Trip Cap Policy definition.

## 2.1 Metropolitan Transportation Commission's (MTC) Regional Transportation Plan (Plan Bay Area)

*Plan Bay Area 2050*[11] is a joint regional planning document overseen by the MTC and the Association of Bay Area Governments (ABAG). It serves as the region's Sustainable Communities Strategy (SCS) pursuant to SB 375 and the 2050 RTP (preceded by *Plan Bay Area 2040*) and integrates four elements (Housing, Economy, Transportation, and Environment) and five guiding principles (affordable, connected, diverse, healthy, and vibrant) to manage greenhouse gas (GHG) emissions and plan for future population growth. Most of the investments are directed toward residents of Equity Priority Communities or other systematically underserved communities. The plan envisions investment in affordable housing production and preservation, a universal basic income to support residents' essential needs, investments in means-

[11] Metropolitan Transportation Commission, 2021. *Plan Bay Area 2050*. Available online at Plan Bay Area 2050 | Plan Bay Areahttp://2040.planbayarea.org/.

based transit fare discounts, and subsidies to protect homes and businesses from natural hazards. The following strategies are included:

- Housing Strategies
  - Protect and Preserve Affordable Housing
    - H1. Further strengthen renter protections beyond state law
    - H2. Preserve existing affordable housing
  - Spur Housing Production for Residents of All Income Levels
    - H3. Allow a greater mix of housing densities and types in Growth Geographies
    - H4. Build adequate affordable housing to ensure homes for all
    - H5. Integrate affordable housing into all major housing projects
    - H6. Transform aging malls and office parks into neighborhoods
  - Create Inclusive Communities
    - H7. Provide targeted mortgage, rental, and small business assistance to Equity Priority Communities
    - H8. Accelerate reuse of public and community-owned land for mixed-income housing and essential services
- Economic Strategies
  - Improve Economic Mobility
    - EC1. Implement a statewide universal basic income
    - EC2. Expand job training and incubator programs
    - EC3. Invest in high-speed internet in underserved low-income communities
  - Shift the Location of Jobs
    - EC4. Allow greater commercial densities in Growth Geographies
    - EC5. Provide incentives to employers to shift jobs to housing-rich areas well served by transit
    - EC6. Retain and invest in key industrial lands
- Transportation Strategies
  - Maintain and Optimize the Existing System
    - T1. Restore, operate, and maintain the existing system
    - T2. Support community-led transportation enhancements in Equity Priority Communities
    - T3. Enable a seamless mobility experience
    - T4. Reform regional transit fare policy
    - T5. Implement per-mile tolling on congested freeways with transit alternatives

        - T6. Improve interchanges and address highway bottlenecks
        - T7. Advance other regional programs and local priorities
    - Create Healthy and Safe Streets
        - T8. Build a Complete Streets network
        - T9. Advance regional Vision Zero policy through street design and reduced speeds
    - Build a Next-Generation Transit Network
        - T10. Enhance local transit frequency, capacity, and reliability
        - T11. Expand and modernize the regional rail network
        - T12. Build an integrated regional express lanes and express bus network
- Environmental Strategies
    - Reduce Risk from Hazards
        - EN1. Adapt to a sea level rise
        - EN2. Provide means-based financial support to retrofit existing residential buildings
        - EN3. Fund energy upgrades to enable carbon neutrality in all existing commercial and public buildings
    - Expand Access to Parks and Open Space
        - EN4. Maintain urban growth boundaries
        - EN5. Protect and manage high-value conservation lands
        - EN6. Modernize and expand parks, trails, and recreation facilities
    - Reduce Climate Emissions
        - EN7. Expand commute trip reduction programs at major employers
        - EN8. Expand clean vehicle initiatives
        - EN9. Expand transportation demand management incentives

Major transit projects included in *Plan Bay Area 2050* include a BART extension to San José/Santa Clara, Caltrain electrification, enhanced service along the Amtrak Capitol Corridor, and improvements to local and express bus services.

## 2.2 Santa Clara Valley Transportation Authority VTP 2040

Santa Clara Valley Transportation Authority (VTA), the countywide transportation authority, has adopted the *Valley Transportation Plan (VTP) 2040* (adopted in October 2014) that describes all major projects and initiatives expected to occur in the next 20 years. It prioritizes complete streets, express lanes, light rail effectiveness upgrades, bus rapid transit, and bicycle/pedestrian improvements.



Most recently, the Phase 3 of the US 101 and State Route (SR) 85 Express Lanes Project converted the existing single carpool lanes to express lanes on US 101 from near SR 237 to SR 85 in Mountain View and SR 85 from SR 237/Grant Road to the US 101/SR 85 interchange. Also, the existing double carpool lane on US 101 between the San Mateo County line to the US 101/SR 85 interchange was converted to double express lanes. The *VTA 2040 Plan* also includes a package of projects in the North Bayshore Precise Plan area including the electrification of Caltrain, express lane projects along US 101, SR 237 and SR 85, US 101 southbound improvements from San Antonio Road to Rengstorff Avenue, and Permanente Creek Trail grade separation at Charleston Road and extensions of Permanente Creek Trail to Middlefield Road.

## 2.3 Santa Clara Countywide Bicycle Plan

The *Santa Clara Countywide Bicycle Plan's* primary goal was to make it easier and safer for people to bike when traveling from one city to the next in Santa Clara County. The plan establishes a network of Cross County Bikeway Corridors that will provide continuous, complete bike connections across the county. The plan also identifies locations where new and improved bicycle connections are needed across freeways, rail lines, and creeks. Lastly, the plan identifies ways to make it easier for people to use their bicycle with transit, including bicycle access to major transit stops, bicycle parking at stops, and bicycle accommodations on board.

## 2.4 Congestion Management Program Monitoring and Conformance Report

As the county's Congestion Management Agency (CMA), VTA is responsible for managing the county's blueprint to reduce congestion and improve air quality. VTA is authorized to set state and federal funding priorities for transportation improvements affecting the Santa Clara County CMP transportation system. CMP-designated transportation system components in Mountain View include a regional roadway network, a transit network, and a bicycle network. The CMP regional roadway network in Mountain View includes all state highways, county expressways, and some principal arterials, while the transit network includes rail service and selected bus service. The bicycle network focuses on the Cross County Bicycle Corridors, which is a network of 57 routes that are identified in the *Santa Clara Countywide Bicycle Plan* (summer 2018). The long-range countywide transportation plan and how projects compete for funding and prioritization are documented in the *Valley Transportation Plan (VTP) 2040* (adopted in October 2015).

The *Citywide Multimodal Improvement Plan (MIP),* also referred to as the Deficiency Plan per state's CMP legislation, is a planning document that identifies measures to improve transportation conditions on the CMP network instead of making physical traffic capacity expansions such as widening an intersection or roadway. The MIP is based on the VTA Deficiency Plan Requirements, which describe the required content, actions, and implementation standards to assist member agencies with deficiency plan preparation and responsibilities.

## 2.5 City of Mountain View General Plan 2030

The *City of Mountain View General Plan 2030* includes mobility goals aimed to enhance travel by all modes by encouraging use by non-auto modes and thus reduce vehicle trips. The goals and policies include topics of complete streets, accessibility, walkability, bikeability, public transit, safe routes to school, vehicle parking, performance measurements, greenhouse gas emissions and air quality, and vehicles and roadway style efficiency. The goal and policies for the North Bayshore Change Area are listed below:

- ***Goal LUD-16:*** *A diverse area of complementary land uses and open space resources.*
    - *LUD 16.1: Protected open space. Protect and enhance open space and habitat in North Bayshore.*
    - *LUD 16.2: Mix of uses. Promote the North Bayshore Area as a vibrant mix of residential, commercial, service, and entertainment uses through the North Bayshore Precise Plan.*
    - *LUD 16.3: Business-class hotel. Encourage the development of a business-class hotel and conference center.*
    - *LUD 16.4: Innovative corporate campuses. Encourage innovative corporate campus designs.*
    - *LUD 16.5: Protected views. Protect views by including open areas between tall buildings.*
    - *LUD 16.6: Open space amenities. Encourage development to include open space amenities, plazas, and parks that are accessible to the surrounding transit, bicycle, and pedestrian network.*
    - *LUD 16.7: Gateway development. Support the creation of a gateway development with a diverse mix of uses near Highway 101 and North Shoreline Boulevard.*
- ***Goal LUD-17:*** *A sustainable and efficient multi-modal transportation system.*
    - *LUD 17.1: Connectivity. Improve connectivity and integrate transportation services between North Bayshore, downtown, NASA Ames, and other parts of the city.*
    - *LUD 17.2: Transportation Demand Management strategies. Require development to include and implement Transportation Demand Management strategies.*
    - *LUD 17.3: Bicycle and pedestrian focus. Support bicycle and pedestrian improvements and connections to and throughout North Bayshore.*
    - *LUD 17.4: North Shoreline Boulevard and Rengstorff Avenue enhancements. Encourage the enhancement of North Shoreline Boulevard, Rengstorff Avenue, and other key streets in North Bayshore through new development and street design standards*

## 2.6 AccessMV: Comprehensive Modal Plan

*AccessMV* is a modal plan to provide a consistent vision for the city's multi-modal transportation network. This plan aims to identify the city's primary transportation network for all modes and prioritizes previously identified transportation improvement projects. The city has analyzed bicycle level of traffic stress, pedestrian quality of service, and potential transit demand.



## 2.7 Mountain View Vision Zero Policy

On December 10, 2019, Mountain View City Council unanimously adopted a Vision Zero Policy to eliminate fatal traffic collisions in Mountain View by 2030. Vision Zero is an integrated set of policies, plans, and programs based on the philosophy that fatal collisions are unacceptable and often preventable.

Mountain View's Vision Zero approach is to eliminate fatal and severe injury traffic collisions among all road users, including those walking, biking, and driving. This approach is working to eliminate fatal traffic collisions by 2030, working to decrease traffic collisions involving fatalities or severe injuries by 50% by 2030 from a 2016 baseline of 15 collisions; and working to decrease the three-year annual average number of people killed or severely injured (KSI) in collisions by 15% every three years from a current three-year annual average baseline of 19 people.

## 2.8 North Bayshore Precise Plan (NBPP)

The NBPP implements the General Plan's goals, policies, and design directions for the North Bayshore Change Area and establishes standards, guidelines, and decision-making processes for the area's land use and development. All applications for new construction, substantial modifications or improvements to existing buildings, and changes in land use shall be reviewed for conformance with the NBPP. The NBPP is adopted under the authority of the City's Zoning Ordinance, which establishes precise plans as a tool to regulate land use and development where certain properties or conditions require specialized attention. The NBPP includes the following chapters:

- Introduction
- Vision and Guiding Principles
- Land Use and Design
- Green Building and Site Design
- Habitat and Biological Resources
- Mobility
- Infrastructure
- Implementation

The Mobility chapter and section 8.3 of the Implementation chapter are described below. The Mobility chapter specifies the design of the street system, parking approach, transportation demand management approach, and the role of the Mountain View Transportation Management Association (TMA). As noted at the start of the Mobility chapter the key transportation policies and metrics include the following:

- *Setting a district wide single occupancy vehicle mode share target of 45%*
- *Establishing a district-wide vehicle trip cap*
- *Implementation of Transportation Management Association programs*
- *Eliminating minimum parking requirements and setting parking maximums*

- *Development of new street typologies and design guidelines for each typology*
- *Identification of key transportation infrastructure improvements to support SOV target and mode shift*
- *Development of a complete bicycle network*

The NBPP standards and guidelines result in the construction and management of a street system that supports travel by walking, bicycling, carpool, and transit. These mode priorities are emphasized by the first section of the Mobility chapter, Street Typologies, which defines the vehicle priority for six street types and references standards and guidelines discussed in other sections of the chapter. Specifically, the street typologies balance context and mode priority for:

- Gateway Boulevard – Shoreline Boulevard, Amphitheatre Parkway, Garcia Avenue, and Rengstorff Avenue are identified as Gateway Boulevards with vehicle traffic being a high priority. Design standards are described in Table 14 of the NBPP.
- Transit Boulevard – This is an overlay on all of Garcia Avenue and on portions of San Antonio Road, Charleston Road, and Shoreline Boulevard with frequent transit service. Design standards are described in Table 15 of the NBPP.
- Access Street – Access streets distribute vehicle traffic from Gateway Boulevards to adjacent land uses with parking access. Access streets include Terminal Way, Casey Avenue, Marine Way, Salado Drive, Landings Drive, Alta Avenue, US 101 frontage Road, Stierlin Court, Crittenden Lane, and portions of San Antonio Road, Charleston Road, Plymouth Street, and Joaquin Road. Design standards are described in Table 16 of the NBPP.
- Neighborhood Streets – These streets provide access to/from Shoreline Boulevard and are meant to circulate vehicles without providing access to park entrances or refuse pick-up since those services are provided on Access Streets. These streets provide bicycle lanes and a curbside zone for transit stops, street trees, stormwater treatment, and other active uses. Neighborhood streets include Huff Avenue, Pear Avenue, Shorebird Way, Space Park Way, La Avenida, and portions of Joaquin Road, Charleston Road, and Plymouth Street. Design standards are described in Table 17 of the NBPP.
- Service Streets – These streets are residential or service oriented and they can accommodate refuse pick-up, deliveries, emergency access, loading zones, and parking entrances. Many of these streets will be new streets. Design standards are described in Table 18 of the NBPP.
- Green Way – These pathways serve pedestrians and bicyclists and incorporate high-quality crossings of streets. Greenways can accommodate emergency vehicles. Design standards are described in Table 19 of the NBPP.

The next eleven sections of the Mobility chapter provide standards and guidelines for the streets by mode, a list of transportation improvements, and parking requirements. A summary of each section is listed below:

- Public Frontages – This section addresses the area between the street curb and the back of the sidewalk.

- Streetscape Design – This section addresses standards for street tree plantings, sidewalk continuity, sidewalk furniture, pedestrian scale lighting, and stormwater features.
- Priority Transportation Improvements – This section lists and prioritizes the priority transportation improvements for the NBPP in Table 20. Several follow-up studies are identified that would refine the priority transportation improvement list.
- Bicycle Network – This section defines the bicycle facilities, presents a complete bicycle network as shown in Figure 48 of the NBPP, and provides specific design standards and guidance for each bicycle facility.
- Bike Parking and Commuter Amenities – This section provides bike parking and amenity standards and guidance.
- Pedestrian Network – This section defines the pedestrian facilities for each street typology and provides specific design standards and guidance for each pedestrian facility.
- Transit Network – This section identifies the importance of public transit service, employer sponsored shuttles, advanced technologies and the Charleston bridge, Figure 48 shows the transit network and 5- to 10-minute walk sheds and provides specific design standards and guidance for transit facilities.
- Shared, Unbundled, and Manage Parking – This section defines shared parking, unbundled parking, managed parking, and standards and guidelines.
- Off-Street Parking Requirements – This section describes the parking approach for commercial and residential parking, garage adaptation (a parking garage being converted to other uses over time), maximum parking requirements for office/R&D and residential land uses, and other standards and guidelines for parking.
- Carsharing – This section provides standards and guidelines for carsharing.
- Parking for Carpools, Vanpools, and Electric Vehicles – This section provides standards and guidelines for carpools, vanpools, and electric vehicles.

The final two sections of the Mobility chapter discuss the transportation demand management program and the role of the transportation management association to reduce congestion and improve person connectivity.

- Transportation Demand Management – This section includes a description of the employer TDM approach, the use of project-level TDM plans, the residential vehicle trip performance standard, the North Bayshore trip cap (specified in Chapter 8 Section 8.3 of the NBPP and discussed further in the following section), congestion pricing, and commercial and residential TDM standards and guidelines.
- Transportation Management Association – The Mountain View TMA includes companies and property owners in the North Bayshore and East Whisman area. The purpose of the TMA is to reduce congestion and improve person connectivity. This section provides a description of some of the TMA functions and standards.

### 2.8.1 North Bayshore District Trip Cap Policy

The 2017 NBPP established a North Bayshore District Trip Cap Policy (Chapter 6 Section 6.14 and Chapter 8 Section 8.3). The North Bayshore District Trip Cap Policy is expressed as an absolute number of vehicle standard (Chapter 8 Section 8.3, page 244) in the District Vehicle Trip Cap and Monitoring Program Section 8.3 of the NBPP:

- ***North Bayshore Gateway Peak Hour Vehicle Trip Cap.*** *The District Vehicle Trip Cap is established as the maximum allowed number of trips at the three North Bayshore gateways during the following peak hour periods: 8,290 trips (AM) and 8,030 (PM).*

The North Bayshore District Trip Cap Policy quantifies the physical vehicle capacity of the three main gateways (San Antonio Road, Rengstorff Avenue, and Shoreline Boulevard) and represents the number of vehicles that can be served during the peak morning and evening periods, while maintaining reasonable freedom of vehicular movement (i.e., avoiding gridlock conditions on the local streets, at the gateway interchanges, and on the freeway system). The implementation of the District Vehicle Trip Cap Policy at the three gateways is defined as follows:

- ***Vehicle Trip Cap Monitoring.*** *The City shall monitor the number of vehicle trips at each of the three major entry points to North Bayshore: San Antonio Road; Rengstorff Avenue; and Shoreline Boulevard. Monitoring shall occur at least twice a year during periods determined by the City.*
- ***District Vehicle Trip Cap.*** *If monitoring shows that the trip cap is reached at any of the three gateway locations after two consecutive data reporting periods, the City will not grant any new building permits for net new square footage in the North Bayshore Precise Plan area until the number of peak hour vehicle trips is reduced below the trip cap, except as described in the next paragraph.*

  *An application for new development may propose strategies, including but not limited to, physical improvements to the transportation network and additional Transportation Demand Management measures, along with traffic analysis demonstrating the proposed strategies and/or improvements will comply with the district vehicle trip cap prior to project occupancy. Proposed strategies and/or improvements shall be implemented prior to building occupancy, unless deemed otherwise by the City Council. The City Council will consider applications proposing improvements to the transportation network and/or additional Transportation Demand Management measures according to the review process established by City Council policy.*

The adopted North Bayshore District Trip Cap Policy is a target trip generation for the North Bayshore District, and can be defined in different ways. In this case, the adopted North Bayshore District Trip Cap Policy is based on the individual gateway capacity estimates from a traffic operations analysis (Fehr & Peers, *North Bayshore Precise Plan EIR - Vehicle Gateway Capacity with Residential*, December 2016) included in the *Final Subsequent Environmental Impact Report for the North Bayshore Precise Plan* that was certified in November 2017. The 2017 NBPP adds nearly 10,000 residential dwelling units, which has the effect of creating a more balanced directional traffic flow, increasing the amount of outbound traffic in the morning and inbound traffic in the evening.



### 2.8.2 Site-Specific TDM Plan Policy

Separate from the North Bayshore District Trip Cap Policy, the NBPP also includes a Site-Specific TDM Plan Policy that is referenced in sections 6.14 and 8.3 of the NBPP and a precise definition is presented in the North Bayshore Transportation Demand Management (TDM) Plan Guidelines. The Site-Specific TDM Plan Policy applies a 45% morning peak hour inbound single-occupancy vehicle mode share at each development's driveways (or at a District parking structure with specified vehicle trip targets) for future employees (and associated visitors) commuting to North Bayshore. This requirement has been superseded by the North Bayshore Circulation Study and the specific project TDM proposals.

## 2.9 North Bayshore Circulation Study

In December 2018, the *North Bayshore Circulation Study* (Circulation Study) was initiated to carry out several of the short-term implementation actions identified in the NBPP, including feasibility studies of potential gateway improvements (i.e., a new transit bridge over Stevens Creek and a Charleston Road connection under US 101) as well as strategies that might be needed to reduce morning peak hour inbound single-occupancy vehicle (SOV) mode share at the driveways for non-residential development and update the transportation demand management requirements in the *North Bayshore Transportation Demand Management (TDM) Plan Guidelines* (2015) for non-residential development and the *North Bayshore Residential Transportation Demand Management Guidelines* (2018) for residential development.

An initial phase of the Circulation Study focused on the feasibility analysis of the Charleston Road connection and the Stevens Creek bridge. These projects were identified in the Precise Plan as potential improvements to add vehicle gateway capacity and help achieve the site-specific TDM Plan Policy SOV mode share at the driveways for non-residential development. The Circulation Study analysis determined that the Charleston Road connection under US 101 was not feasible and developed an alternative modification to the Rengstorff Avenue interchange. Council reviewed the study analysis on May 12, 2020, and supported the alternative Rengstorff project (Rengstorff Connector that includes modifications to the northbound US 101 off-ramps and on-ramps and a local street connection between Landings Drive and Rengstorff Avenue). However, the City Council did not support a transit bridge over Stevens Creek. The list of Priority Transportation Improvements was revised to reflect these decisions.

The second phase of the study focused on gateway trip compliance with completion of the NBPP. The evaluation resulted in a combination of new transportation infrastructure (Priority Transportation Improvements), a 35% to 40% SOV for existing and future non-residential development travel, and a modified North Bayshore Trip Cap Policy definition. The Circulation Study made the following recommendations:

1. *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 and Rengstorff gateways. The San Antonio gateway should continue to be measured separately.*
    e. *Adjust the Shoreline and Rengstorff gateway capacities as the new infrastructure projects are completed [The numeric policy targets range from 16,350 to 20,730 inbound morning peak period vehicles, and 15,330 to 18,300 outbound evening peak period vehicles].*
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*
- *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.*

These updated North Bayshore Circulation Study policies were approved by the City Council in December, 2021. An amendment to the Precise Plan is planned to incorporate these updated policies.

# 3. Existing Conditions

This chapter describes the Existing Conditions of the roadway system, pedestrian and bicycle facilities, and transit service near the NBS Master Plan area. It also presents existing traffic volumes and operations for the study intersections and freeway segments.

*COVID-19 Note: The following Existing Conditions discussion describes conditions prior to the formal shelter-in-place order issued by Santa Clara County Public Health Department on March 16, 2020, to slow the spread of COVID-19.*

## 3.1 Existing Street System

US 101 and SR 85 provide regional access to the study area. The following streets provide local access and are considered the North Bayshore gateways: Shoreline Boulevard, La Avenida, Rengstorff Avenue, San Antonio Road, and Bayshore Parkway.

*US 101* is a primarily north-south highway located south-west of the project site with six travel lanes in both the northbound and southbound direction. In each direction, two travel lanes are designated as high-occupancy vehicle (HOV) lanes. HOV lanes are limited to use by vehicles occupied by two or more persons between 5:00 AM and 9:00 AM as well as between 3:00 PM and 7:00 PM. US 101 extends north through San Francisco and south through San Jose to Gilroy. Access streets to the project site from US 101 are Shoreline Boulevard, San Antonio Road, and Rengstorff Avenue.

*SR 85* is a north-south highway extending between the US 101 interchange in the city of San Jose to the south and the US 101 interchange in Mountain View to the north. The highway has two mixed-flow lanes plus one HOV lane per direction along its entirety. Access to the project site from SR 85 is via its interchanges with US 101.

*Amphitheatre Parkway* is a three-lane, east-west gateway boulevard that extends east from North Shoreline Boulevard/Stierlin Court in the east to Charleston Road/Garcia Avenue/Rengstorff Avenue in the west. Two lanes are continuously provided in the westbound direction; only one lane is provided eastbound east of the Permanente Creek Bridge. Amphitheatre Parkway provides access to office developments and parks. The posted speed limit is 35 miles per hour. Sidewalks and bike lanes are provided on both sides of Amphitheatre Parkway.

*Shoreline Boulevard* is a four- to six-lane, north-south gateway boulevard with a raised median that extends from El Camino Real in the south to Shoreline at Mountain View Regional Park in the north. Shoreline Boulevard is classified by the *2030 General Plan* as major retail street from US 101 to Charleston Road, from Charleston Road to Crittenden Lane, and Park Street from Crittenden Lane to Shoreline at Mountain view Regional Park. Within the project site, North Shoreline Boulevard provides access to US 101 as well as office and commercial developments. The posted speed limit is 35 mph.



*San Antonio Road* is a two- to six-lane, north-south gateway boulevard that extends from Foothill Expressway (within Los Altos) to Terminal Boulevard near Shoreline at Mountain View Regional Park. San Antonio Road provides access to US 101 as well as office and commercial developments within the project site. The posted speed limit is 35 mph.

*Rengstorff Avenue* is a four-lane, north-south gateway boulevard that extends from El Camino Real in the south to Charleston Road/Garcia Avenue in the north where it becomes Amphitheatre Parkway. Rengstorff avenue provides access to US 101 from the project site. The posted speed limit is 35 mph.

*Charleston Road* is a four-lane, east-west access street that extends from Amphitheatre Parkway in the west to Stevens Creek Trail in the east. Charleston Road is not a through street east of Charleston Road/Shorebird Way. This street provides local access to office and commercial developments. Charleston Road becomes Garcia Avenue west of Garcia Avenue/Amphitheatre Parkway providing local access to office, residential, and commercial developments. The posted speed limit on Charleston Road is 35 miles per hour.

*Landings Drive* is a two-lane, access street that connects on both ends to Charleston Road. The posted speed limit is 25 miles per hour. Landings Drive provides access to office developments.

*Bayshore Parkway* is a two-lane, north-south access street that runs parallel to US 101 from San Antonio Road to Salado Drive. Bayshore Parkway provides access to office developments within the project site. The posted speed limit is 25 mph.

*Alta Avenue* is a two-lane, north-south access street that connects Plymouth Street to Charleston Avenue. Alta Avenue provides access to office developments. The posted speed limit is 25 miles per hour. There are sidewalks on both sides of Alta Avenue.

*Huff Avenue* is a two-lane, north-south neighborhood street that connects Plymouth Street to Charleston Road. Huff Avenue provides access to office and commercial developments. The posted speed limit is 25 miles per hour. There are sidewalks on both sides of Huff Avenue.

*Joaquin Road* is a two-lane, north-south neighborhood street that connects Plymouth Street to Charleston Road. Joaquin Road provides access to office developments. The posted speed limit is 25 miles per hour. There are meandering sidewalks on both sides of Joaquin Road.

*Pear Avenue* is a two-lane, east-west neighborhood street that extends from Shoreline Boulevard to El Centro Avenue. Pear Avenue provides access to office and commercial developments. The posted speed limit is 25 miles per hour. There are sidewalks on both sides of Pear Avenue.

*Shorebird Way* is a two-lane, primarily east-west neighborhood street that connects North Bayshore Boulevard to Charleston Road. Shorebird Way provides access to office developments. The posted speed limit is 25 miles per hour.

*Plymouth Street* is a two-lane, east-west neighborhood street that connects North Shoreline Boulevard to Alta Avenue. Plymouth Street provides access to office developments. The posted speed limit is 25 miles per hour.

*Space Park Way* is a two-lane, east-west neighborhood street that extends from Shoreline Boulevard to Armand Drive. Space Park Way provides access to office and commercial developments. The posted speed limit is 25 miles per hour.

*La Avenida* is a two- to three-lane east-west neighborhood street that extends from North Bayshore Boulevard to Stevens Creek Trail. La Avenida is a one-way westbound street from North Bayshore Boulevard to Inigo Way and a two-way street from Inigo Way to Stevens Creek Trail. La Avenida provides access to office developments. The posted speed limit is 25 mph.

## 3.2 Existing Truck Routes

The City of Mountain View Municipal Code section 19.60 designates truck routes within the city limits. The designated truck routes within the study area are Charleston Road, San Antonio Road, US 101, and SR 85.

## 3.3 Existing Pedestrian Facilities

Pedestrian facilities include sidewalks, curb ramps, crosswalks, and off-street paths that are meant to provide safe and convenient routes for pedestrians to access destinations such as institutions, businesses, public transportation, and recreation facilities. **Figure 7** shows the existing sidewalk gaps in the NBPP area. Most streets in North Bayshore include at least a four-foot-wide sidewalk on one or both sides except for Crittenden Lane, Stierlin Court, a segment of Shorebird Way, Macon Avenue, a segment of Pear Avenue, a segment of Landings Drive, a segment of Bayshore Parkway, a segment of Alta Avenue, San Antonio Road, and a segment of Garcia Avenue. Within the project site, meandering sidewalks buffered from the roadway by landscaping exist along Amphitheatre Parkway, North Shoreline Boulevard, and Charleston Road.

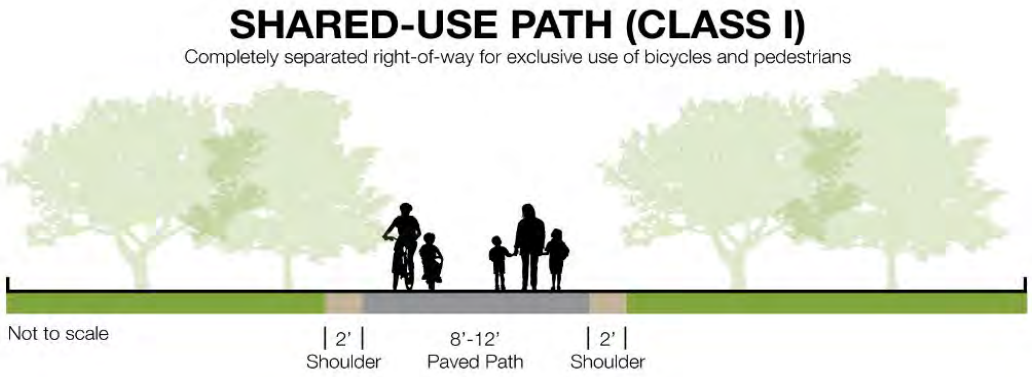
Most intersections in the project site have crosswalks with pedestrian signals. The intersection of North Shoreline Boulevard and Space Park Way has no midblock crosswalk across North Shoreline Boulevard. There is a pedestrian bridge across US 101 via the Permanente Creek Trail, which terminates at West Middlefield Road.

## 3.4 Existing Bicycle Network

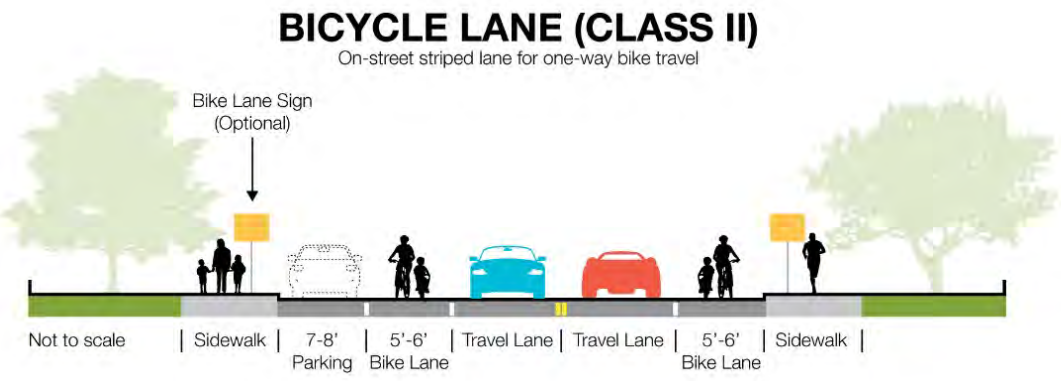
The four classes of bicycle facilities in Mountain View are described in the *Mountain View Bicycle Transportation Plan Update* (2015). These descriptions are based on California Department of Transportation (Caltrans) classifications of bikeways from California Assembly Bill 1193 and the *Highway Design Manual* (Chapter 1000: Bikeway Planning and Design). Each bikeway class is intended to provide bicyclists with enhanced riding conditions. Bikeways offer various levels of separation from traffic based

on traffic volume and speed, among other factors. The four bikeway types and appropriate contexts for each are presented below.

**Class I Bikeway (Shared-Use Path)** Shared-use paths, sometimes referred to as multi-use paths, provide a completely separate right-of-way and are designated for the exclusive use of people riding bicycles and walking with minimal roadway crossings. In general, bike paths are along corridors not served by streets or where sufficient right-of-way exists to allow them to be constructed away from the influence of vehicles. Mountain View has many such paths located along creeks and the light rail line. Class I Bikeways can also offer opportunities not provided by the road system by serving recreational areas and/or desirable commuter routes.

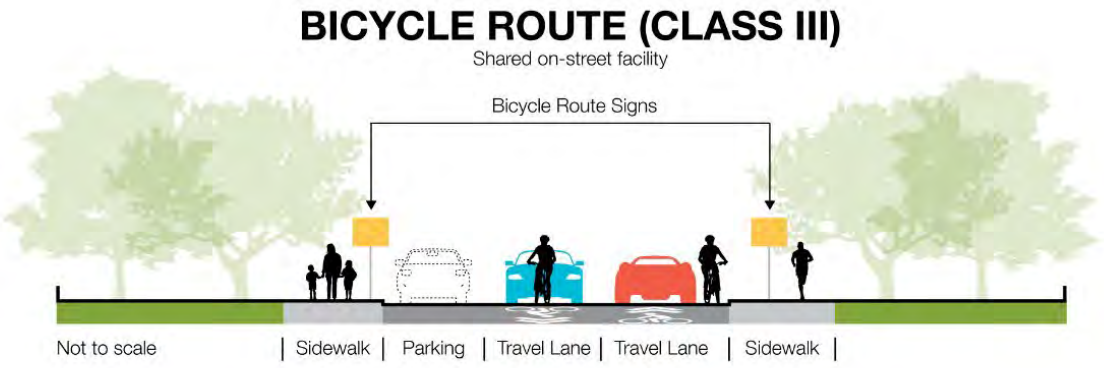



**Class II Bikeways (On-Street Bike Lanes)** Bike lanes provide a striped lane, pavement markings, and signage for one-way bike travel on a street or highway. Bicycle lanes are typically five (5) feet wide, although wider lanes are desirable on roadways with high traffic volumes and/or high travel speeds. The *VTA Bicycle Technical Guidelines* (December 2007) recommends that Caltrans standards regarding bicycle lane dimensions be used as a minimum and provides supplemental information and guidance on when and how to better accommodate the many types of bicyclists. Bike lanes may be enhanced with painted buffers between vehicle lanes and/or parking, and green paint at conflict zones (such as driveways or intersections).

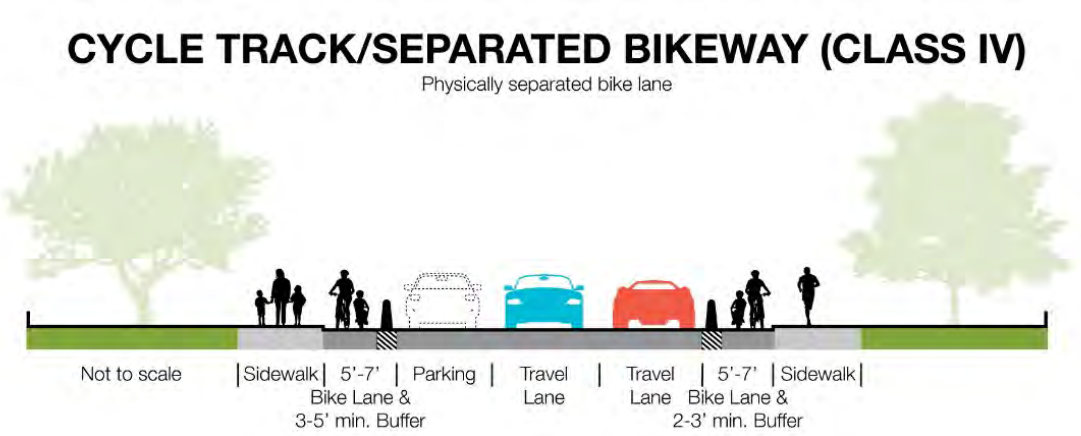


**Class IIIa Bikeways (Bike Routes)** Bike routes maybe identified on a local residential or collector street when the travel lane is wide enough, and the traffic volume is low enough, to allow both cyclists and motor vehicles to share a lane and/or to provide continuity to a bikeway network. Shared-use arrows or "sharrows" are common striping treatments for bike routes.

**Class IIIb Bikeways (Bike Boulevards)** Bicycle boulevards provide further enhancements to bike routes to encourage slow speeds and discourage non-local vehicle traffic via traffic diverters, chicanes, traffic circles, and/or speed tables. Bicycle boulevards can also feature special wayfinding signage to nearby destinations or other bikeways.




**Class IV Bikeways (Separated Bikeway)** Separated bikeways, also referred to as cycle tracks or protected bikeways, are bikeways for the exclusive use of bicycles which are physically separated from vehicle traffic. Separated bikeways were adopted by Caltrans in 2015. Types of separation may include, but are not limited to, grade separation, flexible posts, physical barriers, or on-street parking.




Under California law, bicyclists are allowed to use all roadways in California unless posted otherwise. Therefore, even for roadways that have no designated (or planned) bikeway identified, a majority are open for cycling.

The location of the existing bicycle facilities is shown on **Figure 8**. Existing Class I Shared Use Paths in Mountain View include the Stevens Creek Trail, Hetch Hetchy Trail, Permanente Creek Trail, existing light rail trails, and a portion of the Bay Trail through Shoreline at Mountain View Regional Park, all of which have asphalt or concrete surfaces. As described above, Class I bikeways are off-street multi-use (pedestrian and bicycle) paths that are separated from roadways to create a safer, convenient, and more connected walking and biking environment. Stevens Creek Trail and Permanente Creek Trail are two north-south Class I bikeways that run through the project site and connect to the Bay Trail, an east-west Class I bikeway north of the project site.

Within the project site, Class II Bike lanes exist along Shoreline Boulevard, La Avenida, Inigo Way, Charleston Road/Garcia Avenue, Crittenden Lane, Amphitheatre Parkway, Bayshore Parkway, and Rengstorff Avenue. Class IIIa Bike routes exist along the segment of Shoreline Boulevard north of Charleston Road.

## 3.5 Existing Transit Service

North Bayshore is served by both public transit and private shuttle services. Prior to the COVID-19 shelter-in-place policy, public transit routes that served the North Bayshore area included Santa Clara Valley Transportation Authority (VTA) Route 40, Express Route 185, and Orange Line, as well as two MVgo routes: MVgo West Bayshore and MVgo East Bayshore. Private shuttle services are operated by Google, Microsoft,[12] and Intuit.

**Figure 9** displays the pre-COVID public transit routes in and near the North Bayshore District, and **Table 6** shows the span of service and frequency of the public transit routes that serve North Bayshore.

[12] Microsoft shuttle is furloughed due to the construction of the new building.

**Table 6: Pre-COVID 2020 Transit Service**

| Route | From | To | Weekdays | | | Weekends | |
|---|---|---|---|---|---|---|---|
| | | | Operating Hours | Headway (minutes) | | Operating Hours | Headway (minutes) |
| | | | | Peak | Midday | | |
| ***Express Shuttle*** | | | | | | | |
| 185 | Gilroy Transit Center | Mountain View | 6:00 to 9:45 AM (N)<br>4:15 to7:45 PM (S) | 10 | No Service | No Weekend Service | |
| ***Bus*** | | | | | | | |
| 40 | Foothill College | Mountain View Transit Center | 6:30 AM to 10:30 PM (N)<br>6:13 AM to 10:05 PM (S) | 10 | 30 | 8:15 AM to 7:00 PM | 10 |
| ***Transit Lines*** | | | | | | | |
| Orange Line | Mountain View Station | Alum Rock Station | 5:00 AM to 12:50 PM (E)<br>4:42 AM to 1:15 AM (W) | 5 | 10 | 5:50 AM to 1:00 AM | 5 |
| MVgo West Bayshore | Downtown Mountain View Transit Center | Casey Avenue/ Intuit Main Street | 6:45 AM to 10:45 AM & 3:00 to 8:45 PM | 15 | N/A | No Weekend Service | |
| MVgo East Bayshore | Downtown Mountain View Transit Center | Crittenden Lane | 7:14 AM to 10:18 AM<br>4:01 PM to 8:17 PM | 20 | N/A | No Weekend Service | |

Note: Routes reflect VTA New Service launched on December 28, 2019.
Source: VTA, ACE and MVgo 2020.

Through the COVID-19 pandemic, several changes have been made to the transit service in North Bayshore. Express route 185 was canceled due to low ridership and a new MVgo route has been added to the North Bayshore area. Public transit routes now include Santa Clara Valley Transportation Authority (VTA) Route 40, and Orange Line, as well as three MVgo routes: MVgo B, MVgo C, and MVgo D.

**Figure 10** displays the existing public and private transit routes in and near the North Bayshore District, and **Table 7** shows the span of service and frequency of the public transit routes that serve North Bayshore.

**Table 7: Existing 2022 Transit Service**

| Route | From | To | Weekdays | | | Weekends | |
|---|---|---|---|---|---|---|---|
| | | | Operating Hours | Headway[1] (minutes) | | Operating Hours | Headway (minutes) |
| | | | | Peak | Midday | | |
| ***Bus*** | | | | | | | |
| 40 | Foothill College | Mountain View Transit Center | 6:25 AM to 10:30 PM (N)<br>6:14 AM to 10:00 PM (S) | 30 | 30 | 8:15 AM to 6:30 PM | 50 |
| ***Transit Lines*** | | | | | | | |
| Orange Line | Mountain View Station | Great America ACE Station | 3:00 PM to 6:40 PM (E)<br>6:00 AM to 10:00 AM (W) | 60 | N/A | N/A | N/A |
| MVgo | (B) Downtown Mountain View Transit Center | Shoreline, La Avenida, Crittenden | 6:30 AM to 10:00 AM<br>3:25 PM to 8:05 PM | 15 | N/A | No Weekend Service | |
| | (C) Downtown Mountain View Transit Center | Charleston, Garcia, and San Antonio (counterclockwise loop) | 6:35 AM to 10:35 AM<br>3:00 PM to 8:00 PM | 15 | N/A | No Weekend Service | |
| | (D) Downtown Mountain View Transit Center | San Antonio, Garcia, and Charleston (clockwise loop) | 6:40 AM to 10:45 AM<br>2:50 PM to 8:00 PM | 15 | N/A | No Weekend Service | |

Notes:
1. Headways are defined as the time between transit vehicles on the same route.

Source: VTA, ACE and MVgo, 2022.

