Sea Level Rise Maps

6.0

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6 Sea Level Rise Maps

6.1 Introduction

This chapter contains the maps generated for the Federal Highways Administration (FHWA) pilot project (as listed in Table 6.1). There are two main types of maps – those that show expected inundation, and those that show the overtopping potential of the shoreline assets. The inundation maps present the depth and extent of inundation associated with the six inundation scenarios evaluated as part of this effort. Each SLR scenario -16 inches (40 cm) by mid-century and 55 inches (140 cm) by end of century - is evaluated under three storm/tide conditions: inundation associated with high tides also known as mean higher high water (MHHW), inundation associated with 100-year extreme water levels also known as still water elevations (100-yr SWEL), and inundation associated with 100-year extreme water levels coupled with wind waves (100-yr SWEL + wind waves). The depth of inundation information associated with the six inundation scenarios was extracted along the shoreline assets to provide a high-level assessment of the potential for shoreline overtopping. The shoreline overtopping potential maps present the results of this exercise. Please refer to Section 4.2 for details on what the inundation and overtopping maps show.

Before reviewing the maps, please read Section 6.2 to understand the caveats associated with the maps due to data availability and methodology limitations.

Table 6.1 Number of maps produced by type

	Inundation overview	Inundation zoom-in maps	Overtopping depth	Overtopping %	Overtopping depth zoom-ins
16” + MHHW	1	5	1	1	0
16” + 100-yr SWEL	1	5	1	1	5
16” + 100-yr SWEL + wind waves	1	5	1	1	0
55” + MHHW	1	5	1	1	0
55” + 100-yr SWEL	1	5	1	1	5
55” + 100-yr SWEL + wind waves	1	5	1	1	0
Total	**6**	**30**	**6**	**6**	**10**

6.2 Caveats Associated with the Maps

The inundation maps and shoreline overtopping potential maps are intended as planning-level tools to illustrate the potential for inundation and coastal flooding under future SLR scenarios and the maps do not represent the exact location or depth of flooding or shoreline overtopping. The maps are based on model outputs and do not account for all of the complex and dynamic Bay processes or future conditions such as erosion, subsidence, future construction or shoreline protection upgrades, or other changes to San Francisco Bay or the region that may occur in response to SLR. For more context on the maps and analyses, including a description of the data and methods used, please refer to Chapter 4 and the associated Appendix. Users agree to hold harmless and blameless the State of California and its representatives and its agents for any liability associated with the use of the maps. The maps and data

shall not be used to assess actual coastal hazards, insurance requirements, or property values or be used in lieu of Flood Insurance Rate Maps issued by the Federal Emergency Management Agency (FEMA).

The inundation maps created for the pilot study region represent advancement over previous inundation maps that characterized the extent of inland inundation due to sea level rise. Most notably, the new maps include:

- The depth and extent of inundation.
- The maps rely on topographic information from the 2010 USGS LIDAR. The flood protection levees and other features that could impede flood conveyance are captured in this latest set.
- Wave dynamics along the Alameda County shoreline are considered. Wave heights along the shoreline can exceed 4 feet in height therefore wave dynamics are important processes to consider when evaluating the potential for shoreline overtopping and inundation in nearshore coastal areas.
- The new mapping effort also benefited from an assessment of hydraulic connectivity, using inundation mapping methodologies developed by the NOAA Coastal Services Center to exclude low-lying areas that are below the inundated water surface elevation, but are not hydraulically-connected to the inundated areas.

