

Benicia Industrial Park Transportation & Employment Center Plan



Scenarios Report

August 2016

Prepared for the City of Benicia by

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URBAN DESIGN & CITY PLANNING

Table of Contents

1	Introduction	1
1.1	Project Objectives	1
1.2	Scenarios Framework	2
1.3	Organization of this Report.....	5
2	Roadway Improvements, Truck Movement	7
2.1	Baseline Improvements.....	7
2.2	More Extensive Improvements.....	15
2.3	Variation between Scenarios.....	16
3	Bike Improvements	17
3.1	Bicycle User Groups and Needs	17
3.2	Bike Parking and Facilities	17
3.3	Variation between Scenarios.....	21
3.4	Constraints.....	23
4	Pedestrian Improvements	25
4.1	Baseline Pedestrian Improvements	25
4.2	Variation between Scenarios.....	25
4.3	Constraints.....	26
5	Streetscape Design	29
5.1	Constraints.....	30
5.2	Variation between Scenarios.....	30
6	Land Use and Zoning	41
6.1	Existing Land Use.....	41
6.2	Current Zoning.....	42
6.3	Development Potential: Variation between Scenarios.....	46

7	Signage and Wayfinding	51
7.1	Wayfinding Elements.....	51
7.2	Variation between Scenarios.....	52
8	Alternative Fueling and Other Recommended Sustainability Measures.....	59
8.1	Alternative Fueling.....	59
8.2	Renewable Energy.....	62
8.3	Transportation Demand Management Measures	63
9	Conclusions and Next Steps	65
	Appendix A: Complete Streets Policy - City Council Resolution No. 16-2	69
	Appendix B: Land Use Regulations in Industrial Zoning Districts.....	71
	Appendix C: Glossary of Acronyms	77

List of Figures

Figure 1-1: Land Use Scenarios	4
Figure 2-1: Baseline Roadway Improvements.....	11
Figure 2-2: Industrial Park Special Flood Hazard Areas – Sulphur Springs Creek.....	12
Figure 2-3: Industrial Park Special Flood Hazard Areas – Shoreline.....	13
Figure 3-1: Bicycle Facilities	19
Figure 3-2: Sharrow Illustrations	22
Figure 4-1: Pedestrian Improvements	27
Figure 5-1: Street and Streetscape Improvements.....	35
Figure 5-2: Boulevard with Protected Bike Lanes and Sidewalks - East 2 nd Street (<i>Scenarios 2 and 3</i>).....	36
Figure 5-3: Street with Shared-Use Path - Park Road (<i>Scenario 3</i>).....	37
Figure 5-4: Street with Shared-Use Path - Stone Road (<i>Scenario 3</i>)	38
Figure 5-5: Street with Shared-Use Path – Industrial Way, between Park Road and Lake Herman Road (<i>Scenario 3</i>).....	39
Figure 6-1: Existing Land Use.....	43
Figure 6-2: Current Zoning	44
Figure 6-3: Benicia Industrial Park PDA Opportunity Sites	49
Figure 7-1: Wayfinding.....	55
Figure 7-2: Examples of Wayfinding Elements	56
Figure 8-1: PG&E Natural Gas Transmission Pipelines	62

List of Tables

Table 2-1: Baseline Roadway Improvements.....	9
Table 2-2: More Extensive Roadway Improvements.....	15
Table 6-1: Existing Land Use Summary.....	42
Table 6-2: Zoning Designations by Acreage.....	45
Table 6-3: Development Regulations in Industrial Park Zoning Districts	46
Table B-1: IL, IG, IW, and IP Districts: Land Use Regulations	71

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I Introduction

I.1 Project Objectives

BENICIA INDUSTRIAL PARK PDA

The Benicia Industrial Park is a significant employment center in Solano County. Home to over 600 firms employing more than 5,000 workers, which comprises over a third of the total jobs in Benicia, the Industrial Park serves as the economic engine for the city, contributing approximately two-thirds of the city's sales tax revenue. The Park is strategically located, served by I-680, a private deep water port, and Union Pacific Railroad mainline and spurs. In addition, SolTrans local buses and FAST intercity express buses both service the Park, and a bus transit hub is currently under construction.

The Benicia Industrial Park has been recognized as a Priority Development Area (PDA) by the Association of Bay Area Governments (ABAG). PDAs are places that local jurisdictions have identified within their communities where new development will support the day-to-day needs of residents and workers in a pedestrian-friendly environment served by transit. While the addition of residential uses is not anticipated as part of the Industrial Park's PDA designation, as an employment-based PDA, the Industrial Park has the added goal of advancing employment growth by attracting new business and providing for the renovation of established areas.

The Benicia Industrial Park Transportation and Employment Center Plan (TEC Plan) will help the City achieve these goals in the Industrial Park by creating a more complete business and transportation environment that retains existing business, attracts new businesses and increases the potential for grant funding, reduces fuel consumption and air emissions, and assists the City in fulfilling its commitment to provide context appropriate infrastructure improvements for Complete Streets.

COMPLETE STREETS

As defined by State law and the California Department of Transportation, Complete Streets are roads that provide safe mobility for all users, including bicyclists, pedestrians, transit vehicles, truck drivers and motorists, while remaining appropriate to the function and context of where they are located.¹ Complete Streets have a number of benefits for the communities that implement them, such as supporting increased physical activity, improving public health and safety, providing mobility and access options for non-drivers, and decreasing vehicle trips and associated

¹ California Department of Transportation. (2014). *Complete Streets: Implementation of Deputy Directive 64-R2: Complete Streets – Integrating the Public Transportation System*. [Brochure]. Sacramento, CA

greenhouse gas emissions. In accordance with the Metropolitan Transportation Commission (MTC) policy for eligibility to obtain OBAG 2 funds, Benicia adopted a Complete Streets policy in January 2016 with City Council Resolution No. 16-2 (see Appendix A).²

Consideration of existing operations within the Industrial Park will be critical to the success of implementing Complete Streets as part of the TEC Plan. There is consistent truck and rail traffic throughout the Park at all hours of the day, which can cause safety and health concerns when paired with increased bike and pedestrian traffic. However, through careful streetscape design, select streets can become well-marked thoroughfares that provide safe access to transit lines and places of employment for cyclists and pedestrians. This would allow Industrial Park workers traveling by all modes to enjoy safe routes to work without impeding the movement of goods and materials that is essential to the Park's success.

1.2 Scenarios Framework

In order to consider different approaches to achieving the project's dual goals of context-appropriate Complete Streets and economic development, three "Land Use Scenarios" were developed. Each Scenario maintains consistency with the General Plan and assumes a different outcome for future land use changes in the Industrial Park, thus providing different recommendations for roadway, bike, pedestrian, wayfinding and streetscape improvements. The Scenarios are shown in Figure 1-1 and briefly outlined below:

- **Scenario 1: Minimal Intensification**

Scenario 1 assumes no significant future changes in land use. Recommendations are intended to improve upon existing conditions and introduce Complete Streets at a basic level.

- **Scenario 2: Development of Northern Gateway Property**

Scenario 2 assumes development of the Northern Gateway property, 528-acres of vacant land located north of East 2nd Street, immediately north of the current Benicia Industrial Park development. While the mix and distribution of future land uses on the property has not yet been determined and will be defined through a Specific Plan at a future date, this Scenario assumes predominantly light industrial development, potentially with some office or other commercial uses, consistent with the Light Industrial and General Commercial districts. In this Scenario, East 2nd Street becomes the center spine running through the Park, and recommendations promote connection to and through this corridor.

² OBAG 2 refers to the second round of funding for the One Bay Area Grant program, which is projected to total roughly \$916 million for projects from 2017-18 through 2021-22. The OBAG 2 program is divided into a Regional Program, managed by the Metropolitan Transportation Commission (MTC), and a County Program, managed by the nine Bay Area Congestion Management Agencies (CMAs).

- **Scenario 3: Development of Northern Gateway Property plus Land Use Intensification**

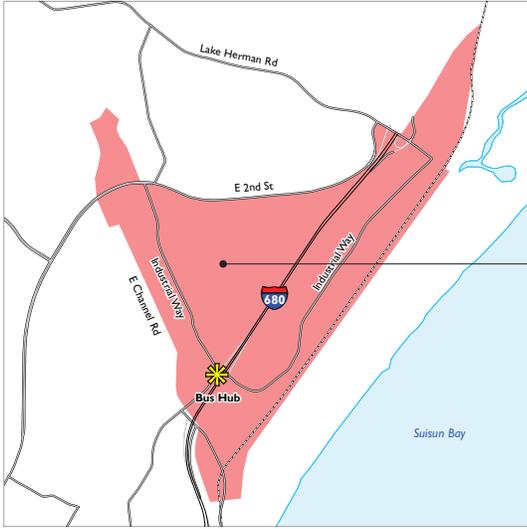
Like Scenario 2, Scenario 3 assumes development of the Northern Gateway property. However, this Scenario also assumes some intensification of the older industrial area as well. Any development within the Industrial Park would remain industrial in nature, but it may be complemented or supported by additional light industrial and/or business/R&D development in the Northern Gateway area as provided under current zoning regulations. Recommendations would promote improved connectivity in the central/west area.

It is important to recognize that many more Land Use Scenarios would be possible beyond the three that are examined in this report. Choices were made to evaluate a reasonable range of land use outcomes, but this analysis does not exhaust every possible permutation. Instead, it allows the development of a plan that will best complement the Park's most *likely* future land use changes based upon the City's General Plan, zoning regulations, and known market conditions.

Additionally, the Scenarios are not meant to be mutually exclusive alternatives for the City and community to choose between. Rather, they are intended as a vehicle to guide discussion and input into the TEC Plan. In order to maintain flexibility, it is likely that the TEC Plan will "mix and match" recommendations from each of the three Land Use Scenarios, and consider how transportation improvements may be phased over time to meet changing land use needs.

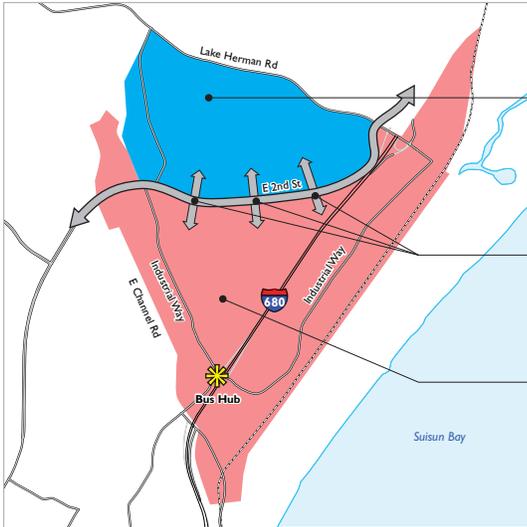
Figure I-1: Land Use Scenarios

Scenario 1



Development of vacant parcels and supporting streetscape/circulation improvements to create Complete Streets

Scenario 2

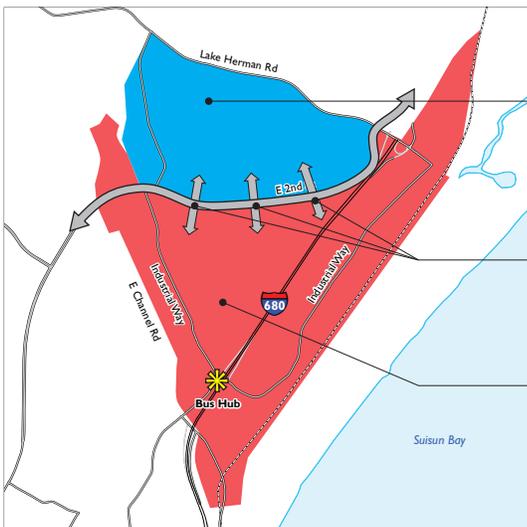


Development of Northern Gateway property

E 2nd St becomes a key corridor with new north-south connections

Development of vacant parcels and supporting streetscape/circulation improvements to create Complete Streets

Scenario 3



Development of Northern Gateway property

E 2nd St becomes a key corridor with new north-south connections

Development of vacant **and** underutilized parcels and significant streetscape/circulation improvements to create Complete Streets

I.3 Organization of this Report

Chapters in this report are organized by topic as follows:

Chapter 1 Introduction describes the project objectives and Scenarios framework, and provides an overview of the report's organization.

Chapter 2 Roadway Improvements, Truck Movement describes baseline needs to address existing deficiencies, "next level" improvements suggested for each Scenario, and applicable constraints.

Chapter 3 Bike Improvements describes bicycle user groups and their respective needs, bike parking and facilities recommended overall and for each Scenario, and applicable constraints.

Chapter 4 Pedestrians describes current and anticipated pedestrians and their needs, pedestrian facilities recommended overall and for each Scenario, and applicable constraints.

Chapter 5 Streetscape describes current deficiencies in streetscape design and site amenities as well as specific roadway improvement concepts.

Chapter 6 Land Use and Zoning describes the existing land use mix and current zoning within the Industrial Park, recommendations for each Scenario, suggested locations for supporting (non-industrial) uses, and the connection to the circulation system.

Chapter 7 Signage and Wayfinding describes the objectives of improved signage and wayfinding, specific wayfinding elements, improvements recommended for each Scenario, and branding and graphic design considerations.

Chapter 8 Alternative Fueling and Other Recommended Sustainability Measures describes opportunities for alternative fueling, renewable energy capture and transportation demand management.

Chapter 9 Conclusions and Next Steps summarizes findings, key points of decision and important considerations when evaluating the Scenarios, and describes areas for further study and refinement following community input.

The discussion and recommendations on each topic are communicated through text, figures, renderings and maps.

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2 Roadway Improvements, Truck Movement

2.1 Baseline Improvements

The Benicia Industrial Park will require a “baseline” level of investment in the roadway infrastructure in order to thrive as a Transportation and Employment Center. Based on traffic volumes collected in September 2014, all the study intersections are meeting the City’s Level of Service (LOS) standards, meaning that capacity is not an issue at this time when considering only roadway traffic flows. However, trains crossing Park Road at-grade can sporadically degrade the LOS to E or F at the adjacent intersection of Park Road and Bayshore Road.³ For roadway traffic, intersection geometric deficiencies, pavement maintenance, and flooding issues should be addressed at a minimum. This section describes the package of investments that should accompany any of the Land Use Scenarios.

EXISTING ROADWAY NETWORK

This section briefly lists the main facilities in the Plan Area. Additional detail may be found in Chapter 2 of the Existing Transportation Conditions and Needs Assessment Report. The regional roadway network in and around the Plan Area includes Interstates 680 and 780, both four-lane freeway facilities. The main local and arterial streets serving the Industrial Park include:

- **East 2nd Street**, an arterial roadway extending north and east from downtown Benicia to Lake Herman Road. Between Lake Herman Road and Industrial Way, this roadway has two travel lanes and a center turn lane with varying right-of-way width. There are no sidewalks or bicycle lanes along this section and parking is prohibited on either side of the roadway. Between Industrial Way and I-780, East 2nd Street widens to a four-lane facility with median/turn lanes and bicycle lanes.
- **Lake Herman Road** is a two-lane, east-west roadway that runs west from I-680, forming the northern boundary of the Plan Area. This roadway does not have marked bicycle lanes or sidewalks and parking is prohibited on either side of the roadway.
- **Old Lake Herman Road** (or Reservoir Road) is a two-lane, north-south roadway that runs in the western portion of the Plan Area and connects East 2nd Street to Lake

³ Fehr and Peers. Draft Transportation Impact Analysis Report. Valero Benicia Refinery Crude by Rail Project. May 2013.

Herman Road. Reservoir Road is a narrow roadway with no shoulders, marked bicycle lanes or sidewalks.

- **Industrial Way** is a two-lane arterial roadway that connects I-680 to East 2nd Street to the west and I-680 and Lake Herman Road to the northeast. Between Oregon Street and Noyes Court, Industrial Way is a three-lane street, with two lanes in the southbound direction and one lane in the northbound direction. There are no bicycle lanes and, with the exception of a short segment between Noyes Court and Park Road, no sidewalks.
- **Park Road** is a two-lane, north-south arterial roadway that runs parallel to I-680 to the west, veering northwest before intersecting with East 2nd Street. Park Road serves as the connection between the interchange ramps at Industrial Way and Bayshore Road and the rest of the Industrial Park and extends south to Grant Street in the Lower Arsenal. This street also lacks sidewalks and bicycle lanes.
- **Bayshore Road** in the vicinity of I-680 is a two-lane arterial roadway connecting the Valero refinery with the waterfront and the port.

GEOMETRIC AND DESIGN DEFICIENCIES

The Existing Transportation Conditions and Needs Assessment Report identifies five intersections and one roadway segment that do not meet design standards. The deficiencies include short stopping sight distances, inadequate spacing between intersections, and turning radii inadequate to accommodate the California STAA⁴ trailer truck. These locations, the identified needs, and potential improvements are listed in Table 2-1 and located on Figure 2-1.

PAVEMENT MAINTENANCE

Detailed information on the existing pavement condition of Industrial Park roads may be found in Section 2.2 of the Existing Transportation Conditions and Needs Assessment Report. In addition to the intersection and roadway improvements discussed above, targeted pavement maintenance projects would address roadway segments that have failed or are in poor pavement condition. These roadway segments are also listed in Table 2-1 and shown on Figure 2-1. In general, pavement type should be suitable for heavy truck traffic. In locations with less truck traffic, and as appropriate to road usage and soil conditions, the use of permeable pavers or porous pavement could be explored as a way to manage stormwater.

FLOODING AND DRAINAGE ISSUES

As shown in Figures 2-2 and 2-3, areas of the Industrial Park that are at a low elevation, close to the Bay, and/or by Sulfur Springs Creek (including Park Road and Bayshore Road), are located within Special Flood Hazard Areas as documented by FEMA Flood Insurance Rate Maps (FIRM). The City's Draft Adaptation Plan will contain strategies that may help alleviate some of these flooding issues in the future as sea levels rise and storm intensity increases. These issues may also be addressed by the Stormwater Management and Flood Mitigation Plan planned as part of the City's Measure C Expenditure Plan for FY 2015-2017.

⁴ "STAA" - Surface Transportation Assistance Act of 1982

Although drainage for these areas is of major importance, currently only a few facilities provide curbs and gutters to allow proper drainage. Of the Industrial Park roadways east of I-680, only Industrial Way and Bayshore Road provide curbs and gutters, while all other streets (including Mallard Drive, Sprig Drive and Teal Drive) lack drainage infrastructure. This baseline improvement would provide drainage improvements to the facilities listed in Table 2-1.

Table 2-1: Baseline Roadway Improvements

<i>Roadway Intersection or Segment</i>	<i>Deficiency</i>	<i>Potential Improvements</i>
Geometric Deficiencies		
Industrial Way from East 2 nd Street to I-680 NB on-ramp.	Number of lanes varies between 2 and 3; lack of center left turn lane	Widen to a three lane road with center left turn lane where feasible.
I-680/Lake Herman Road & Gateway Plaza Drive	Inadequate spacing from intersection of Lake Herman Road and I-680 NB ramps (per City's spacing requirement)	Due to geometric and intersection spacing constraints, consider installing traffic signals at the Lake Herman Road/Gateway Plaza Drive and Lake Herman Road/I-680 NB off ramp intersections. The traffic signals should operate with one controller such that the traffic phasing can be programmed to operate in a manner to eliminate the occurrence of queuing and blocking between the two intersections.
West Channel Road & East Channel Road	Inadequate stopping sight distance for eastbound vehicles.	Install advisory curve speed warning sign. Also consider a speed feedback sign if speeding occurs on the roadway.
Industrial Way & SB I-680 off-ramp	Inadequate spacing from intersection of Industrial Way and Park Road. Inadequate stopping sight distance for westbound vehicles due to I-680 overpass structure. Inadequate STAA turning radius for left turn from ramp onto Industrial Way.	Provide a separate sign announcing distance to Park Road intersection. Provide warning sign for westbound vehicles. Pavement widening to accommodate STAA trucks.
Industrial Way & NB I-680 on-ramp	Inadequate STAA turning radius for right turn from Industrial Way onto ramp.	Widen ROW/intersection to accommodate STAA trucks and install traffic signals
Bayshore Road & NB I-680 off-ramp	Inadequate stopping sight distance for westbound vehicles. Insufficient turning radius for STAA vehicles from freeway turning right.	Warning sign for westbound vehicles and install traffic signals. Widen ROW/intersection to accommodate STAA trucks.
Bayshore Road & SB I-680 on-ramp		
West Channel Road from Industrial Way to Channel Court	Inadequate geometry creates safety concerns	Widen road where feasible
Pavement Maintenance		
Bayshore Road south of East Channel Road to south of Industrial Way	Pavement Condition Index (PCI) ¹ of 11	Reconstruct or resurface to "good" condition

Table 2-1: Baseline Roadway Improvements

<i>Roadway Intersection or Segment</i>	<i>Deficiency</i>	<i>Potential Improvements</i>
Industrial Way north of Teal Drive to south of Lake Herman Road	PCI of 33	Reconstruct or resurface to “good” condition *Project in Measure C Expenditure Plan for FY 2015-2016
Lake Herman Road from Gateway Plaza Court to east of Industrial Way	PCI of 36	Reconstruct or resurface to “good” condition
Park Road north of Bayshore Road to south of Industrial Way	PCI 35	Reconstruct or resurface to “good” condition
Park Road north of Industrial Way to south of Stone Road	PCI 98	Reconstruct or overlay to “good” condition
Park Road north of Stone Road to south of East 2 nd Street	PCI 73	Resurface to “good” condition
Address Flooding/Drainage		
Roadways east of I-680 ²	Lack of curbs and gutters to allow proper drainage	Provide curbs and gutters with storm drains along Mallard Drive, Spring Drive, and Teal Drive

Notes:

1. The Pavement Condition Index (PCI) ranges from 0 to 100. A newly constructed street will have a PCI of 100 while a failed street will have a PCI of 25 or less. The pavement condition categories are “good” (PCI greater than 70), “fair” (PCI of 50 – 69), “poor” (PCI of 25 – 49) and “very poor/failed” (PCI less than 25).
2. There may be spot locations west of I-680, such as along Industrial Way where it parallels the railroad, that should also be assessed for proper drainage infrastructure.