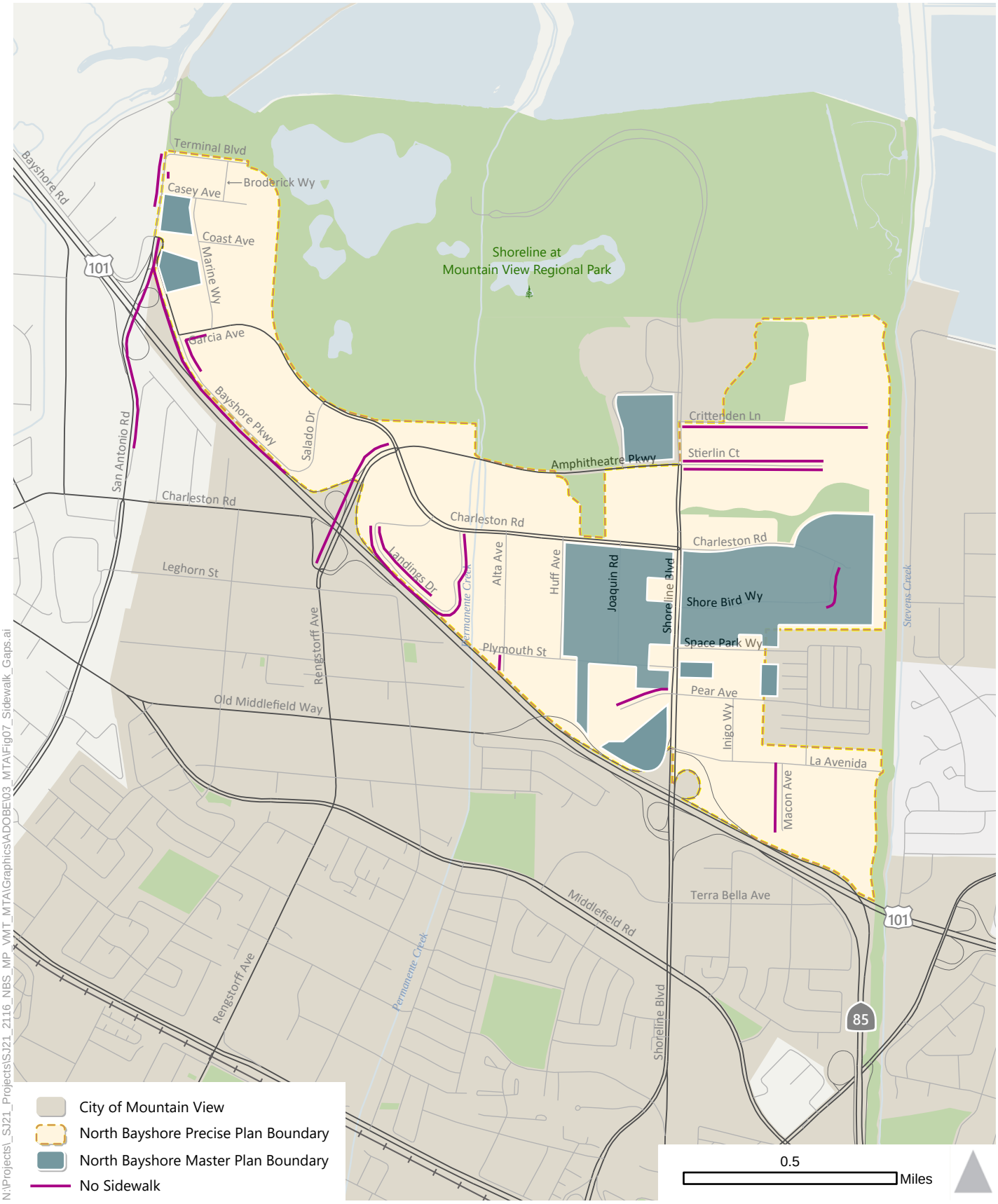



Figure 7

## Sidewalk Gaps

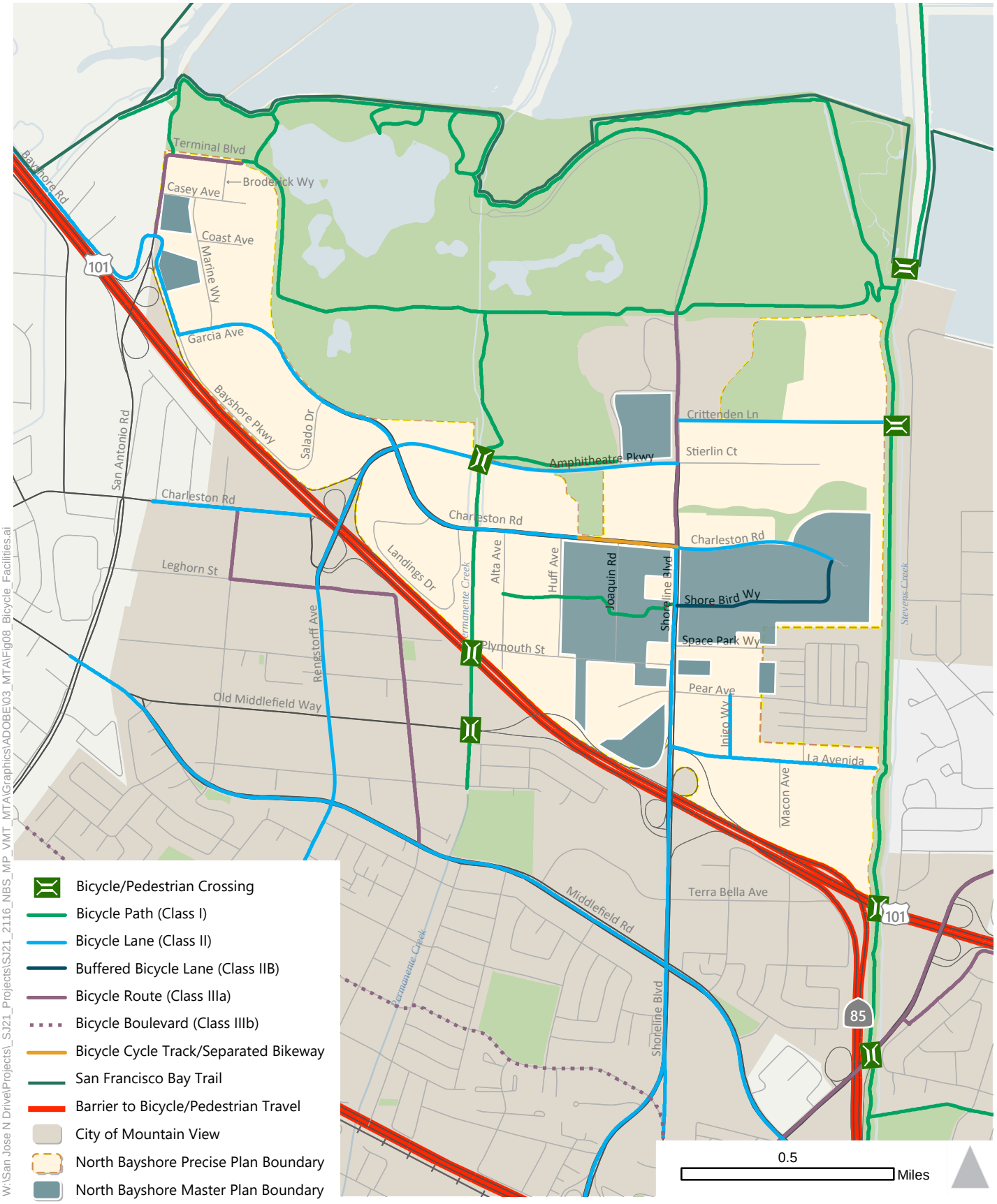



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Figure 8

## Bicycle Facilities

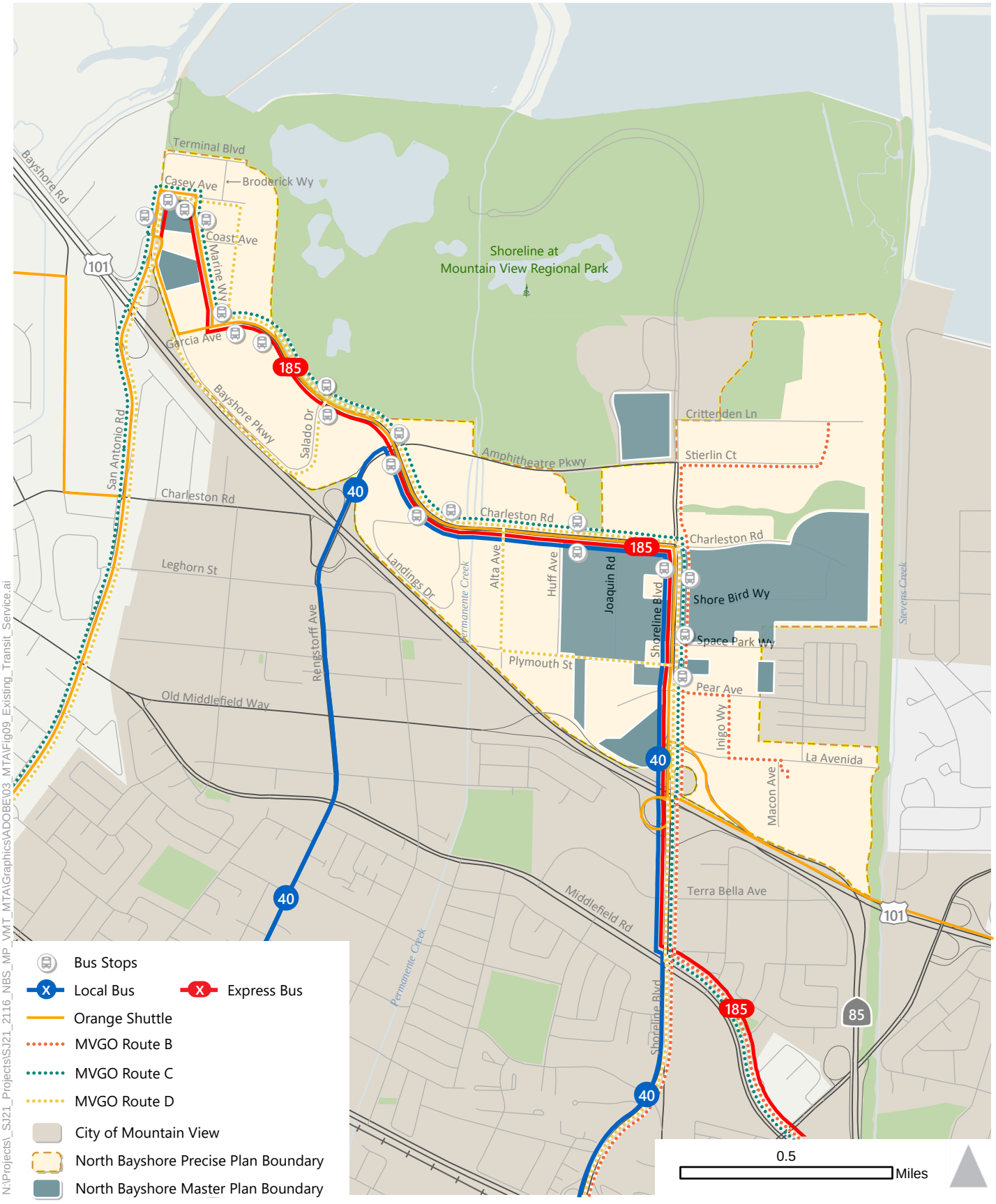


Figure 9

## Existing (Pre-COVID) Transit Service

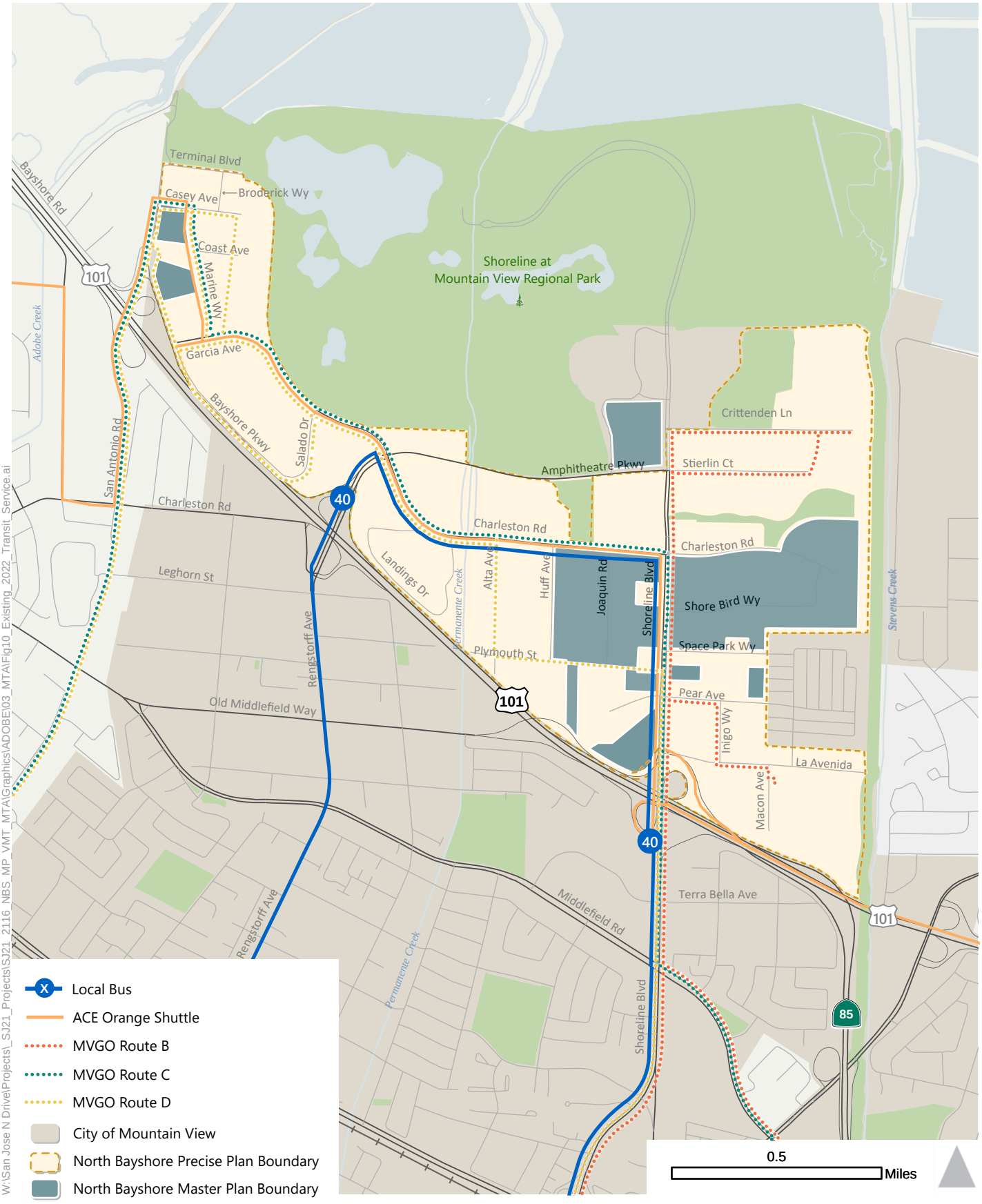


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Figure 10

## Existing 2022 Transit Services

## 3.6 Existing Intersection Volume Approach

Typically, new traffic counts are collected at all study intersections for traffic analyses to evaluate a recent existing condition. However, since the Existing Condition for this analysis describes conditions prior to the March 2020 shelter-in-place policy, the turning movement counts collected in May 2019 (obtained from the *Landings Office Development and Huff Avenue Parking Structure Site Specific Transportation Analysis (SSTA)*, May 2020) were used as the existing turning movement counts for Scenario 1. The count data also includes pedestrian and bicycle counts for each intersection (refer to **Appendix A**). **Figure 11** shows the peak hour intersection traffic volumes, lane configuration, and control type for the study intersections.

As shown in the *Spring 2022 North Bayshore District Monitoring and Preliminary Hybrid Work Assessment* (Fehr & Peers, June 2022) report, work commute traffic is only about 50 percent of the Spring 2020 volumes during the morning and evening peak periods. This lower vehicle traffic is because most employees at North Bayshore area businesses continue to work from home.

## 3.7 Existing Intersection Operations

Existing intersection lane configurations, signal timings, and peak hour turning movement volumes were used to calculate the levels of service (LOS) at the study intersections for the highest peak hour during the AM (7:00 to 10:00) and the PM (4:00 to 7:00) peak commute hours (refer to **Figure 11**). **Table 8** shows the existing intersection level of service at each study location. **Appendix B** contains the corresponding calculation sheets.

The results of the LOS calculations indicate that all of the study intersections are operating at levels of service that meet the applicable LOS standards under Existing Conditions except for the following.

- Int. 3: Rengstorff Ave-Amphitheatre Pkwy / Garcia Ave-Charleston Rd (LOS F during the PM peak hour)
- Int. 5: Rengstorff Ave / US 101 Southbound Ramps (LOS E during the AM peak hour)
- Int. 11: Shoreline Blvd / Charleston Rd (LOS F during the PM peak hour)
- Int. 15: Shoreline Blvd / Space Park Wy (LOS F during the AM peak hour)
- Int. 17: Shoreline Blvd / Pear Ave (LOS E during the PM peak hour)
- Int. 18: Shoreline Blvd / La Avenida - US 101 Northbound Ramps (LOS F during AM peak hour and LOS E during the PM peak hours)

By comparison, the NBPP TIA also concludes that the intersections above do not meet the LOS standards under Existing Conditions. This analysis identified a worse LOS than the NBPP at the following locations:

- Locations with higher Existing volumes in this MTA than the *NBPP TIA*.
    - Int. 2: San Antonio Rd / US 101 Northbound Ramps – PM peak hour (10% higher in MTA)
    - Int. 6: Rengstorff Ave / Leghorn St – AM peak hour (15% higher in MTA)

- Locations evaluated in TRAFFIX in NBPP, but Synchro 11 in MTA: The TRAFFIX and Synchro 11 software involve different levels of precision in user-adjustment to simulate real-world conditions. Additionally, TRAFFIX analysis requires VTA standard inputs for base signal timing settings. Thus, LOS results between the two software should not be directly compared.
    - Int. 7: Landings Dr / Charleston Rd (AM and PM peak hours)
    - Int. 8: Alta Ave / Charleston Rd (AM peak hour)
    - Int. 9: Huff Ave / Charleston Rd (AM and PM peak hours)
    - Int. 11: Shoreline Blvd / Charleston Rd (AM and PM peak hours)
    - Int. 15: Shoreline Blvd / Space Park Wy (AM peak hour)
- Locations in which NBPP TIA included geometry that does not reflect current conditions.
    - Int. 17: Shoreline Blvd / Pear Ave (AM peak hour) (non-current geometry on northbound and eastbound approaches)
- In addition, because of the signalization of the Shoreline Boulevard and Plymouth Road intersection (study intersection #16), the NBPP TIA calculations result in a LOS of F with a side-street stop control while this analysis with signalization shows an LOS B result.

**Table 8: Existing Intersection Levels of Service**

| Intersection | | Count Date | LOS Threshold[2] | Control[1] | Peak Hour[3] | Delay[4] | LOS[5] |
|---|---|---|---|---|---|---|---|
| 1 | San Antonio Rd / Bayshore Pkwy[7] | May 2019 | D | Signalized | AM<br>PM | 14.6<br>32.5 | B<br>C |
| 2 | San Antonio Rd /<br>US 101 Northbound Ramps[7] | May 2019 | D | Signalized | AM<br>PM | 19.3<br>10.9 | B<br>B |
| 3 | Rengstorff Ave-Amphitheatre Pkwy /<br>Garcia Ave-Charleston Rd | May 2019 | D | Signalized | AM<br>PM | 36.0<br>**82.3** | D<br>**F** |
| 4 | Rengstorff Ave /<br>US 101 Northbound Ramps[7] | May 2019 | D | Signalized | AM<br>PM | 2.6<br>5.8 | A<br>A |
| 5 | Rengstorff Ave /<br>US 101 Southbound Ramps[7] | May 2019 | D | Signalized | AM<br>PM | **68.1**<br>50.6 | **E**<br>D |
| 6 | Rengstorff Ave / Leghorn St | May 2019 | D | Signalized | AM<br>PM | 38.5<br>27.8 | D<br>C |
| 7 | Landings Dr / Charleston Rd | May 2019 | D | Signalized | AM<br>PM | 33.8<br>40.8 | C<br>D |
| 8 | Alta Ave / Charleston Rd | May 2019 | D | Signalized | AM<br>PM | 23.3<br>26.5 | C<br>C |
| 9 | Huff Ave / Charleston Rd | May 2019 | D | Signalized | AM<br>PM | 25.8<br>40.2 | C<br>D |

## Table 8: Existing Intersection Levels of Service

| Intersection | | Count Date | LOS Threshold[2] | Control[1] | Peak Hour[3] | Delay[4] | LOS[5] |
|---|---|---|---|---|---|---|---|
| 10 | Joaquin Rd / Charleston Rd | May 2019 | D | Side-Street Stop Controlled | AM<br>PM | 11.8<br>13.3 | B<br>B |
| 11 | Shoreline Blvd / Charleston Rd | May 2019 | D | Signalized | AM<br>PM | 50.5<br>**105.7** | D<br>**F** |
| 12 | Alta Ave / Plymouth St[6,7] | May 2019 | D | All-Way Stop Controlled | AM<br>PM | 7.5<br>8.4 | A<br>A |
| 13 | Huff Ave / Plymouth St[6,7] | May 2019 | D | Side-Street Stop Controlled | AM<br>PM | 11.0<br>12.2 | B<br>B |
| 14 | Joaquin Rd / Plymouth St[6,7] | May 2019 | D | Side-Street Stop Controlled | AM<br>PM | 15.0<br>20.1 | B<br>C |
| 15 | Shoreline Blvd / Space Park Wy | May 2019 | D | Side-Street Stop Controlled | AM<br>PM | **88.6**<br>23.2 | **F**<br>C |
| 16 | Shoreline Blvd / Plymouth St[7] | May 2019 | D | Signalized | AM<br>PM | 15.6<br>18.1 | B<br>B |
| 17 | Shoreline Blvd / Pear Ave | May 2019 | D | Signalized | AM<br>PM | **57.8**<br>33.3 | **E**<br>C |
| 18 | Shoreline Blvd /<br>La Avenida-US 101 NB Ramps[7] | May 2019 | D | Signalized | AM<br>PM | **102.2**<br>**60.5** | **F**<br>**E** |
| 19 | Shoreline Blvd /<br>US 101 Southbound Ramps[7] | May 2019 | D | Signalized | AM<br>PM | 16.5<br>13.1 | B<br>B |
| 20 | La Avenida /<br>US 101 Northbound Ramps | Future Intersection | | | | | |
| 21 | Inigo Wy / La Avenida | 2015 | D | Side-Street Stop Controlled | AM<br>PM | 10.9<br>13.2 | B<br>B |

Notes: **Bold** text indicates intersection operates at a deficient Level of Service compared to the applicable standard.

1. Signal refers to a signalized intersection. SSSC = Side-Street Stop Controlled intersection.
2. *City of Mountain View 2030 General Plan and Greenhouse Gas Reduction Program EIR*, page 121 (2011).
3. AM = morning peak hour, PM = evening peak hour.
4. Whole intersection weighted average control delay expressed in seconds per vehicle calculated using methods described in the *Highway Capacity Manual*, 6th Edition. For side-street stop-controlled intersections, total delay for the worst movement approach is reported.
5. LOS = Level of Service. Unless otherwise noted, the LOS calculations conducted using the Synchro level of service analysis software package, which applies the method described in the *Highway Capacity Manual,* 6th Edition.
6. LOS calculation conducted using TRAFFIX software.
7. Denotes intersections in which lane configuration or signal phasing preclude application of HCM 6th Edition methodology. For these intersections, 2000 *Highway Capacity Manual* methodology is utilized for delay and LOS calculations. Delay calculations for intersections analyzed in the TRAFFIX software also utilize 2000 *Highway Capacity Manual* methodology, as this software does not support HCM 6th Edition methodology. *Int. 5 uses HCM 6th Edition in Cumulative with Project scenario only.

Source: Fehr & Peers, 2023.



## 3.8 Field Observations

Field visits were conducted in 2020, prior to COVID-19, to confirm the operations analysis results and to observe overall transportation system characteristics. In general, observations indicated that most of the study intersections are operating at or near the calculated levels of service. For the AM peak directions of travel, an extensive queue was observed on Shoreline Boulevard northbound between Pear Avenue and Middlefield Road. Because of the high northbound vehicle volume along Shoreline Boulevard, combined with pedestrians and vehicles crossing Shoreline Boulevard at Pear Avenue, this intersection acts as a bottleneck that meters traffic into the North Bayshore area.

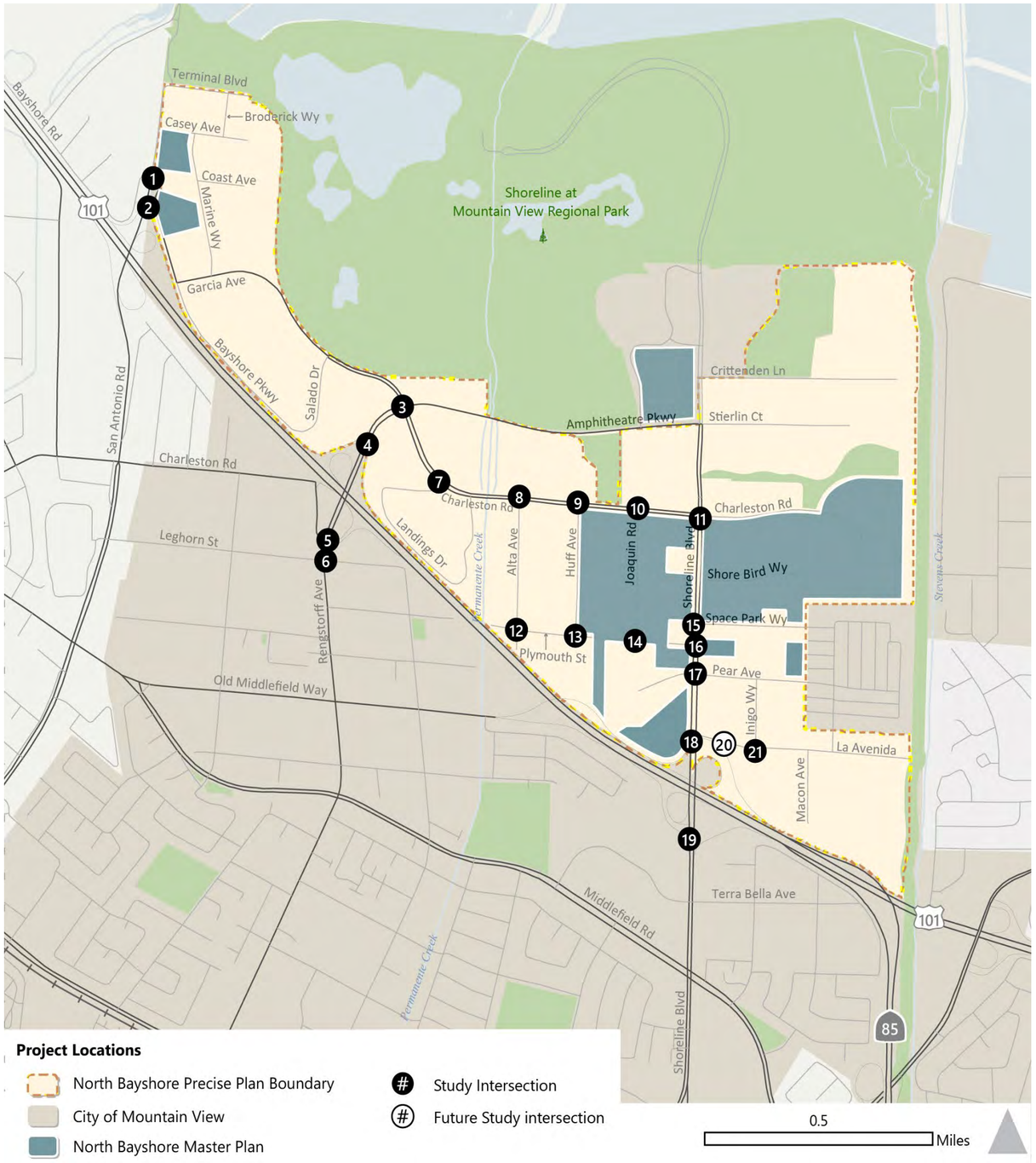
In the evening peak hour, the queue of southbound vehicles on Shoreline Boulevard extends from the US 101 Southbound ramps to Plymouth Street. This queuing is primarily due to a lane utilization imbalance caused by traffic heading toward US 101 northbound and the US 101 and SR 85 southbound on-ramps.

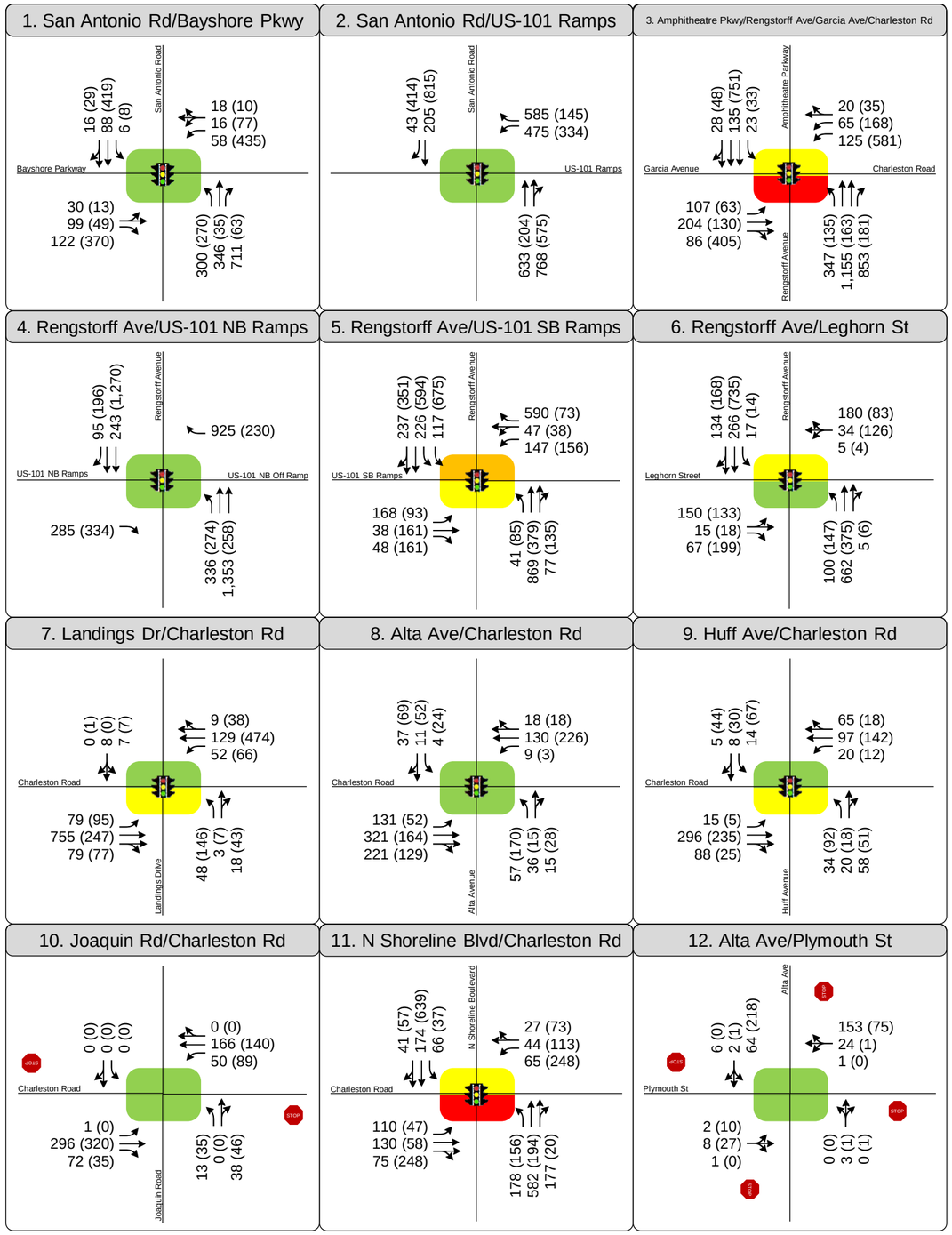
The Rengstorff Avenue gateway is an alternative to the Shoreline Boulevard gateway, with less congestion and shorter queues than along Shoreline Boulevard. However, for those commuters traveling to or from the south, most prefer to use the Shoreline Boulevard gateway to minimize the time spent on the heavily congested freeway. The San Antonio Road gateway is more lightly used and does not experience elevated levels of congestion or queuing during either the morning or evening peak hours.

Bicycle use is widespread throughout the North Bayshore area and along the roadways and shared-use paths leading to the area. There was a high number of observed bicyclists at Amphitheatre Parkway/ Garcia Avenue-Charleston Road. The highest number of cyclists using Shoreline Boulevard was during the AM peak hour. Google operates a bike share program in the North Bayshore area, which allows employees to bicycle between Google buildings within the plan area.

As noted earlier, Spring 2022 volumes are about 50% of the Spring 2020 volumes. In the Spring of 2022, short vehicle queues were observed and all vehicle traffic is served in one intersection signal cycle except for the US 101 northbound off ramp at Shoreline Boulevard. Standing queues (which occur when vehicle traffic requires more than one intersection signal cycle to be served) were not observed. Unlike during congested conditions of previous monitoring reports, the observed vehicle volume is well below the gateway capacity and arriving vehicles are served in one signal cycle.

As shown in the *Spring 2022 North Bayshore District Monitoring and Preliminary Hybrid Work Assessment* (Fehr & Peers, June 2022) report, the total number of morning inbound peak hour persons traveling across the gateways has declined 63%; of those people, the proportion using single-occupant vehicles (SOVs) has increased from 57% to 62%, the proportion using high-occupancy vehicle (HOVs) has increased from 11% to 18%, and the proportion using transit has decreased from 28% to 15%. Similar results are found in the morning inbound 3-hour peak period. Further, the evening commute has similar trends.



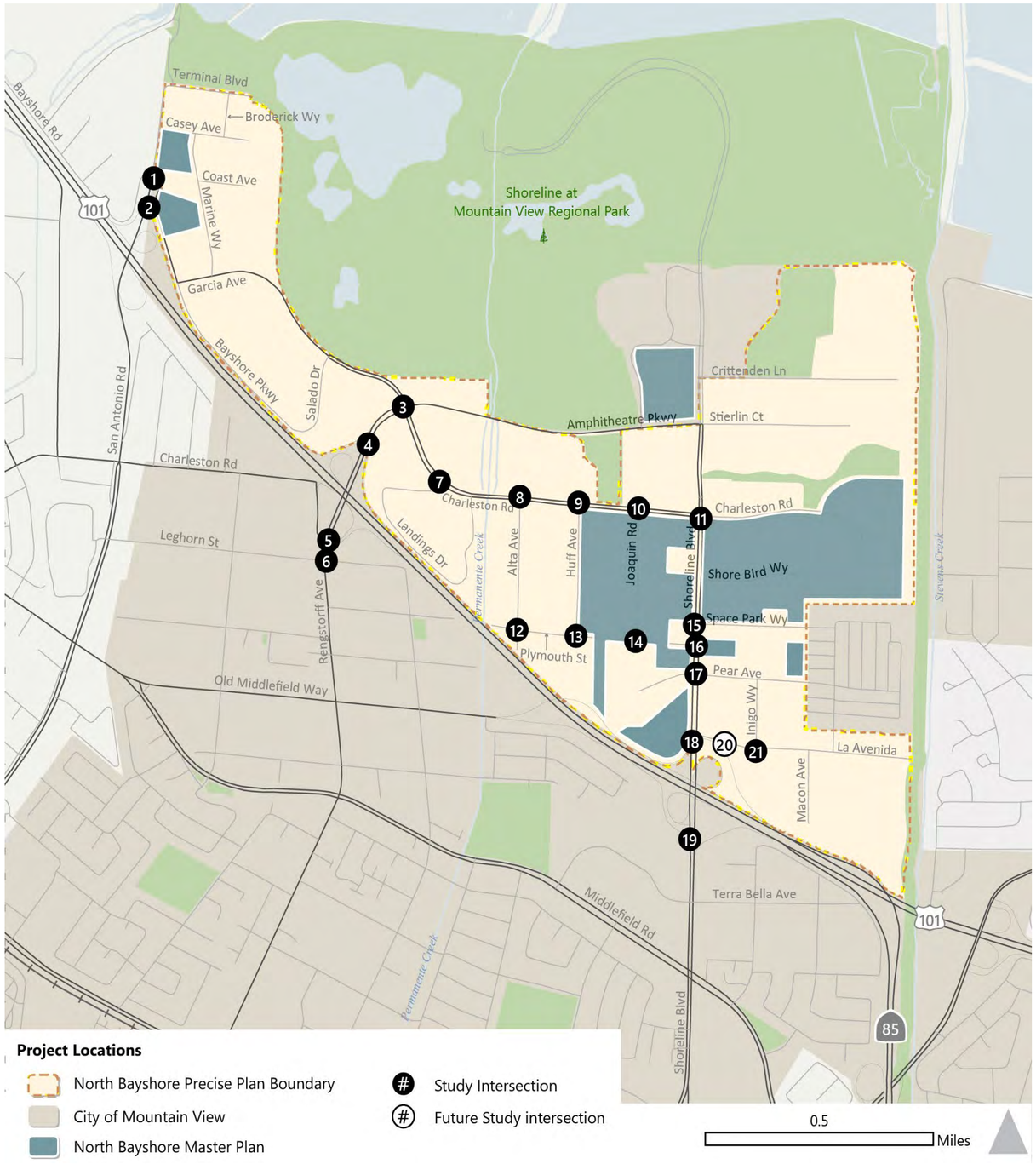




## LEGEND

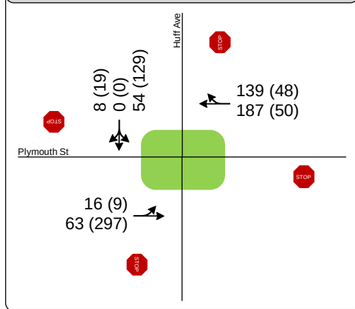
- Study Intersection
- AM (PM) Peak Hour Traffic Volume
- AM PM — A-C D E F
- Lane Configuration
- Stop Sign
- Signalized

Figure 11

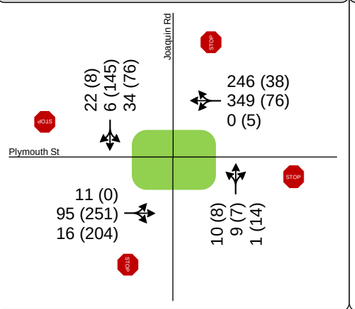
Peak Hour Traffic Volumes, Traffic Control, Lane Configurations, and Level of Service
Existing Conditions



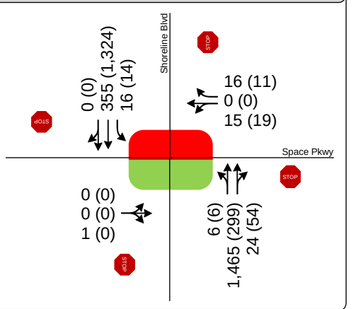

### 13. Huff Ave/Plymouth St



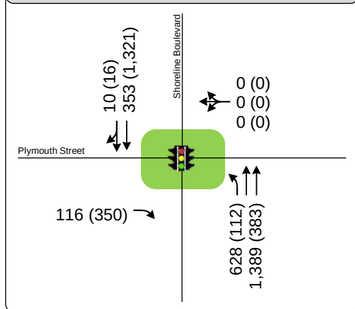

### 14. Joaquin Rd/Plymouth St



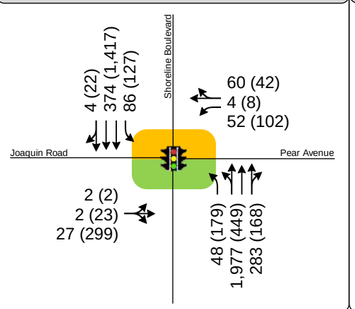

### 15. Shoreline Blvd/Space Pkwy



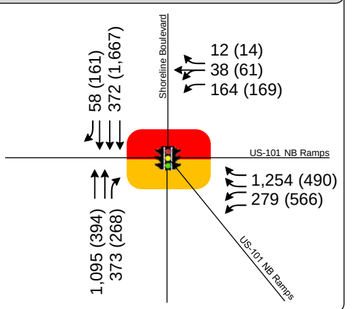

### 16. Shoreline Blvd/Plymouth St



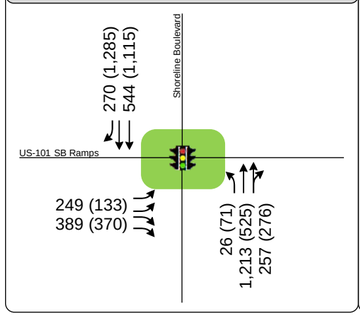

### 17. Shoreline Blvd/Joaquin Rd/Pear Ave




### 18. Shoreline Blvd/US-101 NB Ramps



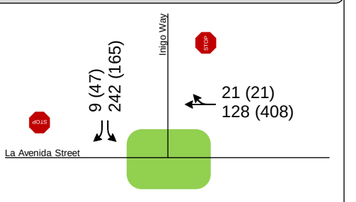

### 19. Shoreline Blvd/US-101 SB Ramps




### 20. Future Intersection

Does Not Exist in Existing Conditions

### 21. Inigo Way/La Avenida St




## LEGEND

- Study Intersection
- AM (PM) Peak Hour Traffic Volume
- AM PM A-C D E F
- Lane Configuration
- Stop Sign
- Signalized

Figure 11

Peak Hour Traffic Volumes, Traffic Control, Lane Configurations, and Level of Service

Existing Conditions

# 4. Site Access and On-Site Circulation

This chapter evaluates site access and internal circulation for pedestrians, bicyclists, and vehicles, and consistency with the NBPP mobility policies, standards, and guidelines based on the Parking Layout and Circulation Plan site plans provided by the applicant.

## 4.1 Pedestrian Access and Circulation

Existing pedestrian access and circulation are discussed, followed by an assessment of the proposed pedestrian access.

### 4.1.1 Existing Pedestrian Access and Circulation

As described in the Existing Conditions chapter, most of the streets in the NBS Master Plan area include at least a four-foot-wide sidewalk. There are a few sidewalk gaps within the NBS Master Plan area, including along Pear Avenue west of Shoreline Boulevard, Shorebird Way south of Charleston Road, Stierlin Court, and Crittenden Lane, as shown on **Figure 7**.

Meandering sidewalks buffered from the roadway by landscaping exist along the gateway boulevards: Amphitheatre Parkway, North Shoreline Boulevard, and Charleston Road. Existing multi-use pathways within or near the pedestrian study area include Stevens Creek Trail, Permanente Trail, and the Green Loop. The NBPP defines gateway boulevards as major traffic arteries that serve as primary entry points to North Bayshore and provide access to other streets within the NBS Master Plan site as well as to district parking structures.

### 4.1.2 Proposed Pedestrian Access and Circulation

The NBS Master Plan site plan was evaluated for internal circulation within the NBS Master Plan and access to transit uses near the site. The NBS Master Plan will add pedestrian trips to the existing sidewalk network from employees who walk to and from work to nearby office locations, who walk to nearby bus stops and the Mountain View Transit Center, located at Castro Street and Central Expressway, and who walk to and from other destinations in the area.

As shown in **Figure 12**, the NBS Master Plan proposes pedestrian circulation throughout the site shown in red dots. The proposed pedestrian paths provide direct and safe access from surface parking lots to office and commercial developments within the NBS Master Plan site. This plan is consistent with the NBPP standard on pedestrian circulation designs for surface parking lots. A Pedestrian Lane, or Social Spine, is proposed in light red along Grove Street as an alternative path to Charleston Road and Shoreline Boulevard. A Green Loop is proposed, which is a two-way cycle track and pedestrian path, which circulates throughout the site and connects to Permanente Creek Trail. This increases pedestrian access and internal connectivity within the site and provides multi-directional travel for cyclists. This element is consistent

with the NBPP. The NBPP estimates an increase in pedestrian activity, so providing sidewalks and the Green Loop throughout the NBS Master Plan site is consistent with the NBPP.

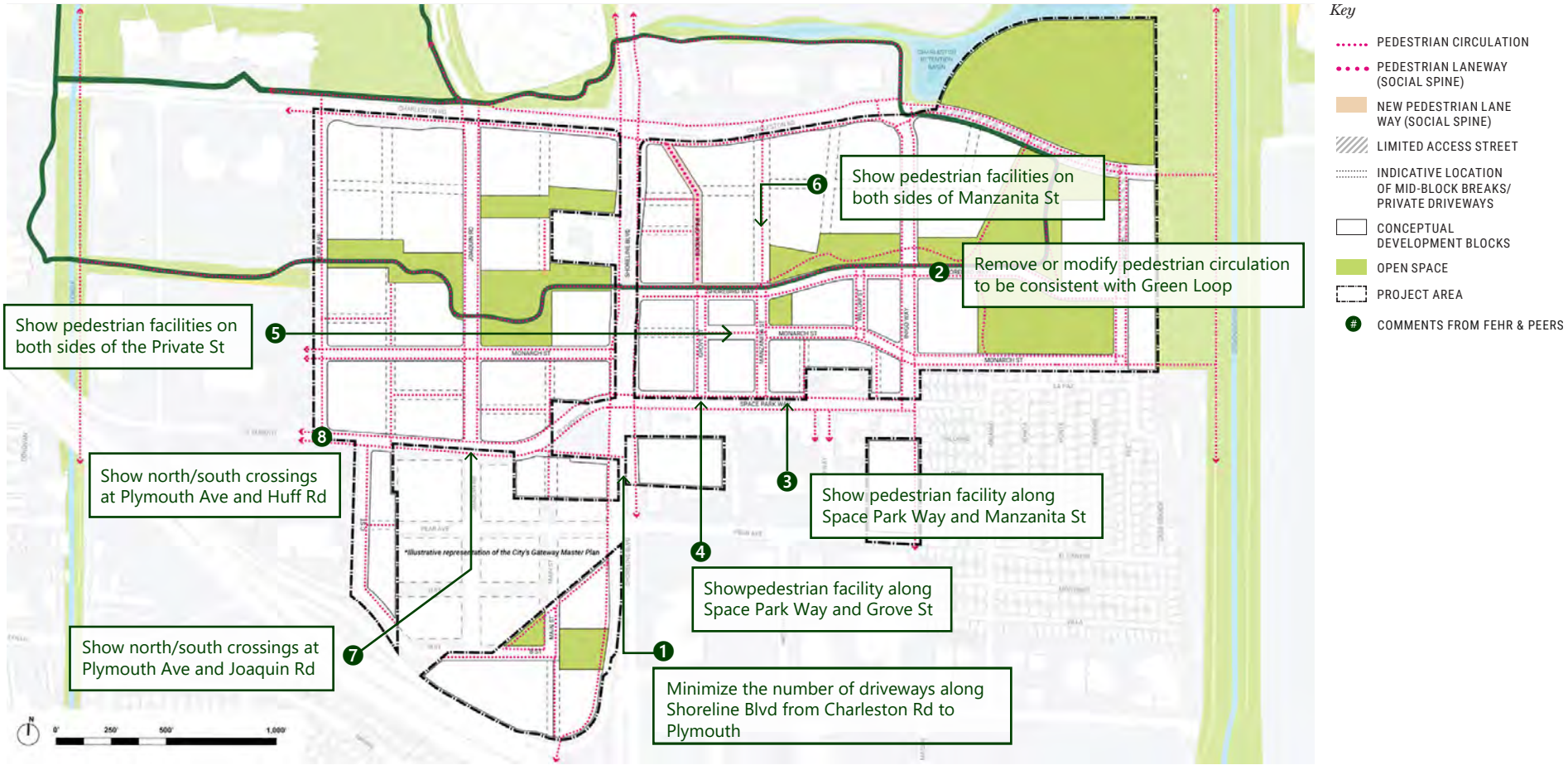
While the NBS Master Plan provides circulation throughout the Master Plan area, **Figure 13** shows our recommendations in refining the proposed pedestrian access and circulation:

1. Minimize the number of driveways along Shoreline Blvd from Charleston Rd to Plymouth St
2. Remove or modify pedestrian circulation to be consistent with Green Loop
3. Show pedestrian facility along Space Park Way and Manzanita St
4. Show pedestrian facility along Space Park Way and Grove St
5. Show pedestrian facilities on both sides of the Private St
6. Show pedestrian facilities on both sides of Manzanita St
7. Show north/south crossings at Plymouth Ave and Joaquin Rd
8. Show north/south crossings at Plymouth Ave and Huff Rd


Source: North Bayshore Framework Master Plan (Plan 6.1.6 Pedestrian Network, December 2022)

Figure 12

# Proposed Pedestrian Circulation




Source for Ped and Bike Comments: Proposed Changes to Street Sections NBS Framework Master Plan, Plan 6.1.6 (December 2022)

Figure 13

## Proposed Pedestrian Circulation Recommendations

## 4.2 Bicycle Access and Circulation

Existing bicycle access and circulation are discussed, followed by an assessment of the proposed bicycle access.