The inundation maps are intended only as a screening-level tool for performing the vulnerability and risk assessment. Although the inundation maps do account for additional processes and they rely on new data, they are still associated with the following series of assumptions and caveats:

- The bathymetry of San Francisco Bay and the topography of the landward areas, including levees and other flood and shore protection features, would not change in response to SLR and increased inundation (e.g., the morphology of the region is constant over time).
- The maps do not account for the accumulation of organic matter in wetlands or potential sediment deposition and/or resuspension that could alter San Francisco Bay hydrodynamics and/or bathymetry.
- The maps do not account for erosion, subsidence, future construction, or levee upgrades.
- The maps do not account for the existing condition or age of the shore protection assets. No degradation or levee failure modes have been analyzed as part of the inundation mapping effort.
- The levee heights and the heights of roadways and/or other topographic features that may impact flood water conveyance are derived from the USGS 2010 LIDAR at a two meter horizontal grid resolution. Although this data set represents the best available topographic data, and the data has undergone a rigorous QA/QC by a third party, the data has not been extensively ground-truthed. Levee crests and other topographic features may be over or under-represented by the LIDAR data.
- The inundation depth and extent shown on the MHHW maps are associated with the highest high tides, in an attempt to approximate the maximum extent of future daily tidal inundation. This level of inundation can also be referred to as “permanent inundation,” as it represents the area that would be inundated regularly. Tides in San Francisco Bay exhibit two highs and two lows in any given day, and the daily high tide on any given day may be less than the calculated MHHW tidal elevation.
- The inundation depth and extent shown on the 100-yr SWEL maps is associated with a 100-year extreme water level condition—in other words, an extreme tide level with a 1-percent chance of

occurring in any given year. This inundation is considered “episodic inundation” because the newly inundated areas (the areas not inundated under the MHHW scenario) would be inundated only during extreme high tides. It should be noted that extreme tide levels with greater return intervals (i.e., 500-yr SWEL with a 0.2-percent chance of occurring in a given year) can also occur and would result in greater inundation depths and a larger inundated area.

- The depth of inundation is not shown for the extreme coastal storm event conditions (i.e., 100-yr SWEL + waves) because the physics associated with overland wave propagation and wave dissipation are not included in this study. These processes would have a significant effect on the ultimate depth of inundation associated with the large coastal wave events, resulting in a potential reduction in the depth of inundation in most areas. Alternatively, the wave heights used in this analysis are associated with existing 10-year wave heights, and as sea level rises and bay water depths increase, the potential for larger waves to develop in the nearshore environment increases. This dynamic could result in increases in the depth of inundation, particularly directly adjacent to the shoreline assets.

- The inundation maps focus on the potential for coastal flooding associated with sea level rise and coastal storm events. The inundation maps do not account for localized inundation associated with rainfall-runoff events, or the potential for riverine overbank flooding in the local tributaries associated with large rainfall events.

- The maps do not account for inundation associated with changing rainfall patterns, frequency, or intensity as a result of climate change.

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INUNDATION OVERVIEW MAPS

16" MHHW (1)

16" MHHW + 100-yr SWEL (1)

16" MHHW + 100-yr SWEL + wind waves (1)

55" MHHW (1)

55" MHHW + 100-yr SWEL (1)

55" MHHW + 100-yr SWEL + wind waves (1)

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Adapting to Rising Tides

Potential Sea Level Rise *

16-Inch MHHW Sea Level Rise Extent and Depth

- 0 - 2 Feet
- 2 - 4 Feet
- 4 - 6 Feet
- 6 - 8 Feet
- 8 - 10 Feet
- 10 - 16 Feet
- > 16 Feet

- Airport
- Commuter Rail Station
- Ferry Terminal
- Major Roads
- Pump Station
- Tide Gate

- Disconnected Low-Lying Areas
- Project Area

1 in = 2 miles

N

0 0.5 1 2 3 Miles

11/14/2011

Source: Inundation Layers - AECOM, 2011

Northern Project Extent

Southern Project Extent

Emeryville
Piedmont
Oakland
Alameda
San Leandro
San Lorenzo
Hayward
Union City

880
980
260
238
92
84

Webster Tube
Posey Tube
BART
Hegenberger Rd
Hesperian Blvd
WP Railroad
SP Railroad
Union City Blvd

San Francisco Bay

* Disclaimer: The inundation maps and the associated analyses are intended as planning-level tools to illustrate the potential for inundation and coastal flooding under future SLR scenarios and (they) do not represent the exact location or depth of flooding or shoreline overtopping. The maps are based on model outputs and do not account for all of the complex and dynamic Bay processes or future conditions such as erosion, subsidence, future construction or shoreline protection upgrades, or other changes to San Francisco Bay or the region that may occur in response to SLR. For more context about the maps and analyses, including a description of the data and methods used, please see Adapting to Rising Tides: Transportation Vulnerability and Risk Assessment Pilot Project, Technical Report, November 2011.