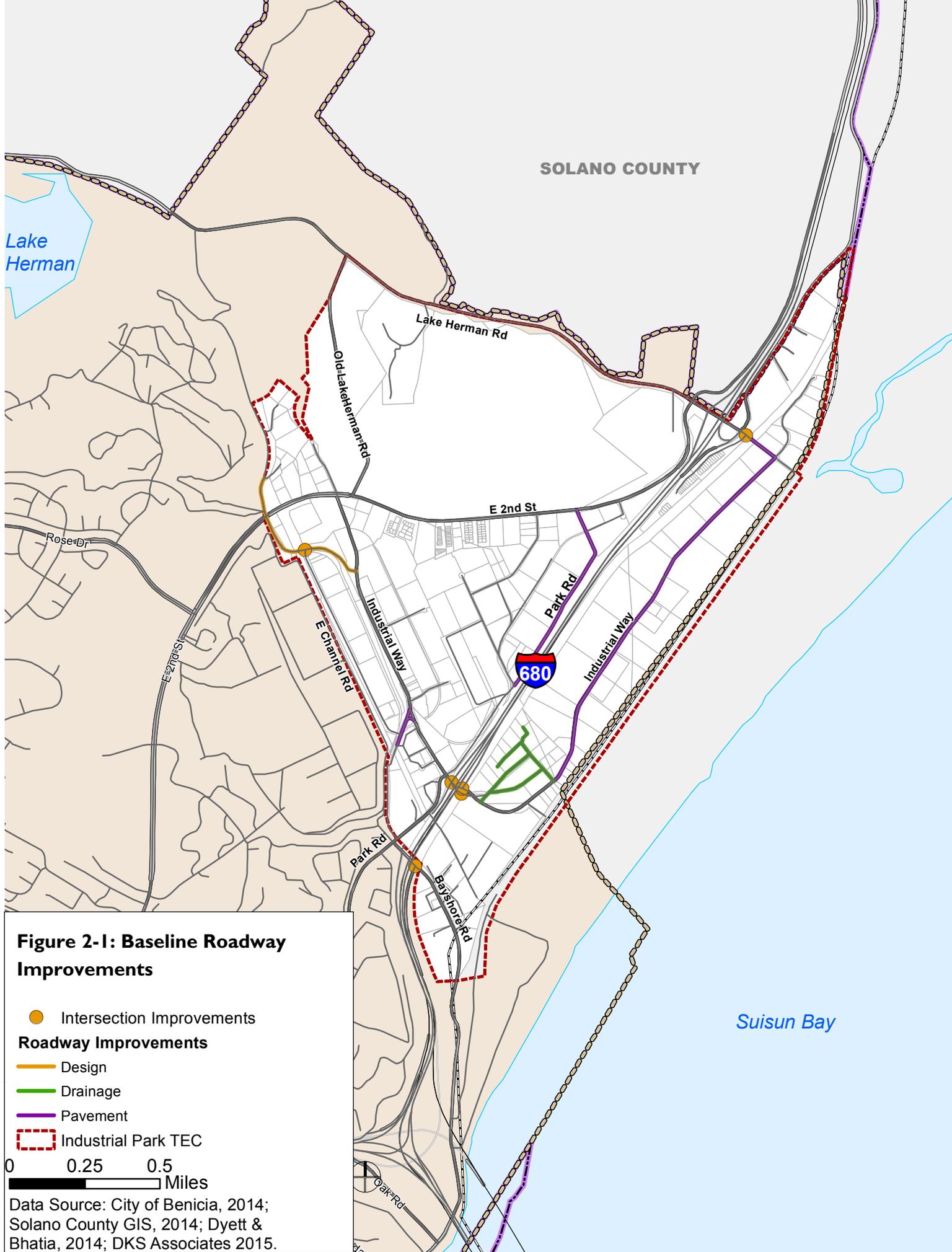
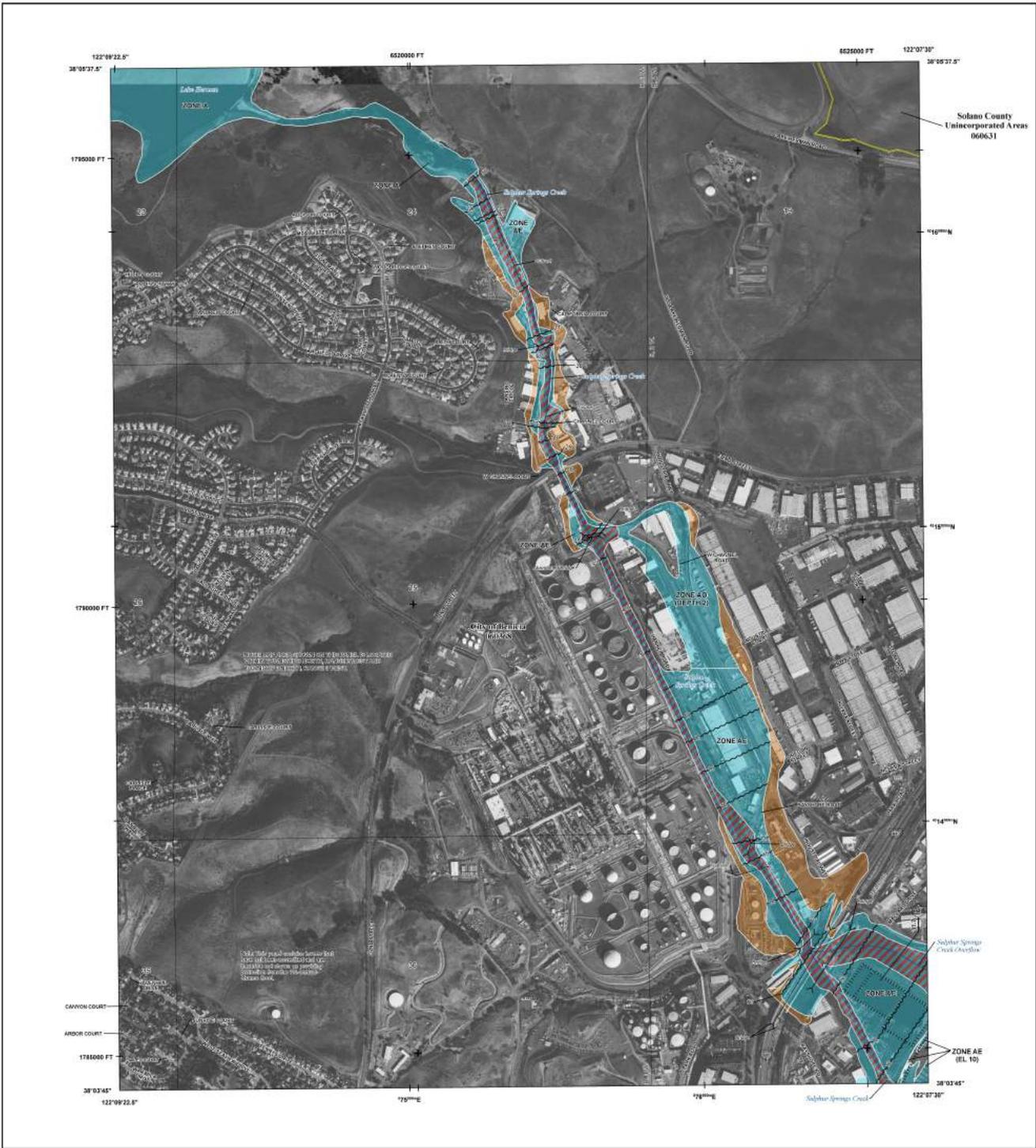


Figure 2-2: Industrial Park Special Flood Hazard Areas - Sulphur Springs Creek



FLOOD HAZARD INFORMATION

SEE THIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT
 THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT [HTTP://MSC.FEMA.GOV](http://MSC.FEMA.GOV)

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) Zone A, A1-A9
	With BFE or Depth Zone AE, AE1-AE10, AE11-AE19, AE20
	Regulatory Floodway
	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
	Future Conditions 1% Annual Chance Flood Hazard Zone X
	Area with Reduced Flood Risk due to Levee See Notes Zone X
OTHER AREAS OF FLOOD HAZARD	NO SCREEN Areas of Minimal Flood Hazard Zone X
	Area of Undetermined Flood Hazard Zone D
OTHER FEATURES	Channel, Culvert or Storm Sewer
	Accredited or Provisionally Accredited Levee, Dike or Floodwall
	Non-accredited Levee, Dike or Floodwall
	Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
	Coastal Transect Baseline
	Profile Baseline
	Hydrographic Feature
	Base Flood Elevation Line (BFE)
	Limit of Study
	Jurisdiction Boundary

NOTES TO USERS

For information and questions about the map, available products associated with this FIRM including future versions of the FIRM, see to other products of the National Flood Insurance Program to general, please see the FIRM Map Information Catalog at <http://MSC.FEMA.GOV> or visit the FEMA Map Service Center website at www.fema.gov. Analytical products may include previously issued Layers of Map Change and Flood Insurance Rate Maps. Analytical products may vary from the map. Many of these products can be ordered or updated directly from the website. Users may determine the current map data for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information Hotline.

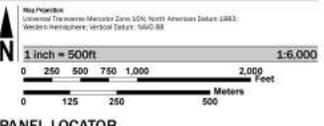
Coordinates appearing on this FIRM panel may not reflect a correct view of the adjacent panel as well as the entire FIRM data. These may be selected directly from the Map Service Center at the customer listed above.

For community and out-of-state map sales refer to the Flood Insurance Study report for this jurisdiction.

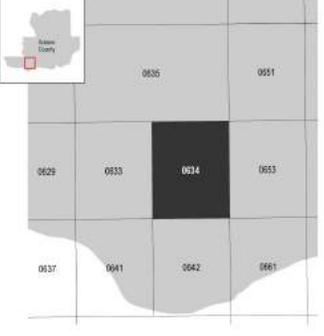
To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-8600.

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SCALE



PANEL LOCATOR



FEMA
 National Flood Insurance Program

**NATIONAL FLOOD INSURANCE PROGRAM
 FLOOD INSURANCE RATE MAP**

**SOLANO COUNTY,
 CALIFORNIA**
 and Incorporated Areas
 Panel: 634 of 730

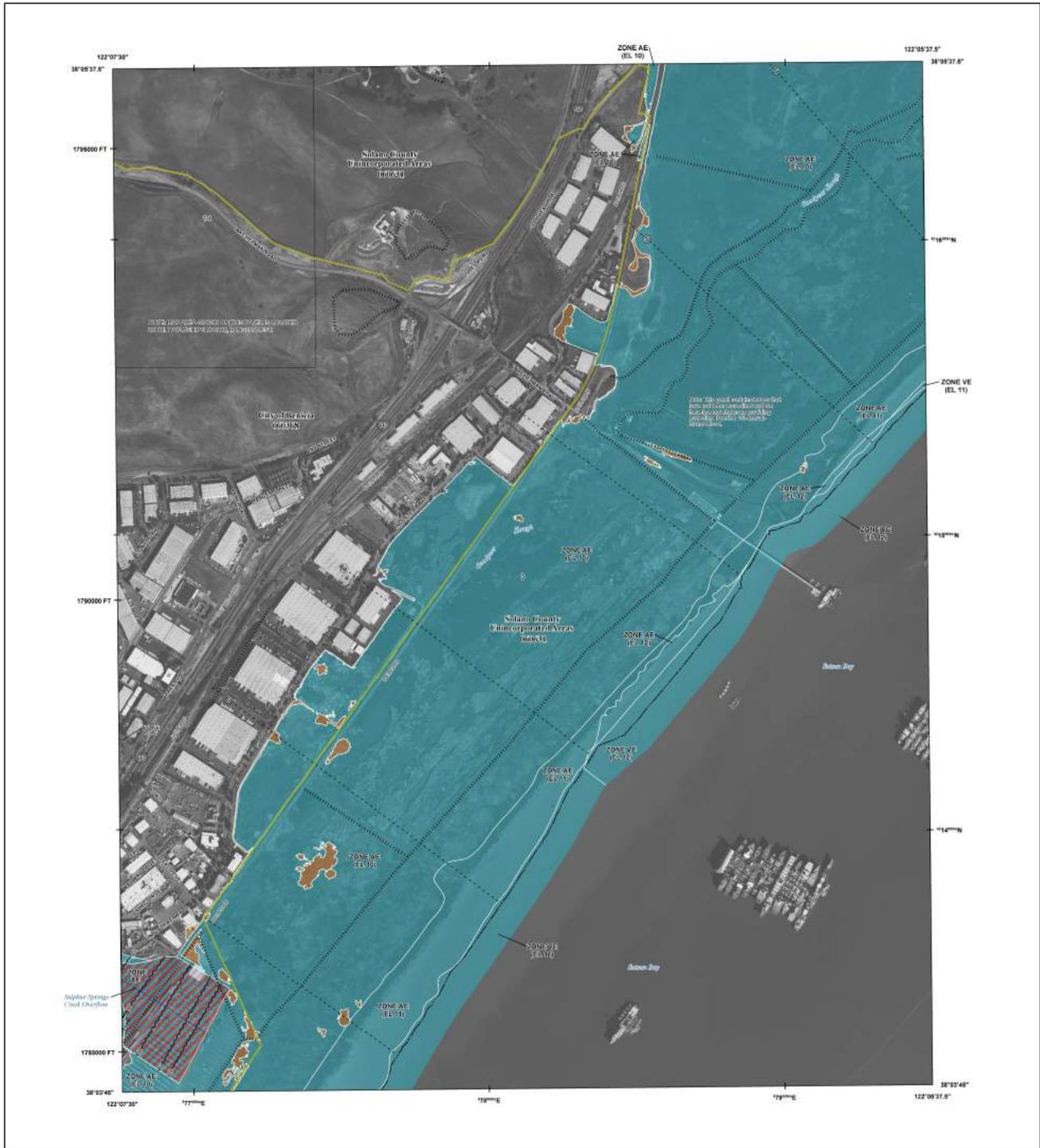
Panel Contains:
 COMMUNITY
 SHEET: C01 OF
 SOLANO COUNTY

NUMBER PANEL SUFFIX
 060631 0634 1

FEMA

VERSION NUMBER
 2.3.2.0
 MAP NUMBER
 0609SC0634F
 MAP REVISED
 AUGUST 3, 2016

Figure 2-3: Industrial Park Special Flood Hazard Areas – Shoreline



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT [HTTP://MSC.FEMA.GOV](http://MSC.FEMA.GOV)

	Without Base Flood Elevation (BFE) Zone A, V, A99
	With BFE or Depth Zone AE, X, AL, AP, VE, AR Regulatory Floodway
	0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
	Future Conditions 1% Annual Chance Flood Hazard Zone X
	Area with Reduced Flood Risk due to Levee See Notes Zone X
	Area of Minimal Flood Hazard Zone X
	Area of Undetermined Flood Hazard Zone D
	Channel, Culvert or Storm Sewer Accredited or Provisionally Accredited Levee, Dike or Floodwall
	Non-accredited Levee, Dike or Floodwall
	Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
	Coastal Transect
	Coastal Transect Baseline
	Profile Baseline
	Hydrographic Feature
	Base Flood Elevation Line (BFE)
	Limit of Study
	Jurisdiction Boundary

NOTES TO USERS

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products, or the National Flood Insurance Program in general, please call the FEMA Map Information Center at 1-877-FEMA-4343 (1-877-362-6227) or visit the FEMA Map Service Center website at <http://msc.fema.gov>. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by using the FIRM Map Information Website.

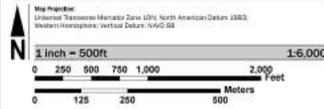
Communities administering an adjacent FIRM panel must obtain a current copy of the adjacent panel as well as the current FIRM block. These may be ordered directly from the Map Service Center at the number listed above.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-685-8880.

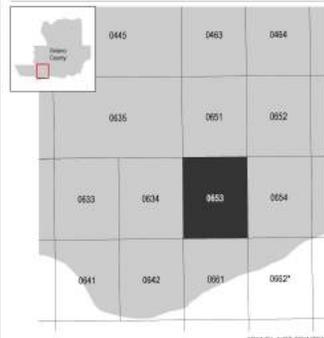
For community and countywide map data refer to the Flood Insurance Study report for this jurisdiction.

Base map information shown on this FIRM was derived from Coastal California LIDAR and Digital imagery dated 2011. USGS NAD 2011 imagery is used in areas not covered by the Coastal California imagery.

SCALE



PANEL LOCATOR



FEMA
National Flood Insurance Program

**NATIONAL FLOOD INSURANCE PROGRAM
 FLOOD INSURANCE RATE MAP
 SOLANO COUNTY,
 CALIFORNIA
 and Incorporated Areas
 Panel 653 of 730**

Panel Contains:
 COMMUNITY: SOLANO COUNTY
 NUMBER: 06090653
 PANEL: 0653
 SUFFIX: F

VERSION NUMBER: 2.3.2.0
 MAP NUMBER: 06090653F
 MAP REVISED: AUGUST 3, 2016

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2.2 More Extensive Improvements

FREEWAY RAMP IMPROVEMENTS OR RECONSTRUCTION

Several of the needs identified in the Existing Transportation Conditions and Needs Assessment Report involve the ramp intersections to and from I-680. Intersection improvements are needed to improve the safety and efficiency of these gateway locations. In addition, the Solano Transportation Authority Comprehensive Transportation Plan identifies construction of an intermodal park-and-ride facility in the area of Lake Herman Road and I-680 that might affect the configuration of these ramps. However, extensive ramp reconstruction and/or realignment may be challenging due to the cost and right-of-way constraints. These locations would warrant further study to determine how best to improve or reconstruct the ramps and are listed in Table 2-2.

Table 2-2: More Extensive Roadway Improvements

<i>Intersection or Segment</i>	<i>Deficiency</i>	<i>Potential Improvements</i>
I-680 NB ramps from Gateway Plaza Drive	Inadequate spacing from intersection of Lake Herman Road	Ramp improvements or reconstruction
Industrial Way & SB I-680 off-ramp	Inadequate spacing from intersection of Industrial Way and Park Road. Inadequate stopping sight distance for westbound vehicles due to I-680 overpass structure. Inadequate STAA turning radius for left turn from ramp onto Industrial Way.	Ramp improvements or reconstruction
Industrial Way & NB I-680 on-ramp	Inadequate STAA turning radius for right turn from Industrial Way onto ramp.	Ramp improvements or ramp reconstruction
Bayshore Road & NB I-680 off-ramp and I-680 SB on-ramp	Inadequate stopping sight distance for westbound vehicles. Insufficient turning radius for STAA vehicles from freeway turning right. Circuitous and confusing routing to get to SB on-ramp and from NB off ramp.	Ramp improvements or reconstruction, potentially connecting the off ramps and on ramps directly in both directions.