### 4.2.1 Existing Bicycle Access and Circulation

As described in the Existing Conditions Chapter, Class II Bike Lanes exist along Shoreline Boulevard, Charleston Road, Amphitheatre Parkway, Bayshore Parkway, and Rengstorff Avenue in the NBS Master Plan area. Class III Bike Routes exist along the segment of Shoreline Boulevard north of Charleston Road. Existing Class I Shared-Use Paths near the NBS Master Plan area include the Stevens Creek Trail, Permanente Creek Trail, and the Green Loop, all of which have asphalt or concrete surfaces.

### 4.2.2 Proposed Bicycle Access and Circulation

The NBS Master Plan site plan was evaluated for internal circulation within the NBS Master Plan, which will add bicycle trips to the existing bicycle network from employees who bike to and from work to nearby office locations, and those who take transit and then bike to work.

As shown in **Figure 14**, the NBS Master Plan proposes bicycle circulation throughout the site. The NBS Master Plan proposes a Class I Green Loop, which is a two-way cycle track and pedestrian path, which circulates throughout the site and connects to Permanente Creek Trail. This increases pedestrian access and internal connectivity within the site and provides multi-directional travel for cyclists. The NBPP identifies Green Ways for the exclusive use of bicyclists and pedestrians. Green Ways are identified as being restricted to bicyclists and pedestrians to create a connected network of walking and biking paths. The Green Loop element is consistent with the NBPP identification of Green Ways.

The NBS Master Plan proposes a Class II buffered on-street bicycle lane on Shoreline South of Monarch Street, and along a segment of Plymouth. This element is consistent with the NBPP. The NBPP states that designated Class II bike lanes will be provided for most of the neighborhood and access streets to allow for safe and direct connection throughout the site. In the NBPP, some neighborhood, access, and service streets with low design speed and traffic volume are designated as shared streets, where motor vehicles and bicycles share the same path. The NBPP identifies Class II bicycle lanes as critical to completing gaps in the bicycle network to allow for safe and direct connections throughout the area and to regional facilities; therefore, this element is consistent with the NBPP.

The NBS Master Plan proposes a Class IV separated bi-directional cycle track along Shoreline Boulevard North of Monarch Street, the west side of Shoreline Boulevard, Charleston Road west of Shoreline Boulevard and Black Street north of Shorebird Way. The NBS Master Plan proposes a separated one-way bike lane along Huff Avenue, C St, Monarch Street, Joaquin Road, Grove Street, Manzanita Street, Space Park Way, Monarch Street, Willow Street, Inigo Way, Main Street, and Charleston Road. The NBPP identifies Charleston Road as a major component of the bicycle network. Providing a cycle track along Charleston Road would enable bicyclists to travel through the site plan area within their own exclusive right-of-way to minimize conflict with vehicle traffic on the road. Refer to Chapter 4.3: Pedestrian and

Bicycle Access to Facilities for a more detailed description of directions and paths of travel to land uses in the area. **Appendix C** includes detailed cross sections from the NBS Master Plan with City Comments.

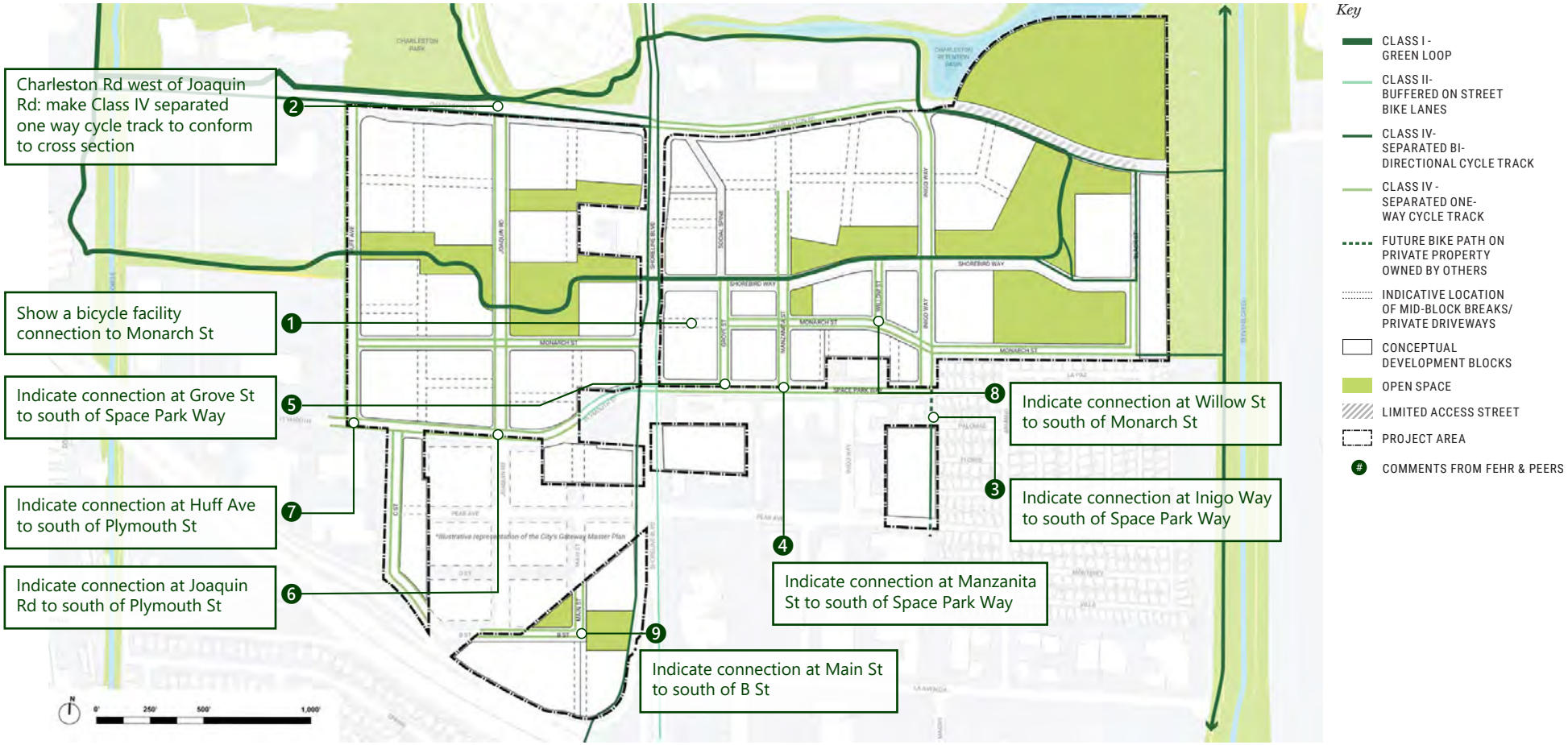
While the NBS Master Plan provides circulation throughout the site, the NBS Master Plan should consider the below recommendations, also shown in **Figure 15**:

1. Show a bicycle facility connection to Monarch St
2. Make Class IV separated one way cycle track to conform to cross section on Charleston Rd west of Joaquin Rd
3. Indicate connection at Inigo Way to south of Space Park Way
4. Indicate connection at Manzanita St to south of Space Park Way
5. Indicate connection at Grove St to south of Space Park Way
6. Indicate connection at Joaquin Rd to south of Plymouth St
7. Indicate connection at Huff Ave to south of Plymouth St
8. Indicate connection at Willow St to south of Monarch St
9. Indicate connection at Main St to south of B St


Source: North Bayshore Framework Master Plan (Plan 6.1.7 Bicycle Network, December 2022)

Figure 14

## Proposed Bicycle Circulation




Source for Ped and Bike Comments: Proposed Changes to Street Sections NBS Framework Master Plan, Plan 6.1.7 (December 2022)

Figure 15

## Proposed Bicycle Circulation Recommendations

## 4.3 Pedestrian and Bicycle Access to Facilities

This section discusses the internal pedestrian and bicycle access to transit, parking, residential, office, and ground floor active locations. This is an explanation of how and where people are walking and bicycling within the NBS Master Plan area and it provides information about order of magnitude of pedestrian and bicycle activity.

### 4.3.1 Pedestrians and Bicyclists Pathways to Transit

Within the bicycle study area, a portion of Charleston Road and Shoreline Boulevard are defined by the NBPP to have a transit boulevard overlay, which prioritizes transit and shuttles over other modes of transportation. Within the NBS Master Plan site bicycling paths and distances to the transit stops on Charleston Road and Shoreline Boulevard are summarized below:

- The primary bicycling paths to the transit stop on Charleston Road west of Shoreline Boulevard include the cycle tracks along Joaquin Road, Shoreline Boulevard, and Charleston Road. The stop is within a 5-minute bike ride from most of the office and residential buildings within the NBS Master Plan boundary.
- The primary bicycling paths to the transit stop on Charleston Road east of Shoreline Boulevard include the cycle tracks along Shoreline Boulevard and Charleston Road. The stop is within a 5-minute bike ride from most of the office and residential buildings within the NBS Master Plan area.
- The primary bicycling paths to the transit stop on Shoreline Boulevard include cycle tracks along Shoreline Boulevard and the portion of the Green Loop south of Charleston Road. The stop is within a 5-minute bike ride from most of the office and residential buildings within the NBS Master Plan area.

The pedestrian access paths are similar to those for bicyclists, since sidewalks are provided along both sides of streets with appropriate pedestrian crossing locations and are designed to account for the pedestrian volume along these pathways.

**Figure 16** shows the pedestrian and bicyclist pathways to transit stops for the core of the NBS Master Plan. In the Traffic Forecasts chapter, the NBS Master Plan will have an estimated 2,380 AM peak hour and 2,110 PM peak hour transit riders walking to/from the nearby transit stops (these transit riders will require approximately 250 AM peak hour and 240 PM peak hour transit vehicles). The primary routes are routes where the most bicycle and pedestrian traffic is expected, while the secondary routes are the routes which will be less frequented. Primary routes include: Charleston Road, Monarch Street, Space Park Way, Joaquin Road, Shoreline Boulevard, Manzanita Street, and Inigo Way. Secondary routes include: Shorebird Way, the Green Loop, Monarch Street (east of Shoreline Boulevard), Huff Avenue, Main Street, Shoreline Boulevard, the Social Spine, Grove Street, and Willow Street. Marine Way garages will include a multimodal hub to transport people via Garcia Avenue and Charleston Road to the core of the NBS Master Plan.

### 4.3.2 Pedestrians and Bicyclists Pathways to District Parking Garages

The district parking north of Charleston Road is the primary parking location for office uses within the NBS Master Plan area. The main bicycling paths for office workers traveling between the district parking and office uses (via Google Bikes) include the cycle tracks along Shoreline Boulevard and Charleston Road as well as the Green Loop. The district parking is within a 5-minute bike ride from the office buildings within Shorebird and Joaquin north and a 10-minute bike ride from the rest of the office and residential buildings within the Master Plan area. Marine Way garages will include a multimodal hub to transport people via Garcia Avenue and Charleston Road to the core of the NBS Master Plan. Because the NBS Master Plan provides a general level of detail of the land use and transportation network, there will be a need to conduct additional transportation analysis during the PCP (Planned Community Permit) stage. In addition, the City may require subsequent site-specific transportation analysis to ensure that each mode of travel and the project site are designed and built to the City's specifications. The NBS Master Plan identifies multimodal hubs in the Amphitheatre (SA-P-1) and Marine Way (MW-P-1 and MW-P-2) district parking structures. As part of the PCP, the location at the district parking structures, modal services provided, as well as, modal access at the multimodal hub will need to be specified for each. In addition, a corridor specific analysis will need to be completed to evaluate walking, biking, and transit access between the hubs and the NBS Master Plan area – especially along Shoreline Boulevard, Garcia Avenue, Charleston Road, and Amphitheatre Parkway. The corridor analysis should describe the demand by mode, their effects, and potential transportation improvements to support the increased walking/biking/transit activity along each of these corridors. The corridor analysis will also require evaluation of vehicle operations.

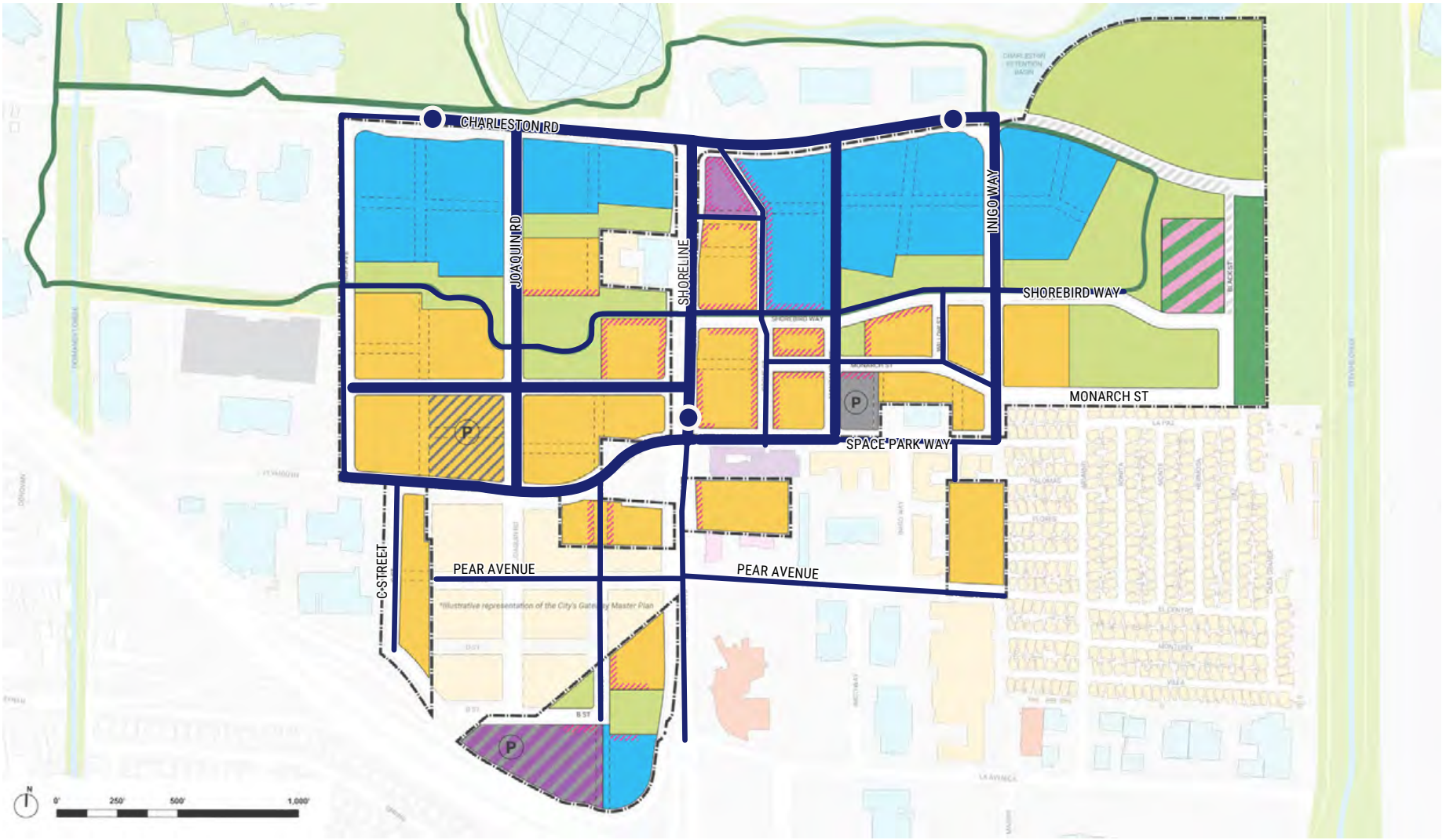
**Figure 17** shows the pedestrian and bicyclist pathways to the district parking garages for the core of the NBS Master Plan. The project is expected to generate vehicle demand to/from the NBS Master Plan area (SOV: 3,510 AM peak hour and 3,860 PM peak hour and HOV: 360 AM peak hour and 460 PM peak hour; Total: 3,870 AM peak hour and 4,320 PM peak hour). Many of these vehicles (2,520 AM peak hour and 2,400 PM peak hour) will park in District parking garages and the occupants will become pedestrians, bicyclists, or transit riders (2,820 AM peak hour and 2,690 PM peak hour) as they travel from the garages to their destination (Refer to **Appendix F** for these calculations). The NBS Master Plan streets are designed to accommodate these North Bayshore travel characteristics by prioritizing pedestrians, bicyclists, and/or transit riders. The primary routes are routes where the most bicycle and pedestrian traffic is expected, while the secondary routes are the routes which will be used less. Primary routes include: Charleston Road, Shorebird Way, Monarch Street, portion of Pear Avenue, Joaquin Road, southern portion of Main Street, Shoreline Boulevard, the Social Spine, Grove Street, southern portion of Manzanita Street, Willow Street, and Inigo Way. Secondary routes include: a portion of the Green Loop, Space Park Way, Huff Street, C Street, southern portion of Joaquin Road, and portions of Pear Avenue and B Street. Marine Way garages will include a multimodal hub to transport people via Garcia Avenue and Charleston Road to the core of the NBS Master Plan.

### 4.3.3 Pedestrians and Bicyclists Pathways between Residential and Office

**Figure 18** shows the pedestrian and bicyclist pathways between the residential and office land uses for the core of the NBS Master Plan. In the Traffics Forecasts chapter, the NBS Master Plan is expected to generate pedestrian demand (2,570 AM peak hour and 2,360 PM peak hour), bicycle demand (640 AM peak hour and 590 PM peak hour), and additional pedestrian and bicycle travel will occur to/from the district garages and transit stops. The primary routes are routes where the most bicycle and pedestrian traffic is expected, while the secondary routes are the routes which will be used less. Primary routes include: Charleston Road, portion of the Green Loop, Shorebird Way, Space Park Way, Joaquin Road, Main Street, portion of Shoreline Boulevard, the Social Spine, portion of Manzanita Street, and Inigo Way, Monarch Street, Space Park Way, Joaquin Road, Shoreline Boulevard, Manzanita Street, and Inigo Way. Secondary routes include: Monarch Street, Pear Avenue, Huff Street, portion of Shoreline Boulevard, Shorebird Way, Grove Street, Manzanita Street, and Willow Street. Because the NBS Master Plan provides a general level of detail of the land use and transportation network, there will be a need to conduct additional transportation analysis during the PCP (Planned Community Permit) stage and may require subsequent site-specific transportation analysis to ensure that each mode of travel and the project site are designed and built to the City's specifications.

### 4.3.4 Orientation of Buildings to Bicycle Facilities and Ground Floor Activity

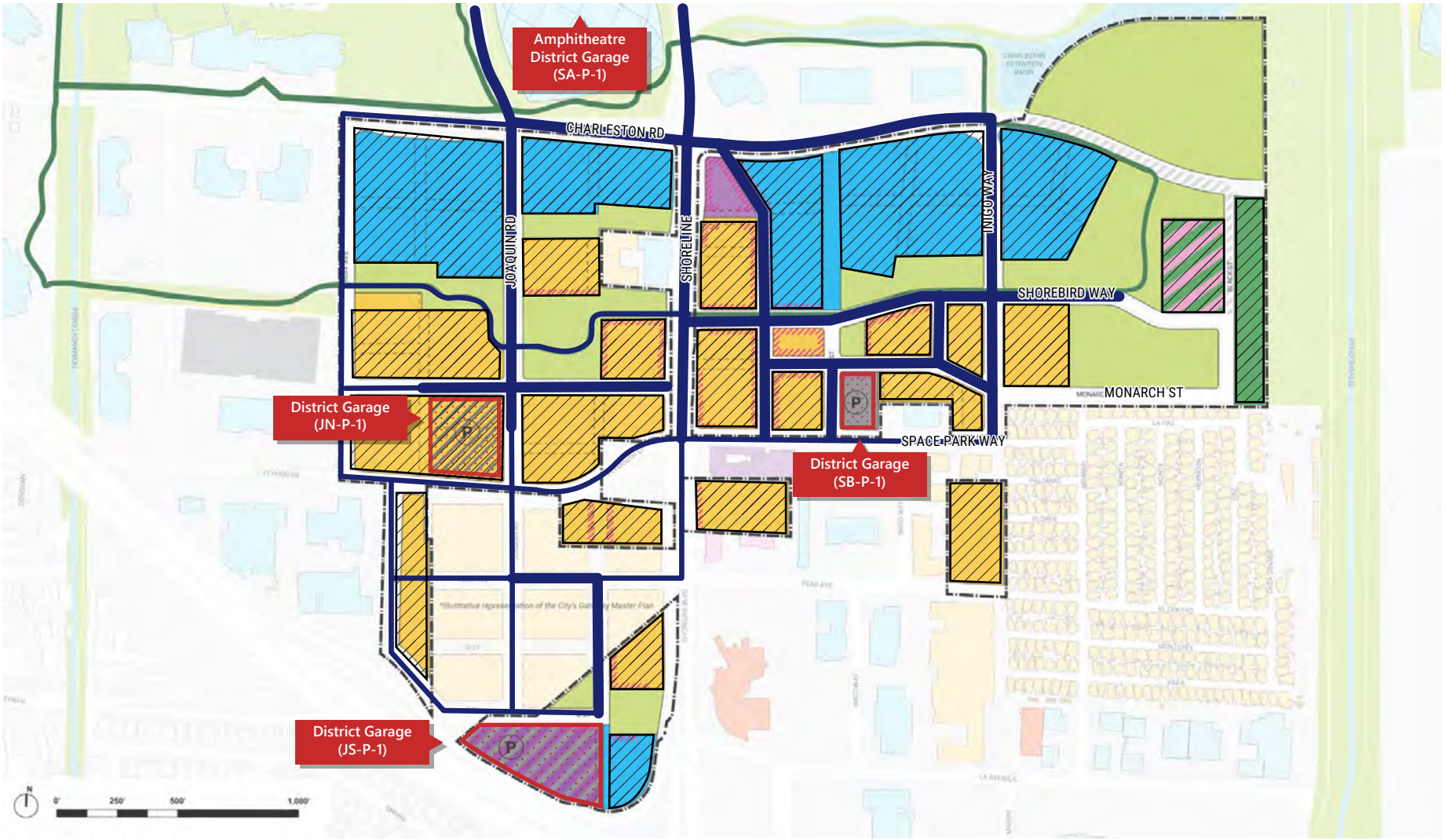
Within the bicycle routes, most of the ground-floor activities are generated at the frontage of active use areas along Shorebird Way, Monarch Street, and the Social Spine. Bicycle facilities are provided along Shoreline Boulevard, Charleston Road, Shorebird Way, and Manzanita Street for bicyclists traveling from office and residential building to active use areas. Because the NBS Master Plan provides a general level of detail of the land use and transportation network, there will be a need to conduct additional transportation analysis during the PCP (Planned Community Permit) stage and may require subsequent site-specific transportation analysis to ensure that each mode of travel and the project site are designed and built to the City's specifications.




Source: North Bayshore Framework Master Plan Frame Work (December 2022)

Figure 16

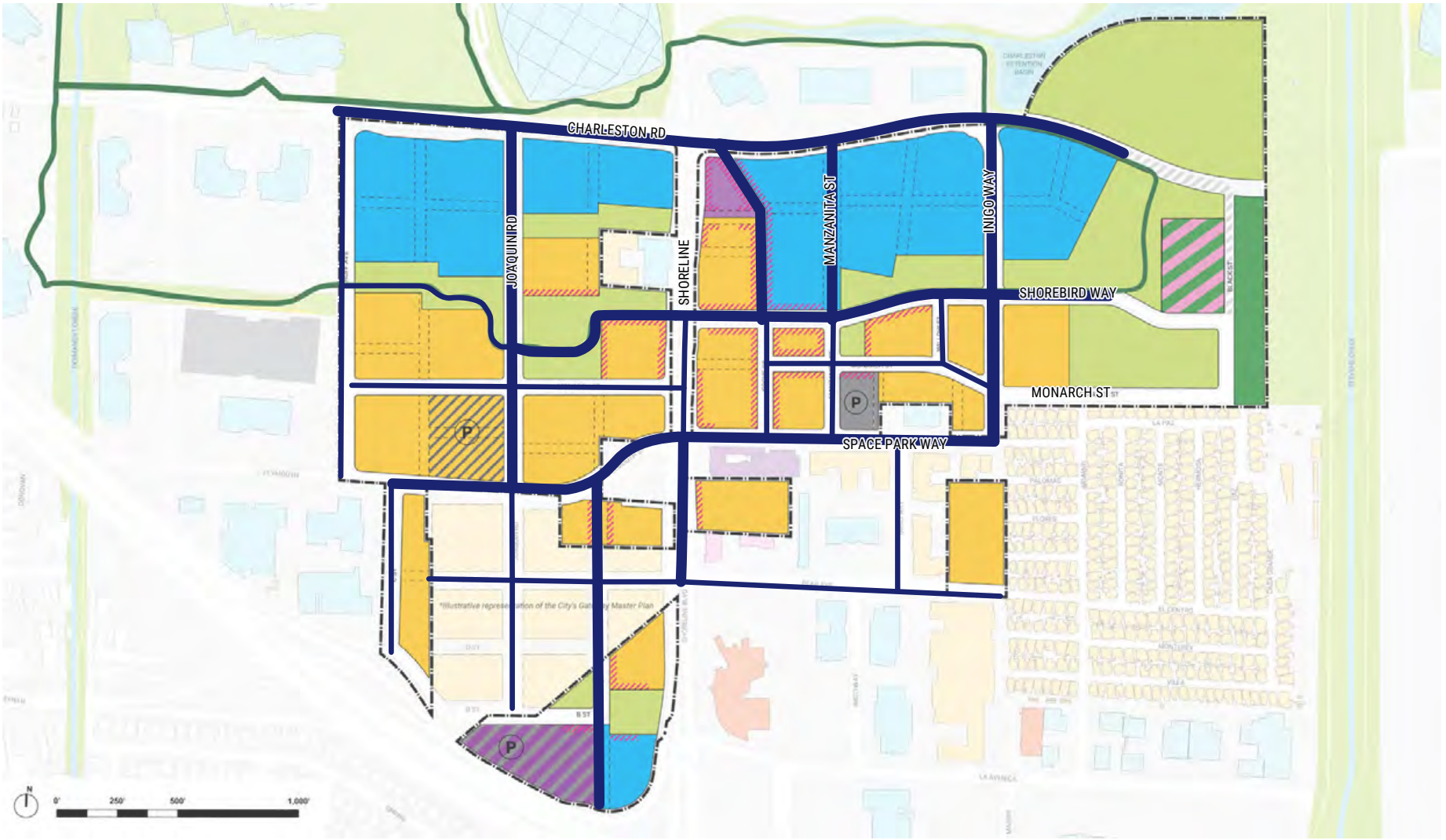
## Pathways to Transit Stops




Source: North Bayshore Framework Master Plan Frame Work (December 2022)

Figure 17

## Pathways to District Parking Garages




Source: North Bayshore Framework Master Plan Frame Work (December 2022)

Figure 18

## Pathways Between Residential and Office

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## 4.4 Vehicle Access and Circulation

Existing vehicle access and circulation are discussed, followed by an assessment of the proposed vehicle access.

### 4.4.1 Existing Vehicle Access and Circulation

As described in the Existing Conditions chapter, US 101 and SR 85 provide regional access to the study area. The following streets provide local access and are considered the North Bayshore gateways: Shoreline Boulevard, La Avenida, Rengstorff Avenue, San Antonio Road, and Bayshore Parkway. The speed limits in the NBS Master Plan site range from 25 mph to 35 mph and serve a mix office, residential, and retail traffic.

### 4.4.2 Proposed Vehicle Access and Circulation

The site plan was evaluated for internal circulation within the NBS Master Plan area, which will add vehicle trips to the existing vehicle network from employees who drive to and from work to nearby office locations. **Figure 19** describes the street typologies and proposed vehicle circulation.

The NBPP defines gateway boulevards as major traffic arteries that serve as primary entry points to North Bayshore and provide access to other streets within the NBS Master Plan site as well as to district parking structures. Within the NBS Master Plan site, Shoreline Boulevard, Rengstorff Avenue, and Amphitheater Parkway will all provide primary access to the Amphitheatre Parking Garage and Shoreline Boulevard will provide access to JS-P-1. Rengstorff Avenue and Amphitheatre Parkway will provide primary access to the Amphitheatre Parking Garage. The NBPP defines neighborhood streets as streets at the front door of office, retail, residential buildings, and on-site parking lots that provide access to and from the gateway boulevards.

Deficient vehicle operations will persist even with additional improvements identified at the Shoreline Boulevard and Rengstorff Avenue gateways (refer to the Adverse Motor Vehicle Effects and Improvements chapter for intersection improvement recommendations). During the morning peak hour, the deficient locations occur inbound office vehicle conflicts with the outbound residential vehicles (i.e., Shoreline Boulevard and Space Park Way, Shoreline Boulevard and Pear Avenue, and Shoreline Boulevard and US 101 Northbound Ramps) or the intersection is constrained (Shoreline Boulevard and Charleston Road). Similar patterns occur in the evening peak hour. During the evening peak hours, the outbound office vehicles will be affected by the inbound residential vehicles (i.e., Rengstorff Avenue and the Rengstorff Connector-US 101 Northbound Ramps, Shoreline Boulevard and Space Park Way, and Shoreline Boulevard and Pear Avenue) or at constrained intersections (i.e., Shoreline Boulevard and Charleston Road and Inigo Way and La Avenida).

#### *4.4.2.1 AM and PM Office and Residential Trips*

**Figure 20** illustrates the primary inbound office vehicle access routes to the district parking and on-site parking during the morning peak hour for the core area of the NBS Master Plan. The outbound residential

vehicle routes are also illustrated in **Figure 20**. **Figure 21** illustrates the primary outbound office vehicle access routes to the district parking and on-site office parking during the evening peak hour for the core area of the NBS Master Plan. The inbound residential traffic on Shoreline boulevard and outbound traffic on Rengstorff Avenue are illustrated on **Figure 21** to show the conflict points with the outbound office traffic. Both figures illustrate the three potential conflicts between office and residential traffic on Shoreline Boulevard and Rengstorff Avenue (refer to the previous section for additional description of these conflict locations.).

The local streets for the NBS Master Plan are designed to serve the office on-site parking (approximately 10% of the office trips), hotel, commercial, and residential land uses. Most of the office trips will use Shoreline Boulevard and Rengstorff Avenue to access the Amphitheatre District Garage (SA-P-1), which limits the likelihood of office cut-through traffic. Also, given the proximity of the Marine Way garages (MW-P-1 and MW-P-2) office cut-through traffic is eliminated when accessing those garages.

## 4.5 Emergency and Service Vehicle Access

The NBPP identifies the following streets that facilitate or provide emergency and service vehicle access:

- Neighborhood streets: facilitate emergency access to nearby Access Streets
- Access Streets: residential or service-oriented street with spaces for emergency vehicle access, loading, delivery, and refuse pick-up
- Green ways: pedestrian and bicycle facilities with emergency vehicle access

**Figure 22** shows loading, servicing, and emergency access within the NBS Master Plan site. NBPP standards indicate that the NBS Master Plan must include emergency access on neighborhood and service streets and the Green Way where access is required for vehicles for adjacent uses and through the circulation network.

The Mountain View Fire Department has minimum street widths to accommodate fire trucks. Fire trucks require a minimum inside turning radius of 21 feet. On fire access roads, the width must be at a minimum 20 feet for 3 story buildings and 26 feet for 4 story buildings. Additionally, the Fire Department requires a minimum street width of 20 feet at streets with no through access to ensure there is efficient space for trucks to turn around. Streets with no through access must be at least 20 feet in width and allow for a 35 foot turn radius. Alternatively, if the street ends in a T formation, both streets must be 20 feet wide and allow 30 feet between the two streets to allow the truck to make the turn off of the dead-end street. All streets must conform to these standards, thus constraining street design. Since the emergency and service vehicle access provided by the NBS Master Plan is consistent with the NBPP standards, no additional recommendations are provided.

## 4.6 District Parking Access Evaluation

The NBS Master Plan allocated 90% of the office parking to the following five district parking locations within the Master Plan area, as shown in blue and orange in **Figure 23**, to increase land use efficiency:

- District parking at five locations within the Master Plan area include the following:
    - JN-P-1 (Joaquin North) is located at the southwest corner of Monarch Street and Joaquin Road within the Joaquin North neighborhood and contains approximately 500 parking spaces. JN-P-1 serves active uses and hotel, neighborhood parks, open spaces, and residential visitor parking.
    - JS-P-1 (Joaquin South) is a 6-level parking garage location in the Joaquin South neighborhood that contains approximately 700 parking spaces. JS-P-1 serves office (450 parking spaces) and retail and hotel uses (250 parking spaces).
    - SB-P-1 (Shorebird) is located at the northeast corner of Space Park Way and Manzanita Street within the Shorebird neighborhood and contains approximately 600 spaces. SB-P-1 serves hotel and active uses as well as residential visitor parking.
    - SA-P-1 (Amphitheatre) is a 6-level parking garage located at the northwest corner of Shoreline Boulevard and Charleston Road that contains approximately 4,584 parking spaces for the NBS Master Plan (4,334 parking spaces), the police operations station (10 parking spaces), and the public parking spaces (240 parking spaces). SA-P-1 serves office employee parking.
    - MW-P-1 & MW-P-2 (Marine Way) are 2- to 3-level parking garages along Marine Way that contain approximately 890 parking spaces. Both parking garages serve office uses.

The demand for these parking garages will be discussed further in the Parking Assessment Chapter. Multi-modal access to the district parking locations was evaluated to ensure compliance with the parking access and design standard in the NBPP. Because the NBS Master Plan provides a general level of detail of the land use and transportation network, there will be a need to conduct additional transportation analysis during the PCP (Planned Community Permit) stage and may require subsequent site-specific transportation analysis to ensure that each mode of travel and the project site are designed and built to the City's specifications. As shown in **Figure 24**, we recommend the following elements:

1. Clarify the multimodal access strategy at the MW-P-1 and MW-P-2 district parking structure, including whether there are transit stops, for access to the NBS Master Plan site, and bicycle and pedestrian connections.
2. Clarify whether the entrance to Amphitheatre Parking Garage from Amphitheatre Parkway is gated or has other controlled access.
3. Consider moving the active use parking on Shoreline Boulevard south of Shorebird Way to avoid Green Loop conflicts and use right in right out access.

### 4.6.1 Driveway Queuing Analysis

A queuing analysis was completed to assess the effects of the district parking at the five garage locations. The peak hour driveway queuing was evaluated for the following five district parking locations within the NBS Master Plan:

- Joaquin North District Parking Garage (JN-P-1)
- Joaquin South Parking Garage (JS-P-1)
- Shorebird District Parking Garage (SB-P-1)
- Amphitheatre District Parking Garage, Amphitheatre Parkway Entrance (SA-P-1)
- Amphitheatre District Parking Garage, Shoreline Boulevard Entrance (SA-P-1)
- MW-P-1 & MW-P-2 (Marine Way)

The gated access queueing analysis uses the Poisson distribution (random vehicle arrivals), inbound traffic volume, and a gate service flow rate. The 95$^{th}$ percentile queue is then calculated and used to determine the storage needed. The queuing analysis considered two gate-control scenarios for each access point—Radio Frequency Identification (RFID) Card and Proximity Card. **Table 9** presents a summary of the ingress queues at each driveway. For each driveway, the number of lanes was initially assumed to be one and was increased to two at driveways where the 95$^{th}$ percentile queue exceed 250 feet. Full details of the gated access queueing analysis are included in in **Appendix D**.



**Table 9: Gated Access Queuing Summary**

| Driveway | Number of Lanes | Gate Control Type[1] | Queue Length (ft)[2,3] |
|---|---|---|---|
| Joaquin North District Parking Garage (JN-P-1) | 1 | RFID | 25 |
| | | Proximity Card | 25 |
| Joaquin South Parking Garage (JS-P-1) | 1 | RFID | 50 |
| | | Proximity Card | 50 |
| Amphitheatre District Parking Garage, Amphitheatre Parkway Entrance (SA-P-1) | 2 | RFID | 25 |
| | | Proximity Card | >250 |
| Amphitheatre District Parking Garage, Shoreline Boulevard Entrance (SA-P-1) | 2 | RFID | 75 |
| | | Proximity Card | 100 |
| Shorebird District Parking Garage (SB-P-1) | 1 | RFID | 50 |
| | | Proximity Card | 50 |
| Marine Way District Parking Garage, Casey Ave Entrance (MW-P-1) | 1 | RFID | 25 |
| | | Proximity Card | 25 |
| Marine Way District Parking Garage, Marine Way Entrance (MW-P-1) | 1 | RFID | 25 |
| | | Proximity Card | 25 |
| Marine Way District Parking Garage, Bayshore Parkway Entrance (MW-P-2) | 1 | RFID | 25 |
| | | Proximity Card | 25 |
| Marine Way District Parking Garage, Marine Way Entrance (MW-P-2) | 1 | RFID | 25 |
| | | Proximity Card | 25 |

Notes:

1. RFID access assumes a service rate of 800 vehicles/hour/lane, Proximity Card assumes 600 vehicles/hour/lane
2. Reported queue length for RFID and Proximity card are a result of the Gated Access Queuing Analysis, included in Appendix D. Queue length for No Gate Control is from 95$^{th}$ Percentile queue in Synchro queuing report.
3. Table 9 reports the longer queue from the AM and PM peak hours for each driveway and approach. The queue from the other peak hour can be found in Appendix D.

Source: Fehr & Peers, 2023

It is recommended that each district parking driveway feature the number of inbound lanes noted in **Table 9**. To reduce vehicle queueing and to maintain consistency across the various district parking structures, it is recommended that all district parking driveways be equipped with RFID access, since they have higher service rates. If equipped with RFID, the throat length for each garage should be at least the queue length calculated with "RFID" for each driveway, as listed in **Table 9**. Though not recommended due to the potential for higher queue lengths, should Proximity Card access be utilized, the throat length for each garage should be at least the length calculated with "Proximity Card" for each driveway, potentially even longer for the Amphitheatre District Parking Garage, Amphitheatre Parkway Entrance (SA-P-1).

### 4.6.2 Driveway LOS Analysis

A vehicle LOS analysis was conducted for the District Parking Garage driveways, utilizing the same lane assumptions as the Gated Access Queuing Analysis. LOS calculations were performed using HCM 6th Edition methodology with Synchro 11 software. District Access Driveway LOS calculations assume no gated access control. The Cumulative with Project District Parking Garage LOS results are described in **Table 10**. Full LOS calculation sheets from Synchro 11 are included in **Appendix B**.

**Table 10: District Parking Garage Level of Service – Cumulative with Project Conditions**

| Driveway | Control[1] | Peak Hour[3] | Delay[3] | LOS[4] |
|---|---|---|---|---|
| Amphitheatre District Parking Garage:<br>Amphitheatre Pkwy Entrance (SA-P-1)[5] | Signalized | AM<br>PM | **77.2**<br>**67.5** | **E**<br>**E** |
| Amphitheatre District Parking Garage:<br>Shoreline Blvd Entrance (SA-P-1) | Signalized | AM<br>PM | 23.1<br>**59.2** | C<br>**E** |
| Joaquin North District Parking Garage (JN-P-1) | AWSC | AM<br>PM | 7.8<br>8.5 | A<br>A |
| Joaquin South Parking Garage (JS-P-1) | AWSC | AM<br>PM | 7.5<br>8.1 | A<br>A |
| Shorebird District Parking Garage (SB-P-1) | SSSC | AM<br>PM | 38.4<br>**55.4** | E<br>**F** |
| Marine Way District Parking Garage:<br>Casey Ave Entrance (MW-P-1) | SSSC | AM<br>PM | 10.9<br>11.2 | B<br>B |
| Marine Way District Parking Garage:<br>Marine Wy Entrance (MW-P-1) | SSSC | AM<br>PM | 7.7<br>10.4 | A<br>B |
| Marine Way District Parking Garage:<br>Bayshore Parkway Entrance (MW-P-2) | SSSC | AM<br>PM | 10.3<br>10.8 | B<br>B |
| Marine Way District Parking Garage:<br>Marine Way Entrance (MW-P-2) | SSSC | AM<br>PM | 10.2<br>10.7 | B<br>B |

1. Signal refers to a signalized intersection. SSSC = Side-Street Stop Controlled intersection, AWSC= All-Way Stop Controlled Intersection
2. AM = morning peak hour, PM = evening peak hour.

3. Whole intersection weighted average control delay expressed in seconds per vehicle calculated using methods described in the *Highway Capacity Manual*, 6th Edition. For side-street stop-controlled intersections, total delay for the worst movement approach is reported.
4. LOS = Level of Service. Unless otherwise noted, the LOS calculations conducted using the Synchro level of service analysis software package, which applies the method described in the *Highway Capacity Manual*, 6th Edition.
5. The LOS on EB Amphitheatre Pkwy at this intersection could be improved by the additional of a second EBL turn lane.

## 4.7 Adverse Effect Evaluation

As shown in **Table 5** and listed below, there are two adverse effect criteria for the site access and circulation evaluation:

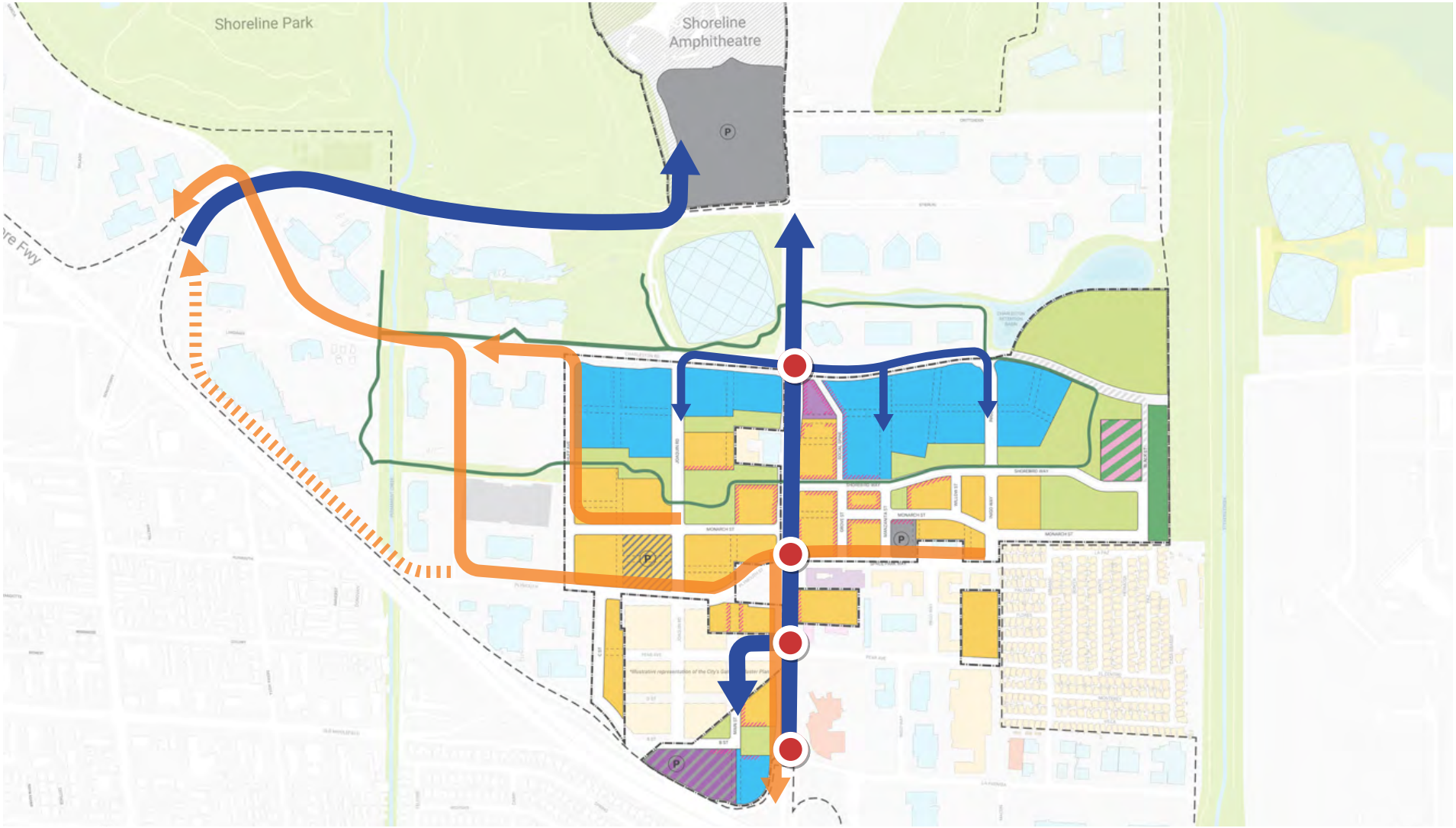
- Criterion #1: Project designs for pedestrian, bicycle, and automobile on-site circulation, access, loading, and parking areas fail to meet City or industry standard design practices.
- Criterion #2: The project fails to provide adequate accessibility for services and delivery trucks on-site, including access to truck loading areas.