Adapting to Rising Tides

Potential Sea Level Rise *

16-Inch Sea Level Rise plus 100-Year Stillwater Levels Extent and Depth

- 0 - 2 Feet
- 2 - 4 Feet
- 4 - 6 Feet
- 6 - 8 Feet
- 8 - 10 Feet
- 10 - 16 Feet
- > 16 Feet

- Airport
- Commuter Rail Station
- Ferry Terminal
- Major Roads
- Pump Station
- Tide Gate

- Disconnected Low-Lying Areas
- Project Area

1 in = 2 miles

0 0.5 1 2 3 Miles

11/14/2011

Source: Inundation Layers - AECOM, 2011

Northern Project Extent

Southern Project Extent

Emeryville
Piedmont
Oakland
Alameda
San Leandro
San Lorenzo
Hayward
Union City

880
980
260
238
92
84

Webster Tube
Posey Tube
BART
Hegenberger Rd
Hesperian Blvd
WP Railroad
SP Railroad
Union City Blvd
UP/PACIFIC RAILROAD

San Francisco Bay

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Adapting to Rising Tides

Potential Sea Level Rise *

16-Inch Sea Level Rise plus 100-Year Stillwater Levels (extent and depth) with Potential Wind-Wave Zone

- 0 - 2 Feet
- 2 - 4 Feet
- 4 - 6 Feet
- 6 - 8 Feet
- 8 - 10 Feet
- 10 - 16 Feet
- > 16 Feet

- Airport
- Commuter Rail Station
- Ferry Terminal
- Major Roads
- Pump Station
- Tide Gate

- Wind-Wave Zone
- Project Area

1 in = 2 miles

0 0.5 1 2 3 Miles

11/14/2011

Source: Inundation Layers - AECOM, 2011

Northern Project Extent

Southern Project Extent

Emeryville
Piedmont
Oakland
Alameda
San Leandro
San Lorenzo
Hayward
Union City

880
980
260
238
92
84

Webster Tube
Posey Tube
BART
Hegenberger Rd
Hesperian Blvd
WP Railroad
SP Railroad
Union City Blvd

San Francisco Bay

*** Disclaimer: The inundation maps and the associated analyses are intended as planning-level tools to illustrate the potential for inundation and coastal flooding under future SLR scenarios and (they) do not represent the exact location or depth of flooding or shoreline overtopping. The maps are based on model outputs and do not account for all of the complex and dynamic Bay processes or future conditions such as erosion, subsidence, future construction or shoreline protection upgrades, or other changes to San Francisco Bay or the region that may occur in response to SLR. For more context about the maps and analyses, including a description of the data and methods used, please see Adapting to Rising Tides: Transportation Vulnerability and Risk Assessment Pilot Project, Technical Report, November 2011.**

Adapting to Rising Tides

Potential Sea Level Rise *

55-Inch MHHW Sea Level Rise Extent and Depth

- 0 - 2 Feet
- 2 - 4 Feet
- 4 - 6 Feet
- 6 - 8 Feet
- 8 - 10 Feet
- 10 - 16 Feet
- > 16 Feet

- Airport
- Commuter Rail Station
- Ferry Terminal
- Major Roads
- Pump Station
- Tide Gate

- Disconnected Low-Lying Areas
- Project Area

1 in = 2 miles

N

0 0.5 1 2 3 Miles

11/14/2011

Source: Inundation Layers - AECOM, 2011

Northern Project Extent

Southern Project Extent

Emeryville
Piedmont
Oakland
Alameda
San Leandro
San Lorenzo
Hayward
Union City

880
980
260
238
92
84

Webster Tube
Posey Tube
BART
Hegenberger Rd
Hesperian Blvd
WP Railroad
SP Railroad
Union City Blvd
UPRR