2.3 Variation between Scenarios

This section describes the package of roadway improvements that best supports each land use Scenario. The “baseline” package of improvements discussed above, addressing geometric deficiencies, pavement condition, and flooding should be pursued under all Scenarios. Freeway ramp improvements or reconstruction would be an option under all Scenarios.

SCENARIO 1 - Minimal Intensification

Under this Scenario, land uses would remain largely as-is with only minimal intensification. This scenario does not account for development on the Northern Gateway property. Improvements under Scenario 1 would focus on facilitating truck movements and improving safety which includes drainage deficiencies. In addition to baseline roadway improvements, further study should be made of options for improving or reconstructing the ramps onto and off of I-680.

SCENARIO 2 – Development of Northern Gateway Property

This Scenario contemplates development of the Northern Gateway property based upon the projected land uses of the General Plan and zoning. In this case, connections between the Northern Gateway property and the existing sections of the Industrial Park would need to be strengthened to foster the identity of the area as a whole and potentially accommodate employees traveling to and from the bus hub at Park Road and Industrial Road as well as Solano County’s Comprehensive Transportation Plan’s planned Intermodal Transportation Station at Lake Herman Road and East 2nd Street. With respect to connectivity within the existing Industrial Park, priority would be given to improving the existing intersections along East 2nd Street, particularly at Industrial Way, Stone Road and Park Road.

SCENARIO 3 – Development of Northern Gateway Property plus Land Use Intensification

Under the third Scenario, land uses in the existing sections of the Industrial Park would intensify to serve a greater density of employees and customers, in addition to development on the Northern Gateway Property. The same package of baseline roadway improvements and intersection improvements described for Scenarios 1 and 2 would support this Land Use Scenario.

3 Bike Improvements

Benicia's Complete Streets Policy (Appendix A) expresses the City's commitment to creating and maintaining streets that accommodate all users, including bicyclists. However, there are particular challenges to providing safe bicycle infrastructure in an industrial context where there is a high volume of truck and rail traffic. In order to provide the opportunity for Benicia Industrial Park workers to safely commute by bicycle, a network of bicycle facilities must be created that provides well-marked access to and through the Park while still allowing for the efficient movement of goods.

3.1 Bicycle User Groups and Needs

When considering potential bicycle improvements to support the Benicia Industrial Park, it is useful to keep in mind the different user populations and their needs. While current information about the number of bicyclists who travel to and through the Industrial Park is not available, two potential user groups were identified in the stakeholder interviews conducted for the TEC Plan. The groups include:

- **Destination commuters** – This group needs to travel safely and conveniently to jobs or services located within the Industrial Park, typically on weekdays. To better serve this group of bicyclists, planned facilities around the edges of the Industrial Park should be supplemented with additional internal facilities, bicycle way-finding signs, and supporting features such as bike racks.
- **Recreational users** – This group needs to safely move through the Industrial Park on planned or existing Class II lanes or Class III routes on East 2nd Street, Park Road, and Industrial Way as well as along a planned interpretive trail along the waterfront.⁵ Recreational use is likely to be concentrated more on weekends versus weekdays, however there is also some potential for lunchtime cyclists.

3.2 Bike Parking and Facilities

Bicycle routes are commonly classified in four different categories:

- **Class I** bike paths are typically separated from vehicular traffic for the exclusive use of bicycles and pedestrians.

⁵ As shown in the General Plan.

- **Class II** bike lanes provide a striped and stenciled lane for one-way travel on a street or highway adjacent to vehicular traffic.
- **Class III** bicycle routes are signed routes where bicycles share the roadway with vehicular traffic and no separate right-of-way is provided for bicyclists.
- **Class IV** bicycle facilities or cycle tracks are a recently-designated category introduced by AB1193 – Protected Bikeways Act. As described in Caltrans’ Design Information Bulletin Number 89, Class IV bikeways are facilities exclusively for use of bicycles with a required separation between the bikeway and through vehicular traffic.

Bicycle support programs and facilities should accompany the completion of or enhancements to the bicycle network. Options that the City should consider include:

- Supporting existing programs or developing new programs to encourage installation of bicycle racks on private properties, at the property owners’ request or expense;
- Provision of secure bike racks or lockers at the bus hub and planned Intermodal Transportation Station;
- Identification of other public areas where bicycle racks or lockers make sense;
- Review of the parking code requirements for new development (bicycle parking equal to five percent of the required automobile parking spaces is presently required for most commercial development);
- Consideration of a tiered bicycle infrastructure requirement for new development that necessitates varying levels of infrastructure depending on the size and type of development, as recommended in the City’s Climate Action Plan;
- Installation of an internal bike share system for use within the Industrial Park
- New incentives as part of a Transportation Demand Management (TDM) program for installing showers or other bicycle support facilities on existing or newly developed sites (Scenario 3); and
- At the time of the next General Plan update, evaluation of designated bicycle routes to determine if they remain the safest and most direct options for routing commuter and recreational cyclists.

Development of an off-road, multi-use trail east of Industrial Way along the waterfront, as shown in the General Plan, should be considered under all the Land Use Scenarios.

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Benicia Community Park

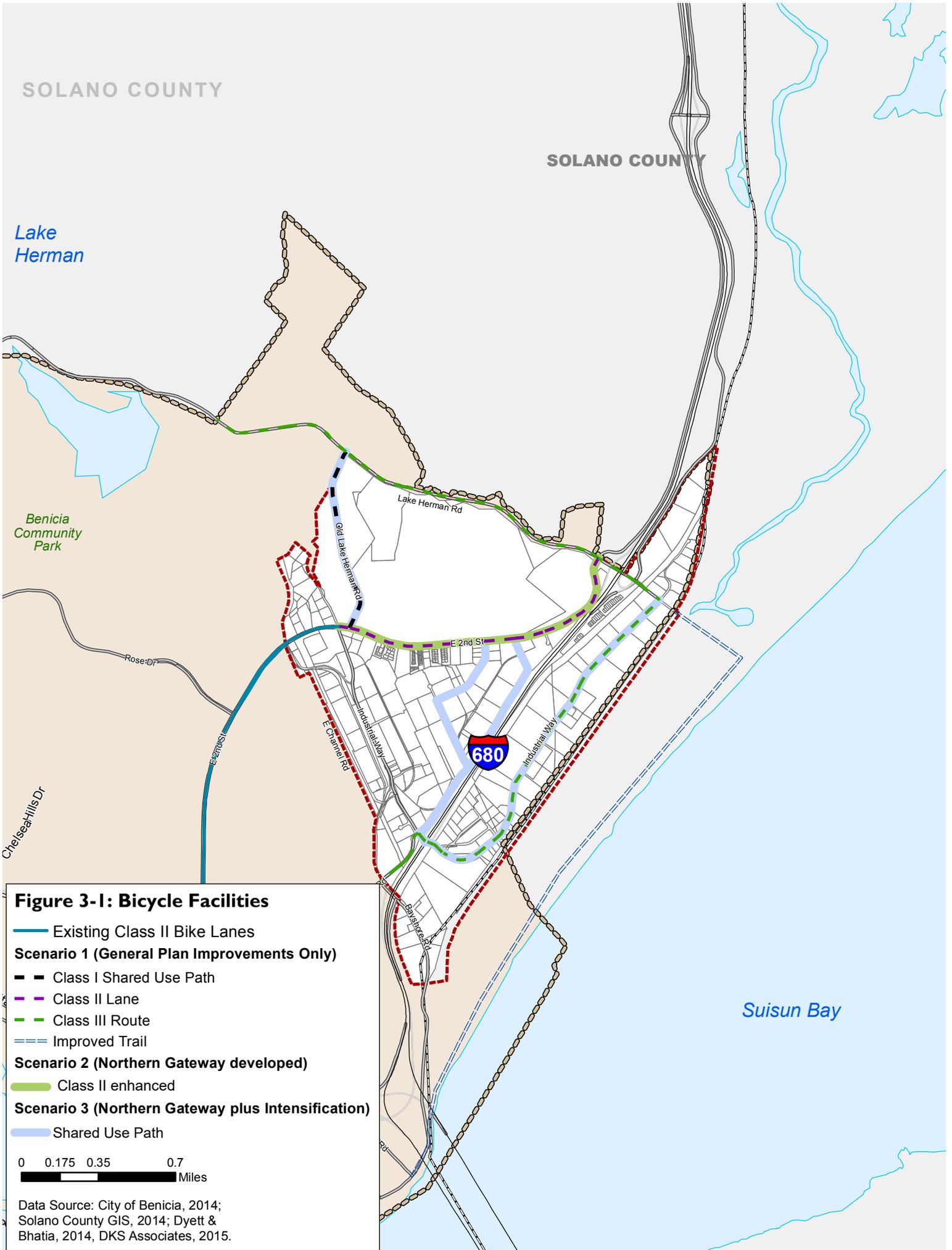
Suisun Bay

Figure 3-1: Bicycle Facilities

-  Existing Class II Bike Lanes
- Scenario 1 (General Plan Improvements Only)**
-  Class I Shared Use Path
-  Class II Lane
-  Class III Route
-  Improved Trail
- Scenario 2 (Northern Gateway developed)**
-  Class II enhanced
- Scenario 3 (Northern Gateway plus Intensification)**
-  Shared Use Path

0 0.175 0.35 0.7 Miles

Data Source: City of Benicia, 2014; Solano County GIS, 2014; Dyett & Bhatia, 2014, DKS Associates, 2015.



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3.3 Variation between Scenarios

Recognizing the unique challenges of implementing Complete Streets policies in an industrial area, the Existing Transportation Conditions and Needs Assessment Report identifies three typologies for major roadways within the Industrial Park area: truck/auto priority, bicycle/pedestrian priority, and transit priority (see Table 6 and Figure 10 in the Existing Transportation Conditions and Needs Assessment Report).

With these recommended designations in mind, this section describes the packages of bicycle facility improvements that would best accompany each Land Use Scenario. The locations of proposed improvements are identified in Figure 3-1.

SCENARIO I - Minimal Intensification

Under Scenario 1, bicycle improvements would focus on completing the bicycle networks currently identified in the General Plan and the Solano County Bicycle Plan, completing a peripheral bicycle network covering all access points to/from the Industrial Park as well as enabling safer and more direct through travel. Bicycle facilities called for in the General Plan, including those along Industrial Way, are largely Class III bicycle routes with Class II lanes proposed only along East 2nd Street. Under this Scenario, the bicyclists served would be mostly destination and recreational users. Bicycle facilities that are consistent with the General Plan include:

- Class III bike routes along Park Road (from Military East Street to Industrial Way), Old Lake Herman Road, Lake Herman Road and Industrial Way (from Park Road to Lake Herman Road);
- The continuation of existing Class II bike lanes along East 2nd Street (from Lake Herman Road to Industrial Way); and
- An off-road, multi-use trail, located east of Industrial Way for recreational purposes.

Under Scenario 1, bicycle facilities would be limited to the conventional striping and painted “sharrows” (see Figure 3-2 for illustration of sharrows). Providing support facilities under Scenario 1 would be less critical and could perhaps be limited to secure bicycle parking (well-lit with visible racks, lockers, etc.) at the planned bus hub.

Figure 3-2: Sharrow Illustrations



Standard sharrow marking (top left) and sharrow markings in East Palo Alto, California (top right) and San Francisco, California (bottom).

Sources: California Manual on Uniform Traffic Control Devices, 2014 Revision 1; sf.streetsblog.org; Google Street View

SCENARIO 2 – Development of Northern Gateway Property

For Scenario 2, creating connections to the Northern Gateway property north of East 2nd Street becomes a priority and the bicycle network would serve additional destination commuters and recreational users. Because of this, support facilities such as lockers or racks would become more important under Scenario 2.

Under Scenario 2, a shared-use bike and pedestrian path should be added to Old Lake Herman Road. In addition, protected bike lanes along East 2nd Street could be built as part of the proposed streetscape design described in Chapter 5 (see Figure 5-2). Where feasible, improvements could include rolled curbs that separate bike lanes from vehicular traffic, as well as adjacent sidewalks,

street trees, and landscaping. Recommended streetscape improvements for East 2nd Street are discussed in more detail in Chapter 5 and should be evaluated in development of a Specific Plan for the area.

SCENARIO 3 – Development of Northern Gateway Property Plus Land Use Intensification

Under Scenario 3, intensifying land uses in the existing Industrial Park area would require a denser network to facilitate bicycle travel. This Scenario would need to serve the highest number of destination commuters as well as through and recreational bicyclists.

As with Scenario 2, protected bike lanes along East 2nd Street are also recommended for Scenario 3. While roadways internal to the Industrial Park would remain primarily auto and truck routes, potential exists for streetscape improvements along Park Road, Stone Road, and Industrial Way that could serve alternative modes. Shared-use bike and pedestrian paths would provide safe routes for bicyclists on one side of the street without hindering the flow of auto and truck traffic. Shared-use paths are described in greater detail in Chapter 5 (see Figures 5-3, 5-4 and 5-5).

Bicycle support facilities would become most important under Scenario 3. Under this Scenario, the City should consider implementing measures for new development such as increased or enhanced bicycle parking requirements and incentives for TDM-related amenities such as showers.

3.4 Constraints

The main constraints to completing or expanding the bicycle network in the Industrial Park are limited rights-of-way, complicated intersections at freeway off ramps and railroad crossings, and contextual compatibility with adjacent industrial uses. For the most part, there is adequate right-of-way for the proposed bicycle routes, but bottlenecks do exist in several locations. For example, the roadways of Industrial Way and Lake Herman Road are both narrow where they pass under the freeway and under/over the railroad. More detailed information on rights-of-way and constraints on the provision of bicycle infrastructure may be found in Section 2.6 of the Existing Transportation Conditions and Needs Assessment Report.

There was a concern voiced in the stakeholder interviews about the compatibility of bicyclists and industrial uses that necessitate truck traffic. Safety is an important concern, particularly at intersections and driveways where turning trucks may not be expecting bicycle cross traffic. Under State law, bicycles are allowed on all roadways except for freeways. Concerns about safe bicycle access in and around the Industrial Park can best be resolved through clearly identified, carefully planned, and marked routes on appropriate streets. Bicycle routes and shared use paths help to organize vehicle travel on roadways and enhance safety, as motorists will know where to expect bicyclists. At the same time, bicyclists should be encouraged to exercise caution through appropriate warning, pavement and directional signage.

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4 Pedestrian Improvements

Pedestrians in the Industrial Park could be employees or customers of existing or future businesses. Some would be commuters traveling from the planned bus hub to work sites. Others would be employees who wish to walk for exercise or to restaurants or other service businesses at lunch time.

As is the case for bicyclists, the heavy truck and rail traffic that travels through the Industrial Park at all hours can make for an uncomfortable and potentially dangerous pedestrian environment. In order to provide Industrial Park users with safe pedestrian routes that do not impede the flow of vehicular traffic, a network of clearly marked pedestrian paths along select roads are needed.

4.1 Baseline Pedestrian Improvements

As noted in the Existing Transportation Conditions and Needs Assessment Report, the Industrial Park is largely lacking a pedestrian network. At a minimum, connections should be provided between the current bus stop, the bus hub, local businesses, and the planned Intermodal Transportation Station, when constructed. Future developments in the Industrial Park should be required to include connections between facilities and adjacent sidewalks.

In addition, sidewalks or other pedestrian facilities should be constructed along Industrial Way from Park Road to Lake Herman Road with crosswalks at all intersections. Because of right-of-way constraints and existing development abutting the curb, the pedestrian facilities along this section of Industrial Way may be limited to one side of the road only and should follow the streetscape recommendations described in Chapter 6. Concurrently, the City should evaluate the long-term maintenance requirements for these improvements.

4.2 Variation between Scenarios

This section describes the package of pedestrian improvements that best supports each Land Use Scenario. The improvements are also illustrated in Figure 4-1.

SCENARIO 1 – Minimal Intensification

Under Scenario 1, pedestrian improvements would focus on providing a minimal level of connectivity from the bus hub to adjoining areas of the Industrial Park. Pedestrian improvements under this Scenario would be largely limited to the baseline improvements described above.

SCENARIO 2 – Development of Northern Gateway Property

If the development of the Northern Gateway property proceeds, connections across East 2nd Street between the newly-developed areas and existing sections of the Industrial Park become more important. Under this Scenario, it will be important to provide sidewalks along East 2nd Street between Industrial Way and Lake Herman Road and to ensure that crosswalks are provided at existing intersections and any new roads or major driveways serving the Northern Gateway property.

Under Scenario 2, pedestrian facilities along East 2nd Street could be built as part of the proposed streetscape design described in Chapter 5 (see Figure 5-2) where feasible. Recommended streetscape improvements are discussed in more detail in Chapter 5 and should be evaluated in development of a Specific Plan for the area.

SCENARIO 3 – Development of Northern Gateway Property plus Land Use Intensification

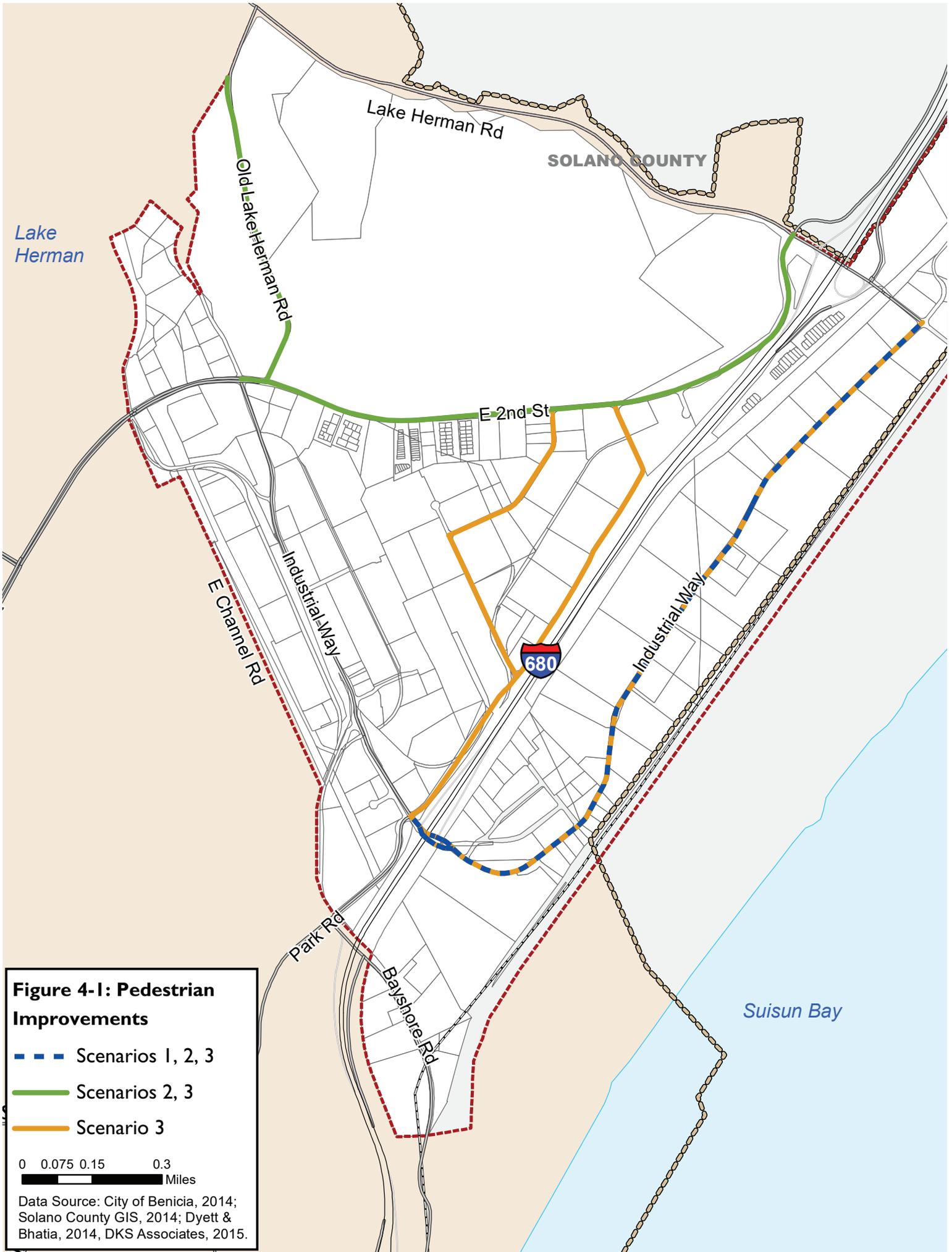
Because land use intensification will likely increase pedestrian activity in the Industrial Park, filling out the pedestrian network will be a priority under this Scenario. In addition to what is described above for Scenario 2, pedestrian facilities should be provided along:

- Park Road (Industrial Way to East 2nd Street);
- Stone Road (East 2nd Street to Park Road); and
- Industrial Way (Park Road to Lake Herman Road).