Because the NBS Master Plan provides a general level of detail of the land use and transportation network, there will be a need to conduct additional transportation analysis during the PCP (Planned Community Permit) stage and may require subsequent site- specific transportation analysis. The site-specific transportation analysis would ensure that each mode of travel and the project site are designed and built to the City's specifications. The NBS Master Plan will need to include additional street design details and specifications of truck loading areas. Therefore, further evaluation is needed to evaluate for these criterion.


Source: North Bayshore Framework Master Plan (Plan 6.1.4 Street Classification, December 2022)

Figure 19

## Proposed Vehicle Circulation



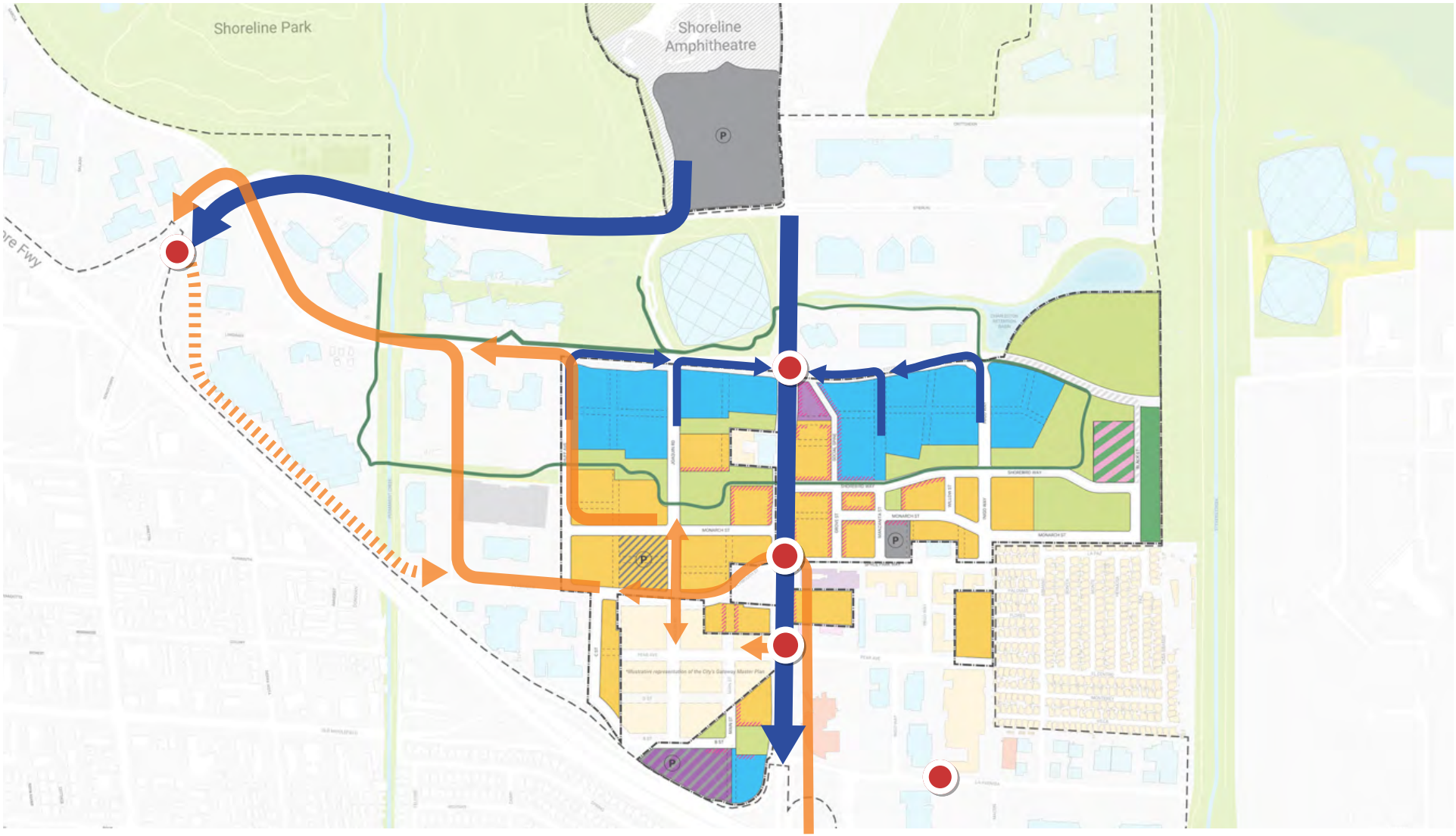

**NORTH BAYSHORE MASTER PLAN LANDUSES**

- OFFICE
- RESIDENTIAL
- HOTEL

- PRIMARY OFFICE VEHICLE ROUTES
- PRIMARY RESIDENTIAL VEHICLE ROUTES
- DEFICIENT LOCATIONS WITH OPERATIONAL IMPROVEMENTS

Figure 20

## Morning Peak Hour Office and Residential Vehicle Trips



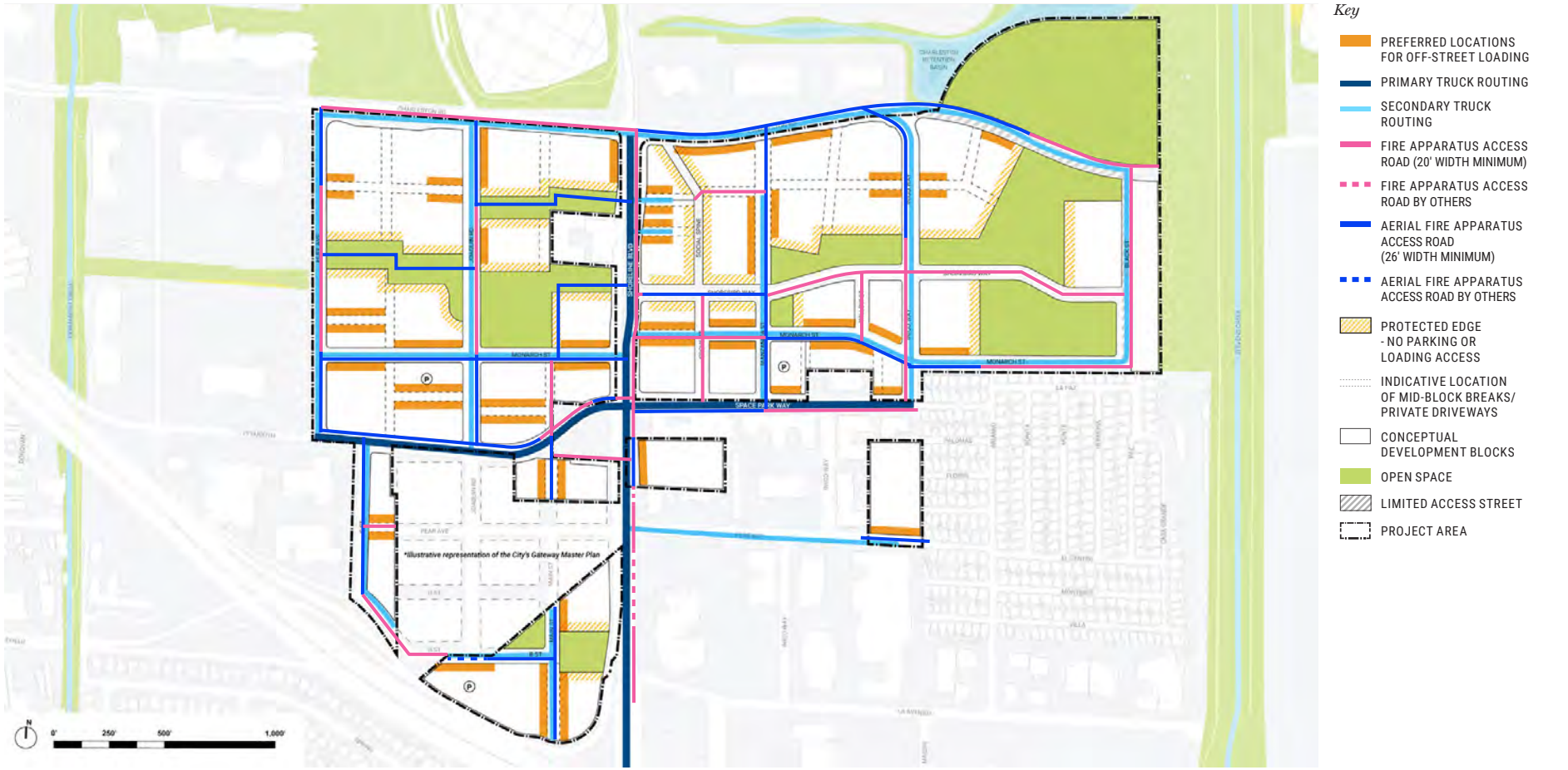

**NORTH BAYSHORE MASTER PLAN LANDUSES**

- OFFICE
- RESIDENTIAL
- HOTEL

- PRIMARY OFFICE VEHICLE ROUTES
- PRIMARY RESIDENTIAL VEHICLE ROUTES
- DEFICIENT LOCATIONS WITH OPERATIONAL IMPROVEMENTS

Figure 21

## Evening Peak Hour Office and Residential Vehicle Trips




Source: North Bayshore Framework Master Plan (Plan 6.1.12 Loading, Servicing & Access and Plan 6.1.13 Emergency Access, December 2022)

Figure 22

## Emergency and Service Vehicle Access

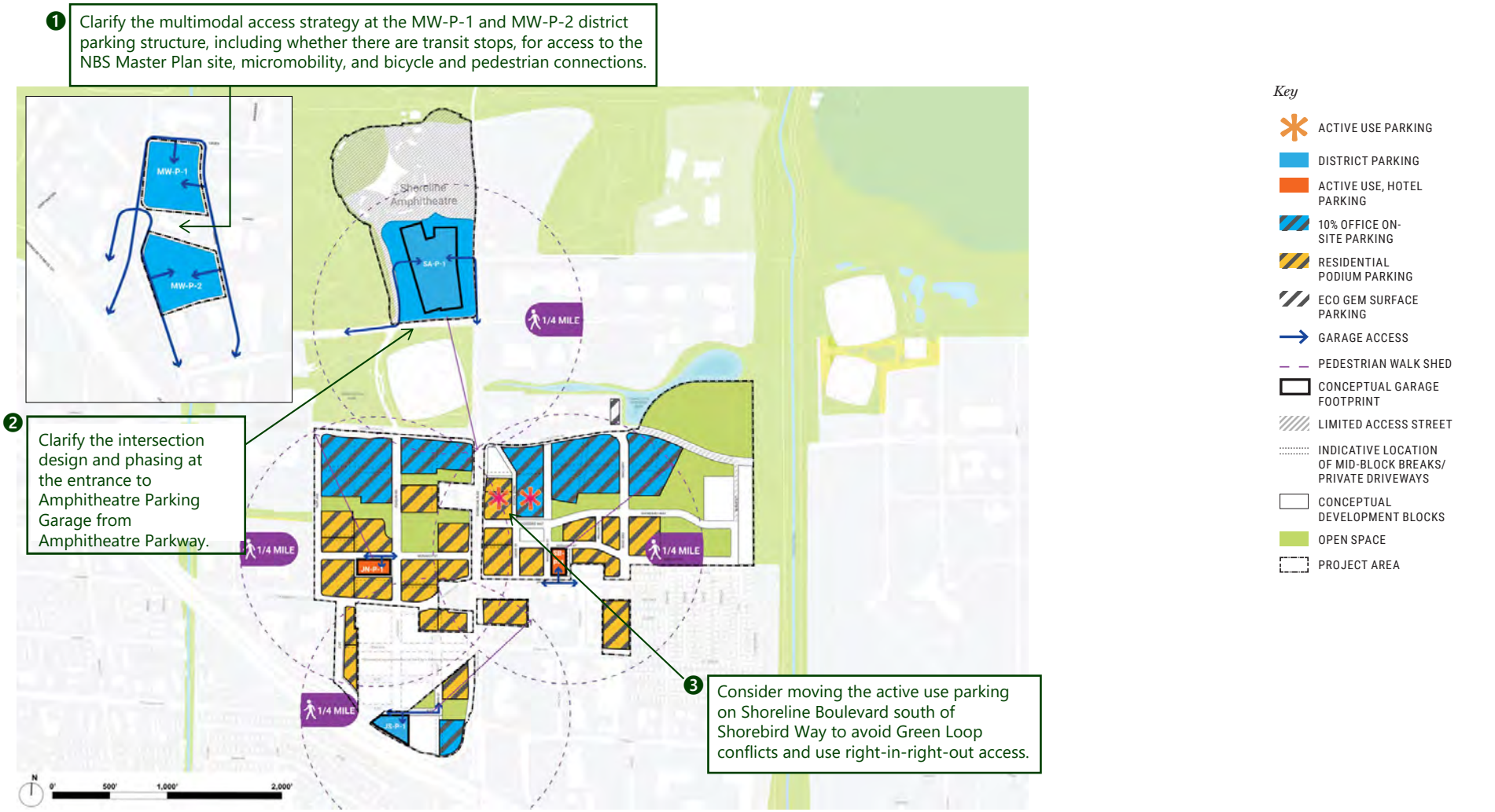

*Key*

- ACTIVE USE PARKING
- DISTRICT PARKING
- ACTIVE USE, HOTEL PARKING
- 10% OFFICE ON-SITE PARKING
- RESIDENTIAL PODIUM PARKING
- ECO GEM SURFACE PARKING
- GARAGE ACCESS
- PEDESTRIAN WALK SHED
- CONCEPTUAL GARAGE FOOTPRINT
- LIMITED ACCESS STREET
- INDICATIVE LOCATION OF MID-BLOCK BREAKS/ PRIVATE DRIVEWAYS
- CONCEPTUAL DEVELOPMENT BLOCKS
- OPEN SPACE
- PROJECT AREA

Source: North Bayshore Framework Master Plan (Plan 6.1.10 District Parking Strategy, December 2022)

Figure 23

# District Parking Access




Source for Parking Comments: Proposed Changes to Street Sections NBS Framework Master Plan, Plan 6.1.10 (December 2022)

Figure 24

## District Parking Access Comments

# 5. Traffic Forecasts

The City of Mountain View travel model was used to develop traffic forecasts for the NBS Master Plan and the project study area.

## 5.1 Summary of Forecasts Methods

The traffic forecasts were developed using the following steps and methods consistent with the NBPP transportation analysis completed in 2017 (refer to the technical documents referenced below for additional details on the analysis methods):

- **Trip Generation**: Daily and peak hour project driveway and North Bayshore Gateway volume estimates were developed using the trip generation methods from the *North Bayshore Precise Plan with Residential – Project Trip Generation Estimates* (February 2017) memorandum in Appendix G of the *North Bayshore Precise Plan Transportation Impact Analysis* (July 2017), and the *North Bayshore Master Plan – Morning Peak Hour Inbound Single-Occupancy Vehicle Mode Share for Non-Residential Development in the North Bayshore District and Trip Generation Summary Tables* memorandum (December 19, 2022) (Refer to **Appendix E** and **Appendix F)**. The daily and peak hour project driveway trip generation is used for the project site, while the North Bayshore Gateway volume is used for the North Bayshore area.
- **Service Population**: The residential and employee populations were estimated using employee densities from the Mountain View travel model.

## 5.2 Driveway Trip Generation

This section summarizes the trip generation for the proposed land uses and those being demolished as part of the proposed project.

### 5.2.1 Existing NBS Master Plan Land Use and Trip Generation

The existing building demolition credit trip generation is shown in **Table 11**. The project driveway vehicle trip generation is based on the occupied buildings described in **Table 12**. The existing daily and total morning and evening peak hour trip generation rates by land use are:

- Office Use: 3.00 total daily vehicle trips per employee; 0.33 AM peak hour trips per employee; and 0.33 PM peak hour vehicle trips per employee.[13]
- Research & Development: 2.89 total daily vehicle trips per employee; 0.28 AM peak hour trips per employee; and 0.24 PM peak hour vehicle trips per employee.[14]

[13] Based on Google employee mode share survey (Spring 2020) and *Spring 2020 North Bayshore District Transportation Monitoring and Near-Term Growth Assessment* (May 2020).

- Industrial: 3.73 total daily vehicle trips per employee; 0.55 AM peak hour trips per employee; and 0.45 PM peak hour vehicle trips per employee.[14]

**Table 11: Driveway Trip Generation for Existing Buildings to be Demolished**

| Land Use | Building Size | Service Population[1] | Daily Trips[1] | AM Peak Hour Trip[1] | | | PM Peak Hour Trips[1] | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | In | Out | Total | In | Out | Total |
| ***North Bayshore Master Plan Trips*** | | | | | | | | | |
| Office | 8,653 square feet | 30 | 90 | 10 | 0 | 10 | 0 | 10 | 10 |
| Research & Development | 1,642,061 square feet | 5,720 | 16,510 | 1,330 | 250 | 1,580 | 280 | 1,120 | 1,400 |
| Industrial | 92,497 square feet | 110 | 410 | 50 | 10 | 60 | 10 | 40 | 50 |
| Public Parking at SA-P-1 | 240 spaces | 0 | 440 | 20 | 20 | 40 | 20 | 20 | 40 |
| | ***Total*** | **5,860** | **17,450** | **1,410** | **280** | **1,690** | **310** | **1,190** | **1,500** |

Note:
1. Service population and vehicle trips rounded to the nearest 10.

Source: Fehr & Peers, 2023.

### 5.2.2 Proposed NBS Master Plan Land Use and Vehicle Trip Generation

The NBS Master Plan driveway trip generation is shown in **Table 12**. The project driveway vehicle trip generation is based on the following information:

- **New Residential Development**: The new residential units are assumed to be a mix of 5,600 market rate units with an average size of 1.80 persons per household and a reduced parking supply rate of 0.65 spaces per dwelling unit, and 1,400 affordable housing units with an average size of 1.90 persons per household and a parking supply rate of 0.69 spaces per dwelling unit. This results in an estimate of 10,080 residents in the market rate units, 2,660 residents in the affordable housing units, and a total of 12,740 residents for the NBS Master Plan. The proposed residential uses would have a combined effective daily trip generation rate of approximately 3.78 daily vehicle trips per dwelling unit, 0.21 AM peak hour vehicle trips per dwelling unit, and 0.30 PM peak hour vehicle trips per dwelling unit.
- **New and Rebuilt Office Development**: The proposed office space is assumed to be 93% occupied (based on historical vacancy rates) at a density of 4.0 employees per 1,000 square feet gross floor area. This results in an estimate of 11,700 employees on site. The daily trip generation rate for new office uses in the NBS Master Plan area is 1.40 daily vehicle trips per employee, 0.20 AM peak hour

[14] Based on ITE *Trip Generation Manual* 11th Edition (September 2021) and *Spring 2020 North Bayshore District Transportation Monitoring and Near-Term Growth Assessment* (May 2020).

vehicle trips per employee, and 0.17 PM peak hour vehicle trips per employee. This new office and other non-residential land uses are committed to achieving a 35% morning peak hour inbound single-occupancy vehicle mode share at the development driveways.

- **New Retail and Entertainment Development**: The proposed retail space is assumed to be 93% occupied at a density of 2.67 employees per 1,000 square feet gross floor area. This results in an estimate of 600 employees on site. The daily trip generation rate for new retail/entertainment uses in the NBS Master Plan is 16.3 daily vehicle trips per employee, 0.35 AM peak hour vehicle trips per employee, and 0.63 PM peak hour vehicle trips per employee.
- **New Hotel Development**: The proposed hotel space is assumed to have an employment density of 0.4 employees per room. This results in an estimate of 210 employees on site. The daily trip generation rates for new hotel uses in the NBS Master Plan are 4.79 daily vehicle trips per room, 0.23 AM peak hour vehicle trips per room, and 0.18 PM peak hour vehicle trips per room.
- **New Police Operations Station Development**: The proposed Police Operations Station is assumed to be 93% occupied (based on historical vacancy rates) at a density of 4.0 employees per 1,000 square feet gross floor area. This results in an estimate of 10 employees on site. The daily trip generation rate for new Police Operations Station land uses in the NBS Master Plan area is 1.40 daily vehicle trips per employee, 0.20 AM peak hour vehicle trips per employee, and 0.17 PM peak hour vehicle trips per employee.
- **Public Parking at SA-P-1**: The 240 public parking spaces at SA-P-1 are assumed to have a trip generation similar to Existing Conditions: 440 daily vehicle trips, 40 AM peak hour vehicle trips, and 40 PM peak hour vehicle trips.



## Table 12: Driveway Vehicle Trip Generation with Project

| Land Use | Building Size | Service Population[1] | Daily Trips[1] | AM Peak Hour Trips[1] | | | PM Peak Hour Trips[1] | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | In | Out | Total | In | Out | Total |
| ***North Bayshore Master Plan*** | | | | | | | | | |
| Residential – Market Rate | 5,600 dwelling units | 10,080 | 21,560 | 280 | 900 | 1,180 | 990 | 690 | 1,680 |
| Residential – Affordable[4] | 1,400 dwelling units | 2,660 | 4,930 | 60 | 200 | 260 | 220 | 160 | 380 |
| *North Bayshore Master Plan Residential Trips (A)* | | *12,740* | *26,490* | *340* | *1,100* | *1,440* | *1,210* | *850* | *2,060* |
| Office | 3,145,897 square feet | 11,700 | 16,360 | 2,070 | 280 | 2,350 | 330 | 1,700 | 2,030 |
| Retail/Commercial Space | 240,000 square feet | 600 | 9,720 | 130 | 80 | 210 | 180 | 190 | 370 |
| Active Space Kiosks[2] | 4,000 square feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hotel | 525 Rooms | 210 | 2,520 | 70 | 50 | 120 | 50 | 50 | 100 |
| Community Uses[3] | 55,000 square feet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Police Operations Station | 2,000 square feet | 10 | 20 | 0 | 0 | 0 | 0 | 0 | 0 |
| Public Parking at SA-P-1 | 240 spaces | 0 | 440 | 20 | 20 | 40 | 20 | 20 | 40 |
| *North Bayshore Master Plan Non-Residential Trips (B)* | | *12,520* | *29,060* | *2,290* | *430* | *2,720* | *580* | *1,960* | *2,540* |
| **North Bayshore Master Plan Trips (A + B = C)** | | **25,260** | **55,550** | **2,630** | **1,530** | **4,160** | **1,790** | **2,810** | **4,600** |
| ***Existing Building Credit*** | | | | | | | | | |
| Office | 8,653 square feet | -30 | -90 | -10 | 0 | -10 | 0 | -10 | -10 |
| Research & Development | 1,642,061 square feet | -5,720 | -16,510 | -1,330 | -250 | -1,580 | -280 | -1,120 | -1,400 |
| Industrial | 92,497 square feet | -110 | -410 | -50 | -10 | -60 | -10 | -40 | -50 |
| Public Parking at SA-P-1 | 240 spaces | 0 | -440 | -20 | -20 | -40 | -20 | -20 | -40 |
| Existing Building Credit (D) | | -5,860 | -17,450 | -1,410 | -280 | -1,690 | -310 | -1,190 | -1,500 |
| ***Net Change*** | | | | | | | | | |
| **Net Increase (C + D = E)** | | **19,400** | **38,100** | **1,220** | **1,250** | **2,470** | **1,480** | **1,620** | **3,100** |

Notes:

1. Service population and daily trips rounded to the nearest 10.
2. The 4,000 square feet of active space kiosks identified in the Greenway Park West, Greenway Park East, and The Portal is a local serving use that is assumed not to generate vehicle trips.
3. The 55,000 square feet of community uses is a local serving use that is assumed not to generate separate vehicle trips during a typical weekday, but rather attract walking and biking trips from the surrounding land uses. Weekend programming of the community uses would generate additional vehicle trips outside of the typical weekday.
4. A sensitivity test was performed with a land use plan that converted 5% inclusionary affordable housing to market rate housing. This change resulted in an increase of less than 10 peak hour vehicle trips and 100 daily vehicles trips. This change is relatively small and would not change the conclusions of the MTA analysis.

Source: Fehr & Peers, 2023.

### 5.2.3 Person Trip Generation

Per the vision of the NBPP, the NBS Master Plan will construct a street system that supports travel by walking, bicycling, carpool, and transit. The NBS Master Plan person travel by mode for all land uses is shown in **Table 13**. This summary shows the majority (more than 40 percent daily and more than 50 percent during the peak hours) of the combined residential and non-residential person trips are by pedestrians, bicyclists, and transit riders. Further the single-occupancy vehicles and high-occupancy vehicles will park in six district parking garages, which then requires the ½ mile or so between the garages and the final destinations will be as a pedestrian, bicyclist, or transit trips.

**Table 13: North Bayshore Master Plan Person Trip Generation by Mode of Travel – All Land Uses**

| Mode of Travel | Daily Person Trips[1] | AM Peak Hour Person Trips[1] | | | PM Peak Hour Person Trips[1] | | |
|---|---|---|---|---|---|---|---|
| | | In | Out | Total | In | Out | Total |
| Pedestrian | 19,060 (19.5%) | 1,210 (19.3%) | 1,360 (37.0%) | 2,570 (25.9%) | 1,120 (30.2%) | 1,240 (19.8%) | 2,360 (23.6%) |
| Bicycle | 4,760 (4.9%) | 300 (4.8%) | 340 (9.2%) | 640 (6.4%) | 280 (7.5%) | 310 (4.9%) | 590 (5.9%) |
| Transit | 15,360 (15.7%) | 1,950 (31.2%) | 430 (11.7%) | 2,380 (23.9%) | 430 (11.6%) | 1,680 (26.8%) | 2,110 (21.1%) |
| *Subtotal (Pedestrian+Bicycle+Transit)* | *39,180 (40.1%)* | *3,460 (55.3%)* | *2,130 (57.9%)* | *5,590 (56.2%)* | *1,830 (49.3%)* | *3,230 (51.5%)* | *5,060 (50.6%)* |
| High-Occupancy Vehicle (HOV) | 9,620 (9.9%) | 540 (8.6%) | 300 (8.2%) | 840 (8.5%) | 450 (12.1%) | 610 (9.7%) | 1,060 (10.6%) |
| Single-Occupancy Vehicle (SOV) | 48,730 (50.0%) | 2,260 (36.1%) | 1,250 (33.9%) | 3,510 (35.3%) | 1,430 (38.6%) | 2,430 (38.8%) | 3,860 (38.8%) |
| *Subtotal (SOV+HOV)* | *58,350 (59.9%)* | *2,800 (44.7%)* | *1,550 (42.1%)* | *4,350 (43.8%)* | *1,880 (50.7%)* | *3,040 (48.5%)* | *4,920 (49.4%)* |
| **Total** | **97,530 (100.0%)** | **6,260 (100.0%)** | **3,680 (100.0%)** | **9,940 (100.0%)** | **3,710 (100.0%)** | **6,270 (100.0%)** | **9,980 (100.0%)** |

Notes:
1. Person trips rounded to the nearest 10. Each table cell expresses: person trips (mode share percentage).
Source: Fehr & Peers, 2023.

The NBS Master plan person travel by mode for residential and non-residential land uses are shown in **Table 14** and **Table 15**, respectively. The residential person trip generation by mode of travel reflects the residential travel characteristics of the entire project, including the combined person trip generation for market rate housing and affordable housing. The residential travel characteristics account for the NBS Master Plan's housing unit mix and parking supply. The non-residential person trip generation by mode of travel reflects the non-residential travel characteristics of the entire project. The new office and other non-

residential land uses are committed to achieving a 35% morning peak hour inbound single-occupancy vehicle mode share at the development driveways.

**Table 14: North Bayshore Master Plan Person Trip Generation by Mode of Travel – Residential Land Uses**

| Mode of Travel | Daily Person Trips[1] | AM Peak Hour Person Trips[1] | | | PM Peak Hour Person Trips[1] | | |
|---|---|---|---|---|---|---|---|
| | | In | Out | Total | In | Out | Total |
| Pedestrian | 12,080 (26.1%) | 240 (33.8%) | 1,170 (40.6%) | 1,410 (39.3%) | 950 (34.5%) | 440 (28.8%) | 1,390 (32.5%) |
| Bicycle | 3,010 (6.5%) | 60 (8.5%) | 290 (10.1%) | 350 (9.7%) | 240 (8.7%) | 110 (7.2%) | 350 (8.2%) |
| Transit | 2,280 (4.9%) | 10 (1.4%) | 240 (8.3%) | 250 (7.0%) | 280 (10.2%) | 20 (1.3%) | 300 (7.0%) |
| *Subtotal (Pedestrian+Bicycle+Transit)* | *17,370 (37.5%)* | *310 (43.7%)* | *1,700 (59.0%)* | *2,010 (56.0%)* | *1,470 (53.4%)* | *570 (37.3%)* | *2,040 (47.7%)* |
| High-Occupancy Vehicle (HOV) | 4,970 (10.7%) | 80 (11.3%) | 240 (8.3%) | 320 (8.9%) | 260 (9.5%) | 190 (12.4%) | 450 (10.5%) |
| Single-Occupancy Vehicle (SOV) | 23,990 (51.8%) | 320 (45.0%) | 940 (32.7%) | 1,260 (35.1%) | 1,020 (37.1%) | 770 (50.3%) | 1,790 (41.8%) |
| *Subtotal (SOV+HOV)* | *28,960 (62.5%)* | *400 (56.3%)* | *1,180 (41.0%)* | *1,580 (44.0%)* | *1,280 (46.6%)* | *960 (62.7%)* | *2,240 (52.3%)* |
| **Total** | **46,330 (100.0%)** | **710 (100.0%)** | **2,880 (100.0%)** | **3,590 (100.0%)** | **2,750 (100.0%)** | **1,530 (100.0%)** | **4,280 (100.0%)** |

Notes:

1. Person trips rounded to the nearest 10. Each table cell expresses: person trips (mode share percentage).

Source: Fehr & Peers, 2023.

**Table 15: North Bayshore Master Plan Person Trip Generation by Mode of Travel – Non-Residential Land Uses**

| Mode of Travel | Daily Person Trips[1] | AM Peak Hour Person Trips[1] | | | PM Peak Hour Person Trips[1] | | |
|---|---|---|---|---|---|---|---|
| | | In | Out | Total | In | Out | Total |
| Pedestrian | 6,980 (13.6%) | 970 (17.5%) | 190 (23.8%) | 1,160 (18.3%) | 170 (17.7%) | 800 (16.9%) | 970 (17.0%) |
| Bicycle | 1,750 (3.4%) | 240 (4.3%) | 50 (6.3%) | 290 (4.6%) | 40 (4.2%) | 200 (4.2%) | 240 (4.2%) |
| Transit | 13,080 (25.5%) | 1,940 (35.0%) | 190 (23.8%) | 2,130 (33.5%) | 150 (15.6%) | 1,660 (35.0%) | 1,810 (31.8%) |
| *Subtotal (Pedestrian+Bicycle+Transit)* | *21,810 (42.5%)* | *3,150 (56.8%)* | *430 (53.9%)* | *3,580 (56.4%)* | *360 (37.5%)* | *2,660 (56.1%)* | *3,020 (53.0%)* |
| High-Occupancy Vehicle (HOV) | 4,650 (9.1%) | 460 (8.3%) | 60 (7.5%) | 520 (8.2%) | 190 (19.8%) | 420 (8.9%) | 610 (10.7%) |
| Single-Occupancy Vehicle (SOV) | 24,740 (48.4%) | 1,940 (34.9%) | 310 (38.6%) | 2,250 (35.4%) | 410 (42.7%) | 1,660 (35.0%) | 2,070 (36.3%) |
| *Subtotal (SOV+HOV)* | *29,390 (57.5%)* | *2,400 (43.2%)* | *370 (46.1%)* | *2,770 (43.6%)* | *600 (62.5%)* | *2,080 (43.9%)* | *2,680 (47.0%)* |
| **Total** | **51,200 (100.0%)** | **5,550 (100.0%)** | **800 (100.0%)** | **6,350 (100.0%)** | **960 (100.0%)** | **4,740 (100.0%)** | **5,700 (100.0%)** |

Notes:
1. Person trips rounded to the nearest 10. Each table cell expresses: person trips (mode share percentage).

Source: Fehr & Peers, 2023.

## 5.3 North Bayshore Gateway Volumes

The daily North Bayshore Gateway volumes are shown in **Table 16**. The North Bayshore Gateway vehicle volumes are based on the following assumptions.

- **Existing Gateway Volumes**: This represents existing gateway volumes calculated from the counts conducted at the North Bayshore gateways during the spring 2020 traffic monitoring (counts were collected in February 2020 prior to the COVID pandemic altering travel patterns), with an estimated 24,779 employees (assuming a ½ percent vacancy rate) and 762 residents. Expressed as a rate, this equates to a daily rate of 3.16 vehicle trips per employee, to an AM peak hour rate of 0.31 vehicle trips per employee, to a PM peak hour rate of 0.27 vehicle trips per employee.
- **New Project Traffic**: This represents new daily and peak hour vehicle trips generated by the project.
- **Existing Building Demolition Credit**: This represents daily and peak hour vehicle trips generated by existing buildings on the project site. These trips will be removed with the demolition of the existing buildings.

- **Mixed-Use Vehicle Trip Reduction**: For the NBS Master Plan, the "mixed-use trip reduction share" occurs because the additional residential opportunities in North Bayshore allows some current workers to live nearby. The addition of residential infrastructure in North Bayshore creates a mode shift by allowing people who currently drive into North Bayshore to now walk, bike, or use a local shuttle. Housing increases the diversity of the land use mix and therefore reduces existing gateway vehicle trips.
- **Gateway Total Volume**: This is the total number of daily and peak hour vehicle trips at the gateways, combining all the factors listed above.

### Table 16: North Bayshore Gateway Volume with Project

| Scenario | Daily Trips[1] | AM Peak Hour Trips[1] | | | PM Peak Hour Trips[1] | | |
|---|---|---|---|---|---|---|---|
| | | In | Out | Total | In | Out | Total |
| Existing Gateway Volumes (A) | 78,370 | 6,310 | 1,340 | 7,650 | 1,460 | 5,280 | 6,740 |
| New Project Traffic (B) | 94,620 | 4,540 | 2,310 | 6,850 | 2,800 | 4,720 | 7,520 |
| Existing Building Demolition Credit (C) | -20,520 | -1,690 | -320 | -2,010 | -360 | -1,400 | -1,760 |
| Mixed-Use Trip Reduction (D) | -24,020 | -1,220 | -480 | -1,700 | -440 | -1,000 | -1,440 |
| *Gateway Total Volume (A+B+C+D=E)* | 128,450 | 7,940 | 2,850 | 10,790 | 3,460 | 7,600 | 11,060 |
| **Net New Gateway Traffic (E-A=F)** | **50,080** | **1,630** | **1,510** | **3,140** | **2,000** | **2,320** | **4,320** |

Note:
1. Vehicle trips rounded to the nearest 10.

Source: Fehr & Peers, 2023.

## 5.4 Service Population

Service population is the sum of the number of employees plus residents. **Table 17** shows the service population for the project site, and North Bayshore area, for each project scenario.

**Table 17: Service Populations**

| Population Type | Scenario 1: Existing Conditions[3] | Scenario 2: Cumulative with Project Conditions[4] |
|---|---|---|
| ***Project Site*** | | |
| Employees[1] (A) | 4,070 | 12,520 |
| Residents[1] (B) | 0 | 12,740 |
| Service Population[1,2] (A + B = C) | 4,070 | 25,260 |
| ***North Bayshore*** | | |
| Employees[1] (A) | 24,780 | 39,700 |
| Residents[1] (B) | 760 | 17,030 |
| Service Population[1,2] (A + B = C) | 25,540 | 56,730 |

Notes:
1. Rounded employees, residents, and service population to nearest 10.
2. Service population is defined as the sum of all residents and employees.
3. Scenario 1 is Existing Conditions in 2020.
4. Scenario 2 is Cumulative Conditions with NBPP Growth and the North Bayshore Master Plan Achieving a Modified Site-Specific TDM Policy Goal with a Historical Vacancy Rate and Rengstorff Connector.

Source: Fehr & Peers, 2023.

## 5.5 City of Mountain View Travel Model

The Mountain View travel model was used to develop the forecasts for this study. A description of the Mountain View travel model, land use inputs, transportation network inputs, and transportation demand management are discussed in the following sections.

### 5.5.1 City of Mountain View Travel Model Documentation

The Mountain View Travel Model was comprehensively updated in 2011 as part of continued planning efforts to address transportation infrastructure needs and to assist in the City's North Bayshore Precise Plan. Minor updates were completed for the East Whisman Precise Plan in 2017. The intent of the City's travel model update was to improve the accuracy of the model for local application while maintaining consistency with the structure of the Santa Clara Valley Transportation Authority (VTA)-City/County Association of Governments of San Mateo County (C/CAG) Bi-County Model (VTA Travel Model).

For the NBS Master Plan, the land use and roadway network inputs were updated in the Mountain View Travel Model to represent a base year 2020 and a future year 2030. The updates accounted for the changes in existing land uses and the NBS Master Plan roadway network and district parking locations.



The City of Mountain View Travel Model is sensitive to two factors that are key elements of the NBPP with Residential:

- Land Use Characteristics
- Transportation Demand Management (TDM) Strategies

Both are important components of the NBS Master Plan, and the City of Mountain View Travel Model has been updated to more completely account for the effects of both elements on vehicle trip generation.

### 5.5.2 Land Use Inputs

Urban development patterns directly influence vehicle travel demand. The City of Mountain View is employing a variety of compact growth measures, plans, and techniques to encourage walking, biking, and transit use, and to reduce demand for vehicle travel, as areas of the city are redeveloped or experience infill development.

The Mountain View Travel Model does capture the effects of land use characteristics such as density, diversity, design, and destinations in the model's trip generation estimates. By quantifying changes in these characteristics, the model process adjusts the number of vehicle trips based on a set of elasticities (or variables) that relate changes in vehicle trips to changes in the inputs related to the built environment.

#### *5.5.2.1 North Bayshore Area Land Use*

As described as a part of the scenarios in Chapter 1, the following eight constructed or planned developments are anticipated to add vehicle trips to the North Bayshore gateway after 2020 (the year of the North Bayshore gateway counts):

- Intuit – Bayshore Parkway
- Microsoft
- Sobrato – 1255 Pear Avenue Mixed-Use Office and Residential
- Shashi Hotel
- Charleston East
- 1100 La Avenida Affordable Housing
- Landings and Huff/Alta Garage
- Gateway Master Plan (non-Google)

The locations of these development projects are presented in **Figure 6**, and **Table 4** in **Chapter 1** presents a summary of their associated land use assumptions (which in some cases involve demolition of existing buildings as well as construction of new buildings). For reference, **Figure 6** also shows the location of the remaining known and pending projects in the North Bayshore District.

Altogether, the eight developments will involve the following net increases in land use:

- 2,186,299 square feet of office, research & development, and industrial building space
- 200 hotel rooms
- 99,536 square feet of restaurant, retail, and service building space

- 100,000 square feet of recreational building space
- 2,098 multi-family dwelling units

**Table 18** and **Table 19** show the land use totals by category for each scenario: Existing Conditions (Scenario 1) and the Cumulative with Project Conditions (Cumulative Conditions with NBPP Growth and the North Bayshore Master Plan Achieving a Modified Site-Specific TDM Policy Goal with a Historical Vacancy Rate and Rengstorff Connector) (Scenario 2).

### Table 18: Land Use in North Bayshore Area: Total Building Area

| Land Use[1] | Units | Scenario 1: Existing Conditions[2] | Scenario 2: Cumulative with Project Conditions[3] |
|---|---|---|---|
| Single Family | Dwelling Units | 1 | 1 |
| Multi-Family | Dwelling Units | 362 | 9,460 |
| **Subtotal (Residential) [A]** | **Dwelling Units** | **363** | **9,461** |
| Office | Square Feet | 878,930 | 6,466,146 |
| Research & Development | Square Feet | 5,938,153 | 4,038,142 |
| Industrial | Square Feet | 246,857 | 150,637 |
| **Subtotal (Office, R&D and Industrial) [B]** | **Square Feet** | **7,063,940** | **10,654,925** |
| Retail and Restaurant | Square Feet | 10,878 | 354,374 |
| Service Commercial | Square Feet | 26,138 | 26,138 |
| **Subtotal (Retail/Commercial) [C]** | **Square Feet** | **37,016** | **380,512** |
| Motel | Rooms | 0 | 725 |
| Church | Building | 1 | 1 |
| Institutional/Recreation | Trips | 4,142 | 7,673 |
| **Subtotal (Other Uses)** | **(Various)** | **4,143** | **8,399** |
| **Total Residential [A]** | **Dwelling Units** | **363** | **9,461** |
| **Total Employment Uses [B+C]** | **Square Feet** | **7,100,956** | **11,035,437** |

Notes:
1. Land use summarized from the City of Mountain View travel model traffic analysis zones.
2. Scenario 1 is Existing Conditions in 2020. Under Scenario 1, 2020 vacant buildings include: 91,392 s.f. of R&D buildings are vacant at the Shoreline Commons site.
3. Scenario 2 is the Cumulative with Project Condition: Cumulative Conditions with NBPP Growth and the North Bayshore Master Plan Achieving a Modified Site-Specific TDM Policy Goal with a Historical Vacancy Rate and Rengstorff Connector.

Source: City of Mountain View travel model and Fehr & Peers, 2023.



**Table 19: Land Use in North Bayshore Area: Total Employee and Population Estimates**

| Land Use[1] | Units | Scenario 1: Existing Conditions[2] | Scenario 2: Cumulative with Project Conditions[3] |
|---|---|---|---|
| Single Family | Population | 2 | 2 |
| Multi-Family | Population | 760 | 17,028 |
| **Subtotal (Residential) [A]** | **Population** | **762** | **17,030** |
| Office | Employees | 3,516 | 25,865 |
| Research & Development | Employees | 20,784 | 14,133 |
| Industrial | Employees | 296 | 181 |
| **Subtotal (Office, R&D and Industrial) [B]** | **Employees** | **24,596** | **40,179** |
| Retail and Restaurant | Employees | 60 | 1,285 |
| Service Commercial | Employees | 78 | 78 |
| **Subtotal (Retail/Commercial) [C]** | **Employees** | **138** | **1,363** |
| Motel | Employees | 0 | 290 |
| Church | Employees | 10 | 10 |
| Institutional/Recreation | Employees | 414 | 767 |
| **Subtotal (Other Uses) [D]** | **Employees** | **424** | **1,067** |
| **Total Residential [A]** | **Population** | **762** | **17,030** |
| **Total Employment Uses [B+C+D]** | **Employees** | **25,158** | **42,609** |

Notes:
1. Land use summarized from the City of Mountain View travel model traffic analysis zones.
2. Scenario 1 is Existing Conditions in 2020. Under Scenario 1, 2020 vacant buildings include: 91,392 s.f. of R&D buildings are vacant at the Shoreline Commons site.
3. Scenario 2 is the Cumulative with Project Condition: Cumulative Conditions with NBPP Growth and the North Bayshore Master Plan Achieving a Modified Site-Specific TDM Policy Goal with a Historical Vacancy Rate with Rengstorff Connector.

Source: City of Mountain View travel model and Fehr & Peers, 2023.

**Table 20** and **Table 21** show the occupied land use totals by category, both for what exists today and for what is expected once the Near-Term Growth developments are constructed.