San Francisco Bay

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Adapting to Rising Tides

Potential Sea Level Rise *

55-Inch Sea Level Rise plus 100-Year Stillwater Levels Extent and Depth

- 0 - 2 Feet
- 2 - 4 Feet
- 4 - 6 Feet
- 6 - 8 Feet
- 8 - 10 Feet
- 10 - 16 Feet
- > 16 Feet

- Airport
- Commuter Rail Station
- Ferry Terminal
- Major Roads
- Pump Station
- Tide Gate

- Disconnected Low-Lying Areas
- Project Area

1 in = 2 miles

0 0.5 1 2 3 Miles

11/14/2011

Source: Inundation Layers - AECOM, 2011

Northern Project Extent

Southern Project Extent

Emeryville
Piedmont
Oakland
Alameda
San Leandro
San Lorenzo
Hayward
Union City

880
980
260
238
92
84

Webster Tube
Posey Tube
BART
Hegenberger Rd
Hesperian Blvd
WP Railroad
SP Railroad
Union City Blvd
UP PACIFIC RAILROAD

San Francisco Bay

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Adapting to Rising Tides

Potential Sea Level Rise *

55-Inch Sea Level Rise plus 100-Year Stillwater Levels (extent and depth) with Potential Wind-Wave Zone

- 0 - 2 Feet
- 2 - 4 Feet
- 4 - 6 Feet
- 6 - 8 Feet
- 8 - 10 Feet
- 10 - 16 Feet
- > 16 Feet
- Wind-Wave Zone
- Project Area
- Airport
- Commuter Rail Station
- Ferry Terminal
- Major Roads
- Pump Station
- Tide Gate

1 in = 2 miles

0 0.5 1 2 3 Miles

11/14/2011

Source: Inundation Layers - AECOM, 2011

Northern Project Extent

Southern Project Extent

Emeryville
Piedmont
Oakland
Alameda
San Leandro
San Lorenzo
Hayward
Union City
San Francisco Bay

880
980
260
238
92
84

Webster Tube
Posey Tube
BART
Hegenberger Rd
Hesperian Blvd
WP Railroad
SP Railroad
Union City Blvd

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INUNDATION ZOOM-IN MAPS SHOWING SELECTED TRANSPORTATION ASSET LOCATION

16" MHHW (5)

16" MHHW + 100-yr SWEL (5)

16" MHHW + 100-yr SWEL + wind waves (5)

55" MHHW (5)

55" MHHW + 100-yr SWEL (5)

55" MHHW + 100-yr SWEL + wind waves (5)

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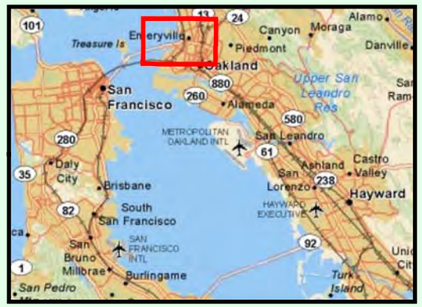

Northern Project Extent

R-06
Bus Route: EGR

Powell St

R-01
Bus routes: C | F | FS | G | H | J | L | LA | EGR
Amtrak Thruway

R-12
Bus routes: B | BA | C | CB | E | F | FS | G | H J | L LA | NL | NX | NX1 | NX2 | NX3 | NX4 O | OX | P | S | SB | V | W | Z | 800
Caltrans Bike Shuttle | Amtrak Thruway