Due to right-of-way constraints and the fact that these will remain predominantly auto and truck routes serving industrial uses, pedestrian facilities located in the interior of the Industrial Park should largely consist of shared-use paths along one side of the roadway, as described in Chapter 6 (see Figures 6-3, 6-4 and 6-5). Opportunities to create pedestrian and bicycle paths separate from the roadway network, for example along disused railroad rights-of-way, should be explored further.

4.3 Constraints

Constraints and limitations to expanding the pedestrian network are similar to those described under bicycle improvements: limited right-of-way in certain locations and proximity to heavy vehicle traffic. Provision of pedestrian infrastructure will enhance safety in the Industrial Park by providing clearly marked crossing points and alerting motorists to the potential presence of pedestrians. Pedestrian facilities are also an important component in meeting Complete Streets planning requirements.



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5 Streetscape Design

Streetscape refers to the elements - such as roadway, paths, landscaping, lighting, signage - along a street, typically encompassing the space between facing buildings as well as the street right-of-way. Streetscapes often vary in accordance with adjacent land uses; e.g., residential streetscapes are often characterized by ornamental landscaping, urban commercial streetscapes by wider sidewalks and ornamental lighting. Industrial areas are typically characterized by minimal streetscape features with less ornamental fixtures and landscaping.

The Benicia Industrial Park currently straddles eras in terms of streetscape and site amenities, as well as its buildings and other forms of infrastructure. The original area south and west of southerly Stone Road lacks facilities for any travel mode other than trucks; i.e. no sidewalks, street trees, etc. More recently developed lands along northerly Stone Road, Industrial Way, and East 2nd Street have segments of frontage sidewalks and landscape designed per City standards and typical of suburban development in recent decades. Any new development on the Northern Gateway Property is likely to be similar in accordance with current standards, including facilities that support pedestrian and bicycle circulation.

The Benicia Industrial Park competes with other industrial areas to attract and retain tenants. For higher value added companies, typically those with higher ratios of employee to floor area; workplace area support facilities are important. For those industries in which employees are at a premium - e.g. research and development, high-tech and knowledge-based jobs - support facilities are even more important. These facilities include easy and attractive transit, bicycle, and/or pedestrian access and proximity to support services such as dining and recreation. These types of jobs and amenities are a lesser focus of the current Industrial Park, but may be incorporated into the Northern Gateway Area in the future. Any streetscape and circulation improvements contemplated in this planning process will aim to provide reasonable enhancements to circulation in the existing Industrial Park—in a way that is compatible with a strong industrial area—while also supporting investment in and connections to any future development in the Northern Gateway Area. Connections to existing and future trails that provide access to other parts of the city will also be considered.

Given the size of the Industrial Park, its mix of tenants, and its lack of an internal transit network - e.g. a shuttle system - it is difficult to imagine strong demand for pedestrian circulation in the near term. The potential for bicycle circulation is stronger, particularly if coupled with expanded bus service and better bicycle connections to the downtown, and residential areas, such as Southamptton, via East 2nd Street per the General Plan. In addition, there may be potential for connections to the Arsenal via Park Road. Most likely to encourage bicycle use is an internal bike-share program that promotes cycling by allowing Industrial Park employees to bike between buildings and/or between the bus hub and their workplaces, making trips fast and easy without cars. A bike-share program would also satisfy the requirements of the Bay Area Air Quality

Management District (BAAQMD) Commuter Benefits Program for businesses with 50 or more full-time employees (BAAQMD Regulation 14, Rule 1).

The intent of these recommendations is to set the stage for retaining and attracting additional high-wage and high-revenue producing companies as envisioned by the General Plan. These kinds of improvements can stimulate investment in the Industrial Park as well as improve the sustainability of this important part of the City of Benicia.

5.1 Constraints

With the exception of a few most recently developed sites, there are no sidewalks within the Industrial Park, and there are no designated bikeways or routes. Both are key elements in meeting Complete Streets requirements as well as providing basic amenities throughout the Industrial Park. More recently developed sites do provide frontage landscaping, but the kind of consistent street tree plantings that typify newer industrial parks are absent. Street trees would provide a sense of continuity within the area, while also softening the appearance of areas with large expanses of parking, roadways and other hard surfaces. In places where there is a constricted right of way, street tree plantings would need to occur on the street facing edge of private properties. In these cases, tree planting should be made a requirement of redevelopment.

Importantly, shade trees can make bicycle and pedestrian circulation links more attractive, reducing auto use, greenhouse gas emissions, and providing related benefits to public health. They also aid in rainwater capture, stormwater management, and provide shade to offset the “urban heat island effect”, which according to the EPA further reduces energy use and greenhouse gas generation.⁶

A major challenge in transitioning the Industrial Park to an improved circulation and amenity environment is the lack of space within existing rights-of-way to provide sidewalks, bikeways, and frontage shade trees. In the older portions of the Industrial Park, paved parking and loading areas extend to the edge of existing rights-of-way. In the newer areas, mature landscaping and utilities are located in the back of curb area typically dedicated to access- and streetscape-related improvements. Additional constraints include upslope areas within and adjoining the right-of-way along East 2nd Street as well as the limited right-of-way at the I-680 underpass on Park Road.

5.2 Variation between Scenarios

Given the built-out nature of the existing Industrial Park, and the low probability that site-by-site property redevelopment will be able to provide contiguous Complete Street access and streetscape improvements within a desirable time frame, improvements are generally recommended within existing curb-to-curb roadway areas, making use of excess roadway wherever it exists. Truck

⁶ As defined by the EPA, the term “heat island” describes built up areas that are hotter than nearby rural areas. Heat islands can affect communities by increasing summertime peak energy demand, air conditioning costs, air pollution and greenhouse gas emissions, heat-related illness and mortality, and water quality.

turning movements at intersections and driveway entrances are a key concern, and will require location-by-location study to determine specific geometric requirements. Frontage street trees must be species that can be limbed to a minimum height of 14 feet for truck clearance. Special paving is not recommended at pedestrian crossings due to the wear and tear associated with heavy truck traffic. East 2nd Street is a special case, with an approximately 120-foot right-of-way between Reservoir Road and Park Road that can be improved to include Complete Street improvements as well as stormwater capture as part of any future development of the Northern Gateway Property.

Where roadways are reconfigured to include bicycle, pedestrian, and other Complete Streets elements, greater than the minimum vehicle travel lane width should be maintained where possible. The Caltrans Highway Design Manual⁷ specifies a preferred lane width of 12 feet. Similarly, the American Association of State Highway and Transportation Officials recommends a minimum 12 foot lane width in industrial areas.⁸ The minimum widths for bicycle facilities specified by Caltrans are 8 feet for a two-way Class I shared use path (with 10 feet preferred), 5 feet for a one-way Class I path, 4 feet for a Class II bicycle lane (5 feet where posted speeds are greater than 40 miles per hour), 5 feet for a one-way Class IV cycle track, and 8 feet for a two-way cycle track.

Concept recommendations for roadway improvements are described for each Scenario and illustrated with before-and-after renderings. These renderings incorporate the recommendations of Chapters 3 and 4 relating to pedestrian and bicycle facilities. Additional detail regarding signage and wayfinding is covered in Chapter 7. The proposed locations of suggested recommendations are shown in Figure 5-1.

SCENARIO 1 – Minimal Intensification

Given the limited bike and pedestrian improvements suggested for this Scenario, only minimal streetscape improvements are recommended. As discussed in Chapter 3 and 4, bicycle facilities would be limited to conventional striping, painted sharrows, and secure bicycle parking at the future bus hub, while pedestrian improvements would provide connectivity from the bus hub to adjoining areas.

SCENARIO 2 – Development of Northern Gateway Property

In addition to the streetscape improvements recommended for Scenario 1, the following additional recommendations are made for Scenario 2:

Shared Use Path for Old Lake Herman Road

Old Lake Herman Road (also referred to as Reservoir Road) would be reconfigured to include a shared use path for bicycles and pedestrians, which would allow for increased connectivity

⁷ 6th Edition HDM Change 12/30/15.

⁸ AASHTO, A Policy on Geometric Design of Highways and Streets 2011, 6th ed. (United States: American Association of State Highway & Transportation Officials, 2011).

between Lake Herman Road and East 2nd Street. Examples of shared-use paths are illustrated in Figures 5-3, 5-4 and 5-5.

Boulevard with Protected Bike Lanes and Sidewalks - East 2nd Street

Any future development of the Northern Gateway property will provide the opportunity to reconfigure East 2nd Street as a multi-modal boulevard that serves as a central spine running between the older and newer areas of the Industrial Park. These improvements are possible only along East 2nd Street, where a large unused right-of-way area allows for them as part of development of the Northern Gateway property.

As illustrated by Figure 5-2, the roadway should be reconfigured to include a median, frontage sidewalks, curbside stormwater-capture planting strips, street trees, lighting, and protected bike lanes. The sketch depicts 6-ft bike lanes protected by a rolled curb, allowing the bike lanes to double as shoulder areas for emergency/breakdown situations. Depressions in the rolled curb may be necessary to allow proper stormwater drainage. The sketch also depicts a 16-ft wide landscape/rain garden median that could accommodate a 6-ft pedestrian refuge and 10-ft turn lane at major intersections.

Future planning for the Northern Gateway property should account for the Complete Streets objectives of the Transportation and Employment Center Plan and incorporate appropriate streetscapes/prototypes to align with the recommendations of this Plan. TEC Plan recommendations may be further reviewed and modified as part of the planning process for the Northern Gateway property in light of the project's land uses, circulation, and grading. In the future, the City should also consider extending the Complete Streets improvements for East 2nd Street south to Rose Drive.

SCENARIO 3 – Development of Northern Gateway Property plus Land Use Intensification

In addition to the streetscape improvements recommended for Scenarios 1 and 2, the following additional recommendations are made for Scenario 3:

Interior Streets with Shared-Use Paths – Park Road, Stone Road, and Industrial Way (east of I-680)

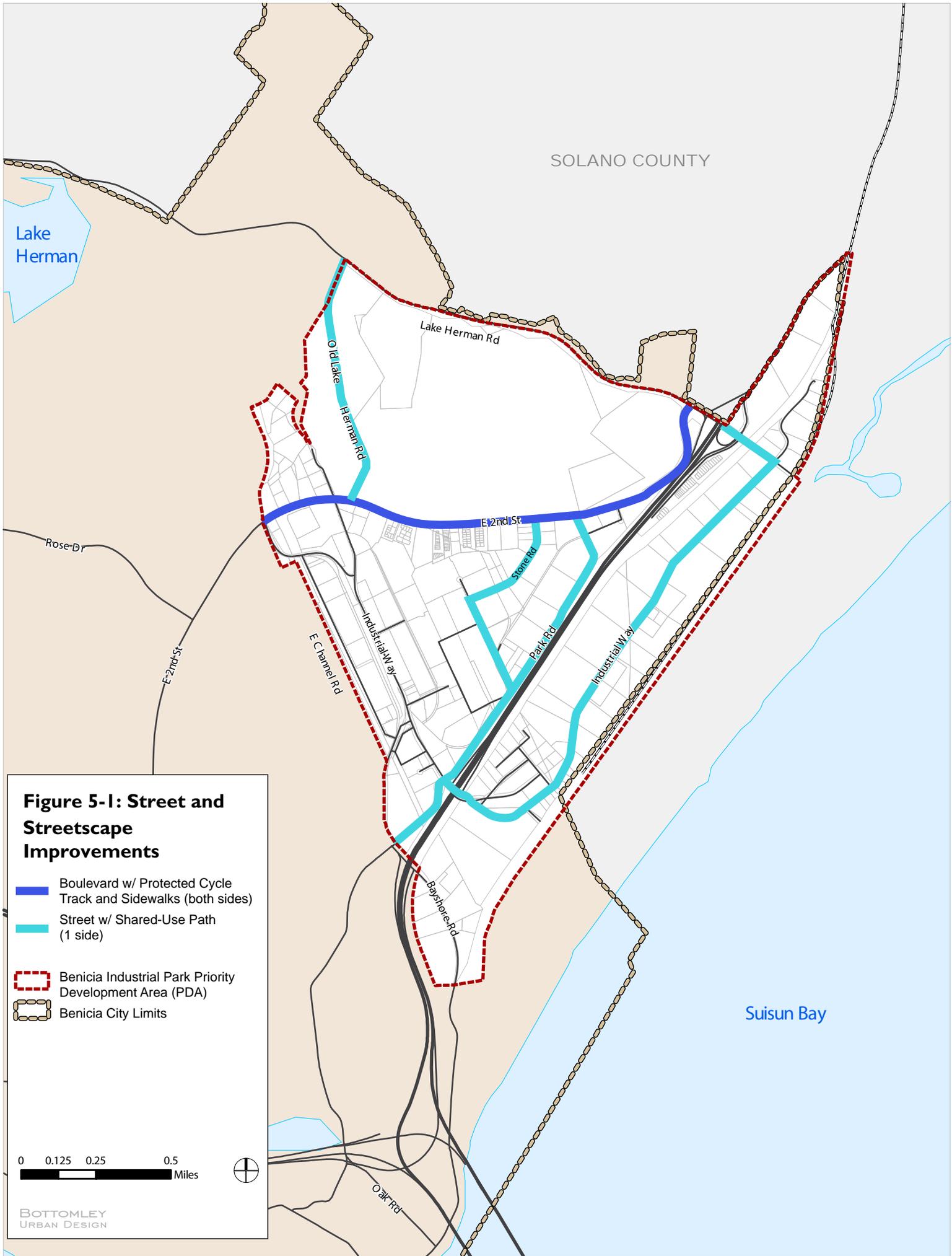
Given the land use intensification Scenario 3 assumes for the interior of the existing Industrial Park, there is an opportunity to incorporate shared-use paths for bicyclists and pedestrians on select interior roads. Limiting bike and pedestrian facilities to a few designated routes with ample signage will help ensure safety by reducing the potential for conflicts between auto/truck traffic and bicyclists/pedestrians. Special markings could be added to areas where shared-use paths cross in front of driveways to increase visibility and alert bicyclists and pedestrians to the possibility of entering/exiting truck and vehicle traffic.

As shown in Figures 5-3 and 5-4, existing 17' (+/-) lanes on Park Road and Stone Road would be reduced to 12' to accommodate a multi-use pedestrian/bike path along one side of the roadway; the curb-to-curb width is too narrow to provide a path along both frontages. Along Park Road, the path would be located along the easterly side of roadway, adjacent to the embankment down

to I-680. The path could be located along either frontage of Stone Road, as the number of driveway curb cuts and other breaks in the frontage are roughly the same on both sides of the roadway. Infill frontage shade trees and pedestrian-oriented streetlights are recommended where feasible on private property behind the right-of-way.

In addition, a shared-use path is proposed for the portion of Industrial Way located east of I-680, between Park Road and Lake Herman Road. As shown in Figure 5-5, existing 14' (+/-) lanes would be reduced to 13', and existing curbside parking removed on one side of the roadway to accommodate bicycle and pedestrian access along the easterly, bayside of the street. Curbside parking, which is heavily utilized by trucks in the area, would remain on one side of the street. It is recommended that the path and parking be on the same side so that the parking may provide a buffer from truck traffic. Overlooks or parklets that face Suisun Marsh may be considered as well. Infill frontage shade trees are recommended on private property behind the right-of-way line.

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SOLANO COUNTY

Lake Herman

Lake Herman Rd

Lake Herman Rd

E 2nd St

Stone Rd

Park Rd

Industrial Way

E Channel Rd

Industrial Way

Bayshore Rd

Oak Rd

Suisun Bay

Figure 5-1: Street and Streetscape Improvements

- █ Boulevard w/ Protected Cycle Track and Sidewalks (both sides)
- █ Street w/ Shared-Use Path (1 side)
- Benicia Industrial Park Priority Development Area (PDA)
- Benicia City Limits

0 0.125 0.25 0.5 Miles



Figure 5-2: Boulevard with Protected Bike Lanes and Sidewalks - East 2nd Street
 (Scenarios 2 and 3)