## Table 20: Land Use in North Bayshore Area: Occupied Building Area

| Land Use[1] | Units | Scenario 1: Existing Conditions[2,3] | Scenario 2: Cumulative with Project Conditions[4,5] |
|---|---|---|---|
| Single Family | Dwelling Units | 1 | 1 |
| Multi-Family | Dwelling Units | 362 | 9,460 |
| **Subtotal (Residential) [A]** | **Dwelling Units** | **363** | **9,461** |
| Office | Square Feet | 810,657 | 6,013,515 |
| Research & Development | Square Feet | 5,908,463 | 3,755,472 |
| Industrial | Square Feet | 245,623 | 140,092 |
| **Subtotal (Office, R&D and Industrial) [B]** | **Square Feet** | **6,964,743** | **9,909,079** |
| Retail and Restaurant | Square Feet | 10,824 | 329,569 |
| Service Commercial | Square Feet | 26,008 | 24,308 |
| **Subtotal (Retail/Commercial) [C]** | **Square Feet** | **36,832** | **353,877** |
| Motel | Rooms | 0 | 725 |
| Church | Building | 1 | 1 |
| Institutional/Recreation | Trips | 4,142 | 7,673 |
| **Subtotal (Other Uses)** | **(Various)** | **4,143** | **8,399** |
| **Total Residential [A]** | **Dwelling Units** | **363** | **9,461** |
| **Total Employment Uses [B+C]** | **Square Feet** | **7,001,575** | **10,262,956** |

Notes:

1. Land use summarized from the City of Mountain View travel model traffic analysis zones.
2. Scenario 1 is Existing Conditions in 2020. Under Scenario 1, 2020 vacant buildings include: 91,392 s.f. of R&D buildings are vacant at the Shoreline Commons site.
3. Under Scenario 1, the remainder of the office, R&D, industrial, retail, restaurant, and service commercial buildings are assumed to be "Occupied" with a ½% vacancy rate of the total existing building square footage.
4. Scenario 2 is the Cumulative with Project Condition: Cumulative Conditions with NBPP Growth and the North Bayshore Master Plan Achieving a Modified Site-Specific TDM Policy Goal with a Historical Vacancy Rate with the Rengstorff Connector.
5. "Occupied" building square footage accounts for a 7% vacancy rate off the total building square footage under Scenario 2 for the office, R&D, industrial, retail, restaurant, and service commercial buildings.

Source: City of Mountain View travel model, and Fehr & Peers, 2023.



**Table 21: Land Use in North Bayshore Area: Occupied Employee and Population Estimates**

| Land Use[1] | Units | Scenario 1: Existing Conditions[2,3] | Scenario 2: Cumulative Conditions[4,5] |
|---|---|---|---|
| Single Family | Population | 2 | 2 |
| Multi-Family | Population | 760 | 17,028 |
| **Subtotal (Residential) [A]** | **Population** | **762** | **17,030** |
| Office | Employees | 3,243 | 24,054 |
| Research & Development | Employees | 20,680 | 13,144 |
| Industrial | Employees | 295 | 168 |
| **Subtotal (Office, R&D and Industrial) [B]** | **Employees** | **24,218** | **37,366** |
| Retail and Restaurant | Employees | 59 | 1,195 |
| Service Commercial | Employees | 78 | 73 |
| **Subtotal (Retail/Commercial) [C]** | **Employees** | **137** | **1,268** |
| Motel | Employees | 0 | 290 |
| Church | Employees | 10 | 10 |
| Institutional/Recreation | Employees | 414 | 767 |
| **Subtotal (Other Uses) [D]** | **Employees** | **424** | **1,067** |
| **Total Residential [A]** | **Population** | **762** | **17,030** |
| **Total Employment Uses [B+C+D]** | **Employees** | **24,779** | **39,701** |

Notes:
1. Land use summarized from the City of Mountain View travel model traffic analysis zones.
2. Scenario 1 is Existing Conditions in 2020. Under Scenario 1, 2020 vacant buildings include: 91,392 s.f. of R&D buildings are vacant at the Shoreline Commons site.
3. Under Scenario 1, the remainder of the office, R&D, industrial, retail, restaurant, and service commercial buildings are assumed to be "Occupied" with a ½% vacancy rate of the total existing building square footage.
4. Scenario 2 is the Cumulative with Project Condition: Cumulative Conditions with NBPP Growth and the North Bayshore Master Plan Achieving a Modified Site-Specific TDM Policy Goal with a Historical Vacancy Rate with Rengstorff Connector.
5. "Occupied" building square footage accounts for a 7% vacancy rate off the total building square footage under Scenario 2 for the office, R&D, industrial, retail, restaurant, and service commercial buildings.

Source: City of Mountain View travel model, and Fehr & Peers, 2023.

### 5.5.3 Transportation Network Inputs

Fehr & Peers added detail to the Mountain View Travel Model traffic analysis zone (TAZ) structure to account for the district parking structures and project boundaries, and to account for the refined street network in the NBS Master Plan area. The NBPP land area is divided into more than 60 TAZs to add detail to the model structure and land use allocations and the NBS Master Plan is separated into its own TAZs. The street network accommodates these TAZs, such that the model network better represents the public streets anticipated to be constructed to support the NBS Master Plan development. By refining the travel

model in this way, the model results can be used to evaluate the distribution of vehicle traffic at each gateway that is attributable to the various development areas of the NBS Master Plan.

NBS Master Plan land use was allocated to TAZs based on parking location as shown in **Table 2.**This allocation method ensured that vehicle traffic was distributed accurately to where the traffic occurs. This is specifically important for the district parking structures, where the vehicle traffic does not occur where the land use is physically located.

The future roadway network was developed based on planned and funded improvements identified in the financially constrained roadway improvement project list from the *Valley Transportation Plan (VTP) 2040* published by the VTA (October 2014), and the City's 2030 General Plan Circulation Chapter. This roadway network used the Future Year (2030) scenario and the regional roadway improvements within Mountain View are summarized below (with VTP 2040 project numbers in parentheses).

- SR 237 HOV/express lanes: Mathilda Ave to SR 85 (H5)*
- SR 85 northbound to eastbound SR 237 connector ramp and northbound SR 85 auxiliary lane including braided SR 237 eastbound off-ramp between SR 85 and Dana Street (H21)*
- SR 237 westbound on-ramp at Middlefield Road (H32)*
- US 101 southbound improvements from San Antonio Road to Charleston/Rengstorff Avenue (H42)*
- SR 237 eastbound auxiliary lanes: Mathilda Avenue to Fair Oaks Avenue (H47)*
- Southbound US 101 auxiliary lanes between Ellis Street and SR 237 (H49)*

* Denotes Congestion Management Program (CMP) facility.

The transportation improvements within North Bayshore are presented in **Figure 5** and **Table 4** in **Chapter 1**.

### 5.5.4 Transportation Demand Management

In addition to a land use plan, the NBPP contains several transportation policies, programs, and initiatives intended to help reduce per service population vehicle trips, strengthen Mountain View's alternative transportation network, and encourage travelers to shift to other travel modes. This TDM requirement has been further enhanced in the NBS Master Plan to better accommodate the future growth.

Typically, travel demand models do not directly capture the effects of TDM strategies. However, daily and peak hour TDM adjustments for commute and non-commute trip purposes are applied with the Mountain View Travel Model per the methods described in the *4D Enhancement User's Guide* (Fehr & Peers, 2011). The outcome of applying the daily and peak hour TDM adjustments and a Fratar distribution process to modify the trip generation of NBS Master Plan transportation analysis zones to generate the daily and



peak hour vehicle trips presented in **Table 12** and the North Bayshore District transportation analysis zones to generate the daily and peak hour vehicle trips presented in **Table 16**.[15]

[15] Fratar, T. J. *Vehicular Trip Distribution by Successive Approximations*. Traffic Quarterly, Vol. 8, No. 1, 1954, pp. 53–65.

# 6. Motor Vehicle Operations Methods

This chapter describes the traffic analysis methods used for the operations analysis.

## 6.1 Traffic Analysis Methods

The operations of roadway facilities are described with the term level of service (LOS), a qualitative description of vehicular traffic flow based on factors such as speed, travel time, delay, and freedom to maneuver. Six levels are defined from LOS A, which reflects free-flow conditions where there is little interaction between vehicles, to LOS F, where the vehicle demand exceeds the capacity and high levels of vehicle delay result. LOS E represents "at-capacity" operations. When traffic volumes exceed the capacity at a signalized intersection, vehicles may wait through multiple signal cycles before traveling through the intersection; these operations are designated as LOS F. Examples of the various levels of service for a signalized intersection are illustrated in **Figure 25**.

The Synchro 11 and TRAFFIX software used to calculate delay and LOS in this analysis are intersection-level tools. Because of this, the results do not truly represent a corridor-level analysis, but rather a series of individual intersection analyses which do not account for the effects of queuing, weaving, or transit signal priority. **Appendix K** includes further discussion on the considerations of isolated intersection analysis.

## Analysis Methods and Thresholds

### 6.1.1 Signalized Intersections

#### *6.1.1.1 Analysis Method*

The method described in Chapter 19 of the *Highway Capacity Manual* (HCM) 6th Edition (Transportation Research Board) was used to prepare the level of service calculations for the study intersections.[16] This level of service method, which is approved by the City of Mountain View and the VTA, analyzes a signalized intersection's operation based on average control delay per vehicle. Control delay includes the initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The average control delay is calculated using Synchro 11 or TRAFFIX 8.0 analysis software and is correlated to a LOS designation as shown in **Table 22**.

[16] Select locations with unique phasing conditions use in Chapter 16 of the 2000 *Highway Capacity Manual* (HCM) (Transportation Research Board).

**Table 22: Signalized Intersection Level of Service Definitions**

| Level of Service | Description | Average Control Delay per Vehicle (seconds) |
|---|---|---|
| A | Operations with very low delay occurring with favorable progression and/or short cycle lengths. | ≤ 10.0 |
| B+<br>B<br>B- | Operations with low delay occurring with good progression and/or short cycle lengths. | 10.1 to 12.1<br>12.1 to 18.0<br>18.0 to 20.0 |
| C+<br>C<br>C- | Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear. | 20.1 to 23.0<br>23.1 to 32.0<br>32.0 to 35.0 |
| D+<br>D<br>D- | Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, and high volume-to-capacity (V/C) ratios. Many vehicles stop and individual cycle failures are noticeable. | 35.1 to 39.0<br>39.1 to 51.0<br>51.1 to 55.0 |
| E+<br>E<br>E- | Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. | 55.1 to 60.0<br>60.1 to 75.0<br>75.1 to 80.0 |
| F | Operations with delays unacceptable to most drivers occurring due to over-saturation, poor progression, or very long cycle lengths. | > 80.0 |

Source: *Traffic Level of Service Analysis Guidelines*, VTA Congestion Management Program, June 2003; and *Highway Capacity Manual*, Transportation Research Board, 2016.

Signalized intersection operations and deficiencies are evaluated based on each jurisdiction's minimum threshold for acceptable operations as shown in **Table 23** and the deficiency thresholds identified in **Section 1.5** of the report. Based on these thresholds, an intersection is deemed unacceptable when the LOS exceeds the applicable threshold. The following table shows the thresholds for acceptable operations:

**Table 23: Signalized Intersection LOS Thresholds for Acceptable Operations**

| Jurisdiction | Intersection LOS Standards | Citation |
|---|---|---|
| City of Mountain View | City of Mountain View all intersections LOS D; except for: Downtown Mountain View LOS E; San Antonio Shopping Center LOS E; CMP facilites LOS E | *City of Mountain View 2030 General Plan and Greenhouse Gas Reduction Program EIR*, page 121 (2011) |

Source: Fehr & Peers, 2023.


**Intersection Operation:** Free Flow

**Degree of Delay:** Negligible Delays


**Intersection Operation:** Stable Flow

**Degree of Delay:** Minimal Delays


**Intersection Operation:** Stable Flow

**Degree of Delay:** Moderate Delays


**Intersection Operation:** Less Stable Flow

**Degree of Delay:** Long Delays


**Intersection Operation:** Unstable Flow

**Degree of Delay:** Substantial Delays Can Occur


**Intersection Operation:** Unpredictable Flow/Wait Through Multiple Cycles

**Degree of Delay:** Excessive Delays Can Occur



Figure 25

Signalized Intersection Level of Service Examples

### 6.1.2 Unsignalized Intersections

The operations of the unsignalized intersections were evaluated using the method contained in Chapter 20 and 21 of the *Highway Capacity Manual (HCM) 6th Edition*. LOS ratings for stop-sign-controlled intersections are based on the average control delay expressed in seconds per vehicle. At two-way or side-street-stop controlled intersections, control delay is calculated for each movement, not for the intersection as a whole. For approaches composed of a single lane, the control delay is computed as the average of all movements in that lane. **Table 24** summarizes the relationship between delay and LOS for unsignalized intersections.

**Table 24: Unsignalized Intersection Level of Service Definitions**

| Level of Service | Description | Average Control Delay Per Vehicle (Seconds) |
|---|---|---|
| A | Little or no delay. | ≤ 10.0 |
| B | Short traffic delay. | 10.1 to 15.0 |
| C | Average traffic delays. | 15.1 to 25.0 |
| D | Long traffic delays. | 25.1 to 35.0 |
| E | Very long traffic delays. | 35.1 to 50.0 |
| F | Extreme traffic delays with intersection capacity exceeded. | > 50.0 |

Source: *Highway Capacity Manual*, Transportation Research Board, 2016.

The City does not have an adopted LOS policy for unsignalized intersections; however, the City strives to maintain LOS D, which is a LOS standard that has been used in other traffic studies within the city. For side street stop-controlled intersections, the City determines the need for improvements based on turn movement operations (such as queues overflowing the storage capacity) as well as peak hour traffic signal warrant analyses from the California Manual on Uniform Traffic Control Devices (CA MUTCD).[17]

**Warrant 3 – Peak hour vehicle volume**
This warrant determines if the minor street traffic suffers undue delay when entering or crossing the major street for a minimum of one hour of an average day. This is based on the major street left-turn volume, the higher-volume minor-street approach volume, and calculated delay for vehicles on the higher-volume minor-street approach.

[17] Signal warrant analysis is intended to examine the general correlation between the planned level of future development and the need to install new traffic signals. It estimates future development-generated traffic compared to a sub-set of the standard traffic signal warrants recommended in the 2014 California *Manual on Uniform Traffic Control Devices* (CA *MUTCD*) guidelines. While satisfying one or more of these warrants could justify the installation of a signal at an intersection, this analysis should not serve as the only basis for deciding whether and when to install a signal. To reach such a decision, the full set of warrants should be investigated by an experienced engineer based on field-measured rather than forecast traffic data and a thorough study of traffic and roadway conditions. Furthermore, the decision to install a signal should not be based solely upon the warrants, since the installation of signals may lead to certain types of collisions.

# 7. Cumulative Conditions

This chapter presents the effects of the proposed project on the surrounding roadway system under Cumulative with Project Conditions.

## 7.1 Intersection Operations Analysis

Level of service calculations were prepared using the Synchro 11 software and TRAFFIX 8.0 software to evaluate signalized intersection operations under Cumulative with Project Conditions. The intersection volumes including the Cumulative with Project volumes on **Figure 26** are shown in **Appendix B** and results of the LOS analysis are summarized in **Table 26**. The corresponding LOS calculation sheets are included in **Appendix B**.

Level of service calculations were based on the intersection improvements shown in **Table 25** under the proposed project. The source documents, with intersection improvement summary are listed in **Appendix G**. **Table 23** summarizes planned or recently constructed intersection improvements in an approach format, based on the plans included in **Appendix G**. Further Operational Improvements informed by the Cumulative with Project Intersection Operations analysis are described in Section **8.3.1**.

**Table 25: Future Planned Improvement Assumptions**

| Intersection | | Intersection Improvements |
|---|---|---|
| 1 | San Antonio Rd / Bayshore Pkwy | *No change from Existing* |
| 2 | San Antonio Rd / US 101 Northbound Ramps | *No change from Existing* |
| 3 | Rengstorff Ave-Amphitheatre Pkwy / Garcia Ave-Charleston Rd | **Geometric Improvements**[1]<br>• Northbound: Add an additional right-turn lane.<br>• Eastbound: Reconfigure the shared through-right lane to a right-turn lane.<br>• Westbound: Add an additional left-turn lane with a 500-foot storage pocket, convert the shared through-right lane to one through lane and add a right-turn lane with a 500-foot storage pocket.<br>**Signal Operation Improvements**[1]<br>• Modify to include protected phasing and right-turn overlaps for all movements, except southbound right turn |

| Intersection | | Intersection Improvements |
|---|---|---|
| 4 | Rengstorff Ave /<br>US 101 Northbound Ramps | **Geometric Improvements**[3]<br>*This list describes the planned "Rengstorff Connector" (re-alignment of the US 101 ramps and connection to Landings Drive) as it relates to the intersection of Rengstorff Ave and*<br>*US 101 Northbound Ramps:*<br>• Northbound: Reconfigure outside through lane to a shared through-right turn lane<br>• Southbound: Add a left-turn lane with a 150-foot storage pocket and remove channelization of the right-turn lane<br>• Eastbound (now US 101 northbound on- and off-ramps): Two left-turn lanes with 275-foot storage pockets, a through lane, and a shared through-right-turn lane with a 275-foot storage pocket.<br>• Westbound (now Landings Drive): One left-turn lane, one shared through-left-turn lane, and one shared through-right-turn lane<br>**Signal Operation Improvements**[7]<br>Convert from east-west permissive phasing to split phasing; add protected left-turn phasing for the new southbound left turn movement |
| 5 | Rengstorff Ave /<br>US 101 Southbound Ramps | *No change from Existing* |
| 6 | Rengstorff Ave / Leghorn St | *No change from Existing* |
| 7 | Landings Dr / Charleston Rd | **Geometric Improvements**[1]<br>• Northbound: Convert shared through-right-turn lane to a shared left-right-turn lane<br>• Southbound: Remove vehicular approach and adjacent departure<br>• Eastbound: Reconfigure from left turn lane, through lane, and shared through-right turn lane to through lane and right turn lane<br>• Westbound: Convert shared through-right-turn lane to a through lane<br>**Signal Operation Improvements**[1]<br>• Convert from north-south split phasing to northbound protected left-turn phasing; add a dedicated pedestrian phase. |
| 8 | Alta Ave / Charleston Rd | **Geometric Improvements**[1]<br>• Eastbound: Convert shared through-right turn lane to a right-turn lane with a 65-foot storage pocket<br>• Westbound: Convert shared through-right lane to a right-turn lane with a 100-foot storage pocket<br>**Signal Operation Improvements**[1]<br>• Convert north-south split phasing to protected left-turn phasing; include east-west protected right-turn phasing before and after a protected pedestrian phase with the east-west through phases |
| 9 | Huff Ave / Charleston Rd | **Geometric Improvements**[1]<br>• Eastbound: Convert shared through-right-turn lane to a right-turn lane with a 100-foot storage pocket<br>• Westbound: Convert shared through-right-turn lane to a right-turn lane with a 40-foot storage pocket |

| Intersection | | Intersection Improvements |
|---|---|---|
| 10 | Joaquin Rd / Charleston Rd | **Geometric Improvements**[1]<br>• Eastbound: Convert shared through-right-turn lane to a right-turn lane with a 25-foot storage pocket<br>• Westbound: Convert shared through-right-turn lane to a right-turn lane with a 75-foot storage pocket<br>**Signal Operation Improvements**[2]<br>• Signalize intersection with protected left-turn phasing |
| 11 | Shoreline Blvd / Charleston Rd | **Geometric Improvements**[1]<br>• Northbound: Add a center, reversible dedicated bus lane<br>**Signal Operation Improvements**[4]<br>• Add a dedicated bus phase during the AM peak period |
| 12 | Alta Ave / Plymouth St | *No change from Existing* |
| 13 | Huff Ave / Plymouth St | *No change from Existing* |
| 14 | Joaquin Rd / Plymouth St | **Geometric Improvements**[4]<br>• Westbound: Reconfigure from shared left-through-right-turn lane to a left-turn lane and a shared through-right-turn lane |
| 15 | Shoreline Blvd / Space Park Way | **Geometric Improvements**[4]<br>*"Plymouth Street Realignment" with the following approach-based modifications:*<br>• Northbound: Reconfigure from a shared through-left-turn lane and shared through-right-turn lane to two left-turn lanes, a through lane, and a shared through-right-turn lane; add a center, reversible dedicated bus lane<br>• Southbound: Add a center, reversible dedicated bus lane<br>• Eastbound (now Plymouth Street): Reconfigure eastbound approach from a shared left-through-right-turn lane to a shared through-left turn-lane and a right-turn lane<br>• Westbound: Reconfigure westbound approach from a shared through-left-turn lane and a right-turn lane to a left-turn lane and a shared through-right-turn lane<br>**Signal Operation Improvement**[4]<br>• Signalize the intersection with north-south protected left-turn phasing and east-west split phasing |
| 16 | Shoreline Blvd / Plymouth St | *The "Plymouth Street Realignment" project will remove this intersection* |
| 17 | Shoreline Blvd / Pear Ave | **Geometric Improvements**[4]<br>• Northbound: Convert shared through-left-turn lane to a second through lane, convert shared through-right-turn lane to a right-turn lane with a 300-foot storage pocket; add a center, reversible dedicated bus lane<br>• Southbound: Add a center, reversible dedicated bus lane<br>• Eastbound: Reconfigure eastbound approach from a shared left-through-right-turn lane to a left-turn lane and a shared through-right-turn lane<br>**Signal Operation Improvement**[4]<br>• Convert from north-south split phasing and east-west permissive phasing to protected left turn phasing on all approaches |

| Intersection | | Intersection Improvements |
|---|---|---|
| 18 | Shoreline Boulevard / La Avenida-US 101 Northbound Ramps | **Geometric Improvements**[5]<br>*Re-align US 101 northbound off-ramp to intersect La Avenida Street, creating Intersection 20. Intersection 18 will include the following approach-based improvements:*<br>• Northbound: Remove channelization of right-turn lane (previously provided access to US 101 SB on-ramp, now providing access to La Avenida Street); add a center, reversible dedicated bus lane<br>• Southbound: Add a center, reversible dedicated bus lane<br>• Westbound: With US 101 NB off-ramp approach re-aligned to create Intersection 20, add a second right-turn lane on La Avenida Street approach to Intersection 18<br>**Signal Operation Improvements**[7]<br>Phasing modification to remove southwest-bound (former La Avenida St, prior to re-alignment) movement phase |
| 19 | Shoreline Blvd / US 101 Southbound Ramps | **Geometric Improvements**[6]<br>• Northbound: Remove left-turn lane and add a third through lane with a 45-foot storage pocket; add a center, reversible dedicated bus lane<br>• Southbound: Add a center, reversible dedicated bus lane<br>**Signal Operation Improvements**[6]<br>• Remove northbound left-turn phase |
| 20 | US 101 NB Off Ramp / La Avenida | **Geometric Improvements**[5]<br>*New intersection, created from the re-alignment of the US 101 NB off-ramp, with the following approach-based improvements:*<br>• Northbound: Two left-turn lanes, a bus-only left-turn lane, and two right-turn lanes<br>• Eastbound: One through lane<br>• Westbound: Two through lanes, one with an 80-foot storage pocket<br>**Signal Operation Improvement**[7]<br>• Protected phasing |
| 21 | Inigo Way / La Avenida | **Geometric Improvements**[5]<br>• Northbound: Add new northbound approach with a shared left-through-right-turn lane<br>• Southbound: Convert right-turn lane to a shared through-right-turn lane<br>• Eastbound: Add an eastbound approach with one left-turn lane, one through lane, and a right-turn lane with a 50-foot storage pocket<br>• Westbound: Convert shared through-right-turn lane to a shared left-through-right-turn lane<br>**Stop Control Improvements**[5]<br>• Include stop control on new northbound approach |

Notes:

1. Charleston Corridor Improvements Phase 2 and 3 (95% Submittal), 2019.
2. Plans for the Improvement of Charleston Road between Huff Ave and N Shoreline Blvd (As-Builts), 2019.
3. BFK, 2021; Charleston Corridor Improvements Phase 2 and 3 (95% Submittal), 2019.
4. Plymouth Street and Space Park Way Realignment Design (65% Plans), 2021.
5. Caltrans Project 04170003391, 2020.
6. Shoreline Boulevard Bus Lane and Utility Improvements, 2020.
7. NBS Trip Cap Analysis Synchro Files, Hexagon, 2021.

Text formatted in *italics* denotes a consideration note, not a recommendation.

Source: City of Mountain View and Fehr & Peers, 2023

#### *7.1.1.1 Shoreline Gateway Bus Lane Operations*

As part of Priority Transportation Improvements 14 and 23 in **Table 4**, the Motor Vehicle Operations Analysis models a center-reversible bus lane along Shoreline Boulevard, extending from Middlefield Road to Charleston Road. Each intersection was modeled after the Priority Transportation Improvement's plan set and associated assumptions in **Appendix G**. Signal phasing information for the northern extent of the improvement (Intersection 11, Shoreline Boulevard and Charleston Road) does not yet exist, thus, the signal operation assumptions noted in **Appendix G** were made. The southern extent of the improvement, the intersection of Shoreline Boulevard and Middlefield Road, is not a study intersection.

At the intersection of Shoreline Boulevard and Charleston Road (Int. 11), the AM peak period (northbound bus movement) egress from center-reversible lane is modeled in Synchro 11 with a dedicated bus signal phase. For the PM peak period (southbound bus movement), it is assumed that buses from each approach would enter the center-reversible lane during that approach and movements' signal phase.

At study intersections along Shoreline Boulevard, between Charleston Road and Middlefield Road (Int. 15, Shoreline Boulevard and Space Park Way; Int. 17, Shoreline Boulevard and Pear Avenue; Int. 18, Shoreline Boulevard and La Avenida Street; and Int. 19, Shoreline Boulevard and US 101 SB on-ramps), only through bus movements are modeled, based on assumptions in **Appendix G**. Center-reversible bus lane egress at these intersections is not modeled and requires additional analysis using microsimulation. Signal phasing information which allows the bus full ingress and egress to and from the center lane has not been provided in the City's Priority Transportation improvement plans. The analysis presented in this report considers only bus through-movements at those intersections. Signal phasing for the intersections of Shoreline Boulevard and Pear Avenue (Int. 17) and Shoreline Boulevard and Space Park Way (Int. 15) assume a two-barrier structure as suggested in **Appendix G**, from "Plymouth Street and Space Park Way Realignment Design (65% Plans)". The phasing shown in that plan set does not include the capability for buses to turn in and out of the center bus lane, nor does it describe concurrent phasing between the northbound left and northbound through vehicle movements, which would be a desired phasing scenario with the high northbound AM volume.

### 7.1.2 Cumulative with Project Conditions

The results for Existing Conditions (2019) are included in **Table 26** for comparison purposes, along with the projected changes in control delay between the Existing and Cumulative with Project Conditions. Level of service and queuing by approach as well as critical volumes at Gateway Intersections by movement for the AM and PM peak hours are described in **Appendix H**.

The following intersections, with applicable peak hour noted, exceed their applicable level of service standard under Cumulative with Project Conditions:

- Int. 2: San Antonio Rd / US 101 Northbound Ramps (AM peak hour)
- Int. 3: Rengstorff Ave-Amphitheatre Pkwy / Garcia Ave-Charleston Rd (AM peak hour)
- Int. 4: Rengstorff Ave / US 101 Northbound Ramps (AM and PM peak hours)



- Int. 5: Rengstorff Ave / US 101 Southbound Ramps (AM peak hour)
- Int. 6: Rengstorff Ave / Leghorn St (AM and PM peak hours)
- Int. 11: Shoreline Blvd / Charleston Rd (AM and PM peak hours)
- Int. 13: Huff Ave / Plymouth St (AM and PM peak hours)
- Int. 14: Joaquin Rd / Plymouth St (AM and PM peak hours)
- Int. 15: Shoreline Blvd / Space Park Wy (AM and PM peak hours)
- Int. 17: Shoreline Blvd / Pear Ave (AM and PM peak hours)
- Int. 18: Shoreline Blvd / La Avenida-US 101 Northbound Ramps (AM and PM peak hours)
- Int. 21: Inigo Wy / La Avenida (AM and PM peak hours)

**Table 26: Existing and Cumulative with Project Intersection Levels of Service**

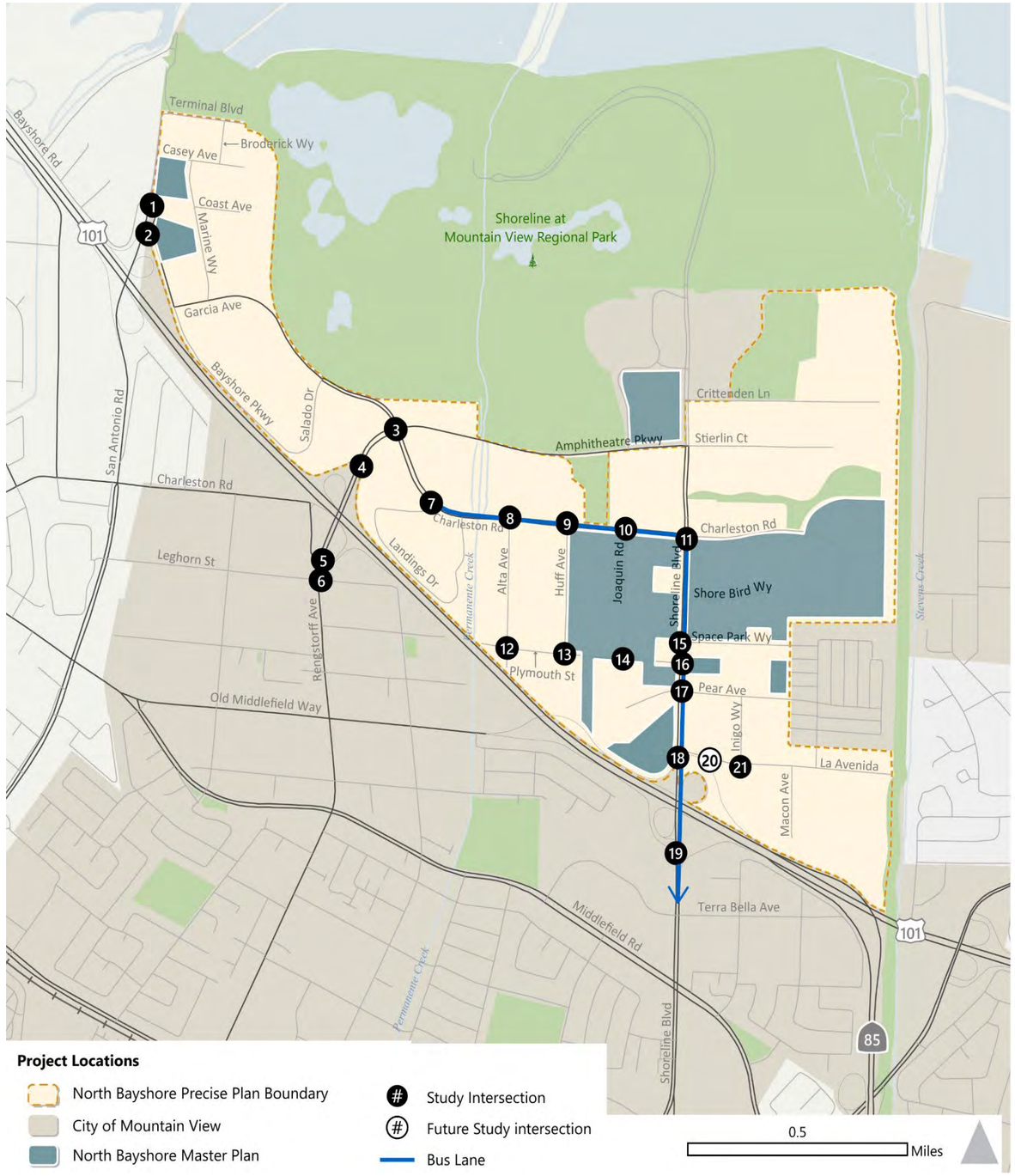
| | Intersection | Control Device[1] | LOS Thres-hold[2] | Peak Hour[3] | Existing Conditions | | Cumulative with Project Conditions | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Delay[4] | LOS[5] | Delay[4] | LOS[5] |
| 1 | San Antonio Rd / Bayshore Pkwy[7] | Signal | D | AM | 14.6 | B | 20.9 | C |
| | | | | PM | 32.5 | C | 34.4 | C |
| 2 | San Antonio Rd / US 101 Northbound Ramps[7] | Signal | D | AM | 19.3 | B | **>120** | **F** |
| | | | | PM | 10.9 | B | 14.1 | B |
| 3 | Rengstorff Ave- Amphitheatre Pkwy / Garcia Ave-Charleston Rd[7] | Signal | D | AM | 36.0 | D | **46.8** | **E** |
| | | | | PM | **82.3** | **F** | 51.1 | D |
| 4 | Rengstorff Ave / US 101 Northbound Ramps[7] | Signal | D | AM | 2.6 | A | **112.3** | **F** |
| | | | | PM | 5.8 | A | **90.1** | **F** |
| 5 | Rengstorff Ave / US 101 Southbound Ramps[7*] | Signal | D | AM | **68.1** | **E** | **93.6** | **F** |
| | | | | PM | 50.6 | D | 37.3 | D |
| 6 | Rengstorff Ave / Leghorn St | Signal | D | AM | 38.5 | D | **68.8** | **E** |
| | | | | PM | 27.8 | C | **67.3** | **E** |
| 7 | Landings Dr / Charleston Rd[5] | Signal | D | AM | 33.8 | C | 20.9 | C |
| | | | | PM | 40.8 | D | 22.3 | C |
| 8 | Alta Ave / Charleston Rd[7] | Signal | D | AM | 23.3 | C | 33.6 | C |
| | | | | PM | 26.5 | C | 28.4 | C |
| 9 | Huff Ave / Charleston Rd | Signal | D | AM | 25.8 | C | 23.0 | C |
| | | | | PM | 40.2 | D | 30.5 | C |
| 10 | Joaquin Rd / Charleston Rd | Signal[7] | D | AM | 11.8 | B | 19.0 | B |
| | | | | PM | 13.3 | B | 23.9 | C |
| 11 | Shoreline Blvd / Charleston Rd[7] | Signal | D | AM | 50.5 | D | **72.0** | **E** |
| | | | | PM | **105.7** | **F** | **86.4** | **F** |
| 12 | Alta Ave / Plymouth St[6,7] | AWSC | F | AM | 7.5 | A | 18.7 | C |
| | | | | PM | 8.4 | A | 25.0 | C |
| 13 | Huff Ave / Plymouth St[6,7] | SSSC | F | AM | 11.0 | B | **>120** | **F** |
| | | | | PM | 12.2 | B | **>120** | **F** |
| 14 | Joaquin Rd / Plymouth St[6,7] | SSSC | F | AM | 15.0 | B | **>120** | **F** |
| | | | | PM | 20.1 | C | **>120** | **F** |
| 15 | Shoreline Blvd / Space Park Wy[7] | Signal | D | AM | **88.6** | **F** | **>120** | **F** |
| | | | | PM | 23.2 | C | **>120** | **F** |
| 16 | Shoreline Blvd / Plymouth St | Signal | D | AM | 15.6 | B | Does Not Exist Under Cumulative Conditions | |
| | | | | PM | 18.1 | B | | |

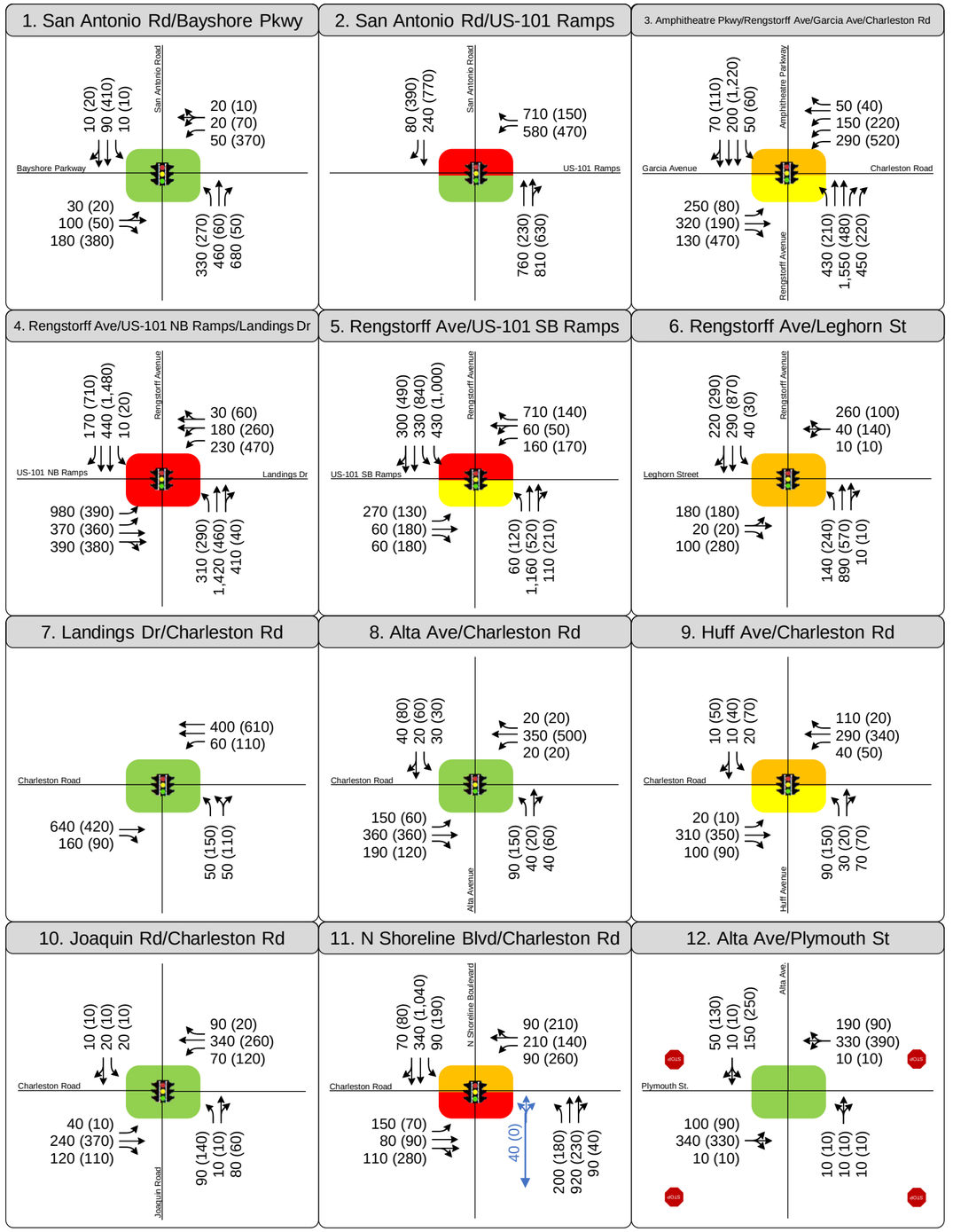
| Intersection | | Control Device[1] | LOS Thres-hold[2] | Peak Hour[3] | Existing Conditions | | Cumulative with Project Conditions | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Delay[4] | LOS[5] | Delay[4] | LOS[5] |
| 17 | Shoreline Blvd / Pear Ave[7] | Signal | D | AM | **57.8** | **E** | **>120** | **F** |
| | | | | PM | 33.3 | C | **>120** | **F** |
| 18 | Shoreline Blvd / La Avenida-US 101 NB Ramps[7] | Signal | D | AM | **102.2** | **F** | **>120** | **F** |
| | | | | PM | **60.5** | **E** | **91.9** | **F** |
| 19 | Shoreline Blvd / US 101 Southbound Ramps[7] | Signal | D | AM | 16.5 | B | 10.4 | B |
| | | | | PM | 13.1 | B | 54.5 | D |
| 20 | La Avenida / US 101 Northbound Ramps | Signal | D | AM | Future Intersection | | 27.0 | C |
| | | | | PM | | | 31.0 | C |
| 21 | Inigo Wy / La Avenida | SSSC | F | AM | 10.9 | B | **>120** | **F** |
| | | | | PM | 13.2 | B | **>120** | **F** |

Notes: **Bold** text indicates intersection operates at a deficient Level of Service compared to the applicable standard.

1. Signal refers to a signalized intersection. SSSC = Side-Street Stop Controlled intersection.
2. City of Mountain View 2030 General Plan and Greenhouse Gas Reduction Program EIR, page 121 (2011)
3. AM = morning peak hour, PM = evening peak hour.
4. Whole intersection weighted average control delay expressed in seconds per vehicle calculated using methods described in the *Highway Capacity Manual*, 6th Edition. For side-street stop-controlled intersections, total delay for the worst movement approach is reported.
5. LOS = Level of Service. LOS calculations conducted using the Synchro level of service analysis software package, which applies the method described in the *Highway Capacity Manual* 6th Edition unless otherwise noted.
6. LOS calculation conducted using TRAFFIX software.
7. Denotes intersections in which lane configuration or signal phasing preclude application of HCM 6th Edition methodology. For these intersections, 2000 *Highway Capacity Manual* methodology is utilized for delay and LOS calculations. Delay calculations for intersections analyzed in the TRAFFIX software also utilize 2000 *Highway Capacity Manual* methodology, as this software does not support HCM 6th Edition methodology. *Int. 5 uses HCM 6th Edition in Cumulative with Project scenario only.

Source: Fehr & Peers, 2023.



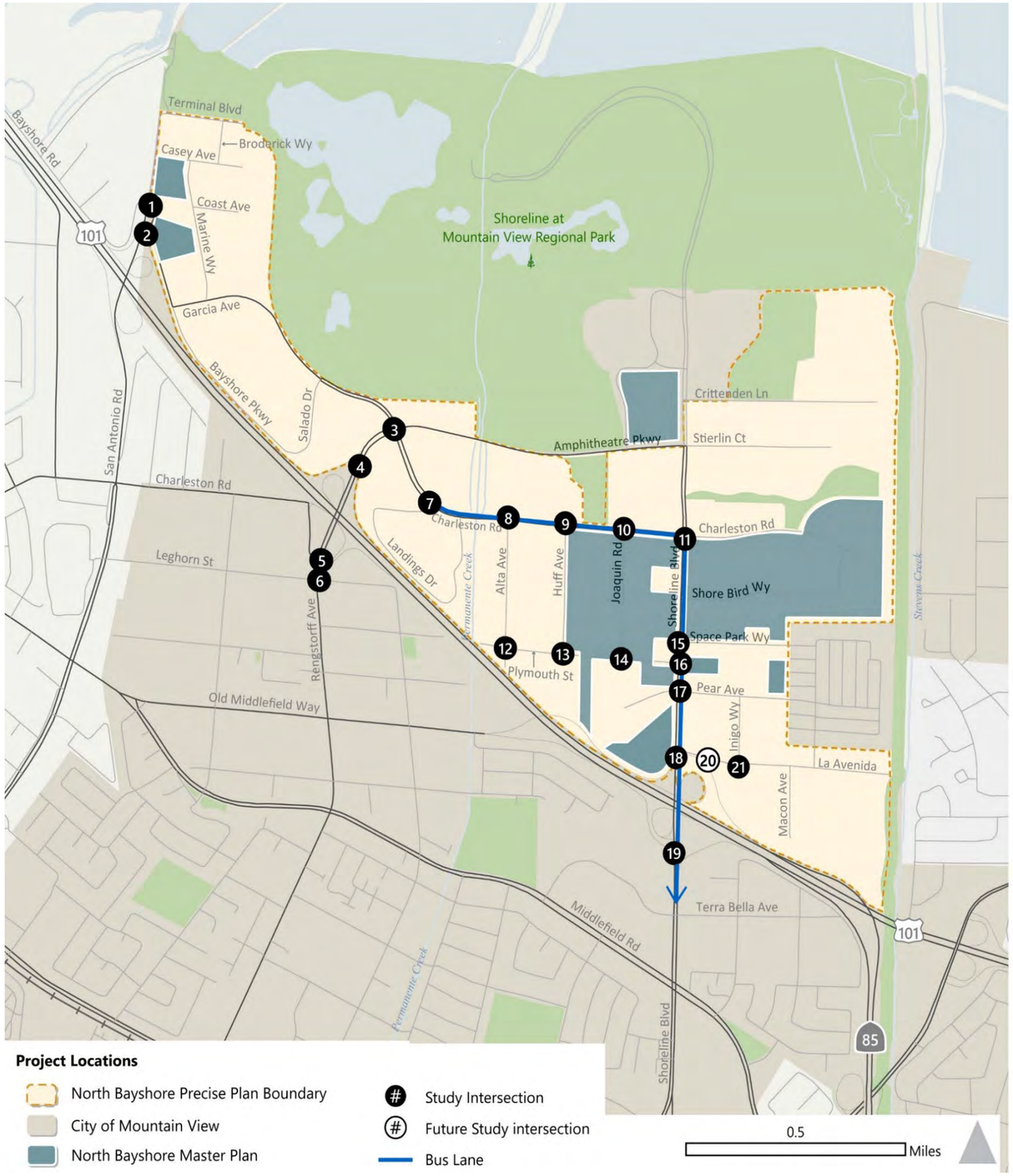



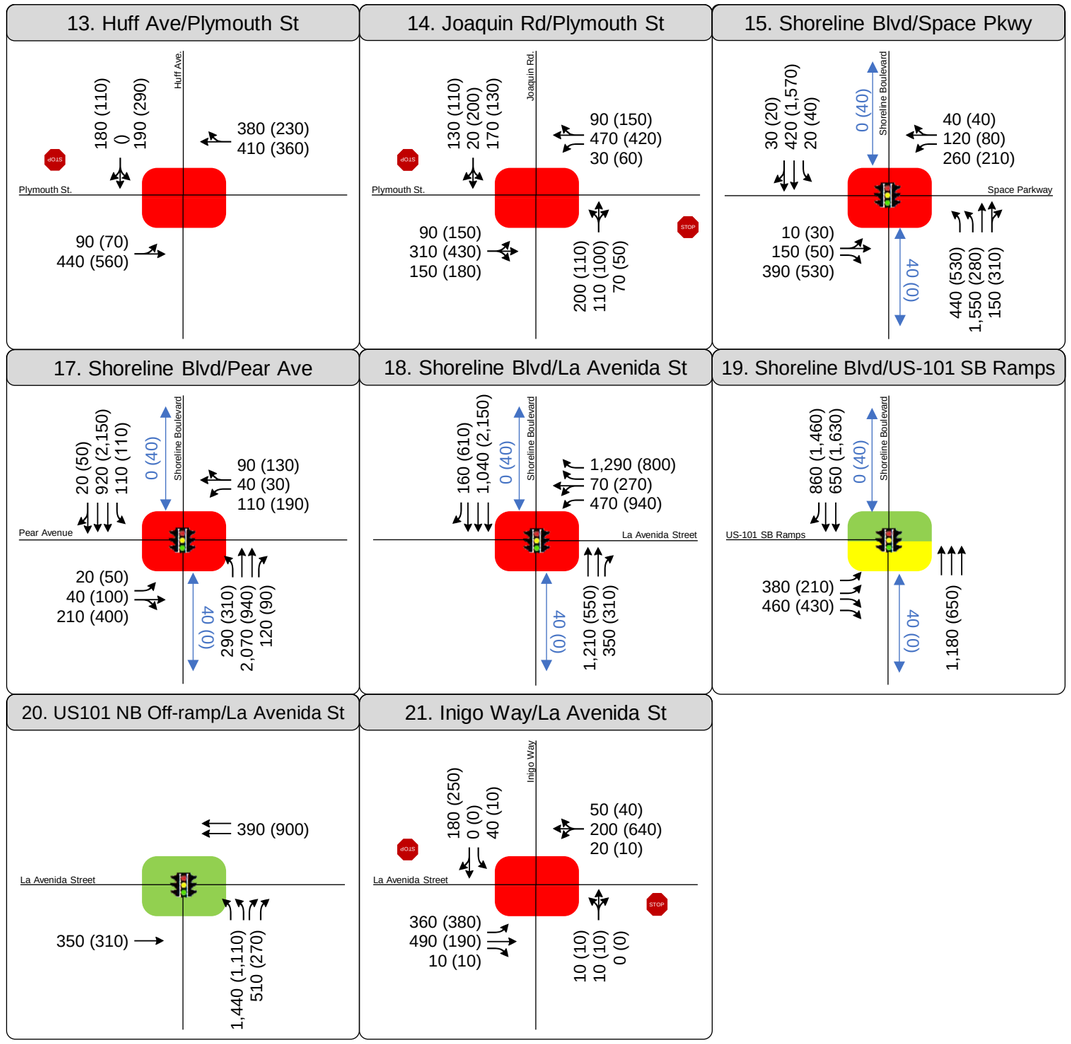

## LEGEND

| | | | |
|---|---|---|---|
| # | Study Intersection | AM (PM) | Peak Hour Traffic Volume |
| AM PM | A-C D E F | | Lane Configuration |
| STOP | Stop Sign | | Bus Lane Configuration |
| | Signalized | | |

Figure 26

Peak Hour Traffic Volumes, Traffic Control, Lane Configurations, and Level of Service
Cumulative with Project Conditions




## LEGEND

| | | | |
|---|---|---|---|
| # | Study Intersection | AM (PM) | Peak Hour Traffic Volume |
| AM PM | A-C D E F | | Lane Configuration |
| STOP | Stop Sign | | Bus Lane Configuration |
| | Signalized | | |

Figure 26

Peak Hour Traffic Volumes, Traffic Control, Lane Configurations, and Level of Service
Cumulative with Project Conditions

# 8. Adverse Motor Vehicle Effects and Improvements

This chapter discusses potential project effects on the study intersections. First, the adverse effect criteria are described. Next, the adverse effects and operational improvements are presented for each transportation facility type. The operational improvements described in this chapter require further analysis to evaluate their individual feasibility and benefits.