Toll Plaza

Burma Rd

R-09

Bay Bridge

R-07
Bus route: 31

Mandela Parkway

R-04
Bus route: NL

West Grand Avenue

T-06

UP Martinez Subdivision

San Francisco Bay

T-01

BART Transbay Tube

F-02

BNSF International Gateway Railport Intermodal Yard

F-04

7th Street Highway and Railroad Pumps

T-02

BART

T-03
Bus routes: 26 | 31 | 62

80 580 880 980

Adapting to Rising Tides

Map 1 of 5: Emeryville Crescent - I-80/880/580 Maze Area

Inundation Potential

16-Inch MHHW Sea Level Rise Extent and Depth

- 0 - 2 Feet
- 2 - 4 Feet
- 4 - 6 Feet
- 6 - 8 Feet
- 8 - 10 Feet
- 10 - 16 Feet
- > 16 Feet
- Disconnected Low-Lying Areas
- Project Area
- # Asset Code
- Unselected Rail Station
- Pump Station
- BART (Selected)
- Railway (Selected)
- Railway (Unselected)
- Road (Selected)
- Road (Unselected)

1 inch = 1,650 feet

0 500 1,000 2,000 3,000 Feet

11/11/2011

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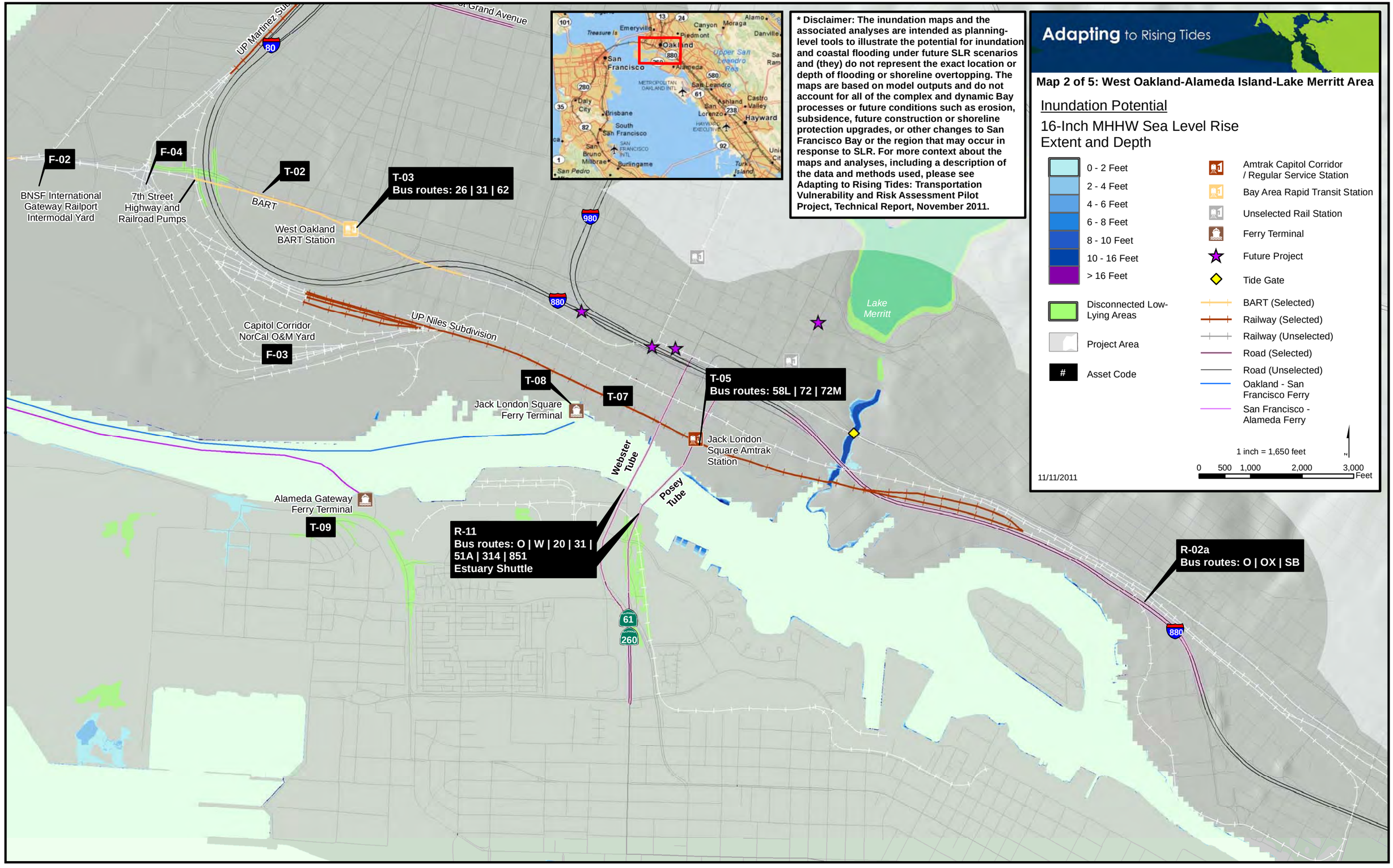