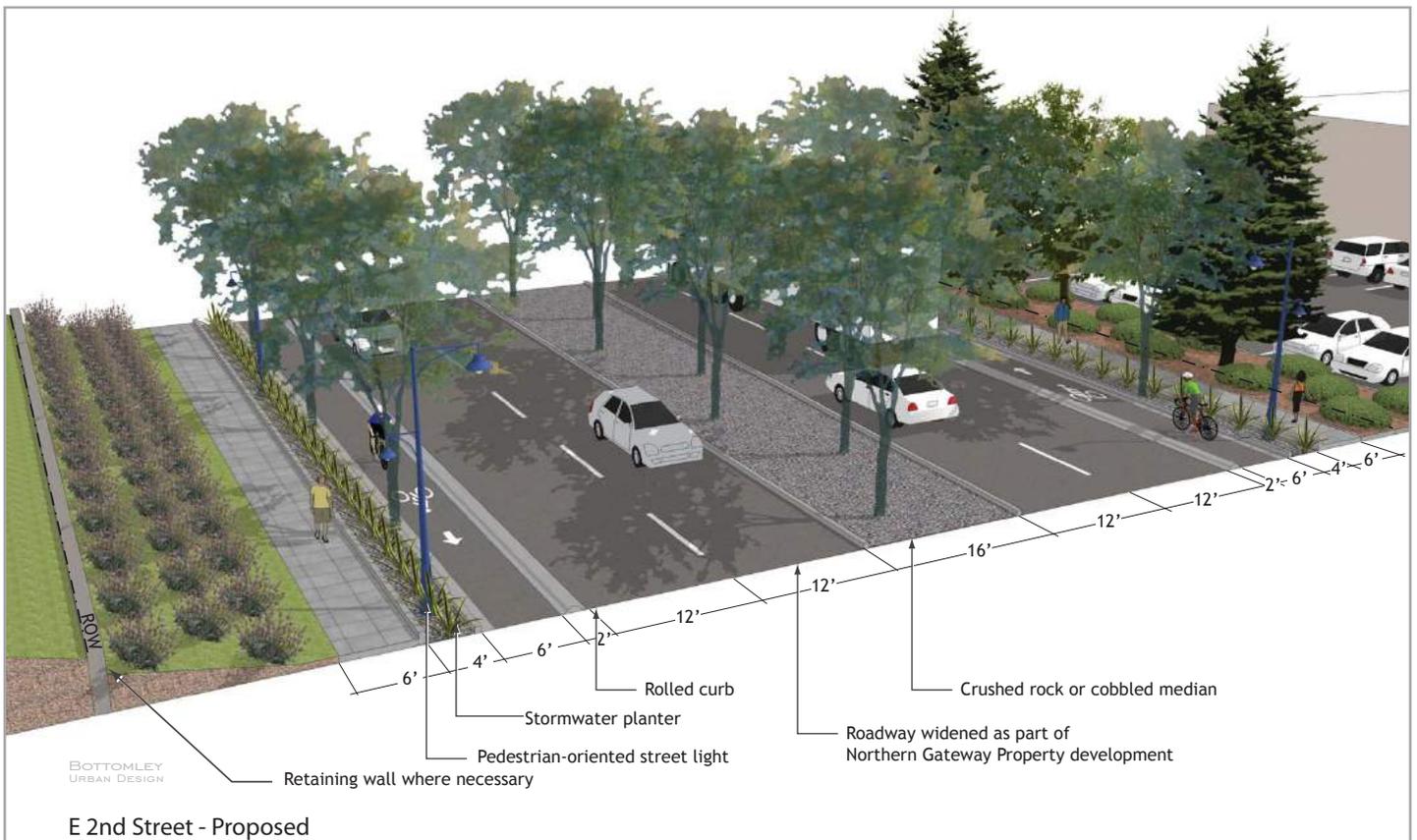
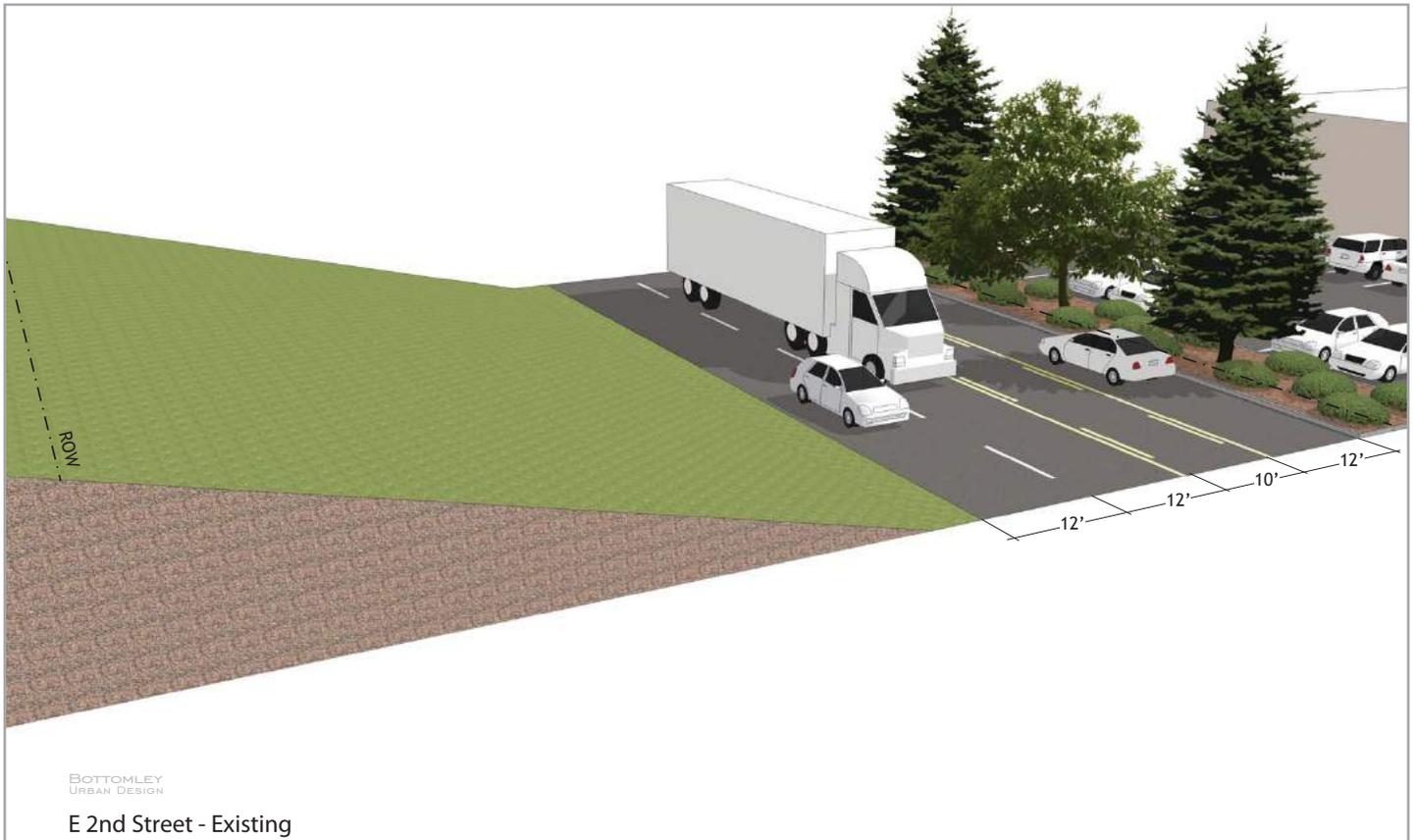
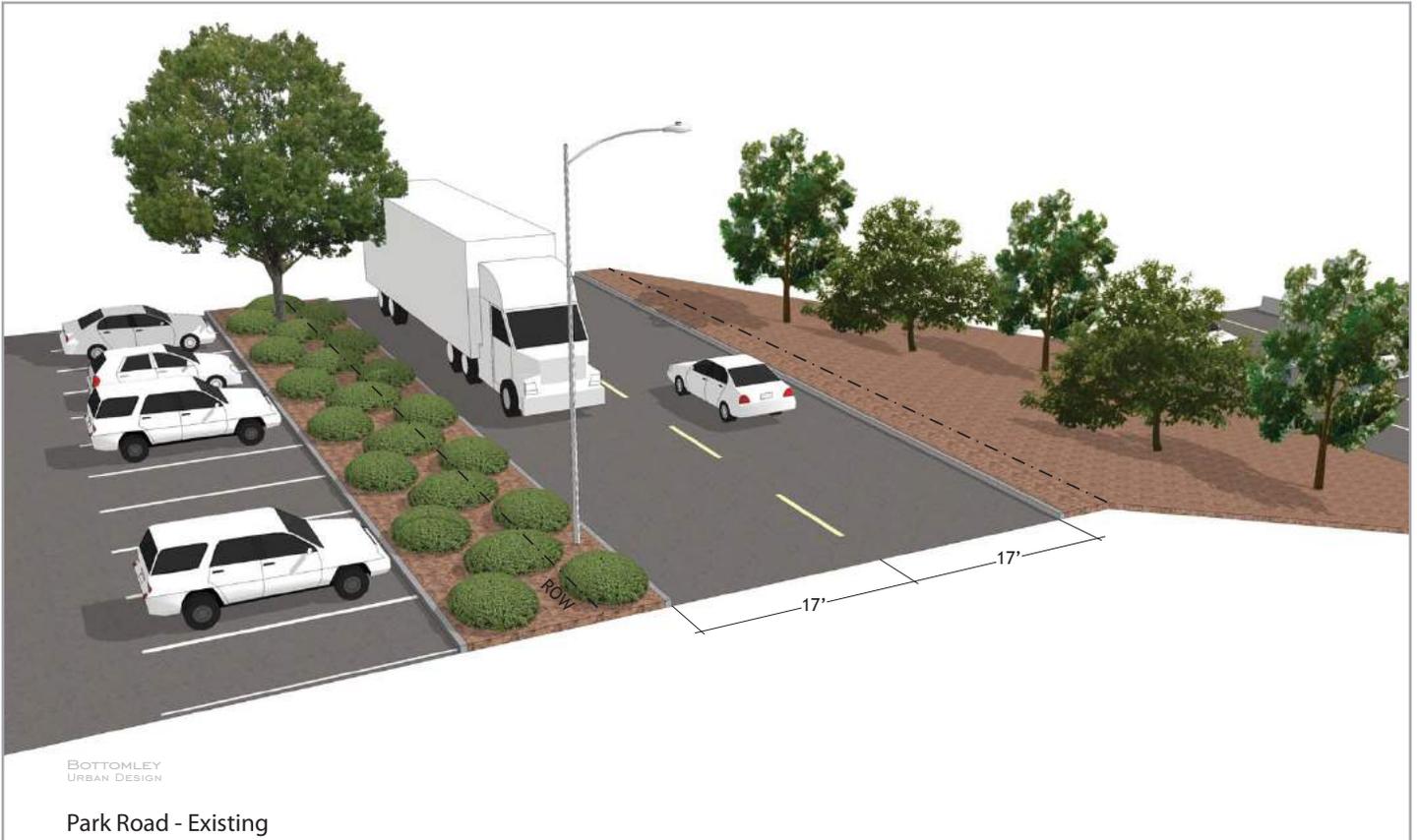


Figure 5-3: Street with Shared-Use Path - Park Road
 (Scenario 3)



Park Road - Existing

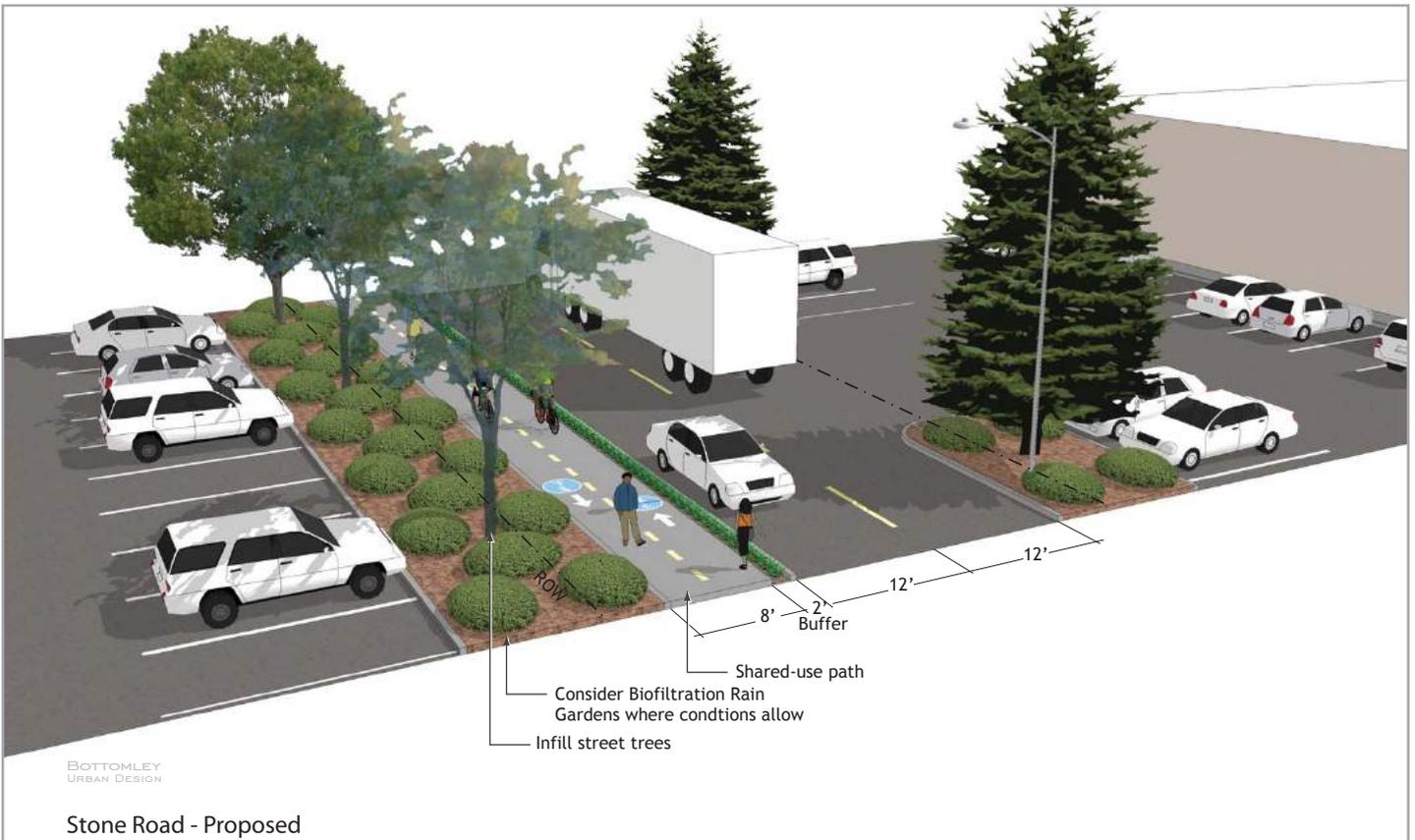


Park Road - Proposed

Figure 5-4: Street with Shared-Use Path - Stone Road
 (Scenario 3)

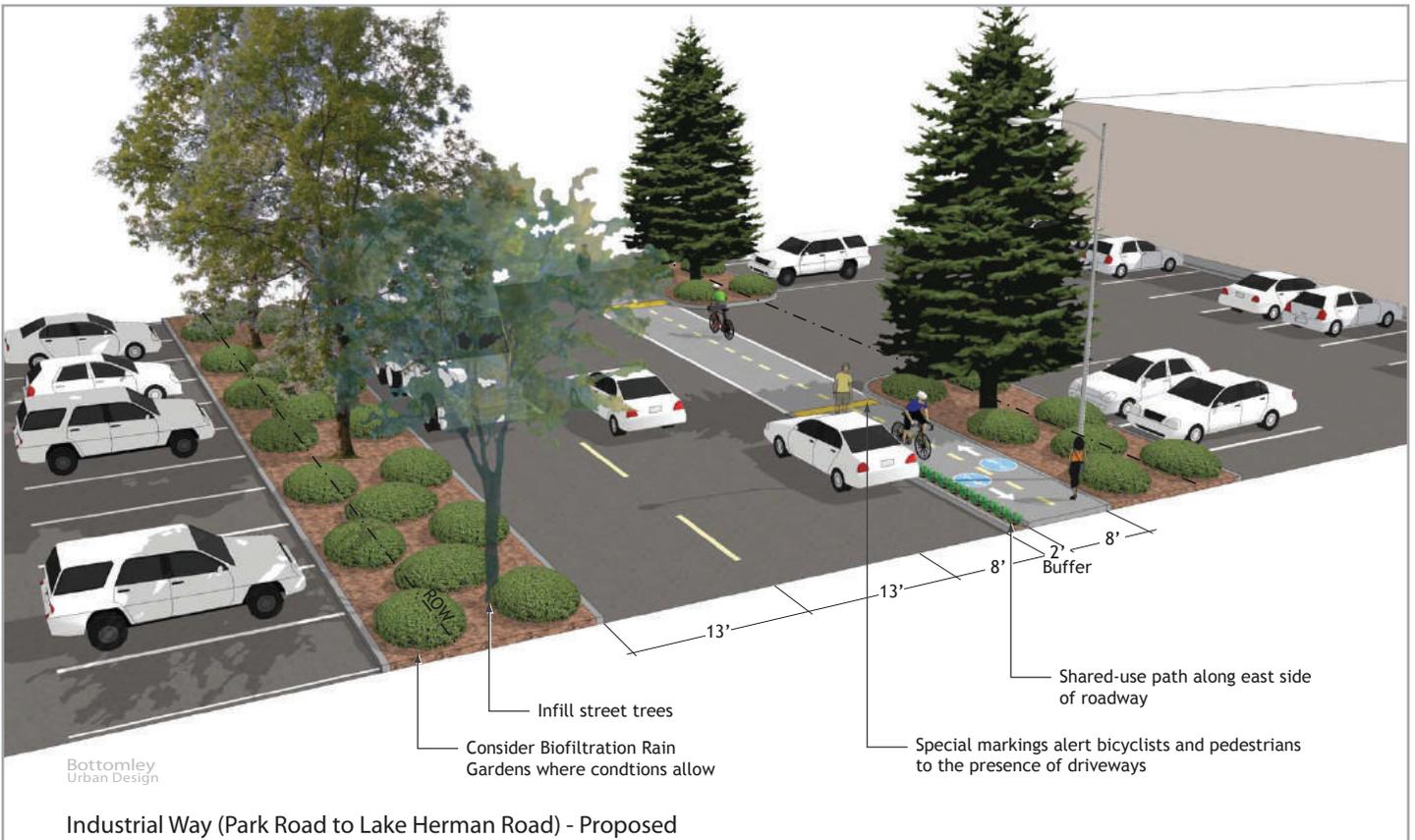
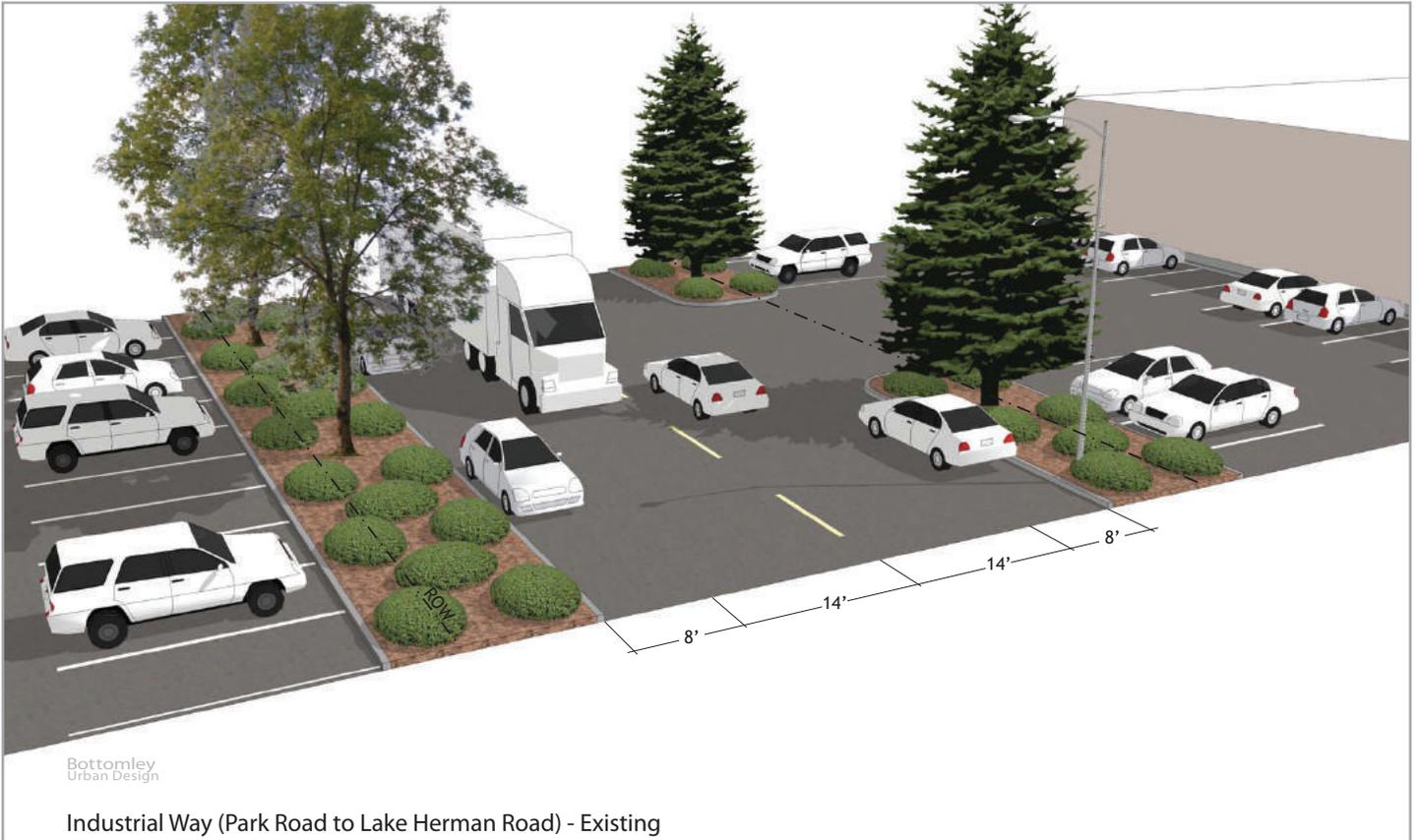


Stone Road - Existing



Stone Road - Proposed

Figure 5-5: Street with Shared-Use Path - Industrial Way, between Park and Lake Herman Roads (Scenario 3)



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6 Land Use and Zoning

6.1 Existing Land Use

Existing land uses were identified from City and County data, windshield reconnaissance, and aerial photography. The City and County data use parcel-level information from the County's Geographic Information Systems (GIS) database, including Assessor's data, updated in 2013. Aerial photography is current as of 2014. Figure 6-1 shows existing land uses in the Plan Area. Table 6-1 summarizes existing land use by acreage.

Industrial is the most prominent land use type in the Plan Area, constituting 43 percent of the total land. Vacant is the second largest land use type, covering more than one third of the total Plan Area, the majority of which is located on the Northern Gateway property. While land designated as Open Storage is usually associated with adjacent industrial activities, it stands as a separate existing land use category for its high redevelopment potential. Open Storage is defined as land where open storage is the primary intended use (compared to vacant land) and there is no permanent structure.

Commercial Services, Utilities, Religious Facilities, and other land uses constitute 10 percent of the Plan Area. Commercial Services include gas stations, auto service stations, and restaurants. City and state-owned properties, a PG&E electrical substation and the Valero wastewater treatment plant are categorized under Utilities. The New Harbor Community Church is the only religious facility in the Plan Area.