## 8.1 Adverse Effect Criteria

### 8.1.1 Signalized Intersections

The *City of Mountain View 2030 General Plan* (July 2012) includes policies to develop and adopt multi-modal transportation performance measures for projects in the City of Mountain View.

> *POLICY MOB 8.1: Multi-modal performance measures. Develop performance measures and indicators for all modes of transportation, including performance targets that vary by street type and location.*
>
> *POLICY MOB 8.2: Level of service. Ensure performance measurement criteria optimize travel by each mode.*

The *City of Mountain View 2030 General Plan and Greenhouse Gas Reduction Program Environmental Impact Report* established the following interim level of service policy standards:

> ***Interim level of service (LOS) standards.*** *Until adoption of the mobility plans described in Action MOB 1.1.1 [and adoption of alternative impact thresholds in Action MOB 8.1.2], maintain the Citywide vehicle LOS standards from the 1992 General Plan, which include a target peak hour LOS policy of LOS D for all intersections and roadway segments, with the following exceptions in high-demand areas:*
>
> - *Use LOS E for intersections and street segments within the Downtown Core and San Antonio areas where vitality, activity and multi-modal transportation use are primary goals; and*
> - *Use LOS E for intersections and street segments on CMP designated roadways in Mountain View (e.g., El Camino Real, Central Expressway and San Antonio Road).*

This transportation analysis follows the interim LOS standards.

Adverse effects at signalized City of Mountain View intersections are found to occur when the addition of project traffic causes one of the following:

- Intersection operations degrade from an acceptable level to an unacceptable level; or

- Exacerbates unacceptable operations by increasing the average critical delay by four seconds or more and increasing the critical volume-to-capacity (V/C) ratio by 0.01 or more; or
- Increases the V/C ratio by 0.01 or more at an intersection with unacceptable operations when the change in critical delay is negative (i.e., decreases). This can occur if the critical movements change.

### 8.1.2 Unsignalized Intersections

Level of service analysis at unsignalized intersections is generally used to determine the need for modifying the type of intersection control (i.e., installing an all-way stop or a traffic signal). Traffic volumes, delay, and traffic signal warrants are evaluated to determine if the analyzed future intersection control is appropriate.

Based on previous studies, adverse effects are said to occur when the addition of project traffic causes the average intersection delay for an all-way stop-controlled intersection, or the worst movement/approach for a side-street stop-controlled intersection, to degrade to LOS F and the intersection satisfies the peak hour traffic signal warrant from the *California Manual of Uniform Traffic Control Devices* (MUTCD) (2014).[18]

### 8.1.3 Adverse Effects and Improvements

Adverse effects on intersections were evaluated under Cumulative with Project Conditions. Where adverse intersection effects are identified, physical improvements are identified that could help address the operational LOS and queuing deficiency. While many of the identified improvements do not fully address the LOS deficiency and these adverse effects would remain, they do partially improve intersection delays and/or queues. The operational improvement intersection LOS calculations are presented in **Appendix B.**

The identified operational improvements only address roadway modifications for vehicle operations. The identified improvements are meant to manage the vehicle queuing and lane utilization present at the North Bayshore gateways and localized congestion. Other modes of travel are studied in other sections of this report and the recommendations from those sections will need to be evaluated relative to these recommendations. Specifically, the proposed improvements could have secondary effects on pedestrian and bicycle travel, especially those that require addition of lanes and roadway widening that could be in conflict with the NBPP's multimodal circulation goals.

Therefore, the City will need to balance the need for operational improvements with the NBPP Master Plan's overall circulation goals and multi-modal strategies. These identified improvements also may require new property acquisition or have other impacts that may not be consistent with current City policies and improvement projects. Identification of these operational improvements should not preclude

[18] The peak-hour signal warrant analysis should not serve as the only basis for deciding whether and when to install a traffic signal. To reach such a decision, the full set of warrants should be investigated based on a thorough study of traffic and roadway conditions by an experienced engineer. The decision to install a signal should not be based solely upon the warrants, since the installation of signals can lead to certain types of collisions. The responsible state or local agency should undertake regular monitoring of actual traffic conditions and accident data and timely re-evaluation of the full set of warrants in order to prioritize and program intersections for signalization.



the City of Mountain View from establishing alternative policies and programs to reduce the severity of the adverse effect on these facilities. Lastly, the final improvement will require coordination among multiple stakeholders to address the practical steps of implementing physical improvements.

identified improvements focus on improving the conflict points between office and residential and the gateway turn movements that most affect the gateway capacity. Many of the improvements are meant to manage the vehicle queuing and lane utilization present at the North Bayshore gateways. Cumulative with Project Conditions NBSPP growth and implementation of the proposed project under Cumulative with Project Conditions, would increase motor vehicle traffic and congestion, resulting in deficient intersection operations at the following locations:

#### 8.1.3.1.1 San Antonio Road Gateway

- Int. 2: San Antonio Rd / US-101 Northbound Ramps (AM peak hour)

#### 8.1.3.1.2 Rengstorff Avenue Gateway

- Int. 4: Rengstorff Ave / US 101 Northbound Ramps (AM and PM peak hour)
- Int. 5: Rengstorff Ave / US 101 Southbound Ramps (AM peak hour)
- Int. 6: Rengstorff Ave / Leghorn St (AM and PM peak hour)

#### 8.1.3.1.3 Shoreline Boulevard Gateway

- Int. 11: Shoreline Blvd / Charleston Rd (AM and PM peak hour)
- Int. 15: Shoreline Blvd / Space Park Wy (AM and PM peak hour)
- Int. 17: Shoreline Blvd / Pear Ave (AM and PM peak hour)
- Int. 18: Shoreline Blvd / La Avenida-US 101 NB Ramps (AM and PM peak hour)
- Int. 21: Inigo Wy / La Avenida St (AM and PM peak hour)

#### 8.1.3.1.4 Other North Bayshore Intersections

- Int. 13: Huff Ave / Plymouth St (AM and PM peak hour)
- Int. 14: Joaquin Rd / Plymouth St (AM and PM peak hour)
- Int. 21: Inigo Wy / La Avenida (AM and PM peak hour)

**Table 27** shows the delay and LOS grade for each deficient intersection under Cumulative with Project Conditions, with and without operational improvements. The table also shows the percentage of NBS Master Plan traffic as a portion of total intersection entering volumes for AM and PM peak hours. These percentages will be used by the City to develop fair share contributions for intersection improvements. Intersections at which operational improvements could benefit adjacent deficient intersection operations are included as well, despite acceptable LOS at those individual intersections, such as the intersection of Shoreline Boulevard and the US 101 Southbound Ramps (Int. 19). Additionally, some intersections that do not have LOS-related improvements under the "Operational Improvements" scenario may report a

different delay than the Cumulative with Project scenario, due to corridor-wide split and offset optimization after an adjacent intersection was altered. This includes the intersections of Charleston Road and Huff Avenue (Int. 9) and Charleston Road and Joaquin Road (Int. 10). Also included are intersections for which the 95th percentile queue lengths exceed the storage capacity during either the AM or PM peak hour – storage recommendations are provided for these conditions. The corresponding LOS calculation sheets are included in **Appendix B** and LOS and queue lengths by approach are included in **Appendix H**. Improvements are described below and are summarized in **Table 25**.

**Table 27: Operational Improvements and Cumulative with Project Conditions LOS**

| Intersection | | Operational Improvements Recommended for Further Study[4] | Peak Hour | NBS MP Fair Share | Cumulative with Project Conditions[3] | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Without Operational Improvements | | With Operational Improvement | |
| | | | | | Delay[1] | LOS | Delay | LOS |
| ***San Antonio Road Gateway*** | | | | | | | | |
| 1 | San Antonio Rd / Bayshore Pkwy | **Intersection Queuing Improvements**<br>Geometric and turn pocket improvements to the NB, EB, and WB approaches | AM<br>PM | 22%<br>30% | 20.9<br>34.4 | C<br>C | 19.4<br>36.2 | B<br>D |
| 2 | San Antonio Rd / US 101 Northbound Ramps | **Intersection LOS Improvements**<br>Lane marking improvements to NB departure<br>**Intersection Queuing Improvements**<br>Turn pocket improvements to the WB approach | AM<br>PM | 17%<br>21% | **123.6**<br>14.1 | **F**<br>B | 37.1<br>14.1 | D<br>B |
| ***Rengstorff Avenue Gateway*** | | | | | | | | |
| 3 | Rengstorff Ave-Amphitheatre Pkwy / Garcia Ave-Charleston Rd | **Intersection LOS Improvements**<br>Geometric improvements to the NB and EB approaches<br>**Intersection Queuing Improvements**<br>Turn pocket improvements to the EB approach | AM<br>PM | 32%<br>39% | 46.8<br>51.1 | D<br>D | 43.0<br>44.4 | D<br>D |
| 4 | Rengstorff Ave / US 101 Northbound Ramps | **Intersection LOS Improvements**<br>Geometric improvements to the NB, EB, and WB approaches<br>**Intersection Queuing Improvements**<br>Turn pocket improvements to the SB, EB, and WB approaches | AM<br>PM | 34%<br>38% | **112.3**<br>**90.1** | **F**<br>**F** | 37.5<br>**58.0** | D<br>**E** |

**Table 27: Operational Improvements and Cumulative with Project Conditions LOS**

| Intersection | | Operational Improvements Recommended for Further Study[4] | Peak Hour | NBS MP Fair Share | Cumulative with Project Conditions[3] | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Without Operational Improvements | | With Operational Improvement | |
| | | | | | Delay[1] | LOS | Delay | LOS |
| 5 | Rengstorff Ave / US 101 Southbound Ramps | **Intersection LOS Improvements** Geometric improvements to the NB and WB approaches **Intersection Queuing Improvements** Turn pocket improvements to the EB and WB approaches | AM<br>PM | 24%<br>24% | **93.6**<br>37.3 | **F**<br>D | 42.6<br>54.1 | D<br>D |
| 6 | Rengstorff Ave / Leghorn St | **Intersection LOS Improvements** Geometric improvements to the EB and WB approaches **Intersection Queuing Improvements** Turn pocket improvements to the NB and SB approaches | AM<br>PM | 17%<br>16% | **68.8**<br>**67.3** | **E**<br>**E** | 38.8<br>31.7 | D<br>C |
| ***Shoreline Boulevard Gateway*** | | | | | | | | |
| 11 | Shoreline Blvd / Charleston Rd | **Intersection LOS Improvements** Geometric improvements to the SB and EB approaches **Intersection Queuing Improvements** Turn pocket improvements to the NB, SB, EB, and WB approaches | AM<br>PM | 30%<br>39% | **72.0**<br>**86.4** | **E**<br>**F** | **73.4**<br>**70.8** | **E**<br>**E** |
| 15 | Shoreline Blvd / Space Park Wy | **Intersection LOS Improvements** Geometric improvements to the NB, SB, and EB approaches and signal phasing improvements, dedicated bus signal phase **Intersection Queuing Improvements** Turn pocket improvements to the NB approach | AM<br>PM | 34%<br>39% | **>120**<br>**>120** | **F**<br>**F** | **>120**<br>**118.1** | **F**<br>**F** |
| 17 | Shoreline Blvd / Pear Ave | **Intersection LOS Improvements** Geometric improvements to the NB and EB approaches and signal phasing improvements, including dedicated bus signal phase | AM<br>PM | 33%<br>39% | **>120**<br>**>120** | **F**<br>**F** | **100.0**<br>**9**<br>**104.5** | **F**<br>**F** |

**Table 27: Operational Improvements and Cumulative with Project Conditions LOS**

| Intersection | | Operational Improvements Recommended for Further Study[4] | Peak Hour | NBS MP Fair Share | Cumulative with Project Conditions[3] | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Without Operational Improvements | | With Operational Improvement | |
| | | | | | Delay[1] | LOS | Delay | LOS |
| 18 | Shoreline Blvd / La Avenida-US 101 Northbound Ramps | **Intersection LOS Improvements** Geometric improvements to the WB approach | AM<br>PM | 33%<br>39% | **>120**<br>**91.9** | **F**<br>**F** | **>120**<br>48.1 | **F**<br>D |
| 19 | Shoreline Blvd / US 101 Southbound Ramps[2] | **Intersection LOS Improvements** Geometric improvements to the SB approach for benefit of upstream intersections, and signal phasing improvements for benefit of transit operations | AM<br>PM | 30%<br>30% | 10.4<br>54.5 | B<br>D | 11.8<br>37.2 | B<br>D |
| ***Other North Bayshore Intersections*** | | | | | | | | |
| 7 | Landings Drive / Charleston Rd | **Intersection Queuing Improvements** Turn pocket improvements to the WB approach | AM<br>PM | 33%<br>40% | 20.9<br>22.3 | C<br>C | 20.9<br>22.3 | C<br>C |
| 8 | Alta Ave / Charleston Rd | **Intersection Queuing Improvements** Turn pocket improvements to the NB and EB approaches | AM<br>PM | 33%<br>40% | 33.6<br>28.4 | C<br>C | 33.6<br>28.4 | C<br>C |
| 9 | Huff Ave / Charleston Rd | **Intersection Queuing Improvements** Turn pocket improvements to the NB and WB approaches | AM<br>PM | 33%<br>40% | 23.0<br>30.5 | C<br>C | 23.0<br>30.1 | C<br>C |
| 10 | Joaquin Rd / Charleston Rd | **Intersection Queuing Improvements** Turn pocket improvements to the NB, EB, and WB approaches | AM<br>PM | 33%<br>40% | 19.0<br>23.9 | B<br>C | 19.2<br>25.2 | B<br>C |
| 13 | Huff Ave / Plymouth St | **Intersection LOS Improvements** Geometric improvements to all approaches and intersection signalization | AM<br>PM | 35%<br>41% | **>120**<br>**>120** | **F**<br>**F** | 26.5<br>28.0 | C<br>C |
| 14 | Joaquin Rd / Plymouth St | **Intersection LOS Improvements** Geometric improvements to all approaches and intersection signalization | AM<br>PM | 37%<br>41% | **>120**<br>**>120** | **F**<br>**F** | 42.8<br>45.3 | D<br>D |
| 21 | Inigo Wy / La Avenida | **Intersection LOS Improvements** Geometric improvements to the NB and EB approaches and intersection signalization | AM<br>PM | 37%<br>41% | **>120**<br>**>120** | **F**<br>**F** | 26.4<br>**57.7** | C<br>**E** |

Notes:

1. Both Cumulative with Project Conditions without Operation Improvements and Cumulative with Project Conditions with Operational Improvements scenarios include coordinated corridor cycle length, split, and offset optimization. For this reason, the delay value for an intersection under the Operational Improvement scenario may be different from that same intersection under the Cumulative with Project scenario, even if that particular intersection does not include delay-affecting (in isolated intersection analysis) operational improvements.
2. The Operational Improvements PM peak hour scenario for Int. 19 includes a dedicated bus signal phase for center bus lane operations. This transit improvement would degrade vehicle LOS, as some cycle time would be reallocated from vehicle phases to the bus-only phase.
3. **Bold** text indicates intersection operations below the applicable level of service standard.
4. Potential operational improvements may have secondary effects on pedestrian and bicycle travel and the City will need to balance the need for operational improvements with the NBPP Master Plan's overall circulation goals before implementing any of the potential operational improvements.

Source: Fehr & Peers, 2023.

While initial feasibility, plan conflict, and right-of-way considerations are provided below, the operational improvements listed in this section will require detailed intersection designs to determine the extent of right-of-way needs, and effects on pedestrian, bicycle and transit facilities, landscaping, trees, and other design considerations. These considerations are discussed in in the italicized bullets below each improvement description. All operational improvements listed in this section should be accompanied by detailed intersection design at the individual project approval phase.

#### 8.1.3.1.5 San Antonio Road Gateway Improvements

The identified operational improvements for the San Antonio Road Gateway listed below should be evaluated in coordination with the current VTA / Caltrans San Antonio/Rengstorff Interchange project (PA & ED Phase). The suggested improvements can be considered for potential inclusion in that PA & ED study. A recommended project (or phases) for these two interchanges will be developed through the PA & ED and will be separately funded.

*Intersection 1: San Antonio Rd / Bayshore Pkwy*

- Intersection LOS Improvements
  - Add a second northbound left-turn lane on San Antonio Road
  - Provide additional northbound right-turn lane on San Antonio Road
  - **Feasibility Considerations and Secondary Effects:**
    - *Lane additions could require additional right-of-way acquisition along that approach for the desired lane width and length of the associated storage pocket and taper. Specific elements of such design should be evaluated in a future study.*
    - *Operational improvements that include lane additions could result in a longer pedestrian crossing distance, removal of landscaping, or other secondary effects on active mobility or streetscape design. Such implications should be the subject of further study by the City, in which the interactions between multimodal mobility and vehicular circulation priorities are evaluated.*

- Intersection Queuing Improvements
  - Extend northbound right turn lane(s) on San Antonio Road to 240 feet (NBPP SEIR Mitigation)
  - Design additional northbound left turn lane(s) on San Antonio Road to have 200 feet of storage capacity
  - Extend eastbound right turn lane on Bayshore Parkway to 300 feet
  - Extend westbound left turn lane on Bayshore Parkway to 200 feet

*Intersection 2: San Antonio Rd / US 101 Northbound Ramps*

- Intersection LOS Improvements
  - Re-stripe northbound departure to align with northbound through and inside northbound right turn lane at Intersection 1 to improve lane utilization on the northbound approach to Intersection 2
- Intersection Queuing Improvements
  - Extend westbound left storage pocket on US 101 Ramps to 400

#### 8.1.3.1.6 Rengstorff Avenue Gateway Improvements

The recommended operational improvements for the Rengstorff Avenue Gateway listed below should be evaluated in coordination with the current VTA / Caltrans San Antonio/Rengstorff Interchange project (PA & ED Phase). The suggested improvements can be considered for potential inclusion in that PA & ED study. A recommended project (or phases) for these two interchanges will be developed through the PA & ED and will be separately funded.

*Intersection 3: Rengstorff Ave-Amphitheatre Pkwy / Garcia Ave-Charleston Rd*

The recommended operational improvements listed below are in addition to, or modifications of, those described in "Charleston Corridor Improvements Phase 2 and 3 (95% Submittal)", as noted in **Appendix G**.

- Intersection LOS Improvements
  - Add a second eastbound left-turn pocket on Garcia Avenue
  - Add a second northbound left-turn pocket on Rengstorff Avenue
  - **Feasibility Considerations and Secondary Effects:**
    - *Lane additions could require additional right-of-way acquisition, reduction in median width, or both, along that approach for the desired lane width and length of the associated storage pocket and taper. Specific elements of such design should be evaluated in a future study.*
    - *Operational improvements that include lane additions could result in a longer pedestrian crossing distance, removal of landscaping, or other secondary effects on active mobility or*

*streetscape design. Such implications should be the subject of further study by the City, in which the interactions between multimodal mobility and vehicular circulation priorities are evaluated.*

- Intersection Queuing Improvements
  - Extend eastbound left-turn pocket(s) on Garcia Avenue to 200 feet
  - Extend eastbound right-turn pocket on Garcia Avenue to 500 feet

*Intersection 4: Rengstorff Ave / US 101 Northbound Ramps*

The recommended operational improvements listed below are in addition to, or modifications of, those described in the "Priority Project Plans, BKF (July 2021)", as noted in **Appendix G**.

- Intersection LOS Improvements
  - Add a second northbound through-only lane on Rengstorff Avenue (resulting in two through lanes and a shared through-right-turn lane)
  - Add a third eastbound left-turn lane on US 101 Ramps
  - Convert eastbound shared through-right-turn lane on US 101 Ramps to a through-only lane and add a right-turn lane with a storage length of 350 feet
  - Add a westbound through lane on Landings Drive
  - **Feasibility Considerations and Secondary Effects:**
    - *Lane additions could require additional right-of-way acquisition, reduction in median width, or both, along that approach for the desired lane width and length of the associated storage pocket and taper. Specific elements of such design should be evaluated in a future study.*
    - *Operational improvements that include lane additions could result in a longer pedestrian crossing distance, removal of landscaping, or other secondary effects on active mobility or streetscape design. Such implications should be the subject of further study by the City, in which the interactions between multimodal mobility and vehicular circulation priorities are evaluated.*
  - **NBPP Consistency Considerations:** *Adding a third eastbound left-turn lane and a second northbound through lane (in addition to a shared through-right-turn lane) would require a third receiving lane on the northbound departure of the intersection, which would result in inconsistency with the NBPP Design Standards for Gateway Boulevards. For Rengstorff Avenue, this standard states, "Up to two lanes each direction plus turn pockets". This implication should be the subject of further study by the City, in which the interactions between Precise Plan goals, multimodal mobility, and vehicular circulation priorities are evaluated.*
- Intersection Queuing Improvements
  - Design new eastbound storage pockets on US 101 Ramps with the maximum storage length feasible, up to 350-feet, extend existing eastbound storage pockets to maximum length feasible, up to 350 feet.

- **Feasibility Considerations:** *As noted in Appendix H, the eastbound left-turn 95th percentile queue length in the AM peak hour is 400 feet; however, extension of the turn pocket past approximately 350 feet is prohibited by the US-101 mainline, thus no feasible improvements exist to accommodate this queue length.*
- Extend westbound left storage pocket on Landings Drive to 350 feet
- Extend southbound right turn storage pocket on Rengstorff Avenue to 400 feet
- **Feasibility Considerations:** *The northbound left turn 95th percentile queue length in the AM and PM peaks hours are 350 feet and 475 feet, respectively. Turn pocket extension to accommodate such queue lengths would require widening of the upstream US-101 bridge and should be considered during a capital improvement project to replace or widen this bridge.*

*Intersection 5: Rengstorff Ave / US 101 Southbound Ramps*

- Intersection LOS Improvements
  - Convert northbound shared through-right-turn lane on Rengstorff Avenue to a through-only lane and add a right-turn pocket with a length of 100 feet
  - Add a second westbound right-turn lane on US 101 Ramps and remove right-turn lane channelization
  - **Feasibility Considerations and Secondary Effects:**
    - *Previous analyses found lane additions to the westbound approach to be physically infeasible due to grade complications. Additionally, while the median on the northbound approach and the channelized right-turn island on the westbound approach may provide space for these lane additions, provision of additional right-of-way could still be necessary.*
    - *Operational improvements that include lane additions could result in a longer pedestrian crossing distance, removal of landscaping, or other secondary effects on active mobility or streetscape design. Such implications should be the subject of further study by the City, in which the interactions between multimodal mobility and vehicular circulation priorities are evaluated.*
- Intersection Queuing Improvements
  - Extend westbound left storage pocket on US 101 Ramps to 375 feet
  - Extend eastbound left storage pocket on US 101 Ramps to 375 feet
  - Extend westbound right turn storage pocket on US 101 Ramps to 375 feet
  - **Feasibility Considerations:**
    - *Exact westbound left storage pocket length should be dictated by availability of space between the intersection and the US 101 mainline, including the necessary lane taper*
    - *The northbound left turn 95th percentile queue length in the AM and PM peaks hours are 100 feet and 200 feet, respectively. Extension of the turn pocket to accommodate these queue lengths is limited by the existing southbound left turn pocket at the intersection of Rengstorff Avenue and Leghorn Street (Int. 6).*

*Intersection 6: Rengstorff Ave / Leghorn St*

- Intersection LOS Improvements
  - Reconfigure eastbound and westbound left-turn lanes on Leghorn Street with a separate left-turn lane and one shared through-right lane with permitted phasing. *(NBPP EIR Mitigation)*
- Intersection Queuing Improvements
  - Extend northbound left-turn storage pocket on Rengstorff Avenue to 375 feet
  - Extend southbound left-turn storage pocket on Rengstorff Avenue to 75 feet

#### 8.1.3.1.7 Shoreline Boulevard Gateway Improvements

The report indicates that even with priority transportation improvements and the NBPP improvements, with the addition of the project traffic, Shoreline Boulevard will operate with deficiencies, particularly during the evening peak hour for the southbound direction. Operations on Shoreline Boulevard indicates a need to develop additional strategies to better manage peak period congestion. A Shoreline Corridor Plan should be developed to develop traffic management strategies. Those strategies, after further evaluation, can be considered for future implementation in conjunction with Master Plan development phases. Funding is needed to develop the Corridor Plan and help fund the improvement strategies.

*Intersection 11: Shoreline Blvd / Charleston Rd*

The recommended operational improvements listed below are in addition to, or modifications of, those described in "Charleston Corridor Improvements Phases 2 and 3 (95% Submittal)", and the "N Shoreline Blvd BRT Lane Extension" plan set, as noted in **Appendix G**.

- Intersection LOS Improvements
  - Convert southbound shared through-right-turn lane on Shoreline Boulevard to a second through-only lane and add a right-turn lane with a 150-foot storage length
  - Convert eastbound shared through-right-turn lane on Charleston Road to right-turn lane
  - **Feasibility Considerations:**
    - *Though this intersection was constructed in 2021, the listed improvements could further improve vehicle operations. Lane additions could require additional right-of-way acquisition, reduction in median width, or both, along that approach for the desired lane width and length of the associated storage pocket and taper. Specific elements of such design should be evaluated in a future study.*
    - *Operational improvements that include lane additions could result in a longer pedestrian crossing distance, removal of landscaping, bikeway modification, transit signal phasing operations, or other secondary effects on active mobility or streetscape design. Such implications should be the subject of further study by the City, in which the interactions between multimodal mobility and vehicular circulation priorities are evaluated.*

- Intersection Queuing Improvements
  - Extend northbound-left turn pocket on Shoreline Boulevard to 450 feet
  - Extend southbound left-turn pocket on Shoreline Boulevard to 250 feet
  - Extend eastbound left-turn pocket on Charleston Road to 325 feet
  - Extend westbound left-turn pocket on Charleston Road to 500 feet by restriping the existing two-way left-turn lane

*Intersection 15: Shoreline Blvd / Space Park Wy*

The recommended operational improvements listed below are in addition to, or modifications of, those described in "Plymouth Street and Space Park Way Realignment Design (65% Plans)", as noted in **Appendix G**.

- Intersection LOS Improvements
  - Add a dedicated bus phase for the northbound bus movement on Shoreline Boulevard during the AM peak hour and southbound bus movement during the PM peak hour
  - Convert northbound shared through-right-turn lane on Shoreline Boulevard to a through-only lane and add a trap right-turn lane to improve northbound through movement operations at Intersection 17
  - Add a second southbound through lane on Shoreline Boulevard
  - Convert eastbound shared through-left-turn lane on Space Park Way to a through-only lane and add a left-turn lane
  - Adjust signal phasing to feature:
    - Protected east-west phasing and an eastbound right overlap phase
  - **Feasibility Considerations and Secondary Effects:**
    - *Lane additions could require additional right-of-way acquisition, reduction in median width, or both, along that approach for the desired lane width and length of the associated storage pocket and taper. Specific elements of such design should be evaluated in a future study.*
    - *Operational improvements that include lane additions could result in a longer pedestrian crossing distance, removal of landscaping, or other secondary effects on active mobility or streetscape design. Such implications should be the subject of further study by the City, in which the interactions between multimodal mobility and vehicular circulation priorities are evaluated.*
  - **NBPP Consistency Considerations**: *Adding a trap northbound right-turn lane, resulting in a third northbound travel lane between Pear Avenue and Space Park Way would result in inconsistency with the NBPP Design Standards for Gateway Boulevards. For Shoreline Boulevard, this standard states, "Two lanes northbound and three southbound from Highway 101 to Plymouth, plus turn pockets."*

- Intersection Queuing Improvements
    - Extend northbound left-turn pockets on Shoreline Boulevard to 400 feet
    - **Feasibility Considerations:** *The northbound left turn queue lengths in the AM and PM peak hours are 500 and 475 feet, respectively. Extension of the turn pocket past approximately 400 feet is limited by the southbound left turn pocket at the intersection of Shoreline Boulevard and Pear Avenue (Int. 17).*

*Intersection 17: Shoreline Blvd / Pear Ave*

The recommended operational improvements listed below are in addition to, or modifications of, those described in "Plymouth Street and Space Park Way Realignment Design (65% Plans)", as noted in **Appendix G**.

- Intersection LOS Improvements
    - Add a dedicated bus phase for the northbound bus movement on Shoreline Boulevard during the AM peak hour and southbound bus movement during the PM peak hour
    - Add a second northbound left-turn lane on Shoreline Boulevard
    - Convert northbound right-turn lane on Shoreline Boulevard to a shared through-right-turn lane
    - Add an eastbound trap right-turn lane on Pear Avenue
    - **Feasibility Considerations and Secondary Effects:**
        - *Lane additions could require additional right-of-way acquisition, reduction in median width, or both, along that approach for the desired lane width and length of the associated storage pocket and taper. Specific elements of such design should be evaluated in a future study.*
        - *Operational improvements that include lane additions could result in a longer pedestrian crossing distance, removal of landscaping, or other secondary effects on active mobility or streetscape design. Such implications should be the subject of further study by the City, in which the interactions between multimodal mobility and vehicular circulation priorities are evaluated.*
- Intersection Queuing Improvements
    - **Feasibility Considerations:** *The southbound left turn 95th percentile queue length in the AM and PM peaks hours are 225 feet and 125 feet, respectively. Extension of the turn pocket to accommodate these queue lengths is limited by the proposed northbound left turn pocket at the intersection of Shoreline Boulevard and Space Park Way (Int. 15).*

*Intersection 18: Shoreline Blvd / La Avenida-US 101 Northbound Ramps*

The recommended operational improvements listed below are in addition to, or modifications of, those described in the "Priority Project Plans, Caltrans Project 04170003391", as noted in **Appendix G**. These operational improvements should be considered as a future phase of the Shoreline / US 101 Ramp Realignment project.

- Intersection LOS Improvements
  - Add a third westbound left-turn general purpose lane on La Avenida Street
  - **Feasibility Considerations and Secondary Effects:**
    - *Lane additions could require additional right-of-way acquisition, reduction in median width, or both, along that approach for the desired lane width and length of the associated storage pocket and taper. Specific elements of such design should be evaluated in a future study.*
    - *Operational improvements that include lane additions could result in a longer pedestrian crossing distance, removal of landscaping, or other secondary effects on active mobility or streetscape design. Such implications should be the subject of further study by the City, in which the interactions between multimodal mobility and vehicular circulation priorities are evaluated.*
- Intersection Queuing Improvements:
  - **Feasibility Considerations:**
    - *The westbound right turn 95$^{th}$ percentile queue length in the AM and PM peaks hours are 1,125 feet and 675 feet, respectively. Extension of the turn pockets to accommodate these queue lengths would extend upstream of the new intersection of La Avenida Street and the re-aligned US-101 Northbound Off-Ramp (Int. 20). Because most of the westbound right-turning traffic at Intersection 18 is from the northbound left-turn movement at Intersection 20, such a turn pocket extension would not effectively accommodate these queue lengths.*
    - *The northbound right turn 95$^{th}$ percentile queue length in the AM peak hour is 500 feet. Extension of the turn pocket to accommodate this queue length is limited by the upstream bridge over the US-101 mainline.*

*Intersection 19: Shoreline Blvd and US 101 Southbound Ramps*

The recommended operational improvements listed below are in addition to, or modifications of, those described in "Shoreline Boulevard Bus Lane and Utility Improvements", as noted in **Appendix G**. These operational improvements should be considered as a future phase of the Shoreline / US 101 Ramp Realignment project.

- Intersection LOS Improvements
  - Convert the outer southbound through lane on Shoreline Boulevard to a shared through-right-turn lane (channelized) to improve southbound lane utilization along Shoreline Boulevard
  - Add a bus signal phase and bus lane egress for access to US-101
    - The City should further study this improvement as it relates to transit operations (including center lane ingress and egress during the peak hours) along Shoreline Boulevard
    - Inclusion of a dedicated bus signal phase would facilitate center bus lane egress at this intersection. Without this dedicated egress phase, buses destined for the US-101 SB on-

ramps would be subject to the southbound vehicle queue along Shoreline Boulevard during the PM peak hour.

- This improvement would not benefit passenger vehicle operations, as the proportion of non-transit green time each cycle would be decreased to accommodate the bus phase.

Intersection Queuing Improvements

- The eastbound left-turn and right-turn 95th percentile queue lengths are 125 feet and 150 feet in the AM peak hour, respectively, and 150 and 375 feet in the PM peak hour, respectively. While these queue lengths exceed the storage pockets, the US-101 Southbound Off-Ramp provides sufficient storage.

*Intersection 20: US 101 NB Off-Ramp and La Avenida Street*

The recommended operational improvements listed below are in addition to, or modifications of, those described in the "Priority Project Plans, Caltrans Project 04170003391", as noted in **Appendix G**. These operational improvements should be considered as a future phase of the Shoreline / US 101 Ramp Realignment project.

- **Note:** *As noted in Appendix G, this intersection's Priority Improvement geometry will feature a dedicated northbound left-turn bus-only lane. To facilitate movement from this bus lane to the right-turn lanes at the eastbound approach to Shoreline Boulevard, it is recommended that a dedicated bus signal phase be implemented at Int. 20. Because this improvement would facilitate transit operations and would not improve motor vehicle operations, it is not included as an Operational Improvement.*

8.1.3.1.8 Other North Bayshore Intersections

*Intersection 7: Landings Dr / Charleston Rd*

The recommended operational improvements listed below are in addition to, or modifications of, those described in "Charleston Corridor Improvements Phase 2 and 3 (95% Submittal)", as noted in **Appendix G**.

- Intersection Queuing Improvements
  - Extend westbound left-turn pocket on Charleston Road to maximum length possible as feasible given the Permanente Creek Bridge location, up to 180 feet
  - **Feasibility Considerations:**
    - *Left-turn pocket extension would require a reduction in median landscaping area. This effect should be the subject of further study by the City, in which the interactions between streetscape design and vehicular circulation priorities are evaluated.*

*Intersection 8: Alta Ave / Charleston Rd*

The recommended operational improvements listed below are in addition to, or modifications of, those described in "Charleston Corridor Improvements Phase 2 and 3 (95% Submittal)", as noted in **Appendix G**.

- Intersection Queuing Improvements
  - Extend eastbound left-turn pocket on Charleston Road to maximum length possible as feasible given the Permanente Creek Bridge location, up to 250 feet
  - **Feasibility Considerations:** *Left-turn pocket extension would require a reduction in median landscaping area. This effect should be the subject of further study by the City, in which the interactions between streetscape design and vehicular circulation priorities are evaluated.*
  - Extend eastbound right-turn pocket on Charleston Road to 300 feet
  - Extend northbound left-turn pocket on Alta Avenue to 240 feet
  - **Feasibility Considerations:** *Extending right-turn pockets along Charleston Road would result in a decreased dedicated bus lane length. This effect should be the subject of further study by the City, in which the interactions between transit operations and vehicular circulation priorities are evaluated.*

*Intersection 13: Huff Ave / Plymouth St*

- Intersection LOS Improvements
  - Reconfigure lane geometry to feature:
    - Southbound: One left turn lane and one right turn lane
    - Eastbound: One left turn lane and one through-only lane
    - Westbound: One right turn lane and one through-only lane
  - Signalize intersection with protected phasing
  - **Feasibility Considerations and Secondary Effects:**
    - *Lane additions could require additional right-of-way acquisition along that approach for the desired lane width and length of the associated storage pocket and taper. Specific elements of such design should be evaluated in a future study.*
    - *Operational improvements that include lane additions could result in a longer pedestrian crossing distance, removal of landscaping, or other secondary effects on active mobility or streetscape design. Such implications should be the subject of further study by the City, in which the interactions between multimodal mobility and vehicular circulation priorities are evaluated.*
- Intersection Queuing Improvements
  - Turn pockets should be designed with the following storage lengths:
    - Southbound left: 525 feet
    - Eastbound left: 225 feet
    - Westbound right: 500 feet

*Intersection 14: Joaquin Rd / Plymouth St*

The recommended operational improvements listed below are in addition to, or modifications of, those described in "Plymouth Street and Space Park Way Realignment Design (65% Plans)", as noted in **Appendix G**.

- Intersection LOS Improvements
  - Reconfigure lane geometry to feature:
    - One left-turn lane and one shared through-right-turn lane on all approaches
  - Signalize intersection with protected phasing
  - **Feasibility Considerations and Secondary Effects:**
    - *Lane additions could require additional right-of-way acquisition along that approach for the desired lane width and length of the associated storage pocket and taper. Specific elements of such design should be evaluated in a future study.*
    - *Operational improvements that include lane additions could result in a longer pedestrian crossing distance, removal of landscaping, or other secondary effects on active mobility or streetscape design. Such implications should be the subject of further study by the City, in which the interactions between multimodal mobility and vehicular circulation priorities are evaluated.*
- Intersection Queuing Improvements
  - Left turn pockets should be designed with the following storage lengths
    - Northbound: 450 feet
    - Southbound: 425 feet
    - Eastbound: 350 feet
    - Westbound: 150 feet

*Intersection 21: Inigo Wy / La Avenida*

The recommended operational improvements listed below are in addition to, or modifications of, those described in the "Priority Project Plans, Caltrans Project 04170003391", as noted in **Appendix G**. These operational improvements should be considered as a future phase of the Shoreline / US 101 Ramp Realignment project.

- Intersection LOS Improvements
  - Add a second eastbound left-turn lane on La Avenida Street with a 100-foot storage pocket
  - Convert the northbound shared left-through-right-turn lane on Inigo Way to a shared through-right-turn lane and add a left-turn lane
  - Signalize the intersection with split phasing on all approaches.

- **Feasibility Considerations and Secondary Effects:**
  - *Lane additions could require additional right-of-way acquisition along that approach for the desired lane width and length of the associated storage pocket and taper. Specific elements of such design should be evaluated in a future study.*
  - *Operational improvements that include lane additions could result in a longer pedestrian crossing distance, removal of landscaping, or other secondary effects on active mobility or streetscape design. Such implications should be the subject of further study by the City, in which the interactions between multimodal mobility and vehicular circulation priorities are evaluated.*

- Intersection Queuing Improvements
  - **Feasibility Considerations:** *The eastbound left turn 95th percentile queue length in the PM peak hour is 300 feet. Extension of the turn pocket to accommodate this queue length is limited by the upstream intersection of La Avenida Street and the re-aligned US-101 Northbound Off-Ramp*

## 8.2 Storage Pocket Recommendations

A standard storage pocket length analysis was completed at Charleston Road to identify recommendations for left-turn storage pocket lengths. The storage pocket evaluation considered available block length (right-turn pockets), available median space (left-turn pockets), dedicated transit lane considerations on Charleston, and peak hour 95$^{th}$ percentile queuing from the results of the Adverse Effects and Improvements analysis in Section 8.1.3 of this document. Left-turn storage pocket length recommendations were prepared for Charleston Road at the following intersections:

- Int. 8: Alta Ave / Charleston Rd
- Int. 9: Huff Ave / Charleston Rd
- Int. 10: Charleston Rd / Joaquin Rd

It should be noted that any additional length provided to right-turn storage pockets beyond that planned for in *Charleston Corridor Improvements Phase 2 and 3 (95% Submittal)* would reduce the length of the dedicated bus lane. This effect should be the subject of further discussion by the City, in which the interactions between transit operations and vehicular circulation priorities are evaluated.

All six Charleston Road approaches evaluated in this analysis are planned to feature left- and right-turn pockets and no through pockets. Therefore, the 95$^{th}$ percentile queues for through movements are not presented in **Table 28,** but are included in **Appendix I**. **Table 28** summarizes the recommended storage pocket lengths for intersections 8, 9, and 10.

## Table 28: Storage Pocket Length Recommendations

| Int. | Major Street | Minor Street | Approach | Movement | 95th Percentile Queue (ft)[1,2] | Planned Storage Pocket Length (ft)[2] | Available Space (ft)[3, 4, 5] | Recommended Storage Pocket Length (ft) |
|---|---|---|---|---|---|---|---|---|
| 8 | Charleston Road | Alta Avenue | EB | Left | 250 | 50 | 700 | 250 |
| | | | | Right | 300 | 65 | 500 | 300 |
| | | | WB | Left | 50 | 180 | 425 | 180 |
| | | | | Right | 50 | 100 | 580 | 100 |
| 9 | Charleston Road | Huff Avenue | EB | Left | 50 | 120 | 360 | 120 |
| | | | | Right | 50 | 100 | 580 | 100 |
| | | | WB | Left | 100 | 140 | 390 | 140 |
| | | | | Right | 175 | 40 | 530 | 175 |
| 10 | Charleston Road | Joaquin Road | EB | Left | 100 | 80 | 350 | 100 |
| | | | | Right | 125 | 25 | 530 | 125 |
| | | | WB | Left | 150 | 75 | 290 | 150 |
| | | | | Right | 25 | 75 | 575 | 75 |

Notes:

1. 95th percentile queues reported are the longer of the AM and PM Peak Hour queue for that movement, rounded up to the next 25 foot increment. Full Synchro 11 queue reports are included in Appendix I.
2. Planned storage pocket lengths are drawn from Charleston Corridor Improvements Phase 2 and 3 (95% Submittal), sheets PD-9, PD-10, and PD-12. The reported length is the length of the solid white line for that pocket, rounded up to the nearest multiple of 5, as actual storage exceeds the line length.
3. Available space for right-turn pockets consider block length and left-turn pockets consider median length.
4. While right-turn pocket available space considers the entire block length to the upstream intersection, utilizing any additional available length beyond the planned pocket for vehicle storage will decrease the length of the bus-only lane.
5. Available space for left-turn pockets considers the maximum length that could be accommodated for that approach exclusively. However, the WBL to Alta Ave and EBL to Huff Ave, the EBL to Joaquin Rd and WBL to Huff Ave, and the EBL to Shoreline Blvd and the WBL to Joaquin Rd share the same median, thus, the left-turn pocket availability for the particular approaches of each pair are inter-dependent. Block lengths are measured from the stop bar to the following upstream intersections (a point flush with the opposite direction's stop bar)
    - EB at Alta Ave: Landings Dr
    - WB at Alta Ave: Huff Ave
    - EB at Huff Ave: Alta Ave
    - WB at Huff Ave: Joaquin Rd
    - EB at Joaquin Rd: Huff Ave
    - WB at Joaquin Rd: Shoreline Blvd

Source: Fehr & Peers, 2023.