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Adapting to Rising Tides

Map 2 of 5: West Oakland-Alameda Island-Lake Merritt Area

Inundation Potential

16-Inch MHHW Sea Level Rise Extent and Depth

- 0 - 2 Feet
- 2 - 4 Feet
- 4 - 6 Feet
- 6 - 8 Feet
- 8 - 10 Feet
- 10 - 16 Feet
- > 16 Feet
- Disconnected Low-Lying Areas
- Project Area
- # Asset Code
- Amtrak Capitol Corridor / Regular Service Station
- Bay Area Rapid Transit Station
- Unselected Rail Station
- Ferry Terminal
- Future Project
- Tide Gate
- BART (Selected)
- Railway (Selected)
- Railway (Unselected)
- Road (Selected)
- Road (Unselected)
- Oakland - San Francisco Ferry
- San Francisco - Alameda Ferry

1 inch = 1,650 feet

0 500 1,000 2,000 3,000 Feet

11/11/2011

Adapting to Rising Tides

Map 3 of 5: Coliseum - Bay Farm Island Area

Inundation Potential

16-Inch MHHW Sea Level Rise
Extent and Depth

- 0 - 2 Feet
- 2 - 4 Feet
- 4 - 6 Feet
- 6 - 8 Feet
- 8 - 10 Feet
- 10 - 16 Feet
- > 16 Feet
- Disconnected Low-Lying Areas
- Project Area
- # Asset Code
- Amtrak Capitol Corridor / Regular Service Station
- Bay Area Rapid Transit Station
- Unselected Rail Station
- Unselected Ferry Terminal
- Maintenance Yard
- Railway (Unselected)
- Road (Selected)
- Road (Unselected)

1 inch = 2,000 feet

0 600 1,200 2,400 3,600 Feet

11/11/2011

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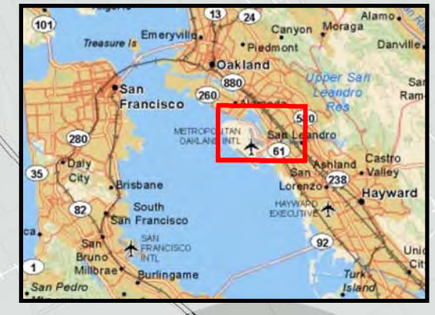
AC Transit Maintenance Facility
F-01
880
Coliseum / Oakland Airport BART Station
T-04
Bus routes: 45 | 46 73 | 98 | 356 | 805
Coliseum / Airport Amtrak Station
61
R-14
Bus routes: 314 | 356
Bay Farm Island Bridge
Bay Farm Island Bike/Pedestrian Bridge
Hegenberger Rd
R-05
Bus routes: 45 | 73 | 356 | 805
Harbor Bay Parkway
R-02b
R-05
BART Oakland Airport Connector
R-08
Bus route: 21
Ron Cowan Parkway
R-05
Bus routes: 73 | 805
Airport Dr