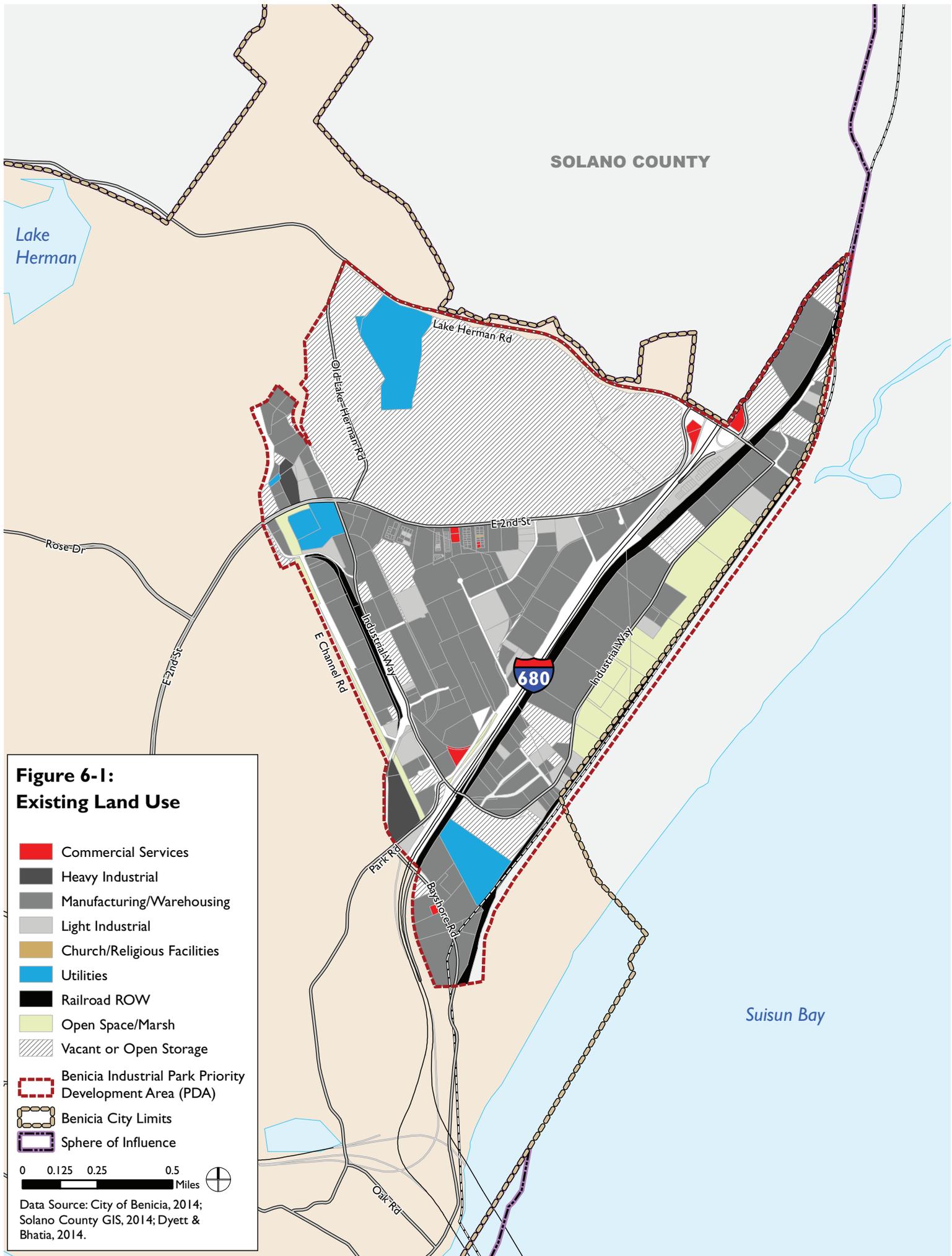
Table 6-1: Existing Land Use Summary

<i>Land Use</i>	<i>Acres</i>	<i>Percent of Plan Area</i>
Industrial	570	43%
<i>Heavy Industrial</i>	16	1.2%
<i>Manufacturing / Warehousing</i>	477	36.3%
<i>Light Industrial</i>	76	0.5%
Commercial Services	7	0.5%
Religious Facilities	<1	<0.1%
Utilities	71	5.4%
Railroad ROW	67	5.1%
Open Space/Marsh	83	7.9%
Open Storage	35	2.7%
Vacant	481	36.6%
Total	1,313	100.0%

Source: Solano County Assessor, Dyett & Bhatia, 2014

6.2 Current Zoning

As shown in Figure 6-2, the majority of land located north of East 2nd Street is zoned for Limited Industrial use, while land to the south is largely zoned for General Industrial use. Key distinctions between these two districts relate to the allowance of a wider range of industrial uses in the General Industrial district, including the manufacturing, assembly and packaging of goods and products from extracted and raw materials. The Limited Industrial district serves to buffer outlying open space and residential areas from the heavier industrial uses located in the General Industrial district. Commercially zoned land is concentrated around the Lake Herman Road interchange at I-680. Additionally, there are also a few pockets zoned for Public/Semi-Public, Industrial Park, and Open Space uses. Table 6-2 summarizes zoning designations by acreage.



SOLANO COUNTY

Lake Herman

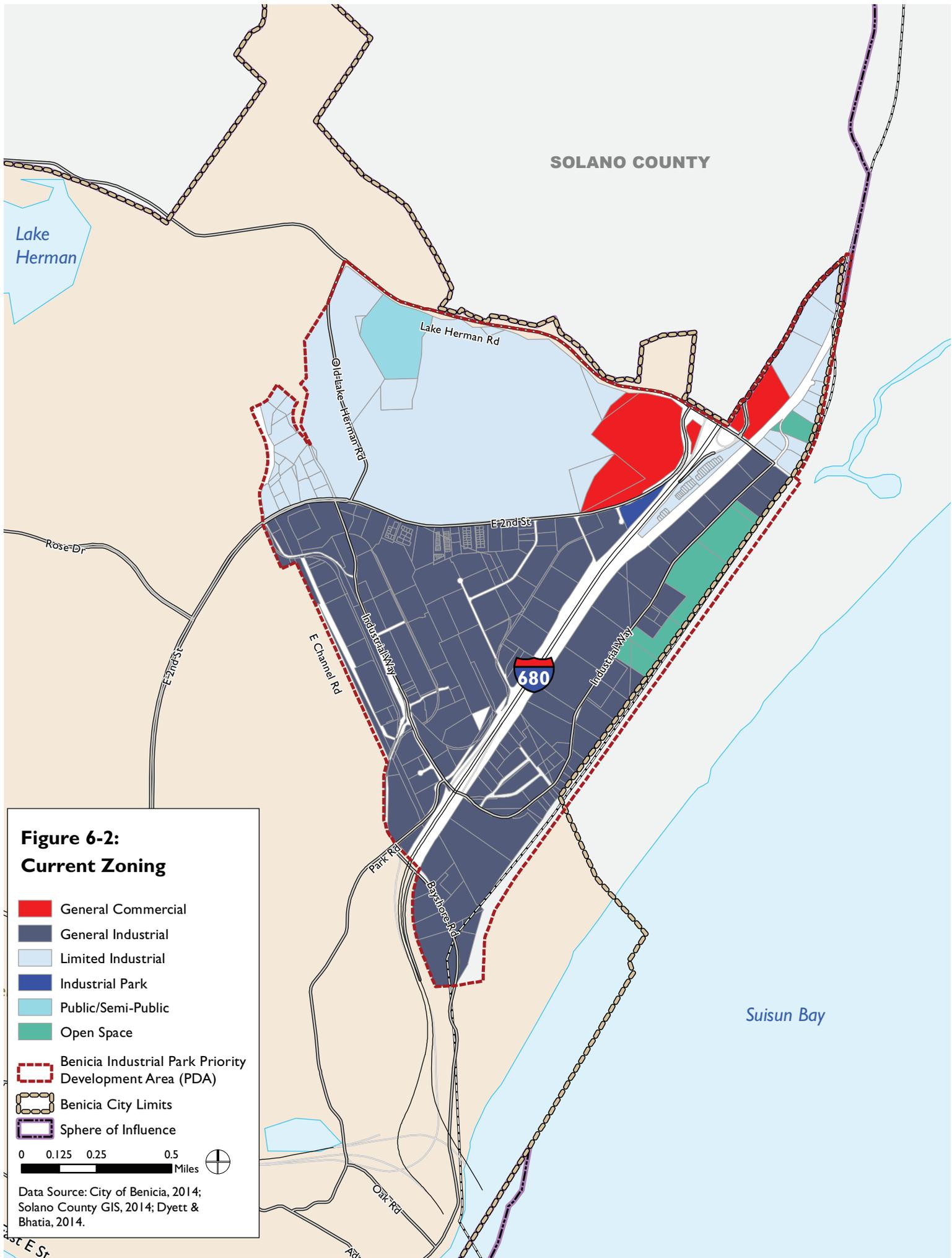
**Figure 6-1:
Existing Land Use**

- Commercial Services
- Heavy Industrial
- Manufacturing/Warehousing
- Light Industrial
- Church/Religious Facilities
- Utilities
- Railroad ROW
- Open Space/Marsh
- Vacant or Open Storage
- Benicia Industrial Park Priority Development Area (PDA)
- Benicia City Limits
- Sphere of Influence

0 0.125 0.25 0.5 Miles

Data Source: City of Benicia, 2014; Solano County GIS, 2014; Dyett & Bhatia, 2014.

Suisun Bay



SOLANO COUNTY

Lake Herman

Lake Herman Rd

© | | Lake-Herman Rd

E 2nd St

Rose Dr

E 2nd St

E Channel Rd

Industrial Way

680

Industrial Way

Park Rd

Bayshore Rd

Suisun Bay

**Figure 6-2:
Current Zoning**

- General Commercial
- General Industrial
- Limited Industrial
- Industrial Park
- Public/Semi-Public
- Open Space
- Benicia Industrial Park Priority Development Area (PDA)
- Benicia City Limits
- Sphere of Influence

0 0.125 0.25 0.5 Miles

Data Source: City of Benicia, 2014;
Solano County GIS, 2014; Dyett & Bhatia, 2014.

Table 6-2: Zoning Designations by Acreage

<i>Zoning District</i>	<i>Acres</i>	<i>Percent of Plan Area</i>
General Industrial	641	51%
Limited Industrial	450	36%
Industrial Park	5	0.4%
General Commercial	77	6%
Open Space	51	4%
Public and Semi-Public	36	3%
Total	1,259	100%

Source: Solano County Assessor, Dyett & Bhatia, 2014

USES

In the Limited Industrial, General Industrial and Industrial Park zoning districts, a number of public/semi-public and commercial uses are permitted as of right, with certain limitations or with a use permit. These uses include day cares, eating and drinking establishments, mobile food vending, commercial recreation and entertainment, and beauty and barbershops. This has led to a variety of non-industrial businesses to be located within the Industrial Park, such as cafes, Cross-Fit gyms, an archery range and a popular taco truck. This flexible zoning allows the opportunity for Park employees to access a range of amenities without having to travel out of the Park.

However, the industrial zoning districts are potentially *too* flexible, given that there are non-industrial businesses located in the Benicia Industrial Park that primarily attract “outside visitors,” or people who otherwise wouldn’t be in the Park for purposes related to industrial activities. Industrial business owners have expressed safety concerns over having unnecessary traffic in the interior of the Park’s General Industrial area due to the high volume of truck and rail movement at all hours. Outside visitors are likely unaccustomed to driving, biking and/or walking around the level of truck and rail traffic that is typical in the Benicia Industrial Park, increasing the potential for accidents.

The City should consider limiting the types of non-industrial uses to those that are specifically supportive of Park businesses and employees. Supportive uses could include eating establishments, food trucks, ATMs, service stations, repair shops, or other similar services. Uses that are targeted at outside visitors, such as churches, recreational facilities, and animal hospitals, should generally be avoided in order to prevent unnecessary traffic in the interior of the Park and the erosion of its industrial nature. To this end, the City should consider amending the Benicia Municipal Code to address appropriate uses in the Industrial Park.

Appendix B details the full list of uses currently permitted in industrial districts.

DEVELOPMENT STANDARDS

For each of the Scenarios, it will be assumed that allowable density and intensity will remain consistent with current development regulations, as they already allow sufficient density and intensity for the land uses and development types that are appropriate to the area. The Scenarios assume no change from the current standards as applied to the Northern Gateway property. Table 6-3 summarizes select development regulations for the Industrial Park’s zoning districts.

Table 6-3: Development Regulations in Industrial Park Zoning Districts

<i>Regulation</i>	<i>Limited Industrial (IL)</i>	<i>General Industrial (IG)</i>	<i>Industrial Park (IP)</i>	<i>General Commercial (CG)</i>
Maximum Height of Structures (ft.)	50	-	50	40
Maximum Lot Coverage	50%	75%	50%	75%
Maximum FAR	0.8	1.0	0.6	1.2
Minimum Site Landscaping	10%	10%	15%	10%

Source: Benicia Municipal Code

6.3 Development Potential: Variation between Scenarios

SCENARIO 1 – Minimal Intensification

Under Scenario 1, land uses would remain largely as-is with only minimal intensification. The primary opportunity sites for this Scenario would be vacant parcels within the main portion of the Industrial Park, south of East 2nd Street. Excluding the Northern Gateway property, there are 74 acres of vacant land on 26 parcels in the Plan Area (see Figure 6-1). Conservatively assuming an FAR of 0.6, and that 50 percent of vacant parcels might develop in the next 20 years, this could potentially result in approximately 970,000 square feet of new building space.

In this Scenario, supporting (non-industrial) uses should be located adjacent to suggested bike and pedestrian improvements near the planned bus hub or along the portion of Industrial Way on the southeast side of the freeway.

SCENARIO 2 – Development of Northern Gateway Property

Under Scenario 2, land uses in the existing mix of uses and development intensity in the Benicia Industrial Park would remain largely as-is, and the Northern Gateway property would primarily develop into an “innovation park⁹” corresponding to the range of commercial and industrial uses

⁹ Innovation Park is defined in the Benicia Industrial Park Market Study (2014) as being focused “on specific types of technology e.g. IT, software development, life sciences, medical, etc.”

permitted by the Benicia Municipal Code. The EIR for the Business Research Park previously proposed for the Northern Gateway property assumed the development of 280 acres of Limited Industrial uses (approximately 4.4 million square feet of new building space that was reduced to 2.4 million in an addendum to the EIR) and 35 acres of Commercial uses (approximately 857,000 square feet of building space). While the ultimate development mix of this property will most likely differ from these calculations, they provide a good estimate of the amount of new development that can be reasonably expected on the Northern Gateway property.

In order to allow them to serve both the new development to the north and the existing Park to the south, supportive uses should be located primarily in the area zoned as General Commercial near the intersection of Lake Herman Road and I-680 as well as along the enhanced East 2nd Street corridor. While it is possible that some professional office or destination commercial uses may be proposed in the commercial area at Lake Herman Road and I-680, the site's close proximity to the freeway is most likely to be conducive to uses that serve Industrial Park employees and regional travelers. Supportive uses along East 2nd Street would be primarily targeted at Park employees, and made more easily accessible by walking or biking.

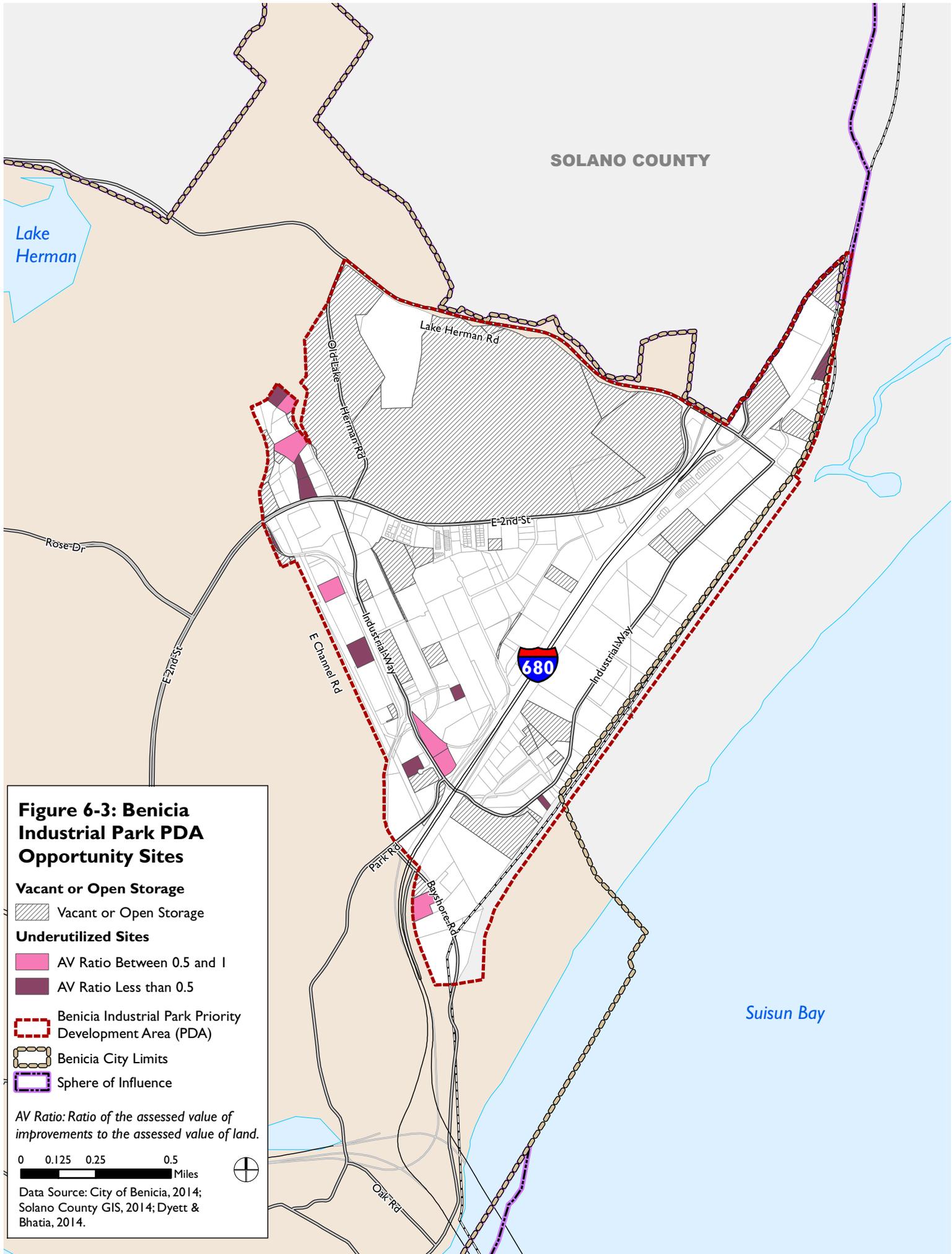
SCENARIO 3 – Development of Northern Gateway Property plus Land Use Intensification

Under Scenario 3, the Northern Gateway property would develop along with some new development and redevelopment in the Benicia Industrial Park. Vacant and underutilized parcels in the existing Industrial Park offer the opportunity for additional intensification. In addition to the currently vacant land identified in Scenario 1, as shown in Figure 6-3, there are an additional 34 acres of underutilized land on 15 parcels in the Study Area.¹⁰ Conservatively assuming an FAR of 0.6, and assuming that 50 percent of these parcels redevelop over the next 20 years, these parcels could result in 450,000 additional square feet of building space. Adding this to the 970,000 square feet of new development that could occur on already vacant sites (Scenario 1), Scenario 3 could see approximately 1.4 million square feet of development within the Benicia Industrial Park (excluding the Northern Gateway property).

Similar to Scenario 2, supporting uses could be located in the area zoned as General Commercial near the intersection of Lake Herman Road and I-680 as well as along the enhanced East 2nd Street corridor. Additional services could be located in the interior of the Park along Stone Road to complement shared use improvements planned for the street. Services located on Stone Road would have the added benefit of being within walking distance of a number of existing Industrial Park businesses.

¹⁰ Underutilized land is defined by AV ratio, a ratio of the assessed value of improvements (buildings and structures) to the assessed value of land. Any parcels with an AV ratio of less than 1.0 (in other words, where the value of the built improvements is less than the value of the land itself) are considered underutilized. Parcels with an AV ratio of less than 0.5 (sites where the value of the built improvements is less than half of the value of the land) are even stronger candidates for reuse and redevelopment.