## 8.3 Intersection Control Recommendations

Intersection control recommendations were prepared for all NBS Master Plan internal intersection. These recommendations evaluated useable sidewalk space, driveways, pedestrian scale lighting, street trees and landscaping, vehicular speed. Intersection control evaluation considered the following factors:

- Major and minor street volume
- *2014 California Manual on Uniform Traffic Control Devices* (CA MUTCD) Peak Hour Signal Warrant criteria
- Modal priority under the NBPP
- Pedestrian and bicycle safety (crossing distance)

For internal intersections that are NBS MTA study intersections, the results of the Adverse Effects and Improvements analysis described in Section 8.1.3 of this document were considered to inform the intersection control recommendations. These intersections include Plymouth Street and Huff Avenue (Int. 13) and Plymouth Street and Joaquin Road (Int. 14).

### 8.3.1 Volume and Peak Hour Signal Warrant Analysis

Using roadway counts and volumes from the *North Bayshore Precise Plan Transportation Impact Analysis* (July 2017), the *North Bayshore Circulation Study* (December 2021), and Chapter 5 of this document, signal warrants for the following intersections were prepared to inform the intersection control recommendations:

- Inigo Way / Charleston Rd (new intersection)
- Manzanita St / Charleston Rd (new intersection)
- Huff Ave / Plymouth Street (Int. 13)
- Joaquin Rd / Plymouth St (Int. 14)
- Inigo Wy / Shorebird Wy (new intersection)

Signal warrant analysis is intended to examine the general correlation between the planned level of future development and the need to install new traffic signals. It estimates future development-generated traffic compared to a sub-set of the standard traffic signal warrants recommended in the *2014 California Manual on Uniform Traffic Control Devices* (CA MUTCD) guidelines. While satisfying one or more of the warrants could justify the installation of a new signal at an intersection, the analysis does not serve as the only basis for deciding whether and when to install a signal. Ultimately, the City will determine the necessity of any new traffic signals based on warrants, other related factors, and/or an engineering study.

MTA internal intersection control evaluation utilized Warrant 3B, which considers peak hour major and minor street volumes and the number of approach lanes. The detailed signal warrant analysis, including volumes and number of approach lanes is included in **Appendix J**.

Table 29 summarizes the recommended intersection control for the intersections of Inigo Way and Charleston Road (new intersection), Manzanita Street and Charleston Road (new intersection), Huff Avenue and Plymouth Street (Int. 13), Joaquin Road and Plymouth Street (Int. 14), and Inigo Way and Shorebird Way (new intersection). Intersection control recommendations for all internal intersections are included in **Figure 27**.

**Table 29: Intersection Control Recommendations**

| Major Street | Minor Street | Peak Hour | Traffic Volume[1] | | Meets Peak Hour Signal Warrant? [2] | Control Recommendation |
|---|---|---|---|---|---|---|
| | | | Major Street | Minor Street | | |
| Charleston Road | Inigo Way | AM | 329 | 158 | No | Roundabout[3] |
| | | PM | 553 | 144 | No | |
| Charleston Road | Manzanita Street | AM | 320 | Ped/Bike Only | No | Uncontrolled; Enhanced Pedestrian Crossing |
| | | PM | 650 | Ped/Bike Only | No | |
| Plymouth Street | Huff Avenue | AM | 1,320 | 370 | **Yes** | Signal |
| | | PM | 1,220 | 400 | **Yes** | |
| Plymouth Street | Joaquin Road | AM | 1,080 | 380 | **Yes** | Signal |
| | | PM | 1,390 | 440 | **Yes** | |
| Shorebird Way | Inigo Way | AM | 193 | 252 | No | AWSC |
| | | PM | 137 | 257 | No | |

Notes:

1. Intersection volumes are from the following sources:
   a. Charleston Rd / Inigo Way, Shorebird Wy / Inigo Wy: North Bayshore Circulation Study Google MP Demands with Rengstorff Ramp Realignment Scenario
   b. Charleston Rd / Manzanita St: North Bayshore Precise Plan EIR Year 2030 Cumulative with Project Scenario
   c. Plymouth St / Huff Ave, Plymouth St / Joaquin Rd: NBS MTA Cumulative Conditions traffic forecasts, as described in Chapter 5 of this document
2. Peak hour warrant analysis utilized California MUTCD 2014 Section 4C.04 Warrant 3B, Peak Hour.
3. The intersection of Charleston Road and Inigo Way is proposed to be a roundabout, as noted in the North Bayshore Framework Master Plan, December 2022. Installation of a roundabout requires further evaluation and may require additional right-of-way.

Source: Fehr & Peers, 2023.

## 8.4 Operational Improvements at Rengstorff and Shoreline Gateways

The planned North Bayshore transportation improvements are important street improvements that enhance operational conditions for vehicles, improve local circulation, and/or enhance active transportation. This section provides annotated comments on the priority transportation improvements for the following design documents along Shoreline Boulevard between US 101 and Charleston Road, and along Rengstorff Avenue between US 101 and Charleston Road.[19]

Section 8.1.3 identifies operational improvements, which consist of opportunities to improve capacity-related deficient vehicular operation, including delay and queueing. Those operational improvements in Section 8.1.3 describe lane configuration, signal phasing, and storage pocket length modification considerations. Section 8.4 provides comments and recommendations which include multimodal operations, such as transit, pedestrian, and bicycle mobility safety considerations, and more detailed signage and striping opportunities than are relevant to the capacity evaluation in Section 8.1.3. Furthermore, while the operational improvements listed in Section 8.1.3 consider addition to or modification of the following plan sets, Section 8.4 provides comments on specific design elements of those plan sets. Although related, the recommendations in Sections 8.1.3 and 8.4 provide discrete context and are not mutually-inclusive, they present various options depending on City priorities and discussion. Additionally, some recommendations in this section could require additional right-of-way acquisition and should be the subject of further evaluation by the City for final plan design.

These recommendations review the following documents:

- Plymouth Street Realignment: Plymouth Space Park Exhibit Option – 1A (BKF, July 2020)
- 100% Submittal of Shoreline Boulevard Bus Lane (Mark Thomas, August 2020)
- US 101 Ramp Realignment (AECOM, August 2020)
- Charleston Corridor Improvements Phase 2 & 3 (Mark Thomas, November 2019)
- Rengstorff Avenue/Landings Drive/US 101 NB Ramps (BKF, July 2021)

The annotated comments for each of the priority transportation improvement design documents are consolidated in **Figure 28**, noted with the priority improvement plan described below. Annotated comments and recommendations for each design document are as follows:

*Plymouth Street Realignment: Plymouth Space Park Exhibit Option – 1A (BKF, July 2020)*.

Per Figure 28, this design can be refined with the following recommendations, which should be further evaluated in future studies:

[19] These designs are interim and final designs have not been refined.

Signing and Striping Opportunities

1. In the near term, eliminate the merge lane on the northbound intersection departure and convert to a bus-only lane. In the long-term, convert this bus-only lane and the median to an extension of the center-reversible bus lane, eventually terminating at Charleston Road (Circulation Study ID C-10)
2. Install "Do Not Block Intersection" signage and striping to disallow blockage of the reversible bus lane entrance.
3. Should the bus lane stop at Space Park Way, the northbound buses will share the same vehicle phase as northbound through vehicles. The merge needs to be redesigned to avoid sideswipes at merge.

Lane Configuration Opportunities (also described in Section 8.1.3)

1. Convert northbound right-turn lane at Pear Avenue to a shared through-right-turn lane to increase northbound through capacity and extend north to Space Park Way, terminating as a trap right-turn lane.
2. Reconfigure eastbound approach to the intersection of Shoreline Boulevard and Space Park Way from a shared through-left turn lane and a right turn lane to a left turn lane, through lane, and right turn lane.
3. Add a second southbound and northbound through-only lane at the intersection of Shoreline Boulevard and Space Park Way.
4. Add a dedicated right turn lane to the eastbound approach to the intersection of Shoreline Boulevard and Pear Avenue.

Signal Phasing Opportunities (also described in Section 8.1.3)

1. Covert to east-west protected phasing and an eastbound right-turn overlap with the northbound left-turn phase.

Transit Operation Opportunities

1. Include a bullnose and pedestrian island (6-foot minimum) at the end of the median bus platform on the southbound approach.
2. Two separate boarding islands should be included at Space Park Way to facilitate bidirectional travel within the reversible lane.
    - The northbound median bus boarding island would be located just north of the intersection within roadway alignment for the dual northbound left turn lanes.
    - The southbound median bus boarding island would be located just south of the intersection.
3. Utilize the median island on the southbound departure for transit boarding and alighting.
4. Replace the existing curbside bus stop with median island at Pear Avenue.

*100% Submittal of Shoreline Boulevard Bus Lane (Mark Thomas, August 2020).*

Per Figure 28, this design can be refined with the following recommendations, which should be further evaluated in future studies:

Lane Configuration Opportunities (also described in Section 8.1.3)

1. Convert northbound right-turn lane at Pear Avenue to a shared through-right turn lane to increase northbound through capacity and extend north to Space Park Way, terminating as a trap right-turn lane (same as comment for Plymouth Street Realignment: Plymouth Space Park Exhibit Option – 1A (BKF, July 2020)).

*US 101 Ramp Realignment (AECOM, August 2020).*

Per Figure 28, this design can be refined with the following recommendations, which should be further evaluated in future studies:

Transit Operation Opportunities

1. Provide bus-only phasing so that buses can turn right at Shoreline Boulevard.

Lane Configuration Opportunities (also described in Section 8.1.3)

1. Add a third westbound left turn lane to the intersection of Shoreline Boulevard and La Avenida Street.
2. Add a southbound shared through-right turn lane at the intersection of Shoreline Boulevard and US-101 Southbound Ramps.

Signing and Striping Opportunities

1. The La Avenida westbound lanes should be striped to align with the left-turn lanes at Shoreline Boulevard and not the right-turn lanes at Shoreline Boulevard.

*Charleston Corridor Improvements Phase 2 & 3 (Mark Thomas, November 2019).*

Per Figure 28, this design can be refined with the following recommendations, which should be further evaluated in future studies:

Signing and Striping Opportunities

1. The northbound right turns from Rengstorff Avenue to Charleston Road should include a no right-turn-on-red condition to allow for protected bicycle movements.

Storage Pocket Opportunities (also described in Section 8.1.3)

1. Consider a 500-foot storage pocket for the eastbound right-turn lane from Garcia Avenue to Rengstorff Avenue.

*Rengstorff Avenue/Landings Drive/US 101 NB Ramps (BKF, July 2021).*

Per Figure 28, this design can be refined with the following recommendations, which should be further evaluated in future studies.

Storage Pocket Opportunities (also described in Section 8.1.3)

1. The new northbound off-ramp should consider two off-ramp lanes and include at least an equivalent amount of vehicle storage as the direct off-ramp and loop off-ramp it is replacing, with three left turn lanes, two through lanes, and a right turn lane at the intersection approach.

Lane Configuration Opportunities (also described in Section 8.1.3)

1. Add an additional westbound through lane and an additional northbound through lane.

While the NBS Master Plan provides vehicle circulation throughout the site, we recommend the NBS Master Plan:

1. Provide larger transit stops along the segment of Shoreline Boulevard south of Space Park Way to address the potential conflicts between office and residential vehicles on Shoreline Boulevard during the peak hour periods. Increase the length of the bus stop, so it does not impede vehicle traffic and provides enough space for transit riders.
2. Provide vehicle right-of-way (ROW) in the northbound direction along the segment of Shoreline Boulevard between Pear Avenue and Space Park Way to account for additional storage capacity. This is consistent with the NBPP, which states that additional right-of-way can be provided along Shoreline Boulevard to accommodate site specific conditions. However, because the NBS Master Plan provides a general level of detail of the land use and transportation network, there may be a need to conduct additional transportation analysis during the PCP (Planned Community Permit) stage or post-construction phase and may require subsequent site specific transportation analysis to ensure that the roadway network and the project sites are designed and built to the City's specifications. In this future phase, reference the VTA Bus Stop & Passenger Design Criteria and Guidelines for bus stop sizing.

Because the NBS Master Plan provides a general level of detail of the land use and transportation network, there will be a need to conduct additional transportation analysis during the PCP (Planned Community Permit) stage and may require subsequent site specific transportation analysis to ensure that each mode of travel and the project site are designed and built to the City's specifications.


Source: North Bayshore Framework Master Plan (Plan 4.1.2 Land Use (Core Master Plan Area), December 2022)

North Bayshore Precise Plan Boundary

City of Mountain View

Signalized Intersection

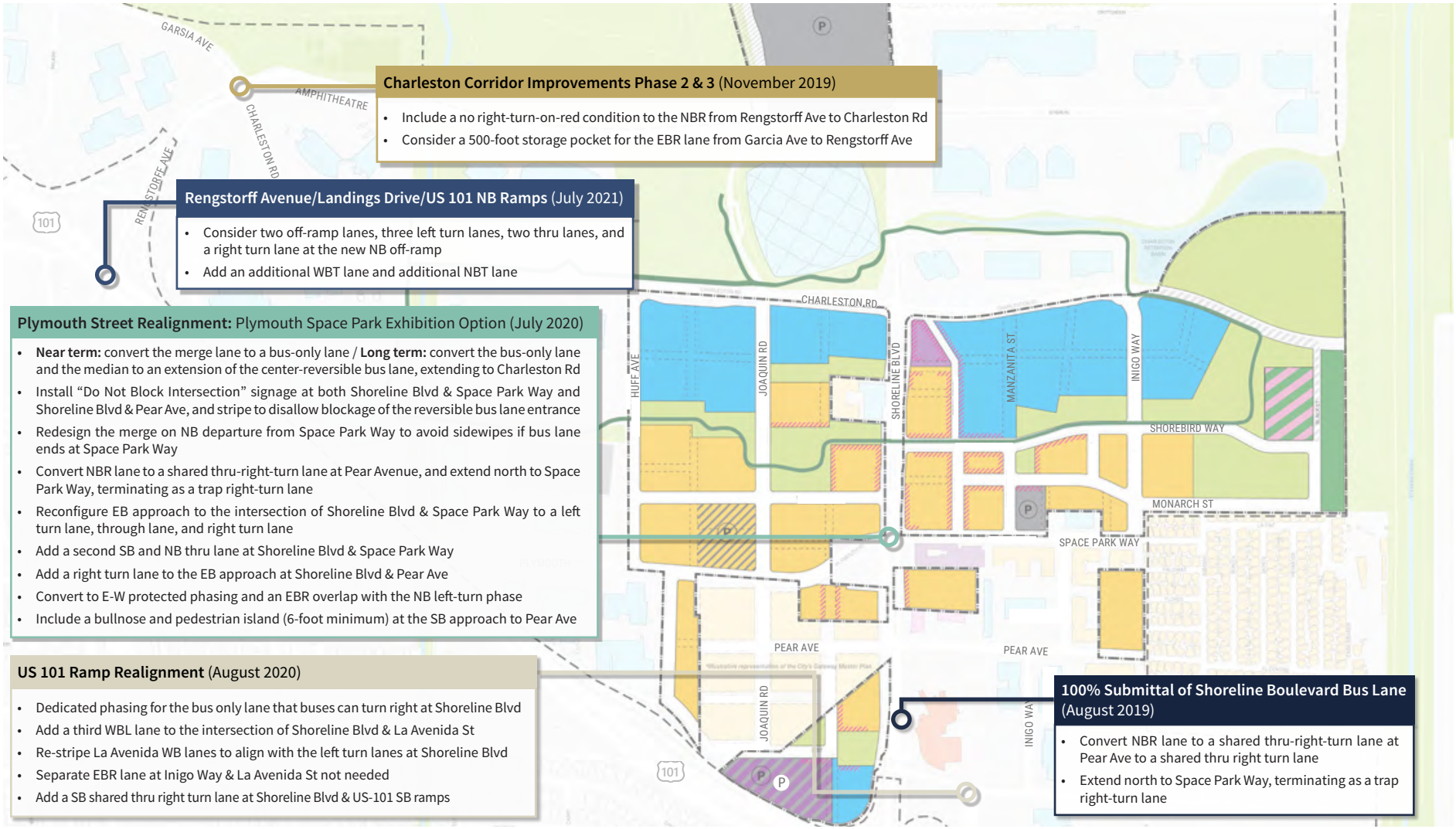
All-Way Stop Control

Side-Street Stop Control

Roundabout

Figure 27

## Intersection Control Recommendations




Source: North Bayshore Framework Master Plan Frame Work (March 2022)

Figure 28

# Operational Improvements at Rengstorff and Shoreline Gateways

# 9. Traffic Calming

The NBS Master Plan will develop a dense and flexible street grid that allows for safe travel for all modes through the site. The new street grid will include new or retrofitted complete streets, pedestrian pathways, and multi-use trails integrated with the existing street network.

To enhance mobility and walkability within the NBS Master Plan site, a series of new complete streets designed with a multi-modal focus will be added to the existing street grid. The new complete streets include access streets, neighborhood streets, and service streets. They will serve adjacent lands uses and include traffic calming features identified in the NBPP as summarized below:

- Access streets, which will serve most of the driveways and parking entrances in the NBS Master Plan area, deliver auto traffic from gateway boulevards to various parking lots near office, retail, and residential buildings. Traffic calming features on new access streets include low design speeds, between 15 and 25 mph, minimum 5' sidewalk with 5' landscape buffer, and minimum 6' bike lane with 3' buffer. **Figure 29** shows a cross-section of Plymouth Street west of Huff Avenue. The characteristics of the cross-section align with the NBPP design standards for access streets.
- Neighborhood streets are streets at the front door of office, retail, and residential buildings, in addition to on-site parking lots that provide access to and from Shoreline Boulevard. Traffic calming features on new neighborhood streets include minimum 6' bike lane and 3' buffer. **Figure 30** shows a cross-section of Joaquin Street. The characteristics of the cross-section align with the NBPP design standards for neighborhood streets.
- Access Streets are residential or service-oriented streets with spaces for emergency vehicle access, loading, delivery, and pick-up. Traffic calming features on new service streets include a low design speed of 15 mph and raised crosswalk at the intersections between pedestrian passageways and shared travel lanes.

In addition to adding new streets, the NBS Master Plan will retrofit several existing streets to increase the visibility of pedestrians and bicyclist, shorten crossing distances for pedestrians and bicyclist, and/or slow the speed of vehicles at mid-block and at intersections using traffic calming treatments, such as curb extensions, raised crosswalks or protected intersections, roundabouts, and tighter curb returns. Shorebird Way will be converted from a two-way street into a one-way eastbound street to limit vehicle volume. A segment of the Shorebird Way right-of-way will be closed seasonally to limit volumes and provide space for native plants and wildlife.

The NBS Master Plan adds new pedestrian pathways, bicycle paths, and multi-use trails in the new grid system to provide pedestrian and bicycle connections between streets and active use areas that generate ground-floor activities. This includes the Green Loop that provides pedestrian and bicycle connections within the NBS Master Plan area as well as the nearby trails and parks, the Social Spine that provides space for active uses and pedestrian connections within Shorebird, and a network of new off-street paths. While there is congestion at the gateways in North Bayshore, there is a low likelihood for cut-through

traffic in the NBS District. The City's Neighborhood Traffic Management Program (NTMP) guidelines set guidelines to establish if the amount of cut-through traffic exceeds the NTMP criteria.

## 9.1 Adverse Effect Evaluation

As shown in **Table 5** and listed below, there are three adverse effects criteria for the traffic calming and neighborhood intrusion evaluation:

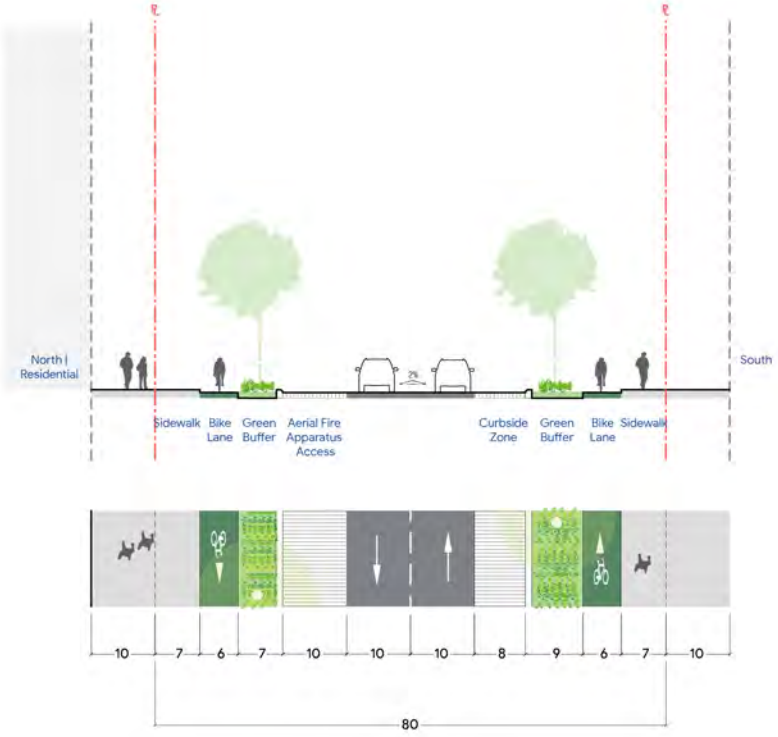
- Criterion #7: A project meets the threshold set by the City's adopted Neighborhood Traffic Management Program (NTMP).
- Criterion #8: Traffic calming devices or other traffic control is identified in an adopted plan.
- Criterion #9: In conformance with the City's Vision Zero Policy, projects proactively implement traffic calming devices to meet the City's multi-modal and safety goals.

Criterion 7 considers a project to have an adverse effect if it meets the threshold set by the City's adopted NTMP, which is "[a]n increase of up to 25% of existing vehicles or 500 vehicles per day, whichever is less, would trigger an automatic analysis of that street." This project generates more than 500 vehicle trips per day, but this is a much larger area than the guidance and the local streets within the project area are anticipated to serve low volume local traffic. The project is not applicable to this criterion.

Criterion 8 considers a project to have an adverse effect if traffic calming devices or other traffic control is identified in an adopted plan. While the project describes proposed improvements to enhance pedestrian and bicycle mobility, traffic control devices are recommended in the Motor Vehicle Operations section. The project is not considered to have an adverse effect based on criterion 8.

Criterion 9 requires a project to conform with the City of Mountain View's Vision Zero Policy (codified in Council Policy K-24 and dated December 10, 2019) by proactively implementing traffic calming devices to meet the City's multi-modal and safety goals. As mentioned previously, the project proposes to design streets with traffic calming features built in; as a result, the project is not considered to have an adverse effect based on criterion 9.

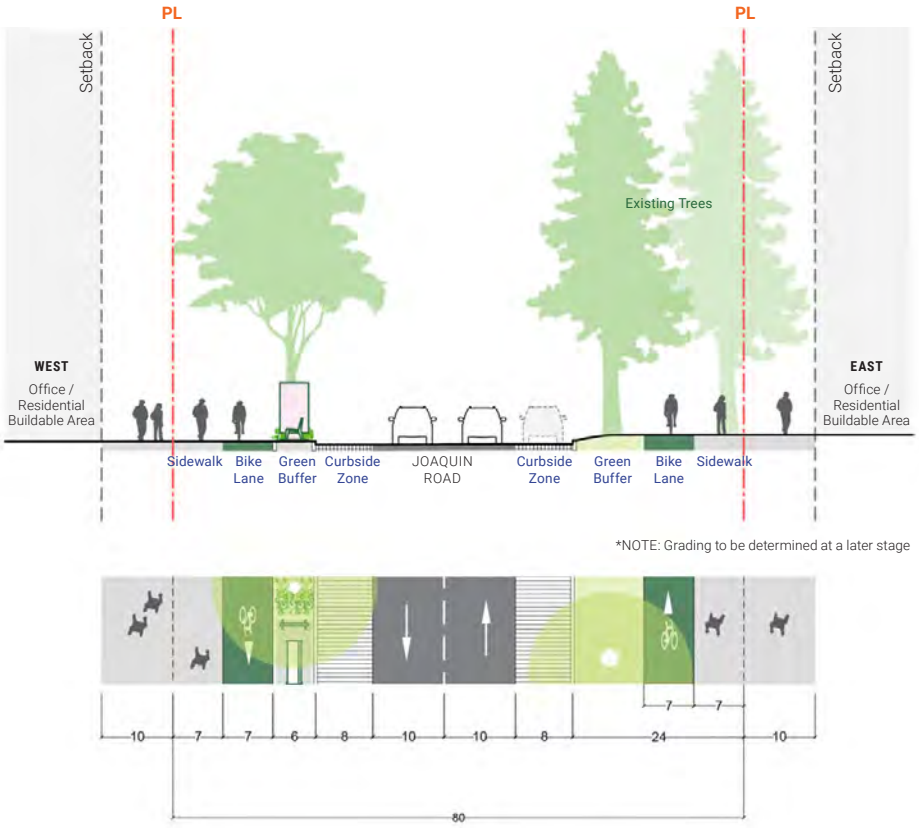
The NBS Master Plan provides a general level of detail of the land use and transportation network; thus, there may be a need to conduct additional transportation analysis during the PCP (Planned Community Permit) stage or post-construction phase and may require subsequent site specific transportation analysis to ensure that the roadway network and the project sites are designed and built to the City's specifications.




Source: North Bayshore Framework Master Plan (Figure 6.1.13 Plymouth Street Section, September 2022)

Figure 29

## Cross-section of Plymouth Street




Source: North Bayshore Framework Master Plan (Figure 6.1.7 Joaquin Street (North of Monarch), December 2022)

Figure 30

# Cross-section of Joaquin Street

# 10. Pedestrian Operations

The pedestrian operations analysis presented in this chapter references existing pedestrian facilities and environment; summarizes the primary walking routes between residential, office, retail, and public uses in the NBS Master Plan; evaluates the Pedestrian Quality of Service (PQOS) within one-half-mile of the pedestrian study area; and identifies potential pedestrian-oriented improvements.

## 10.1 Existing Conditions

As described in the Existing Condition section, most streets in the pedestrian areas include at least a four-foot-wide sidewalk. Meandering sidewalks buffered from the roadway by landscaping exist along the gateway boulevards: Amphitheatre Parkway, North Shoreline Boulevard, and Charleston Road. Existing multi-use pathways within or near the pedestrian study area include Stevens Creek Trail, Permanente Trail, and the Green Loop. There are a few sidewalk gaps within the NBS Master Plan area, including along Pear Avenue west of Shoreline Boulevard, Shorebird Way south of Charleston Road, Stierlin Court, and Crittenden Lane, as shown on **Figure 7.**

### 10.1.1 Existing Conditions Pedestrian Quality of Service

Pedestrian Quality of Service (PQOS) is rated from 1 to 5, with 1 being the best quality and 5 the lowest. *AccessMV* provides PQOS maps and methodology that use a combination of WalkScore, Missing Sidewalks, Posted Speed Limits, and Road Type to determine pedestrian quality. This assessment focuses on key factors affecting walkability including the presence or absence of continuous sidewalks. Based on the PQOS evaluation from *AccessMV*, the existing quality of service for the NBS Master Plan site ranges between a PQOS 4 and PQOS 5 (refer to the Pedestrian Quality of Service on **Figure 31** from *AccessMV*). These results are shown in **Table 31** for the NBS Master Plan area and the NBPP boundary. **Table 30** defines the Pedestrian Quality of Service methodology from *AccessMV*.

**Table 30: Pedestrian Quality of Service Criteria**

| Criterion | Description |
|---|---|
| WalkScore | WalkScore data identifies whether a location has nearby amenities, a high density of intersections, and short block lengths, which indicate it is comfortable for pedestrians. Streets with high WalkScores were given initial high PQOS scores as part of this analysis. |
| Missing Sidewalk | PQOS scores were increased by 1 for any street without sidewalks on both sides, indicating a worse quality of service for pedestrians. |
| Posted Speed Limit | Speed limit data impacts QOS scores by modeling the detrimental impact that high-speed traffic has on pedestrian comfort. Posted speed limits <30 MPH have no impact on QOS; speed limits between 30-34 MPH increase QOS scores by 1; speed limits above 35 MPH increase QOS scores by 2. |
| Road Type | Divided roads with more than 4 motor vehicle travel lanes and undivided roadways with more than 3 motor vehicle lanes increase PQOS scores by 1. |

Source: AccessMV, 2022.

## 10.2 Project Conditions

The proposed plan encourages pedestrian mobility through new streets and mid-block connections, which will enhance the pedestrian experience by reducing the scale of the urban grid to create a dense and flexible network and providing safe and direct pedestrian connections to neighborhood services, places of work, residences, amenities, parks and open space, and transit facilities. Sidewalks and paths will be interconnected, which offers direct routes and paths. The proposed Green Loop, a 1.7 mile, 12-foot-wide multi-use trail network, will be a vital component of a bicycle- and pedestrian-friendly North Bayshore. The Social Spine in Shorebird creates a pedestrian-only route through the site.

Within the pedestrian study area, a portion of Charleston Road and Shoreline Boulevard is defined by the NBPP as a transit boulevard, which prioritizes transit and shuttles over other modes of transportation. Walking paths and distances to the transit stops on Charleston Road and Shoreline Boulevard are summarized below:

- The primary walking paths to the transit stop on Charleston Road west of Shoreline Boulevard include the sidewalks along Joaquin Road, Shoreline Boulevard, and Charleston Road. The stop is within a 5-minute walk from Charleston East and Charleston Parks and a 10-minute walk from most of the office buildings in the Joaquin North neighborhood.
- The primary walking paths to the transit stop on Charleston Road east of Shoreline Boulevard include the sidewalks along Shoreline Boulevard and Charleston Road and the pedestrian pathway along the Social Spine. The stop is within a 5-minute walk from majority of the office developments within the Shorebird neighborhood.
- The primary walking paths to the transit stop on Shoreline Boulevard include sidewalks along Shoreline Boulevard and the portion of the Green Loop south of Charleston Road. The stop is within a 15-minute walk from majority of office developments in the NBS Master Plan area.

The Amphitheatre (SA-P-1) district parking north of Charleston Road and east of Shoreline Boulevard is the primary office parking location within the NBS Master Plan area. Marine Way (MW-P-1 & MW-P-2) would serve some office, but with a multi-modal center, employees and visitors would reach the NBS Master Plan core most likely by transit or bicycle. Primary walking paths for office workers traveling to the district parking location include Shoreline Boulevard, Inigo Way, Charleston Road, and the Green Loop. The district parking is within a 5-minute walk from Charleston East and a 15-minute walk from the majority of the office buildings within Shorebird and Joaquin North. **Figure 32** shows destinations within a 5-minute walk of the NBS Master Plan's geographic center.

The majority of the ground-floor activities within the pedestrian study area are generated at the frontage of active use area along Shorebird Way, Monarch Street, and the Social Spine. Pedestrian facilities are provided for pedestrians traveling from office and residential buildings to active use areas.

### 10.2.1 Project Conditions Pedestrian Quality of Service

This assessment focuses on key factors affecting walkability including the presence or absence of continuous sidewalks. The proposed NBS Master Plan will be enhancing the pedestrian conditions by adding sidewalks, installing protected intersection improvements, off-street paths, the Social Spine, and the Green Loop for pedestrians. The number of street miles increases from 2 to 4.5 due to the new streets and greenways with the NBPP. The increase was calculated based on the new street and greenway additions with the addition of the North Bayshore area. This analysis was assumed based on the previous analysis by *AccessMV*, which use a combination of WalkScore, Missing Sidewalks, Posted Speed Limits, and Road Type to determine pedestrian quality. The addition of low stress pedestrian network components improves the overall quality of the NBPP streets in line with City of Mountain View's Complete Streets policies. The enhanced street grid creates smaller blocks, improving the directness of walking between origins and destinations within the NBPP area for all ages and abilities, including seniors and school-aged children. The pedestrian facilities within the NBS Master Plan site are consistent with the goals and policies outlined in the NBPP, and the quality of service will be improved once these are constructed; therefore, the results outlined in **Table 31** show PQOS increase from 4 and 5 (worst) to 1 (best) for the NBS Master Plan area and NBS boundary.

**Table 31: Existing and Project Conditions Pedestrian Quality of Service**

| | Existing Conditions | | | | Project Conditions | | | |
|---|---|---|---|---|---|---|---|---|
| ***Combined QOS Score*** | | | | | | | | |
| | NBS Master Plan Area | | NBS Boundary | | NBS Master Plan Area | | NBS Boundary | |
| **QOS Rating** | Street (Miles) | % Street (Miles) | Street (Miles) | % Street (Miles) | Street (Miles) | % Street (Miles) | Street (Miles) | % Street (Miles) |
| 1 (Best) | 0 | 0 | 0 | 0 | 4.5 | 100% | 21 | 100% |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 1 | 50% | 6 | 38% | 0 | 0 | 0 | 0 |
| 5 (Worst) | 1 | 50% | 10 | 62% | 0 | 0 | 0 | 0 |
| **Total** | **2** | **100%** | **16** | **100%** | **4.5** | **100%** | **21** | **100%** |

Source: AccessMV, 2021 and Fehr & Peers, 2023.

## 10.3 Pedestrian Volumes

The proposed plan encourages pedestrian mobility through new streets and mid-block connections, which will enhance the walkability. The new urban grid will create a dense and flexible network and provide safe and direct pedestrian connections to neighborhood services, places of work, residences, amenities, parks and open space, and transit facilities. With the new, more walkable network, certain streets will be faced with higher pedestrian volumes and should be considered as candidates for pedestrian traffic control devices. As described in the traffic forecast section, the project is expected to generate approximately 2,500 pedestrian trips in each peak hour, in addition to pedestrian travel that will occur to/from the district garages and transit stops. Charleston Road and Shoreline Boulevard are expected to be the roads with the highest pedestrian volumes due to proximity to project land uses, district garages, and transit stops. **Appendix B** includes projected pedestrian volumes for future intersections. The following intersections are expected to experience the largest amount of pedestrian volume (approximately 500 pedestrians per peak hour):

- Alta Avenue and Charleston Road
- Huff Avenue and Charleston Road
- Joaquin Road and Charleston Road
- Shoreline Boulevard and Charleston Road
- Shoreline Boulevard and Space Park Way

Recommendations for these intersections would be increasing the sidewalk width to accommodate for these higher volumes, adding pedestrian signals, mid-block pedestrian Rectangular RRFBs, high visibility crosswalks, installation of counters to detect pedestrians and bicyclist movements and volumes, leading pedestrian intervals, daylighting crosswalks, protected intersections, no right on red, lower speed limits, raised crosswalks, or considering bulbouts.

## 10.4 Adverse Effects Evaluation

As shown in **Table 5** and listed below, there are four adverse effect criteria for the pedestrian operations evaluation:

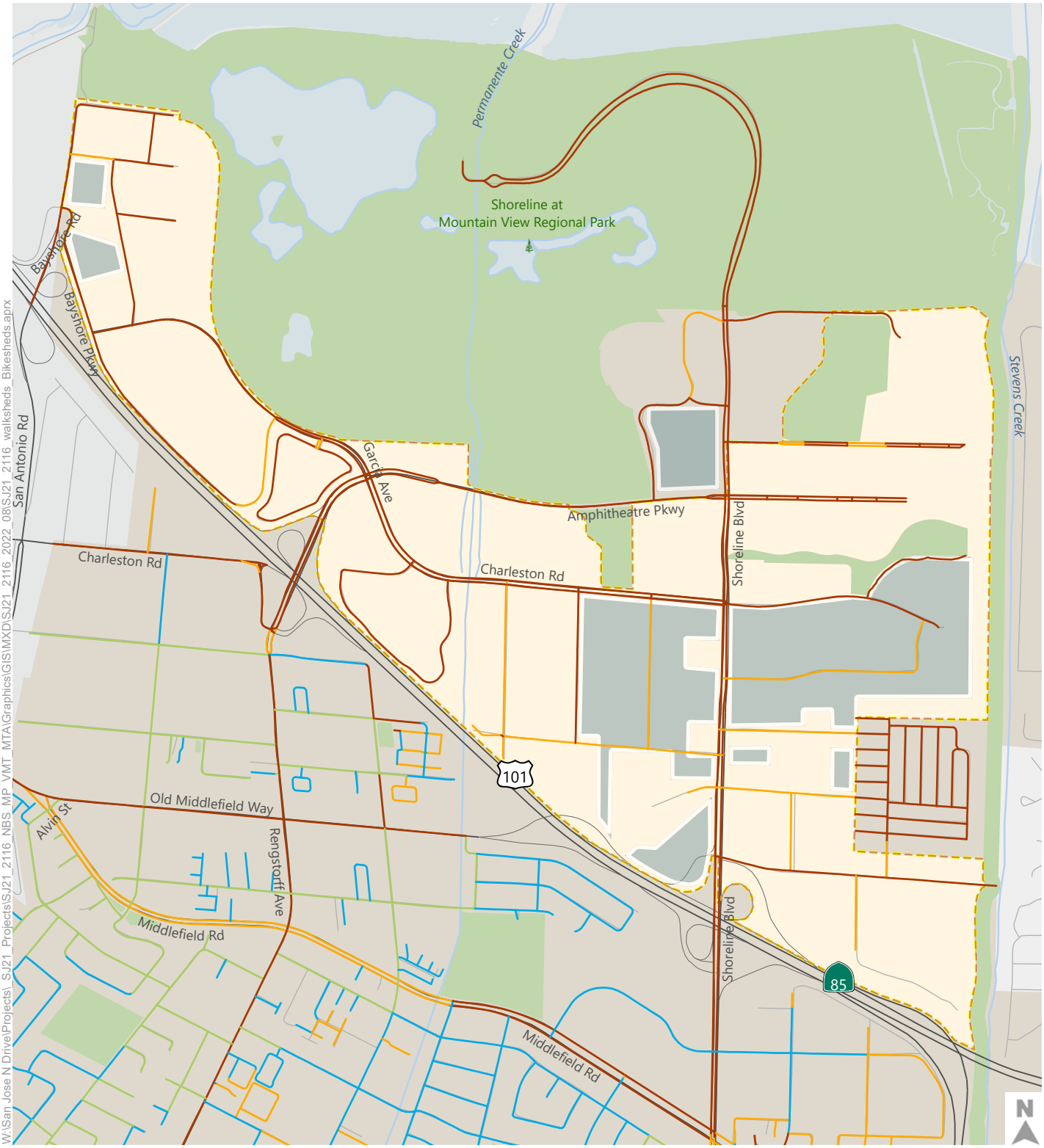
- Criterion #10: The project fails to provide accessible and safe pedestrian connections between buildings and adjacent streets and transit facilities.
- Criterion #11: A project disrupts existing or planned pedestrian facilities or conflicts with adopted City non-auto plans, guidelines, policies, or standards.
- Criterion #12: The project adds trips to an existing transportation facility (e.g., sidewalk) that does not meet current design standards.
- Criterion #13: The project increases vehicle trips to a roadway with a Pedestrian Quality of Service (PQOS) score of 3 or more.

Criterion 10 states that a project is considered deficient if it fails to provide accessible and safe pedestrian connections between buildings and adjacent streets and transit facilities. The project proposes new streets, mid-block connections, sidewalks and paths, proposed Green Loop, and a Social Spine at Shorebird. A proposed Pedestrian Priority Zone along Grove Street can serve as an alternative path to Charleston Road and Shoreline Boulevard. The project also proposes a Green Loop, which is a two-way cycle track and pedestrian path, which circulates throughout the site and connects to Permanente Creek Trail. We are assuming all pedestrian pathways in the site plan are publicly accessible by all pedestrians and will address all sidewalk gaps. This can increase pedestrian access and internal connectivity within the site. As a result, the project is not considered to have an adverse effect based on criterion 10.

A project is considered deficient if it disrupts existing or planned pedestrian facilities or conflicts with adopted City non-auto plans, guidelines, policies, or standards, according to criterion 11. According to the site plan, the sidewalks proposed by the project would meet the minimum widths set by the project for these facilities and thus would not conflict with its planned pedestrian facilities. The project does not conflict with other adopted City non-auto plans, guidelines, policies, or standards, and is thus not considered to have an adverse effect based on criterion 11.

Criterion 12 considers a project deficient if it adds trips to an existing transportation facility that does not meet current design standards. The project will be providing updated transportation facilities which meet the current design standards and, therefore, is not considered to have an adverse effect based on criterion 12.

Criterion 13 states the project is deficient if it increases vehicle trips to a roadway with a PQOS score of 3 or more. The project will be adding new facilities with a PQOS score assumed to be 1 and, therefore, would not be considered to have an adverse effect based on Criterion 13.