Adapting to Rising Tides

Map 4 of 5: San Leandro Marina Area

Inundation Potential

16-Inch MHHW Sea Level Rise
Extent and Depth

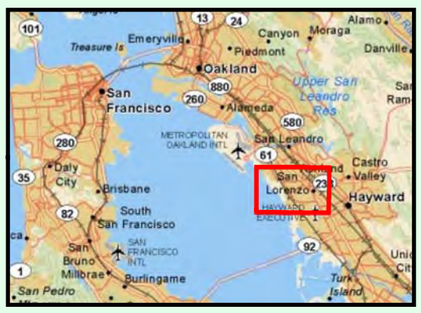
- 0 - 2 Feet
- 2 - 4 Feet
- 4 - 6 Feet
- 6 - 8 Feet
- 8 - 10 Feet
- 10 - 16 Feet
- > 16 Feet
- Disconnected Low-Lying Areas
- Project Area
- # Asset Code
- Unselected Rail Station
- Pump Station
- Tide Gate
- Railway (Unselected)
- Road (Unselected)

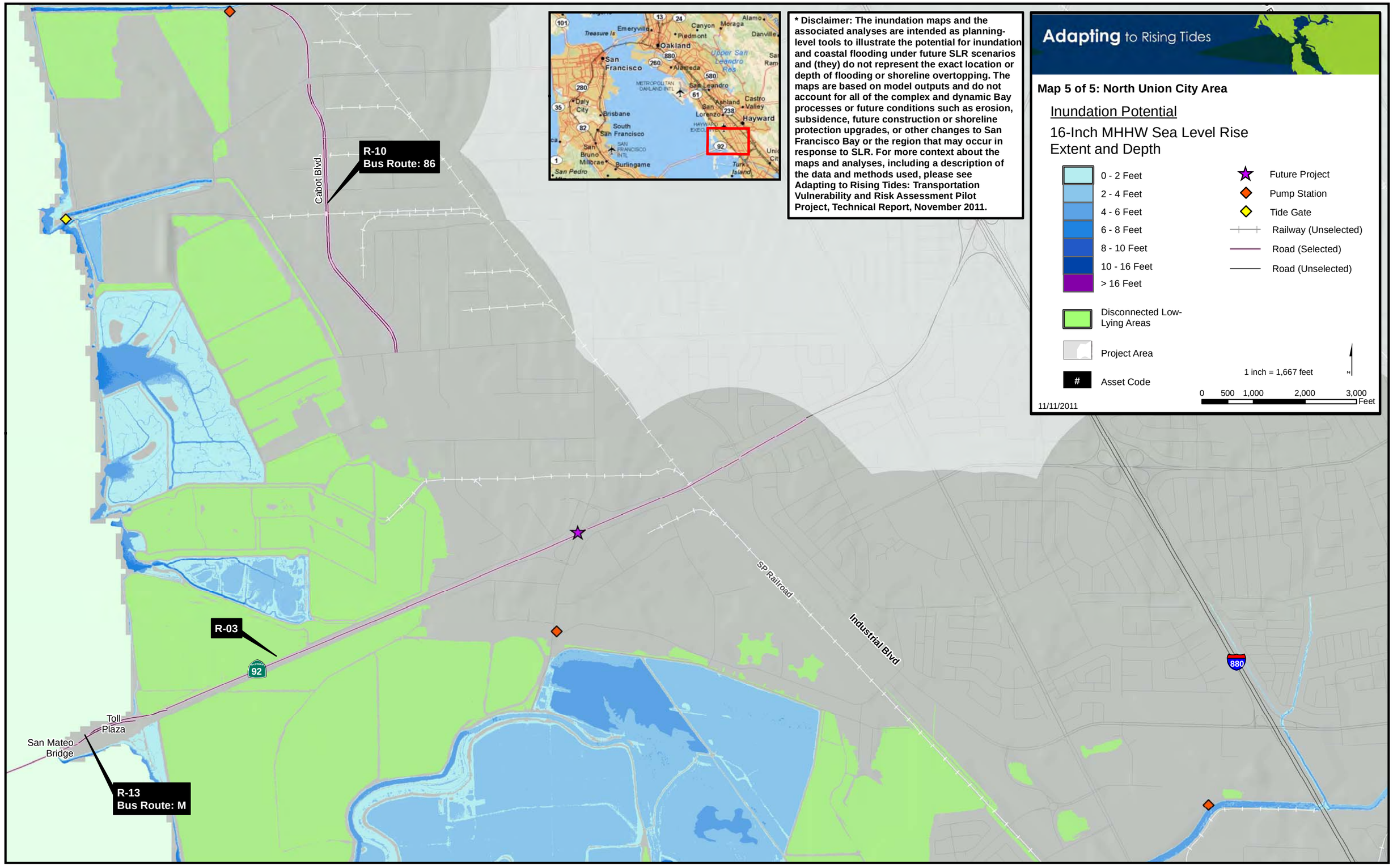
1 inch = 1,667 feet

0 500 1,000 2,000 3,000 Feet

11/11/2011

*** Disclaimer: The inundation maps and the associated analyses are intended as planning-level tools to illustrate the potential for inundation and coastal flooding under future SLR scenarios and (they) do not represent the exact location or depth of flooding or shoreline overtopping. The maps are based on model outputs and do not account for all of the complex and dynamic Bay processes or future conditions such as erosion, subsidence, future construction or shoreline protection upgrades, or other changes to San Francisco Bay or the region that may occur in response to SLR. For more context about the maps and analyses, including a description of the data and methods used, please see Adapting to Rising Tides: Transportation Vulnerability and Risk Assessment Pilot Project, Technical Report, November 2011.**





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Adapting to Rising Tides

Map 5 of 5: North Union City Area

Inundation Potential

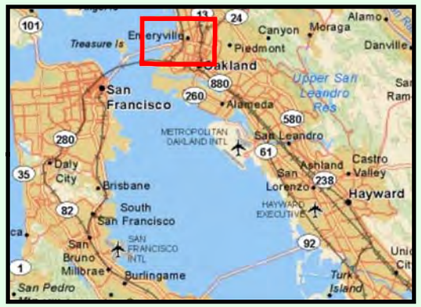
16-Inch MHHW Sea Level Rise
Extent and Depth