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SOLANO COUNTY

Lake Herman

Figure 6-3: Benicia Industrial Park PDA Opportunity Sites

Vacant or Open Storage

Vacant or Open Storage

Underutilized Sites

AV Ratio Between 0.5 and 1

AV Ratio Less than 0.5

Benicia Industrial Park Priority Development Area (PDA)

Benicia City Limits

Sphere of Influence

AV Ratio: Ratio of the assessed value of improvements to the assessed value of land.

0 0.125 0.25 0.5 Miles



Data Source: City of Benicia, 2014; Solano County GIS, 2014; Dyett & Bhatia, 2014.

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7 Signage and Wayfinding

To support improved circulation and navigation within the Industrial Park, signage and wayfinding should achieve the following: 1) provide directional information, particularly for first time visitors and prospective tenants, 2) enhance the image of the Industrial Park for business recruitment and retention, and 3) improve visibility and safety for users of all modes of transportation. It is important that directional and wayfinding signage and maps, if any, are placed in clearly visible locations, are intuitively understood, and tailored to the location in which they are used.

This section provides a general approach to wayfinding in the Industrial Park, with initial recommendations for basic types of wayfinding elements and placement. Street trees can be an element of a wayfinding program as well, and are discussed in the “Streetscape/Landscape” section, below.

7.1 Wayfinding Elements

Three types of wayfinding elements should be considered for the Benicia Industrial Park: highway guide signs, gateway/monument signs, and directional and secondary signs. Figure 7-1 shows suggested locations for each type of signage within the Industrial Park, while Figure 7-2 illustrates examples of each. Signs will be required to meet any applicable requirements regarding sign reflectivity set forth in the Manual on Uniform Traffic Control Devices, published by the Federal Highway Administration.

HIGHWAY GUIDE SIGNS

These signs guide drivers from I-680 freeway exits to local roads that lead to the Industrial Park. As shown in Figure 7-2, Highway Guide Signs can also highlight connections to bike routes. Highway Guide signs would be simple in format with a “public works” appearance; e.g. custom fonts, logos, and other graphic design elements would not be employed.

Northbound Highway Guide signs are recommended at Bayshore Road and Lake Herman Road (east). A southbound Highway Guide sign is recommended at Lake Herman Way. A southbound sign is not recommended at Industrial Way, as this location is within the Industrial Park and wayfinding would be provided by a Gateway and/or Directional Sign.

GATEWAY/MONUMENT SIGNS

These are large, architectural signs that identify the Industrial Park’s boundaries and/or major roadway entrances. Gateway/Monument signs can be configured in a variety of ways, from ornamental walls and panels, to two-dimensional graphic panels with architectural columns, to

three-dimensional structures, and/or combinations thereof. Whatever the form, these signs are designed to project an identity that is exemplified in the design, form, and graphics employed, and would typically feature the Benicia Industrial Park “brand” logo and the Benicia Industrial Park name. To reinforce identity, the logo could be featured on street-name signs as well. Gateway/Monument signs typically reflect a brand theme; for example, a rural theme with wood and stone materials, or a modern/metal character for hi-tech.

Gateway/Monument Signs are recommended at the Industrial Park boundary locations along East 2nd Street, with one just east of the existing Bio-Rad facility, and the other just east of Industrial Way. A Gateway/Monument sign is recommended at the intersection of Park Road/Industrial Way to mark the southerly entrance to the Industrial Park.

DIRECTIONAL SIGNS AND SECONDARY SIGNS

Directional signs are recommended at major intersections within the Industrial Park to find major tenants, facilities, and or streets. These may be freestanding and/or incorporated into the design of Gateway/Monument signs. These signs should reflect the branding and graphics theme employed in the Gateway/Monument signs in order to provide a strong sense of wayfinding continuity within the Industrial Park. Smaller, secondary signs may be desirable to provide supplemental direction for difficult-to-find locations. The branded logo may also appear on street signs and other smaller signs (such as bike route signage) to provide even greater visual continuity.

Directional Signs are recommended along East 2nd Street at Industrial Way, Stone Road, Park Road, and Lake Herman Road; along Park Road at Stone Road and at Industrial Way; and along Industrial Way at Lake Herman Road and at the southbound I-680 off-ramp.

7.2 Variation between Scenarios

The wayfinding concept would not vary for existing developed areas of the Industrial Park. However, the question of whether development on the Northern Gateway Property would be included in the Industrial Park wayfinding sign program, or would seek to have a separate identity is an important factor. The Specific Plan for the Northern Gateway property should evaluate the creation of an integrated sign and wayfinding program with continuous or complementary style to be carried through both the Industrial Park and Northern Gateway industrial areas. Although the sign and wayfinding program need not be identical to the existing Industrial Park, its aesthetic should be coordinated with the remainder of the area.

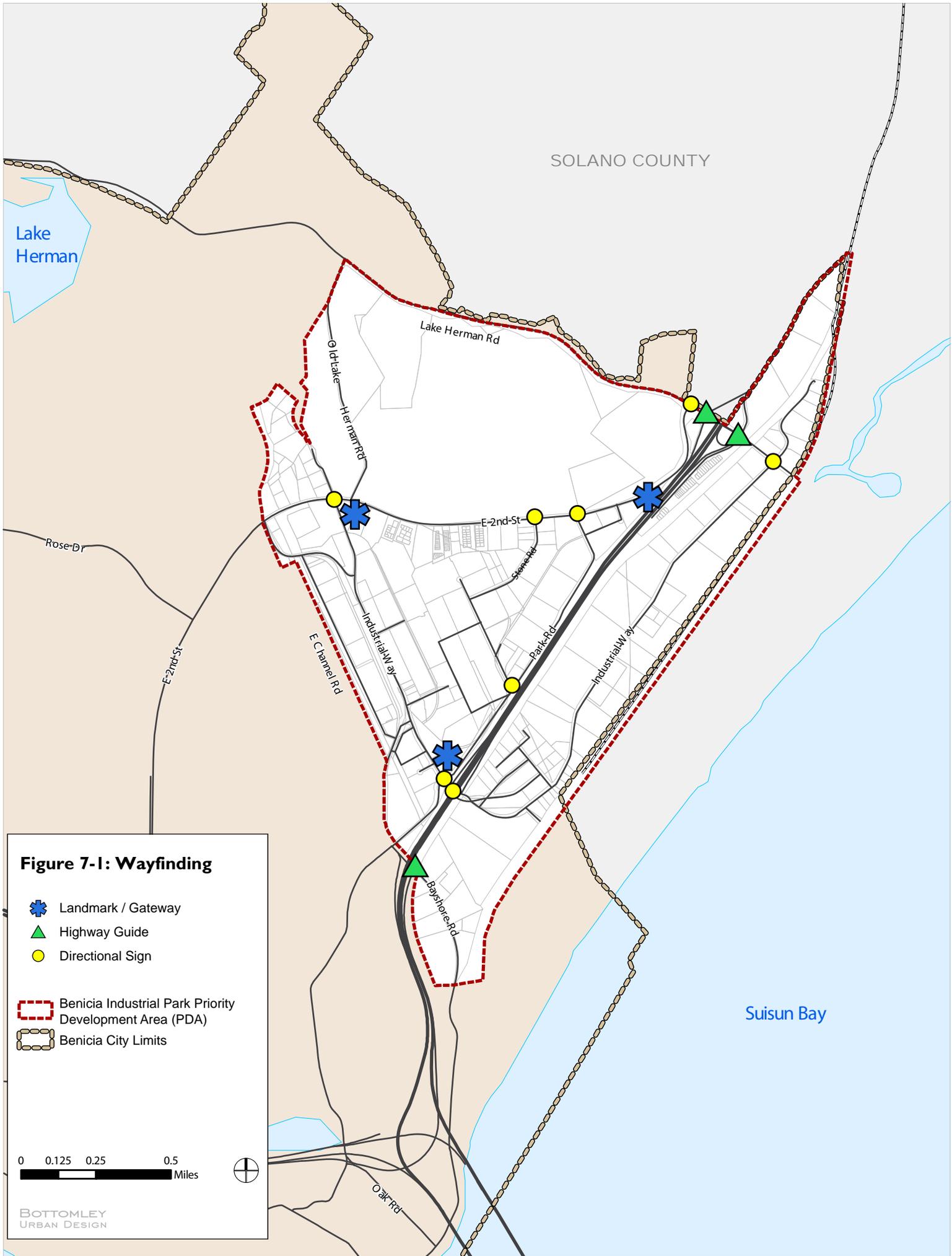
BRANDING AND GRAPHIC DESIGN

The City of Benicia and/or the Benicia Industrial Park Association should request proposals and hire a branding firm/graphic designer to prepare options and a design approach for *Benicia Industrial Park Wayfinding Program*. The program should weigh the goals and future vision for the identity of the Industrial Park, and reflect this in the graphic style, branding/outreach, and wayfinding signage. As noted, it would be beneficial if the program for the industrial areas of the

Northern Gateway Property and the existing Industrial Park are the same, or at least strongly complementary.

Once a design approach is selected, the City could consider developing a signage grant or revolving loan program. Existing property owners would apply to the program for funds to upgrade their business and directional signs to meet the new Industrial Park design standards.

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SOLANO COUNTY

Lake Herman

Lake Herman Rd

Old Lake Herman Rd

E-2nd St

Rose Dr

E-2nd St

E Channel Rd

Industrial Way

Spore Rd

Park Rd

Industrial Way

Bayshore Rd

Suisun Bay

Figure 7-1: Wayfinding

-  Landmark / Gateway
-  Highway Guide
-  Directional Sign

-  Benicia Industrial Park Priority Development Area (PDA)
-  Benicia City Limits

0 0.125 0.25 0.5 Miles



Figure 7-2: Examples of Wayfinding Elements

Highway Guide Signs



Directional Signs and Secondary Signs



Gateway/Monument Signs



8 Alternative Fueling and Other Recommended Sustainability Measures

The alternative fueling and sustainability measures discussed in this chapter would apply to all three Scenarios. The only differences between Scenarios would be the extent and location of their implementation. Because the Scenarios are still largely conceptual, details about the extent and location of implementation are not discussed at this point. However, it is noted where significant differences may occur between the Scenarios.

8.1 Alternative Fueling

While gasoline and diesel continue to be the dominant vehicle fuels in the United States, alternative fueling options are steadily growing in popularity. Not only do alternative fuels decrease demand for fossil fuels, they reduce air pollution and greenhouse gas emissions. Alternative fuels can come from a variety of sources, including natural gas, alcohol, propane, vegetable and waste-derived oils and electricity. Two of these in particular, electricity and compressed natural gas (CNG), are great opportunities for introducing alternative fueling options to the Industrial Park.

ELECTRIC VEHICLE (EV) CHARGING STATIONS

Electric vehicles (EVs) have the potential to reduce greenhouse gas emissions and air pollutants while reducing dependence on petroleum. EVs draw energy from electricity, which is then stored in batteries.¹¹ Vehicles may be all electric or plug-in hybrids that can run on electricity and fuel. While both light-duty and heavy-duty EVs are commercially available, the current industry emphasis is on the light-duty market.

EV charging stations are classified by the rate or speed at which they are able to charge batteries. Charging times can range from 15 minutes to 20 hours or more depending on battery size and type and the type of charging equipment used. There are approximately 28 public EV charging stations in Solano County, including two Level II stations and one, dual port, solar powered fast charging station at Benicia City Hall and one Level II station at the Benicia Community Center. An additional two stations are included in the future Industrial Park Bus Hub.¹²

¹¹ The City of Benicia joined Marin Clean Energy (MCE) in 2014. MCE provides 51% and 100% renewable electricity to its customers and so, charging an electric car at a station in Benicia is even cleaner than using PG&E power, currently 27% renewable content.

¹² Solano Transportation Authority. (2013). Solano County Alternative Fuels and Infrastructure Plan (p. 37).

While most EV owners charge their vehicles at home, opportunities for workplace charging are significant because many personal vehicles spend a considerable amount of time parked at work. Additionally, having access to charging stations at both work and home can improve the commuting range of an EV. Beyond serving as an amenity for employees, workplace EV charging stations also allow businesses to maintain electric vehicles in their fleets and attract the public to their place of business.

In 2013, the Bay Area Air Quality Management District released the Bay Area Plug-In Electric Vehicle Readiness Plan, which identified Benicia's Industrial Park as a potential location for either workplace or public EV charging stations.¹³ Workplace charging stations should be located at any business where there are current or anticipated EV commuters or fleets. Retail locations are considered prime sites for public EV charging stations as they provide an opportunity for shopping, running errands or dining while waiting for a vehicle to charge. Some cities have introduced regulations that mandate a certain percentage of parking spaces to be allocated for EV vehicle charging.

Businesses within the Benicia Industrial Park should be encouraged to provide EV charging for their employees and customers. In particular, there is a prime opportunity to encourage or require that EV charging stations be incorporated into the significant amount of new development assumed in Scenarios 2 and 3. The TEC Plan could recommend making the clarification that EV parking counts toward overall parking requirements in an effort to encourage charging stations in new Industrial Park development. EV charging stations should also be evaluated in the Specific Plan and/or site development proposals for the Northern Gateway site. To assist financing the installation of charging stations, developers and business owners have a number of tools available, including the Business Resource Incentive Program (BRIP), property assessed clean energy (PACE) financing, CaliforniaFIRST Efficiency Financing and the Home Energy Renovation Operation (HERO) program.

COMPRESSED NATURAL GAS (CNG) STATIONS

Compressed natural gas (CNG) is recognized as an alternative fuel under the Energy Policy Act of 1992. Clean-burning and relatively low priced, CNG is natural gas that has been compressed and stored in cylinders at a pressure of 3,000 to 3,600 pounds per square inch. According to the U.S. Department of Energy, a CNG-powered vehicle gets about the same fuel economy as a conventional gasoline vehicle on a GGE (gallon gasoline equivalent) basis.¹⁴

As gasoline prices across the nation continue to fluctuate, interest in CNG is rising. In the U.S., CNG has primarily been used to power transit buses, government fleets, and some corporate trucks. While few automakers sell light-duty CNG vehicles in the U.S., CNG options for medium- and heavy-duty trucks are widely available, making providing this technology an appealing option in the Industrial Park.

¹³ Bay Area Air Quality Management District. (2013). Bay Area Plug-In Electric Vehicle Readiness Plan (p. 62-64).

¹⁴ U.S. Department of Energy. (2014). Natural Gas Fuel Basics. Retrieved June 23, 2015, from http://www.afdc.energy.gov/fuels/natural_gas_basics.html

Currently, there are no CNG stations located in the City of Benicia, and the closest public stations are located in Concord, Vacaville and Napa. The Solano County Alternative Fuels and Infrastructure Plan, jointly funded by Solano Transportation Authority and the City of Benicia, identifies the Benicia Industrial Park as a possible location for a new natural gas fueling facility that could potentially benefit SolTrans (currently conducting a feasibility study to explore the option of introducing CNG buses into its fleet), Benicia Public Works Department and the general public.¹⁵

Given that the cost of a new CNG fueling station can range from approximately \$600,000 to \$5 million, startup costs are a notable constraint.¹⁶ However, there are a number of federal, state and local funding sources available to help mitigate this initial cost burden. Locating a CNG station in the Industrial Park that is open to the public would provide the opportunity for Industrial Park businesses to operate clean-burning and cost-effective CNG vehicle fleets without having to take on the cost burden of constructing and maintaining private filling stations.

CNG filling stations can be built anywhere that natural gas lines exist. As shown in Figure 8-1, natural gas pipelines run through the Industrial Park along East 2nd Street (roughly between East Channel Road and Stone Road), portions of Industrial Way and immediately west of Indiana Street. Additional siting considerations could include the location of centrally located available land as well as proximity to the freeway or the Northern Gateway property. Possible CNG station locations within the Industrial Park are illustrated in Figure 8-1.

¹⁵ Solano Transportation Authority. (2013). Solano County Alternative Fuels and Infrastructure Plan (p. 70).

¹⁶ Solano Transportation Authority. (2013). Solano County Alternative Fuels and Infrastructure Plan.

Figure 8-1: PG&E Natural Gas Transmission Pipelines



8.2 Renewable Energy

Introducing opportunities for renewable energy capture in the Industrial Park would reduce dependence on the electricity grid, save money, and provide for a more sustainable future. The Industrial Park has enviable solar potential, given the direct sunlight and warm temperatures it experiences most of the year and the number of large rooftops and surface parking lots.

PHOTOVOLTAIC (PV) PANELS

Energy from the sun can be harnessed through solar technology, with solar photovoltaic (PV) panels, which convert sunlight into electricity. PV panels make use of the sun's rays as a free and

sustainable resource, while reducing dependence on the electricity grid. PV panels over parking lots (sometimes referred to as “solar canopies” or “solar carports”) have the added benefit of providing shade to parked vehicles while reducing the heat island effect. According to the Environmental Protection Agency and Department of Energy, being able to park in the shade on hot days is a substantial contributor to increased vehicle fuel efficiency, because it saves having to cool a vehicle down by turning up the air conditioner.¹⁷ Solar canopies can further be used to power any EV charging stations located in the parking lot.

The California Solar Rights Act prohibits local jurisdictions from adopting unreasonable barriers to the installation of solar energy systems. Senate Bill 226, passed in 2011, exempts certain solar energy systems, including parking lot PV projects, from environmental review under the California Environmental Quality Act (CEQA). To be consistent with State regulations and to allow for timely and cost-efficient installation, the permitting process to install freestanding PV panels over parking lots should be streamlined as much as possible.

The Industrial Park has a number of large surface parking lots, offering many opportunities for PV canopies to be installed. Larger companies with extensive parking lots would be good initial targets. However, as solar technology continues to advance and PV panels become less expensive and increasingly popular, solar canopies will likely become attractive to many more businesses. In the meantime, there are many state financial incentives, such as the California Solar Initiative, that can help make solar carports more affordable.¹⁸ Additionally, by taking advantage of Marin Clean Energy’s Feed-In Tariff program, a renewable energy purchase program for small-scale renewable energy projects, Industrial Park business owners with PV panels could benefit from long-term guaranteed revenue streams.

For Scenario 1, there is an opportunity to put PV panels on existing parking lots and buildings and vacant parcels. For Scenarios 2 and 3, there is the additional opportunity to integrate the use of PV panels into the development on the Northern Gateway property from the beginning.

8.3 Transportation Demand Management Measures

Transportation Demand Management (TDM) is a general term for strategies that increase overall transportation system efficiency by encouraging a shift away from single-occupant vehicle trips and/or travel during peak periods. From a sustainability perspective, TDM measures have a range of benefits that include reducing vehicle miles traveled (VMT), reducing air pollutants and greenhouse gas emissions, and encouraging new and redevelopment by lowering the amount of costly off-street parking spaces required. In addition, by increasing transportation options for commuters, TDM measures would support the goals of the city’s Complete Streets Policy and help ensure eligibility for One Bay Area Grant program funding.

¹⁷ Environmental Protection Agency. (n.d.) Fuel Economy in Hot Weather. Retrieved June 23, 2015, from <http://www.fueleconomy.gov/feg/hotweather.shtml>

¹⁸ Mooney, C. (2015, January 28). The best idea in a long time: Covering parking lots with solar panels. *The Washington Post*. Retrieved June 23, 2015.

Examples of TDM strategies include:

- Tax free commuter benefits for non-auto commute modes
- Carpool coordination
- Shuttle services to transit services
- Subsidized transit passes
- Bike share system that provides connections between jobs and transit
- Marketing efforts that promote alternative transportation modes
- Bicycle and pedestrian facility improvements that integrate with larger transit networks

Introducing TDM measures to the Industrial Park could significantly reduce VMT by offering workers information about and incentives to use the transit, bicycle and pedestrian amenities recommended in the TEC Plan. It would also allow businesses with 50 or more employees to satisfy the BAAQMD requirement that they provide a commuter benefit option to employees.¹⁹ For existing businesses, the best option would be for a park-wide Transportation Management Agency (TMA) to be formed—potentially through the Benicia Industrial Park Association (BIPA)—to provide these services to all employers. That way, individual employers would not have the burden of providing TDM measures themselves; rather, they could participate in and financially contribute to the TMA, which would provide these services at scale for the whole Industrial Park. For example, the Emery Go-Round, a last-mile shuttle service provided by the Emeryville TMA, provides a good model that may be considered in Scenarios 2 and 3. Emeryville businesses fund this shuttle service that is free to the public based on the square footage of their business. The TMA formed for the Contra Costa Centre in Pleasant Hill provides another good example of what this could look like. For new development, the City could make TDM a requirement for new development through a Development Agreement or Specific Plan.