City of Mountain View

North Bayshore Precise Plan Boundary

North Bayshore Master Plan Boundary

Pedestrian Quality of Service Score

QOS 1: Best Quality of Service

QOS 2

QOS 3

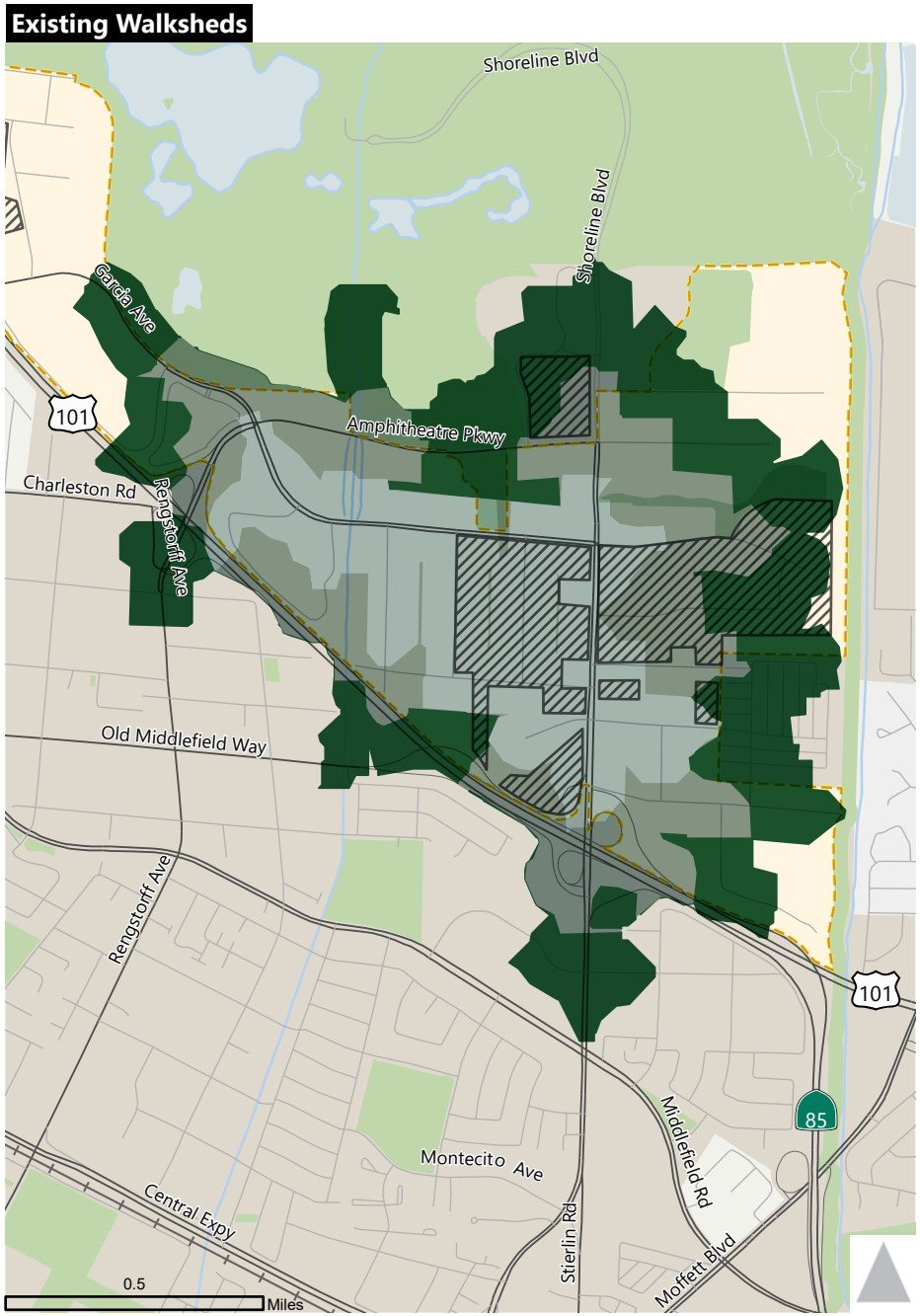
QOS 4

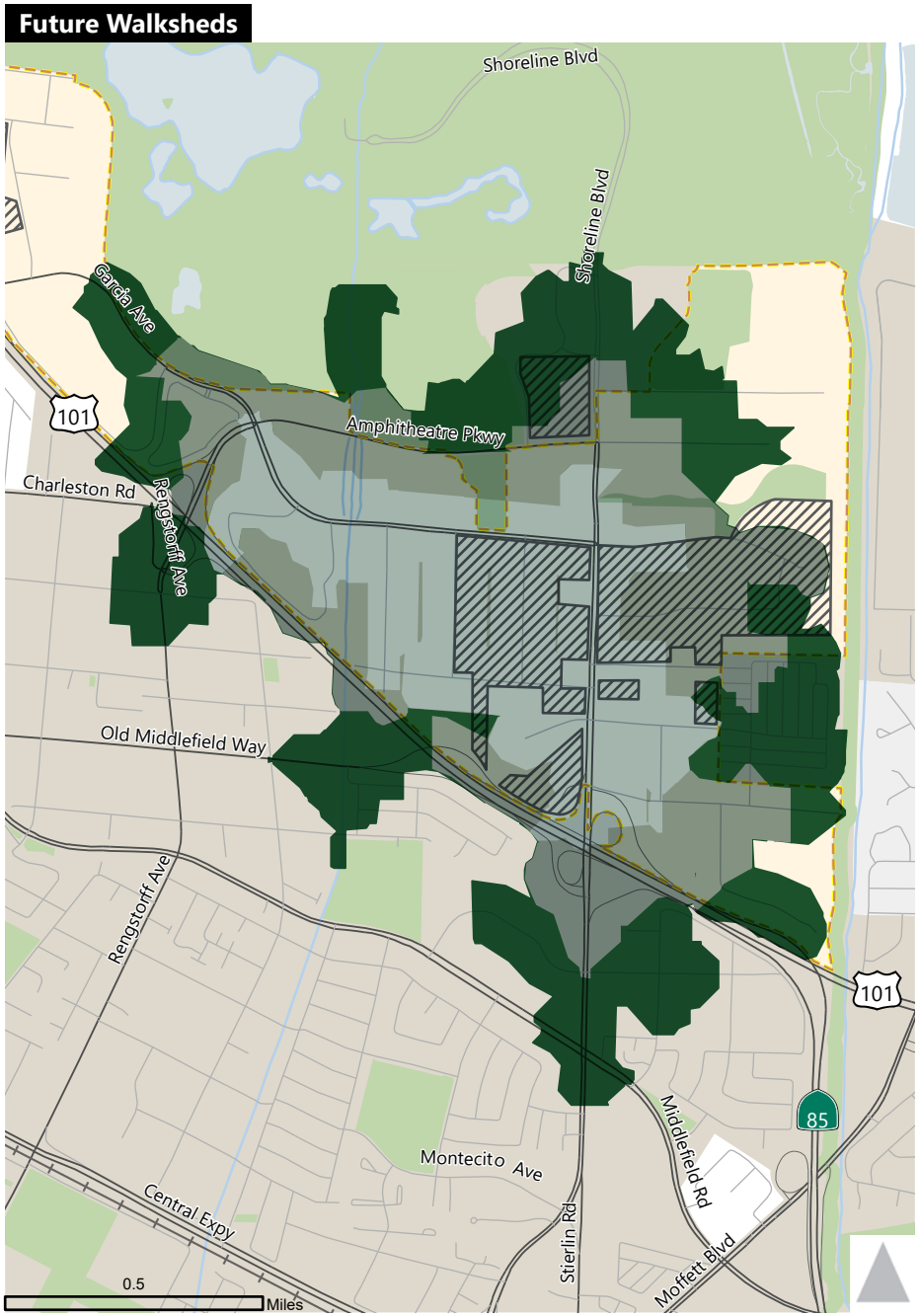
QOS 5: Lowest Quality of Service

Source: City of Mountain View, Caltrans, Esri, OSM, Alta Planning. November 2021

Figure 31

## Pedestrian Quality of Service




Pedestrian Walksheds
5 minutes
10 minutes
15 minutes
City of Mountain View
North Bayshore Precise Plan Boundary
North Bayshore Master Plan Boundary

Figure 32

## Pedestrian Walksheds

# 11. Bicycle Operations

The bicycle operations analysis presented in this chapter references existing bicycle facilities and environment; summarizes the primary biking routes between residential, office, retail, and public uses in the NBS Master Plan; evaluates the bicycle level of traffic stress (LTS) within one-half-mile of the bicycle study area; and identifies potential bicycle-oriented improvements.

## 11.1 Existing Conditions

As described in the Existing Condition section, Class II Bike Lanes exist along Shoreline Boulevard, Charleston Road, Amphitheatre Parkway, Bayshore Parkway, and Rengstorff Avenue in the NBS Master Plan area. Class III Bike Routes exist along the segment of Shoreline Boulevard north of Charleston Road. Existing Class I Shared-Use Paths near the NBS Master Plan area include the Stevens Creek Trail, Permanente Creek Trail, and the Green Loop, all of which have asphalt or concrete surfaces.

### 11.1.1 Existing Conditions Bicycle Level of Traffic Stress

Level of traffic stress (LTS) is closely related to the Four Types of Cyclists theory with the following types:

- BLTS 1: Roadway is comfortable for all ages and abilities.
- BLTS 1.5: Roadway is comfortable for people of all ages and abilities on residential streets
- BLTS 2: Roadway is comfortable for interested but concerned cyclists
- BLTS 3: Roadway is comfortable for somewhat confident cyclists
- BLTS 4: Roadway is comfortable for highly confident cyclists only

Most cyclists are generally considered to be interested and concerned. Whereas the Four Types of Cyclists theory highlights people's willingness to bicycle, LTS measures the quality of a person's experience while bicycling. Low stress bikeways (LTS 1 and 2) are tolerated by most cyclists; in contrast, high stress bikeways are only tolerated by Strong and Fearless cyclists. The development of a low-stress network and elimination of high-stress barriers is critical to broaden the appeal of bicycling, especially for Enthused and Confident and Interested and Concerned cyclists.

An LTS analysis was conducted as part of *AccessMV* using the existing and future network to assess changes in LTS ratings. Under Existing Conditions, Shoreline Boulevard between Charleston Road and North Road is an LTS 4, while Amphitheatre Parkway and Charleston Road are an LTS 3. The rest of the NBS Master Plan site areas are LTS 1 and 2. With these bicycle facilities, the LTS is shown to be less stressful for most bicyclists within the plan area. **Figure 33** shows the Existing LTS Network from *AccessMV*.

## 11.2 Project Conditions

A 3.7 mile off-street and on-street bicycle network is proposed to provide a variety of options for cyclists of all ages and capabilities. The bicycle network will include expansions of and enhancements to existing bike facilities as well as new connections to the regional bike network. Bikeshare services will be integrated into transit stations to support last-leg connections. Because the NBS Master Plan provides a general level of detail of the land use and transportation network, there will be a need to conduct additional transportation analysis during the PCP (Planned Community Permit) stage and may require subsequent site specific transportation analysis to ensure that each mode of travel and the project site are designed and built to the City's specifications. Short-term bicycle parking will be easily accessible from bicycle lanes, highly visible and near areas of high pedestrian activity. Long term bicycle parking intended for residents and employees will be provided internally within residential and office buildings, respectively. **Figure 34** shows destinations within a 5-minute bike ride of the Master Plan's geographic center.

Within the bicycle study area, a portion of Charleston Road and Shoreline Boulevard is defined by the NBPP as a transit boulevard, which prioritizes transit and shuttles over other modes of transportation. Bicycling path and distances to the transit stops on Charleston Road and Shoreline Boulevard are summarized below:

- The primary bicycling paths to the transit stop on Charleston Road west of Shoreline Boulevard include the cycle tracks along Joaquin Road, Shoreline Boulevard, and Charleston Road. The stop is within a 5-minute bike ride from most of the office and residential buildings within the NBS Master Plan area.
- The primary bicycling paths to the transit stop on Charleston Road east of Shoreline Boulevard include the cycle tracks along Shoreline Boulevard and Charleston Road. The stop is within a 5-minute bike ride from most of the office and residential buildings within the NBS Master Plan area.
- The primary bicycling paths to the transit stop on Shoreline Boulevard include the cycle tracks along Shoreline Boulevard and the portion of the Green Loop south of Charleston Road. The stop is within a 5-minute bike ride from most of the office and residential buildings within the NBS Master Plan area.

### 11.2.1 Project Conditions Bicycle Level of Traffic Stress (LTS)

**Table 32** presents the number of street miles within the NBPP area at the different LTS ratings under Existing and Project Conditions to demonstrate the overall change in LTS with the project. The number of street miles increases from 2 to 4.5 due to the new streets and greenways with the NBPP. The increase was calculated based on the new street and greenway additions with the addition of the North Bayshore area. The addition of low stress bicycle network components improves the overall quality of the NBPP streets. The enhanced street grid creates smaller blocks, improving the directness of biking between origins and destinations within the NBPP area for all ages and abilities, including seniors and school-aged children. Under Project Conditions, all streets are rated very good or good with respect to the bicycle level of traffic stress score. These represent the levels of traffic stress tolerated by mainstream riders. As shown in **Figure 35**, the NBS Master Plan, with potential improvements, such as the addition of bike lanes on all

roadways within the NBS Master Plan area, would improve the bicycle LTS sitewide to an LTS 1. The NBS Master Plan site will connect to the city's low-stress network via the connections across US 101.

**Table 32: Existing and Project Conditions Bicycle Level of Traffic Stress**

| | Existing Conditions | | | | Project Conditions | | | |
|---|---|---|---|---|---|---|---|---|
| | NBS Master Plan Area | | NBS Boundary | | NBS Master Plan Area | | NBS Boundary | |
| **LTS Rating** | **Street (Miles)** | **% Street (Miles)** | **Street (Miles)** | **% Street (Miles)** | **Street (Miles)** | **% Street (Miles)** | **Street (Miles)** | **% Street (Miles)** |
| 1 (Very Good) | 1 | 50% | 4 | 25% | 4.5 | 100% | 17 | 81% |
| 1.5 (Good) | 0.5 | 25% | 4 | 25% | 0 | 0 | 2.5 | 12% |
| 2 (Good) | 0 | 0 | 2 | 13% | 0 | 0 | 1 | 5% |
| 3 (Fair) | 0.5 | 25% | 5 | 31% | 0 | 0 | 0 | 0 |
| 4 (Poor) | 0 | 0 | 1 | 6% | 0 | 0 | 0.5 | 2% |
| **Total** | **2** | **100%** | **16** | **100%** | **4.5** | **100%** | **21** | **100%** |

Source: Fehr & Peers, 2023.

## 11.3 Bicycle Volumes

The proposed plan's bicycle network will include expansions of and enhancements to existing bike facilities as well as new connections to the regional bike network. The new urban grid will create a dense and flexible network and provide safe and direct bicycle connections to neighborhood services, places of work, residences, amenities, parks and open space, and transit facilities. With the new bicycle network, certain streets will be faced with higher bicycle volumes. As described in the traffic forecast section, the project is expected to generate approximately 600 bicycle trips in each peak hour, in addition to bicycle travel that will occur to/from the district garage and transit stops. Charleston Road and Shoreline Boulevard are expected to be the roads with the highest bicycle volumes due to proximity to project land uses, district garages, and transit stops. **Appendix B** shows projected future bicycle volumes. The following intersections are expected to experience the largest amount of bicycle volume (approximately 100 bicycles per hour):

- Alta Avenue and Charleston Road
- Huff Avenue and Charleston Road
- Joaquin Road and Charleston Road
- Shoreline Boulevard and Charleston Road
- Shoreline Boulevard and Space Park Way
- Shoreline Boulevard and Plymouth Street
- Amphitheatre Parkway and Garcia Avenue-Charleston Road
- Rengstorff Avenue and Leghorn Street

Recommendations for these intersections or mid-block locations would be bike boxes at the intersections, coordinated signal timing, separated bicycle phasing, green pavement, no right on red, curb bulb outs, dashed green paint at conflict points, installation of counters to detect pedestrians and bicyclist movements and volumes, roundabouts, pedestrian or bike scramble, or leading pedestrian intervals. Additional specific recommendations shall be required at a later stage during individual project PCP (Planned Community Permit) stage and may require subsequent site specific MTAs planning community permit phase.

## 11.4 Adverse Effects Evaluation

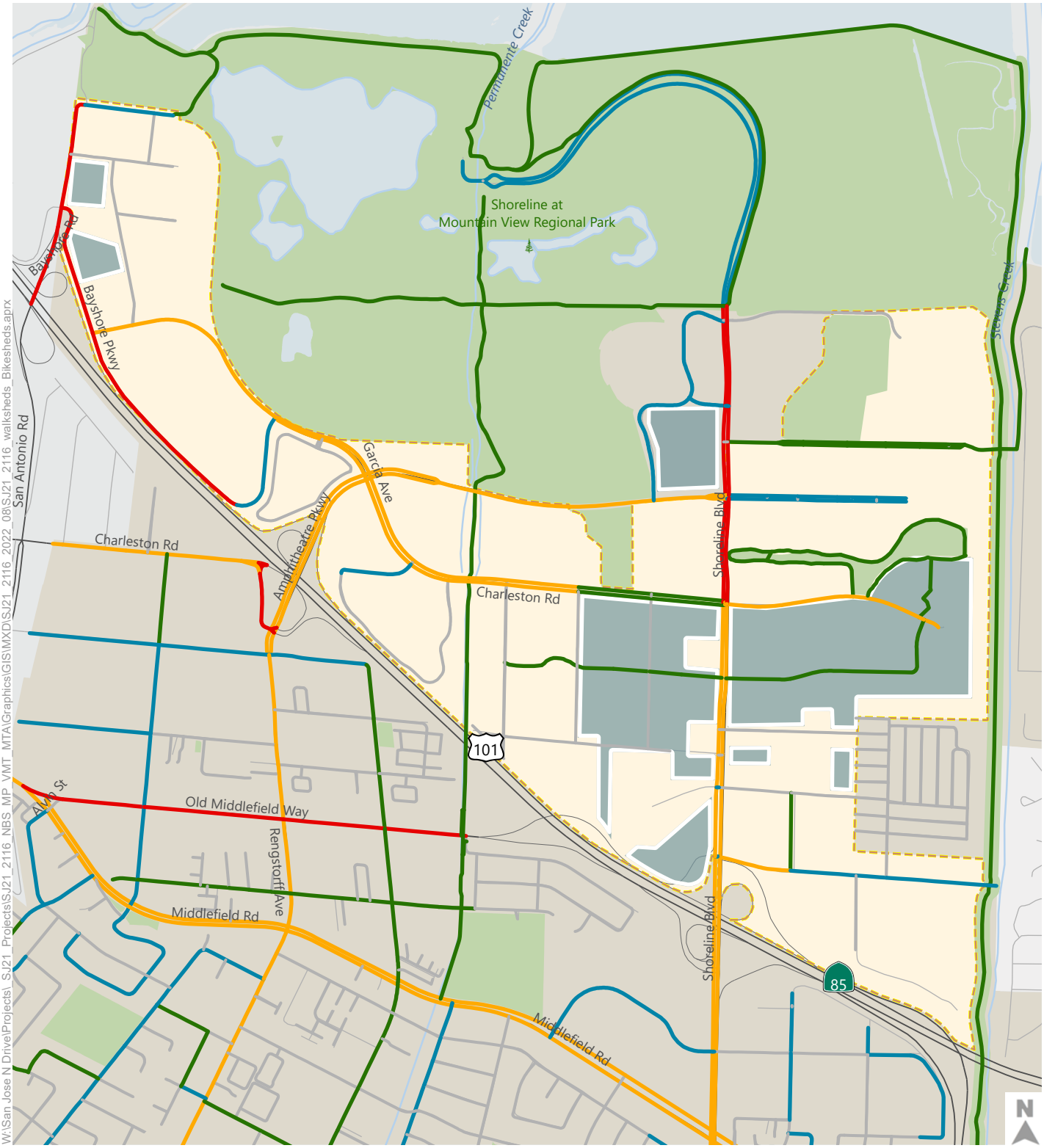
As shown in **Table 5**: Criteria for Determining Adverse Effects and Operational Deficiencies and listed below, there are three adverse effect criteria for the bicycle operations evaluation:

- Criterion #14: The project disrupts existing or planned bicycle facilities or conflicts with adopted City non-auto plans, guidelines, policies, or standards.
- Criterion #15: The project adds trips to an existing transportation facility (e.g., bikeway) that does not meet current design standards. The project increases vehicle trips to a roadway with a BLTS score of 3 or 4.
- Criterion #16: The project does not connect to the City's low-stress (LTS 1 to 2) bike network.

A project is considered deficient if it disrupts existing or planned pedestrian facilities or conflicts with adopted City non-auto plans, guidelines, policies, or standards, according to criterion 14. The project proposes a 3.7 mile off-street and on-street bicycle network which will cover all bicycle gaps in the NBS Master Plan network. As a result, the project is not considered to have an adverse effect based on criterion 14.

Criterion 15 considers a project deficient if it adds trips to an existing facility that does not meet current design standards or to a roadway with a bicycle LTS score of 3 or 4. The project will be constructing new facilities that meet the current design standards and thus is considered to not have an adverse effect per criterion 15.

Criterion 16 evaluates the projects connection to the City's low-stress (LTS 1 or 2) bicycle network. Due to the new additions of bicycle facilities across the project, there is not an adverse effect per criterion 16.




City of Mountain View

North Bayshore Precise Plan Boundary

North Bayshore Master Plan Boundary

Existing LTS

- BLTS 1 All Ages and Abilities
- BLTS 1.5 All Ages and Abilities (Residential)
- BLTS 2 Interested But Concerned
- BLTS 3 Somewhat Confident
- BLTS 4 Highly Confident

Source: City of Mountain View, Caltrans, Esri, OSM, Alta Planning. November 2021

Figure 33

## Existing Bicycle Level of Traffic Stress

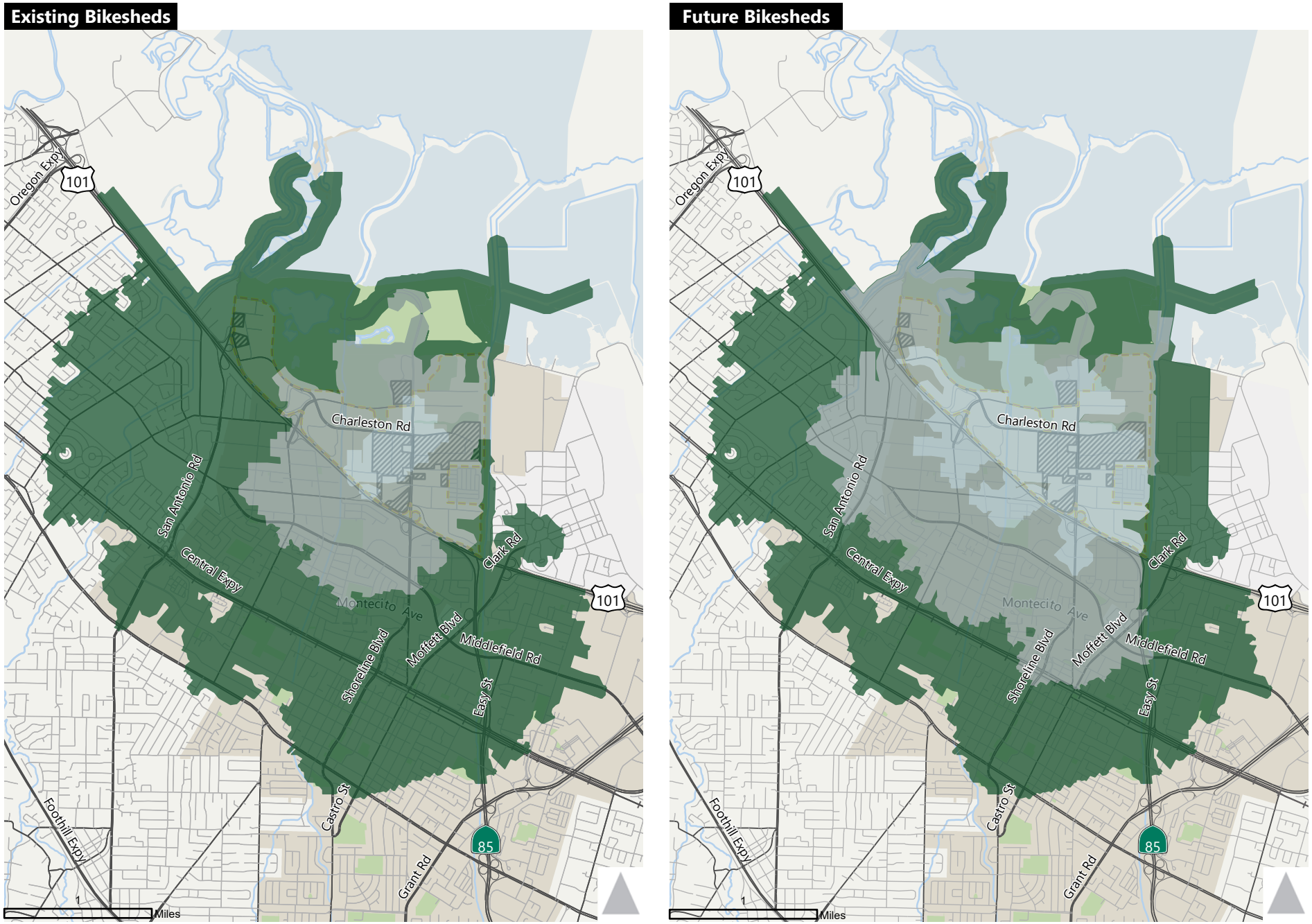
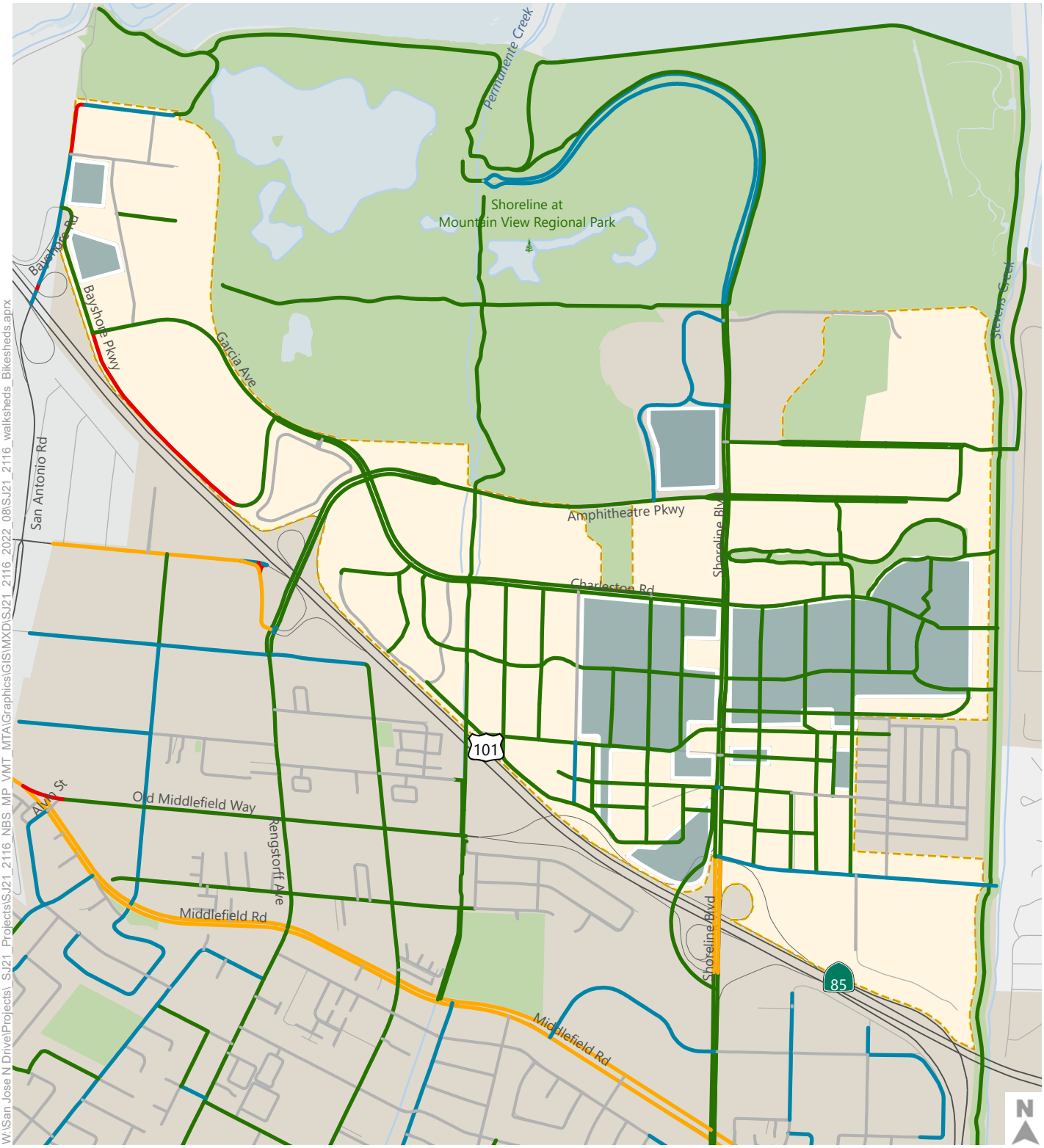



Figure 34

## Bicycle Bikesheds




City of Mountain View

North Bayshore Precise Plan Boundary

Project Area

Future LTS

- BLTS 1 All Ages and Abilities
- BLTS 1.5 All Ages and Abilities (Residential)
- BLTS 2 Interested But Concerned
- BLTS 3 Somewhat Confident
- BLTS 4 Highly Confident

Source: City of Mountain View, Caltrans, Esri, OSM, Alta Planning. November 2021

Figure 35

## Project Conditions Bicycle Level of Traffic Stress

# 12. Parking Assessment

The parking assessment presented in this chapter references the existing parking environment, summarize the proposed parking supply by location and land use type, and compares the proposed supply the NBPP parking requirements for vehicles and bicycles.

## 12.1 Existing Conditions

The parking in the existing plan area is characterized by surface parking lots that front/surround most individual buildings. There currently are no below grade or above ground parking garages within the Project area.

## 12.2 Project Conditions

This section summarizes the project's parking supply and compares it to parking standards specified in the NBPP.

### 12.2.1 Proposed Parking Supply and Requirements

The NBS Master Plan parking strategy proposes to relocate and consolidate the existing surface lots into centralized district parking facilities with a limited amount of surface parking retained at individual sites. A total of 12,708 parking spaces are proposed, including 7,274 in district parking and 5,434 in on-site parking locations. Of these 4,550 are allocated for residential uses, 6,587 to office uses and 1,203 to retail/visitor, and 368 to hotel uses. Each parking location will serve different land uses and thus affect how vehicles travel on the local streets. **Table 33** shows the proposed parking supply by location and land use.

**Table 33: Parking Supply by Location and Land Use**

| Parking Location | Parking Spaces[1] | Residential Parking | Office | Retail/Active/ Visitor | Hotel |
|---|---|---|---|---|---|
| 1. District Garage (JN-P-1) | 500 | 0 | 0 | 500 | 0 |
| 2. District Garage (JS-P-1) | 700 | 0 | 450 | 57 | 193 |
| 3. District Garage (SB-P-1) | 600 | 0 | 0 | 425 | 175 |
| 4. Amphitheatre District Garage (SA-P-1) | 4,584 | 0 | 4,584 | 0 | 0 |
| 5. Marine Way District Garage (MW-P-1 and MW-P-2) | 890 | 0 | 890 | 0 | 0 |
| 6. On-site parking | 5,434 | 4,550 | 663 | 221 | 0 |
| **Total** | **12,708** | **4,550** | **6,587** | **1,203** | **368** |

Source: Google Parking Summary, 2022.

The goal of the parking strategy is to reduce parking demand by constraining supply and sharing parking where possible. This will support a more efficient parking strategy, freeing up land for open space, housing, office, and other uses. Parking will be composed of on-site parking and off-site district parking:

- Residents will use on-site parking, while residential visitors will use district parking garages.
- 90% of office employees and visitors will use district parking garages, while 10% of office employees and visitors will use on-site parking.

District parking is provided at five locations within the NBS Master Plan area include the following:

- JN-P-1 (Joaquin North) is located at the southwest corner of Monarch Street and Joaquin Road within the Joaquin North neighborhood and contains approximately 500 parking spaces. JN-P-1 serves active uses and hotel, neighborhood parks, open spaces, and residential visitor parking.
- JS-P-1 (Joaquin South) is a 6-level parking garage location in the Joaquin South neighborhood that contains approximately 700 parking spaces. JS-P-1 serves office (450 parking spaces), retail, and hotel uses (250 parking spaces).
- SB-P-1 (Shorebird) is located at the northeast corner of Space Park Way and Manzanita Street within the Shorebird neighborhood and contains approximately 600 spaces. SB-P-1 serves hotel and active uses as well as residential visitor parking.
- SA-P-1 (Amphitheatre) is a 6-level parking garage located at the northwest corner of Shoreline Boulevard and Charleston Road that contains approximately 4,584 parking spaces for the NBS Master Plan (4,334 parking spaces), the police operations station (10 parking spaces), and the public parking spaces (240 parking spaces). SA-P-1 serves office employee parking.
- MW-P-1 & MW-P-2 (Marine Way) are 2- to 3-level parking garages along Marine Way that contain approximately 890 parking spaces. Both parking garages serve office uses.

In addition to the district parking locations, the NBS Master Plan includes office and residential on-site parking location within the NBS Master Plan area. The NBS Master Plan provides 90% of the office parking in district office parking garages MW-P-1, MW-P-2, SA-P-1 and JS-P-1, and only 10% of the office parking in office on-site parking locations adjacent to the office buildings. On-site parking within each neighborhood[20] includes the following:

- Joaquin North neighborhood includes 2,531 on-site parking spaces for residential, retail, office, and active land uses.
- Joaquin South neighborhood includes 746 on-site parking spaces for residential, retail, office, and hotel land uses.

[20] Allocation of residential, office, and retail/commercial on-site parking spaces to each neighborhood assumes that vehicles will park close to their desired destination; therefore, the on-site parking is distributed based on the land use allocation by neighborhood.



- Shorebird neighborhood includes 1,826 on-site parking spaces for residential, retail, office, hotel, and active land uses.
- Pear neighborhood includes 331 on-site parking spaces for residential and retail land uses.

### 12.2.2 Vehicle Parking Requirements and Supply

**Table 34** outlines the vehicle parking maximums for Office/R&D and Residential land uses from Chapter 6.11 of the NBPP. For office uses, the maximum parking supply is 2.7 spaces per 1,000 square feet. For residential uses, maximum parking supply rates of 0.25, 0.5, and 1.0 spaces per unit for micro/studios, 1-bedroom, and 2+-bedroom units, respectively. The NBPP does not set minimum or maximum parking standards for retail, hotel, and community use, therefore the parking supplies will be equivalent to the Institute of Transportation Engineers' Parking Generation manual peak period parking demand for the most comparable land use as determined by the Zoning Administrator. The NBP Master Plan meets the proposed parking maximum provided per the NBPP.

**Table 34: Vehicle Parking Requirements**

| Land Use | Size (ksf) | *NBPP* Parking Requirements[1] | Parking Maximum per *NBPP* | | Parking Proposed by Plan[2] | Meet? |
|---|---|---|---|---|---|---|
| Office/Research and Development | 3,146 | Maximum 2.7 parking stalls per 1,000 sf of gross building floor area | 8,494 | | 6,587 | Yes |
| Retail/Commercial | 265 | No Maximum[3,4] | 898 | | 1,203 | Yes |
| Residential – Market Rate[5] | 1,120<br>2,240<br>1,960<br>280 | Parking ratio maximums by unit type:<br>Micro-units 0.25 spaces/unit<br>1 BR: 0.5 spaces/unit<br>2 BR: 1.0 spaces/unit<br>3 BR: 1.0 spaces/unit | 280<br>1,120<br>1,960<br>280 | 4,603 | 4,550 | Yes |
| Residential – Affordable[6] | 350<br>350<br>350<br>350 | Parking ratio maximums by unit type:<br>Micro-units: 0.25 spaces/unit<br>1 BR: 0.5 spaces/unit<br>2 BR: 1.0 spaces/unit<br>3 BR: 1.0 spaces/unit | 88<br>175<br>350<br>350 | | | |
| Hotel | 525 | 0.70 spaces per key | 258 | | 368 | Yes |
| | | **Total** | **14,253** | | **12,708** | **Yes** |

Notes:

1. Mountain View North Bayshore Precise Plan. Section 6.11, Off-Street Parking Requirements. (blobdload.aspx (mountainview.gov)
2. Mountain View North Bayshore Framework Master Plan: TDM Plan. Section 2.2, Project Description. January 2023.
3. For uses with no maximum, the equivalent to the Institute of Transportation Engineers' Parking Generation manual peak period parking demand for the most comparable land use was used to calculate the maximum spaces.
4. Since the NBPP does not set a maximum parking supply for retail uses, for this evaluation we relied on information from the Institute of Transportation Engineers' Parking Generation manual. Land Use: 820 Shopping Center was the most comparable use based on the size of the retail space. 3.68 per 1,000 square feet was used.
5. NBS Master Plan market rate residential housing (mix of 60% studio and 1-bedroom apartments and 40% 2- and 3-bedroom dwelling units) with a reduced residential parking supply rate of 0.65 spaces per dwelling unit.
6. NBS Master Plan market rate residential housing (mix of 25% studio, 1-bedroom, 2-bedroom, and 3-bedroom dwelling units with a reduced residential parking supply rate of 0.69 spaces per dwelling unit.

Source: Fehr & Peers, 2023.

As shown in **Table 34**, the NBS Master Plan's proposed parking supply would meet the NBPP requirements.

### 12.2.3 Parking TDM Measures

Chapter 6.12 in the NBPP outlines the carshare parking standards by land use type. The carshare vehicle requirement for office/research and development land uses is a minimum of three parking spaces per building site for carshare operators. For residential land use, the carshare vehicle requirement is at least one carsharing space for residential parking lots with over 50 parking spaces and at least two carsharing spaces plus 1 space for every 200 additional spaces for residential lots 200 plus. Dedicated carshare spaces will be provided in all garages in the NBS Master Plan area. For office parking, this includes a minimum of 3 car share spaces in each office parking lot. For residential parking, this includes at least 1 space for residential lots over 50 spaces and at least 2 spaces for residential lots over 200 spaces, plus 1 for every additional 200 dwelling units. Car share spaces may also be clustered in centralized locations. The NBS Master Plan's provision of carshare spaces in all parking locations would meet the NBPP requirements.

### 12.2.4 Bicycle Parking Supply and Requirements

**Table 35** outlines the short-term and long-term bicycle parking requirements for office/research and development, retail/commercial, and residential land use according to Chapter 6.7 of the NBPP and the parking supply for the corresponding land use type provided by the NBS Master Plan. As shown in the table, the NBS Master Plan would provide sufficient bicycle parking spaces to meet the NBPP requirements. In addition to short-term and long-term parking, the NBS Master Plan would provide a minimum of 157 showers in bicycle parking facilities for office/research and development uses to meet the NBPP requirement of 1 unisex shower for the first 40 ksf and 1 unisex shower for every additional 20 ksf.

**Table 35: Bicycle Parking Requirements**

| Land Use | Size (ksf / units) | Short-Term Parking Ratio[1] | Required Short-Term Parking per NBPP | Proposed Short-Term Parking Supply[2] | Long-Term Parking Ratio[1] | Required Long-Term Parking per NBPP | Proposed Long-Term Parking Supply[2] |
|---|---|---|---|---|---|---|---|
| Office/Research and Development | 3,150 | 1 per 10,000 sf | 315 | 315 | 1 per 2000 sf | 1,575 | 1,575 |
| Retail/Commercial | 265 | 1 per 5000 sf | 53 | 53 | 1 per 5000 sf | 53 | 53 |
| Residential | 7,000 | 1 per 10 units | 700 | 700 | 1 per unit | 7,000 | 7,000 |

Notes:
1. Mountain View North Bayshore Precise Plan. Section 6.7, Bike Parking and Commuter Amenities. (blobdload.aspx (mountainview.gov)
2. Mountain View North Bayshore Framework Master Plan: TDM Plan. Section 2.2, Project Description. March 2022.

Source: Fehr & Peers, 2023.

## 12.3 Adverse Effect Evaluation

As shown in **Table 5** and listed below, there are four adverse effect criteria for the parking evaluation:

- Criterion #17: The project increases off-site parking demand in the project area.
- Criterion #18: The project proposes more parking than allowed by the City's Zoning Code.
- Criterion #19: The project parking results in significant spillover into adjacent neighborhoods.
- Criterion #20: Parking reduction—requires parking study to demonstrate effective parking management and adequate parking to serve project.

Criterion 17 states that the project would be considered deficient if it increases off-site parking demand in the project area. The project does not increase off-site parking demand in the project area as it will provide enough on-site parking spaces to accommodate the increased demand. Off-site parking is provided in the NBS Master Plan intentionally to avoid adverse effects. As a result, the project is not considered to have an adverse effect based on criterion 17.

Criterion 18 considers a project deficient if it proposes more parking than allowed by the City's Zoning Code. As shown in **Table 34**, the project proposes less parking than what is required by the City's Zoning Code and thus does not have an adverse effect based on criterion 18.

Criterion 19 states that a project would be considered deficient if it results in significant spillover into adjacent neighborhoods. The project provides enough on-site parking based on the Vehicle Parking Requirements to accommodate the future demand of the project area, more discussion of this is in the bicycle and pedestrian operations sections. Therefore, the project is not considered to have an adverse effect based on criterion 19.

Criterion 20 considers a project deficient if it utilizes a parking reduction that would require a parking study to demonstrate effective parking management and adequate parking to serve the project. The project does not utilize any parking reductions and would not have an adverse effect per criterion 20.

# 13. Transportation Demand Management

The NBS Master Plan will implement a TDM program to achieve a 35% morning peak hour inbound single-occupancy vehicle mode share at the development driveways (or district parking structures) for all non-residential development in the NBS Master Plan area. The NBS Master Plan's TDM Plan is a description of Google's approach to reducing vehicle trips by offering employees and residents transportation choices to meet the City's policy requirements and sustainability goals. The TDM Plan describes City of Mountain View transportation policies related to TDM and serves as a guide on how Google will implement the TDM Plan and monitor its success. Specifically, the TDM Plan would implement various TDM measures consistent with the *North Bayshore Transportation Demand Management (TDM) Plan Guidelines* (2015) for non-residential development and the *North Bayshore Residential Transportation Demand Management Guidelines* (2018) for residential development. The TDM plan is a living document that will be reviewed and updated over time to respond to employee behavior and transportation programs. The TDM Plan would implement a variety of TDM measures categorized in the following six TDM programs (Summary from Figure 4.1.5 on Page 25 of the NBS Master Plan TDM Plan; TDM reduction relative to an existing 67.5% SOV mode share)[21]:

- *Active Mobility* (Estimated TDM Reduction of *15%*)
    - *Walk/bike from shorebird residential; bicycle parking, shower and changing facilities; bicycle sharing; bicycle incentives; on-site bicycle repair facilities; bicycle buddy programs; bicycle giveaway program.*
- *Ridesharing and Car Sharing* (Estimated TDM Reduction of *5%*)
    - *Priority parking for carpools and vanpools; rideshare matching services; subsidized or free vanpools or carpools; expanded carpool matching; and car sharing.*
- *Shuttle and Transit* (Estimated TDM Reduction of *30%*)
    - *Shuttle services [including midday service and commute peak hour]; pre-tax commuter benefits; and commuter shuttle services [ranging from long haul, first-last mile connections, and public transit hubs].*
- *Flexible Work Schedule* (Estimated TDM Reduction of *2%*)
    - *Flexible work schedules, and emergency ride home*
- *Marketing* (Estimated TDM Reduction of *2%*)
    - *On-site transportation coordinator; membership in the TMA; marketing and information.*
- *Site Design and Other Measures* (Estimated TDM Reduction of *10%*)

[21] *North Bayshore Transportation Demand Management (TDM) Plan Guidelines* (2015) for non-residential development and the *North Bayshore Residential Transportation Demand Management Guidelines* (2018)

- *Parking cashout; parking supply; [unbundled parking; parking pricing]; on-site amenities and services; funding district-wide services, other TDM measures.*

With this TDM Plan in mind, this chapter evaluates the NBS Master Plan's conformance with the North Bayshore District Trip Cap Policy for each of the three gateways at San Antonio Road, Rengstorff Avenue, and Shoreline Boulevard, the three gateways combined, and the approved North Bayshore District Trip Cap Policy trip targets where the Rengstorff and Shoreline gateways are combined. Vehicle trip caps were specified in the 2017 NBPP; however, the NBS Master Plan's conformance is compared to the approved North Bayshore District Trip Cap Policy from the 2021 *North Bayshore Circulation Study*. The *Circulation Study*, approved by City Council December 2021, includes recommendations for the Priority Transportation Improvements, modifies the single-occupancy vehicle trip rate for office development, and provides a new North Bayshore District Trip Cap Policy trip target.

The policy targets recommended in the *Circulation Study* are presented in **Table 36**. The recommended thresholds are for the inbound 3-hour peak period during the morning and the outbound 3-hour peak period during the evening for Shoreline Boulevard and Rengstorff Avenue gateways combined. These targets include all the transportation improvements listed in **Table 3** and **Figure 5** in the introduction chapter.

**Table 36: Recommended North Bayshore District Trip Cap Policy Targets**

| Gateway | Inbound Morning Peak Period | Outbound Evening Peak Period |
|---|---|---|
| Shoreline Boulevard & Rengstorff Avenue | 20,730 | 18,300 |

Note: Vehicle volumes rounded to nearest 10.
Source: City of Mountain View, *North Bayshore Circulation Study* staff report, December 2021.

**Table 37** compares the North Bayshore gateway volumes under Cumulative with Project Conditions with the recommended North Bayshore District Trip Cap Policy trip target from the *Circulation Study*. The comparison shows that the individual gateways trip targets are met during all peak periods, except for Shoreline Boulevard during the evening peak period, where the vehicle volume exceeds the gateway trip target by 10%. For the combined gateways, the volume is less than the trip target during both peak periods. For the recommended North Bayshore Trip Cap Policy at Shoreline Boulevard and Rengstorff Avenue combined, the vehicle volume is less than the trip target during both peak periods and the NBS Master Plan is in conformance with the recommended North Bayshore Trip Cap Policy trip targets.

## Table 37: North Bayshore Gateway Trip Cap Policy Evaluation: Circulation Study Targets

| Gateway | Inbound Morning Peak Period | | | | Outbound Evening Peak Period | | | |
|---|---|---|---|---|---|---|---|---|
| | Volume[1] | Trip Target[1,2] | Remaining Trip Target | Percent of Trip Target Remaining | Volume[1] | Trip Target[1,2] | Remaining Trip Target | Percent of Trip Target Remaining |
| ***Individual Gateways*** | | | | | | | | |
| San Antonio Road | 3,510 | 4,140 | 630 | 15% | 2,400 | 3,620 | 1,220 | 34% |
| Rengstorff Avenue | 8,690 | 11,100 | 2,410 | 22% | 8,130 | 9,240 | 1,110 | 12% |
| Shoreline Boulevard | 9,230 | 9,630 | 400 | 4% | 9,990 | 9,060 | -930 | -10% |
| ***Combined Gateway[3]*** | | | | | | | | |
| Total | 21,430 | 24,870 | 3,440 | 14% | 20,520 | 21,920 | 1,400 | 6% |
| ***Gateway Trip Cap Comparison*** | | | | | | | | |
| *Shoreline Boulevard & Rengstorff Avenue* | *17,920* | *20,730* | *2,810* | *14%* | *18,120* | *18,300* | *180* | *1%* |

Notes:
1. Vehicle volumes rounded to nearest 10.
2. San Antonio gateway trip target based on 2014 NBPP, and Rengstorff Avenue and Shoreline Boulevard gateway trip targets based on 2021 Circulation Study.
3. The combined gateways are the sum of the San Antonio Road, Rengstorff Avenue, and Shoreline Boulevard gateways.

Source: Fehr & Peers, 2023.

# APPENDICES ARE AVAILABLE UPON REQUEST

Contact Project Planner

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# Appendix A:
# Existing Intersection Counts

# Appendix B: Intersection Level of Service Calculation (Existing Conditions, Cumulative with Project Conditions, and Cumulative with Project Conditions - Operational Improvements)

# Appendix C:
# Cross Sections with City Comments

# Appendix D:
# Gated Access Queuing Summary and Driveway LOS Calculations

# Appendix E:
# North Bayshore Precise Plan with Residential – Project Trip Generation Estimates Memorandum

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# Appendix F:
# North Bayshore Master Plan – Project Trip Generation Memorandum and Detailed Gateway Trip Generation

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# Appendix G:
# North Bayshore Precise Plan Intersection Improvement

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# Appendix H:
# LOS and Queue Summary

# Appendix I:
# 95th Percentile Queues (Existing Conditions, Cumulative with Project Conditions, and Cumulative with Project Conditions – Operational Improvements)

# Appendix J:
# Signal Warrants Summary

# Appendix K:
# Isolated Intersection Discussion