¹⁹ Bay Area Air Quality Management District (2014). BAAQMD Regulation 14, Rule 1: Bay Area Commuter Benefits Program. Retrieved July 30, 2015, from http://www.baaqmd.gov/~media/Files/Planning_and_Research/Commuter_Benefits_Program/Proposed_Rule_Packet/Staff_Report-CBP.ashx

9 Conclusions and Next Steps

CONCLUSIONS

In summary, the following recommendations and key considerations are made for each Scenario. The estimated development potential for each Scenario is included here to help illustrate the approximate nature, amount, and location of potential new investment to provide additional context for the circulation improvements described.

SCENARIO 1 – Minimal Intensification *(Potential for approximately 970,000 square feet of new building space on vacant land within the current Industrial Park)*

- The continuation of Class II bike lanes along East 2nd Street (from Lake Herman Road to Industrial Way)
- Class III bike routes along Park Road (Military East Street to Industrial Way), Old Lake Herman Road, Lake Herman Road and Industrial Way (Park Road to Lake Herman Road)
- An off-road, multi-use trail, located east of Industrial Way, along the water for recreational purposes
- Secure bike parking at bus hub
- Sidewalks and crosswalks connecting the bus hub to pedestrian improvements along Industrial Way
- Roadway improvements that facilitate truck movement, improve safety, and address drainage deficiencies
- Possible freeway ramp improvements or relocation
- Signage and wayfinding elements that provide directional information, enhance the image of the Industrial Park, and improve visibility and safety

SCENARIO 2 – Development of Northern Gateway Property *(Potential for approximately 5.3 million square feet of new building space on vacant land in the Northern Gateway Property)*

- Improve existing and create new roadway connections across East 2nd Street
- Protected bike lanes, sidewalks, crosswalks, curbside stormwater capture planting strips and streetlights along East 2nd Street (Lake Herman Road to Industrial Way)

- Additional sidewalks and crosswalks on the streets connecting the Northern Gateway development with the existing Industrial Park across East 2nd Street
- Shared use path along Old Lake Herman Road
- Class III bike routes along Park Road (Military East Street to Industrial Way), Lake Herman Road and Industrial Way (Park Road to Lake Herman Road)
- An off-road, multi-use trail, located along the water, east of Industrial Way, for recreational purposes
- Secure bike parking at bus transit hub
- Sidewalks and crosswalks connecting the bus transit hub to adjoining areas
- Improved intersections along East 2nd Street, as well as additional roadway improvements that facilitate truck movement, improve safety, and address drainage deficiencies
- Possible freeway ramp improvements or relocation
- Signage and wayfinding elements that provide directional information, enhance the image of the Industrial Park, and improve visibility and safety

SCENARIO 3 – Development of Northern Gateway Property Plus Land Use Intensification *(Potential for approximately 430,000 square feet of new building space on underutilized land in addition to the development potential of Scenarios 1 and 2)*

- Improve existing and create new roadway connections across East 2nd Street.
- Strengthen circulation grid in existing Industrial Park; Shared-use bicycle and pedestrian paths with crosswalks, shade trees and streetlights on one side of the street along Park Road, Stone Road, and Industrial Way (Park Road to Lake Herman Road)
- Protected bike lanes, sidewalks, crosswalks, curbside stormwater capture planting strips and streetlights along East 2nd Street (Lake Herman Road to Industrial Way)
- Additional sidewalks and crosswalks on the streets connecting the Northern Gateway development with the existing Industrial Park across East 2nd Street
- Class III bike routes along Lake Herman Road
- An off-road, multi-use trail, located along the water, east of Industrial Way, for recreational purposes
- Secure bike parking at bus transit hub and bicycle parking required for new development (and possibly showers)
- Sidewalks and crosswalks connecting the bus transit hub to adjoining areas
- Improved intersections along East 2nd Street, as well as additional roadway improvements that facilitate truck movement, improve safety, and address drainage deficiencies
- Possible freeway ramp improvements or relocation

- Signage and wayfinding elements that provide directional information, enhance the image of the Industrial Park, and improve visibility and safety

In addition to the recommended improvements listed above, implementation of alternative fueling and other sustainability measures would be assumed to occur for each Scenario.

NEXT STEPS

Following the release of this report, a public workshop will be held to gather community feedback on the recommendations for each of the Land Use Scenarios. Ultimately this feedback along with input from key stakeholders and the City will be used to “mix and match” recommendations from each of the three Land Use Scenarios to create the final Benicia Industrial Park TEC Plan. In order to allow for flexibility, transportation improvements outlined in the TEC Plan may be phased over time to meet changing land use needs.

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Appendix A: Complete Streets Policy - City Council Resolution No. 16-2

This Complete Streets Policy was adopted by Resolution No. 15-__ by the City Council of the City of Benicia on January 5, 2016.

COMPLETE STREETS PRINCIPLES

1. **Complete Streets Serving All Users.** The City of Benicia expresses its commitment to creating and maintaining Complete Streets that provide safe, comfortable, and convenient travel along and across streets (including streets, roads, highways, bridges, and other portions of the transportation system) through a comprehensive, integrated transportation network that serves all categories of users, including pedestrians, bicyclists, persons with disabilities, motorists, movers of commercial goods, users and operators of public transportation, seniors, children, youth, and families.
2. **Context Sensitivity.** In planning and implementing street projects, departments and agencies of the City of Benicia shall maintain sensitivity to local conditions in both residential and business districts as well as urban, suburban, and rural areas, and shall work with residents, merchants, and other stakeholders to ensure that a strong sense of place ensues. Improvements that will be considered include sidewalks, shared use paths, bicycle lanes, bicycle routes, paved shoulders, street trees and landscaping, planting strips, accessible curb ramps, crosswalks, refuge islands, pedestrian signals, signs, street furniture, bicycle parking facilities, public transportation stops and facilities, transit priority signalization, and other features assisting in the provision of safe travel for all users, such as traffic calming circles, transit bulb outs, and road diets.
3. **Complete Streets Routinely Addressed by All Departments.** All relevant departments and agencies of the City of Benicia shall work towards making Complete Streets practices a routine part of everyday operations, approach every relevant project, program, and practice as an opportunity to improve streets and the transportation network for all categories of users, and work in coordination with other departments, agencies, and jurisdictions to maximize opportunities for Complete Streets, connectivity, and cooperation. The following projects provide opportunities: pavement resurfacing, restriping, accessing above and underground utilities, signalization operations or modifications, and maintenance of landscaping/related features.
4. **All Projects and Phases.** Complete Streets infrastructure sufficient to enable reasonably safe travel along and across the right of way for each category of users shall be incorporated into all planning, funding, design, approval, and implementation processes for any construction, reconstruction, retrofit, maintenance, operations, alteration, or repair of streets (including streets, roads, highways, bridges, and other portions of the transportation system), except that

specific infrastructure for a given category of users may be excluded if an exemption is approved via the process set forth in section C. 1 of this policy.

IMPLEMENTATION

1. **Plan Consultation and Consistency.** Maintenance, planning, and design of projects affecting the transportation system shall be consistent with local bicycle, pedestrian, transit, multimodal, and other relevant plans, except that where such consistency cannot be achieved without negative consequences, consistency shall not be required if the head of the relevant department provides written approval explaining the basis of such deviation. If the City of Benicia has a Bicycle and Pedestrian Advisory Committee, such deviations shall be presented to the Bicycle and Pedestrian Advisory Committee early in the planning and design stage, to ensure the Bicycle and Pedestrian Advisory Committee has an opportunity to provide comments and recommendations.
2. **Street Network/Connectivity.** As feasible, the City of Benicia shall incorporate Complete Streets infrastructure into existing streets to improve the safety and convenience of users and to create employment, with the particular goal of creating a connected network of facilities accommodating each category of users, and increasing connectivity across jurisdictional boundaries and for existing and anticipated future areas of travel origination or destination.
3. **Bicycle and Pedestrian Advisory Committee Consultation.** The City of Benicia Traffic, Pedestrian, Bicycle Safety Committee shall review transportation projects early in the planning and design stage to provide an opportunity to provide comments and recommendations regarding Complete Streets features to be incorporated into the project.
4. **Evaluation.** All relevant agencies or departments shall perform evaluations of how well the streets and transportation network of the City of Benicia are serving each category of users by collecting baseline data and collecting follow-up data on a regular basis.

EXEMPTIONS

Leadership Approval for Exemptions. Projects that seek Complete Streets exemptions must provide written finding of why accommodations for all modes that were not included in the project and signed off by the Public Works Director or equivalent high level staff person. Projects that are granted exceptions must be made publicly available for review. Federal guidance on exceptions can be found from the Federal Highway Administration (FHWA) Accommodating Bicycle and Pedestrian Travel:

http://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/design.cfm

Appendix B: Land Use Regulations in Industrial Zoning Districts

The following table is from the Benicia Municipal Code.

17.32.020 IL, IG, IW and IP districts – Land use regulations.

In the following schedule, the letter “P” designates use classifications permitted in industrial districts. The letter “L” designates use classifications subject to certain limitations described by the “Additional Use Regulations” which follow. The letter “U” designates use classifications permitted on approval of a use permit. The letters “P/U” designate use classifications permitted on the site of a permitted use, but requiring a use permit on the site of a conditional use. Letters in parentheses in the “Additional Regulations” column refer to the “Additional Use Regulations” following the schedule. Where letters in parentheses are opposite a use classification heading, referenced regulations shall apply to all use classifications under the heading.

P - Permitted

U - Use Permit

L - Limited (See “Additional Use Regulations”)

– - Not Permitted

Table B-1: IL, IG, IW, and IP Districts: Land Use Regulations

	<i>IL</i>	<i>IG</i>	<i>IW</i>	<i>IP</i>	<i>Additional Regulations</i>
Residential					(L)
Work/Live Quarters	U	–	–	–	(A)
Public and Semipublic					
Adult Day Health Care	U	U	–	U	(B)
Clubs and Lodges	L18	L18	–	L18	
Cultural Institutions	U	U	–	U	
Day Care, General	U	U	–	U	(B)
Government Offices	U	U	U	U	
Heliports	L1	L1	L1	L1	
Maintenance and Service Facilities	P	P	P	–	
Public Safety Facilities	L20	L20	L20	L20	
Religious Assembly	U	U	–	U	(K)
Utilities, Major	U	U	U	U	

Table B-1: IL, IG, IW, and IP Districts: Land Use Regulations

	<i>IL</i>	<i>IG</i>	<i>IW</i>	<i>IP</i>	<i>Additional Regulations</i>
Waste Facility	–	U	–	–	
Utilities, Minor	P	P	P	P	
Commercial Uses					
Adult Business	P	P	–	P	(M)
Ambulance Services	P	P	–	P	
Animal Sales and Services					
Animal Boarding	L20	–	–	–	
Animal Hospitals	L20	L20	–	–	
Artists' Studios	P	–	–	L20	
Banks and Savings and Loans	L2	L2	–	L2	
Building Materials and Services	P	P	L12	L20	
Catering Services	P	P	–	P	
Commercial Filming	L20	L20	L20	L20	
Commercial Recreation and Entertainment	L5	L21	–	L5	
Game Center	L8	L8	–	L8	
Communication Facilities	P	P	P	P	
Eating and Drinking Establishments	L4	L4	L4	L4	
Mobile Food Vending	P	P	P	P	(N)
With Wine and Beer Service	L4	L4	L4	L4	
With Full Alcoholic Beverage Service	U	U	U	U	
With Take-Out Service	L4	L4	L4	L4	(D)
Limited	L4	L4	L4	L4	(D)
Food and Beverage Sales	L6	L6	–	L7	
Funeral and Interment Services	L9	–	–	–	
Horticulture, Limited	P	P	–	–	
Laboratories	P	P	–	P	
Maintenance and Repair Services	P	P	L12	P	
Marine Sales and Services	–	–	P	–	
Nurseries	P	P	–	U	
Offices, Business and Professional	–	–	–	L13	
Personal Improvement Services	L14	L14	–	L14	
Personal Services	L10	L10	–	L10	
Research and Development Services	P	P	L12	P	

Table B-1: IL, IG, IW, and IP Districts: Land Use Regulations

	<i>IL</i>	<i>IG</i>	<i>IW</i>	<i>IP</i>	<i>Additional Regulations</i>
Vehicle/Equipment Sales and Services					
Automobile Washing	U	L15	–	–	(E)
Service Stations	U	L16	L12	U	
Vehicle/Equipment Repair	L17	L17	–	–	
Vehicle/Equipment Sales and Rentals	U	L11	–	–	
Vehicle Storage	U	U	L12	–	
Warehousing and Storage, Limited	P	P	L12	U	
Industrial					
Industry, Custom	P	P	L12	P	
Industry, General	–	L19	L12	U	
Industry, Limited	P	P	L12	P	
Small-Scale	P	P	L12	P	
Industry, Research and Development	P	P	L12	P	
Industry, Technology	P	P	L12	P	
Port Terminals	–	–	P	–	
Wholesaling, Distribution and Storage					
Wholesaling and Distribution	P	P	L12	U	
Warehousing and Transportation	P	P	L12	U	
Trucking Terminal/Freight Transfer Station	U	U	L12	–	
Package Distribution	P	P	L12	U	
Agricultural and Extractive Uses					(J)(L)
Mining and Processing	–	U	–	–	
Accessory Uses					(F)(G)(H)(L)
	P/U	P/U	P/U	P/U	
Temporary Uses					(G)(J)(L)
Animal Shows	U	U	–	–	
Christmas Tree Sales	P	P	–	–	
Circuses and Carnivals	–	U	–	–	
Retail Sales – Outdoor	U	U	U	–	
Swap Meets – Nonrecurring	U	U	–	–	
Trade Fairs	U	U	U	U	

Table B-1: IL, IG, IW, and IP Districts: Land Use Regulations

	<i>IL</i>	<i>IG</i>	<i>IW</i>	<i>IP</i>	<i>Additional Regulations</i>
Nonconforming					(l)
Other Uses					
Medical Marijuana Distribution Facilities	–	–	–	–	

Notes:

IL, IG, IW, and IP Districts: Additional Use Regulations

- L-1 Allowed with a use permit and heliport permit from the California Department of Transportation, Division of Aeronautics if located 1,000 or more feet from a residential district.
- L-2 Only automatic teller machines allowed.
- L-3 Use permit required only for equipment rentals and retail sales.
- L-4 Permitted as a secondary use in a building occupying no more than 2,500 square feet of the building area. A community development director use permit is required for secondary uses occupying building areas greater than 2,500 square feet but not more than 5,000 square feet, or where the use is the primary use of a building. Not permitted for uses larger than 5,000 square feet.
- L-5 Only health fitness clubs and tennis/racquetball clubs are permitted as the principal use in a structure, subject to a use permit. Other activities regulated under this use classification are permitted as a secondary use within a building, occupying no more than 1,000 square feet of the building floor area.
- L-6 Use permit required for establishments occupying more than 1,000 square feet.
- L-7 Only delicatessens and food stores occupying fewer than 1,000 square feet are permitted.
- L-8 Only game centers with five or fewer games permitted; also see BMC 17.70.290, Game centers.
- L-9 Only crematories, columbariums, and mausoleums allowed.
- L-10 Only beauty shops and barbershops permitted.
- L-11 New or used automobile, truck or motorcycle retail sales shall be permitted only as an accessory to wholesale operations.
- L-12 Only water-related uses allowed.
- L-13 Medical/dental offices, insurance brokerage offices, and real estate brokerage offices not permitted.
- L-14 Only business and trade schools permitted.
- L-15 Only truck tractor and trailer washing permitted.
- L-16 Only stations offering controlled services to individual uses within an industrial area are allowed, subject to a use permit.
- L-17 Only truck and equipment repair primarily serving industrial activities are permitted by right; a community development director use permit is required for automobile repair and for repair services that cater to the general public. If the following conditions are met, the community development director may waive the use permit requirement and approve the use upon issuance of a zoning permit:
 1. The proposed use is located in an existing structure on a major arterial or on a street which connects to a major arterial, and is readily accessible to residential and commercial areas;
 2. No outdoor repair or maintenance activities are proposed in conjunction with the use;
 3. No outdoor storage of vehicles or equipment will take place during nonbusiness hours;
 4. The applicant can demonstrate that the proposed site will meet zoning ordinance parking requirements.
- L-18 Only trade union halls, including their accompanying business offices, are permitted.
- L-19 General industrial uses are permitted by right except that a use permit is required for oil and gas refining.
- L-20 Community development director use permit required. If the following conditions are met, the community development director may waive the use permit requirement and approve the use upon issuance of a zoning permit:

Table B-1: IL, IG, IW, and IP Districts: Land Use Regulations

	<i>IL</i>	<i>IG</i>	<i>IW</i>	<i>IP</i>	<i>Additional Regulations</i>
					<ol style="list-style-type: none"> 1. The proposed use is located in an existing structure which is entirely enclosed, and no outside facilities are proposed; 2. For animal hospitals, or where boarding or overnight care facilities are proposed, the use is located in a soundproofed and air-conditioned facility.
L-2I					<p>Health fitness clubs, tennis/racquetball clubs, and recreational facilities such as batting cages, indoor golf driving ranges, and firing and archery ranges are permitted within a structure, subject to a use permit when occupying more than 1,000 square feet. All activities regulated under this use classification are permitted when occupying no more than 1,000 square feet of the building floor area.</p> <ol style="list-style-type: none"> (A) See BMC 17.70.020, Relocated buildings (use permit required). (B) Limited to facilities accessory to manufacturing, wholesaling, or distribution, and not exceeding 25 percent of the floor area occupied by the principal use. (C) Limited to facilities accessory to manufacturing, wholesaling, or distribution, and not exceeding 25 percent of the floor area occupied by the principal use. (D) See BMC 17.70.090, Eating and drinking establishments with take-out service. (E) See BMC 17.70.110, Service stations, vehicle/equipment repair, and automobile washing. (F) See BMC 17.70.050, Nonresidential accessory structures. (G) See Chapter 17.104 BMC, Use Permits and Variances. (H) Maximum: One dwelling unit per site as caretaker's housing. (I) See Chapter 17.98 BMC, Nonconforming Uses and Structures. (J) See BMC 17.70.260, Hazardous materials. (K) No day care facilities or schools shall be permitted as part of a religious assembly facility. (L) Evaluate a nonindustrial or noncommercial project against the following criteria when considering findings for use permits or variances: <ol style="list-style-type: none"> (1) Will the project create substantial conflicts with existing industrial and commercial traffic? (2) Will the project be subject to excessive glare, noise or vibration from adjacent industrial/commercial uses? (Refer to general plan for noise criteria, Chapter 4, p. 178.) (3) Will the project be exposed to hazardous materials or risks that would create health and safety hazards for persons occupying or visiting the project? (4) Will the project be located on an arterial street, or located in an area which would bring nonindustrial traffic onto local streets? (M) An adult business offering live entertainment shall be subject to the requirements of Chapters 5.44 and 17.102 BMC. (N) Mobile food vending shall be subject to the requirements of BMC 17.70.380, Mobile food vendors.

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Appendix C: Glossary of Acronyms

- ABAG.** Association of Bay Area Governments
- BAAQMD.** Bay Area Air Quality Management District
- BIPA.** Benicia Industrial Park Association
- BRIP.** Business Resource Incentive Program
- CEQA.** California Environmental Quality Act
- CNG.** Compressed Natural Gas
- FAST.** Fairfield and Suisun Transit
- FEMA.** Federal Emergency Management Agency
- FIRM.** Flood Insurance Rate Maps
- HERO Program.** Home Energy Renovation Operation Program
- MTC.** Metropolitan Transportation Commission
- OBAG 2.** Second round of funding for the One Bay Area Grant program
- PACE.** Property Assessed Clean Energy
- PCI.** Pavement Condition Index
- PDA.** Priority Development Area
- STA.** Solano Transportation Authority
- STAA.** Surface Transportation Assistance Act of 1982
- TDM.** Transportation Demand Management
- TEC Plan.** Transportation and Employment Center Plan
- TMA.** Transportation Management Agency
- VMT.** Vehicle Miles Traveled

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