- 0 - 2 Feet
- 2 - 4 Feet
- 4 - 6 Feet
- 6 - 8 Feet
- 8 - 10 Feet
- 10 - 16 Feet
- > 16 Feet
- Disconnected Low-Lying Areas
- Project Area
- # Asset Code
- Future Project
- Pump Station
- Tide Gate
- Railway (Unselected)
- Road (Selected)
- Road (Unselected)

1 inch = 1,667 feet

0 500 1,000 2,000 3,000 Feet

11/11/2011



Northern Project Extent

R-06
Bus Route: EGR

Powell St

R-01
Bus routes: C | F | FS | G | H | J | L | LA | EGR
Amtrak Thruway

R-12
Bus routes: B | BA | C | CB | E | F | FS | G | H | J | L LA | NL | NX | NX1 | NX2 | NX3 | NX4 | O | OX | P | S | SB | V | W | Z | 800
Caltrans Bike Shuttle | Amtrak Thruway

Toll Plaza

Burma Rd

R-09

Bay Bridge

R-07
Bus route: 31

Mandela Parkway

T-06

R-04
Bus route: NL

West Grand Avenue

UP Martinez Subdivision

San Francisco Bay

T-01

BART Transbay Tube

F-02

BNSF International Gateway Railport Intermodal Yard

F-04

7th Street Highway and Railroad Pumps

T-02

BART

T-03
Bus routes: 26 | 31 | 62

80 580 880 980

Adapting to Rising Tides

Map 1 of 5: Emeryville Crescent - I-80/880/580 Maze Area

Inundation Potential

16-Inch Sea Level Rise plus 100-year Stillwater Levels Extent and Depth

- 0 - 2 Feet
- 2 - 4 Feet
- 4 - 6 Feet
- 6 - 8 Feet
- 8 - 10 Feet
- 10 - 16 Feet
- > 16 Feet
- Disconnected Low-Lying Areas
- Project Area
- # Asset Code
- Unselected Rail Station
- Pump Station
- BART (Selected)
- Railway (Selected)
- Railway (Unselected)
- Road (Selected)
- Road (Unselected)

1 inch = 1,650 feet

0 500 1,000 2,000 3,000 Feet

11/11/2011

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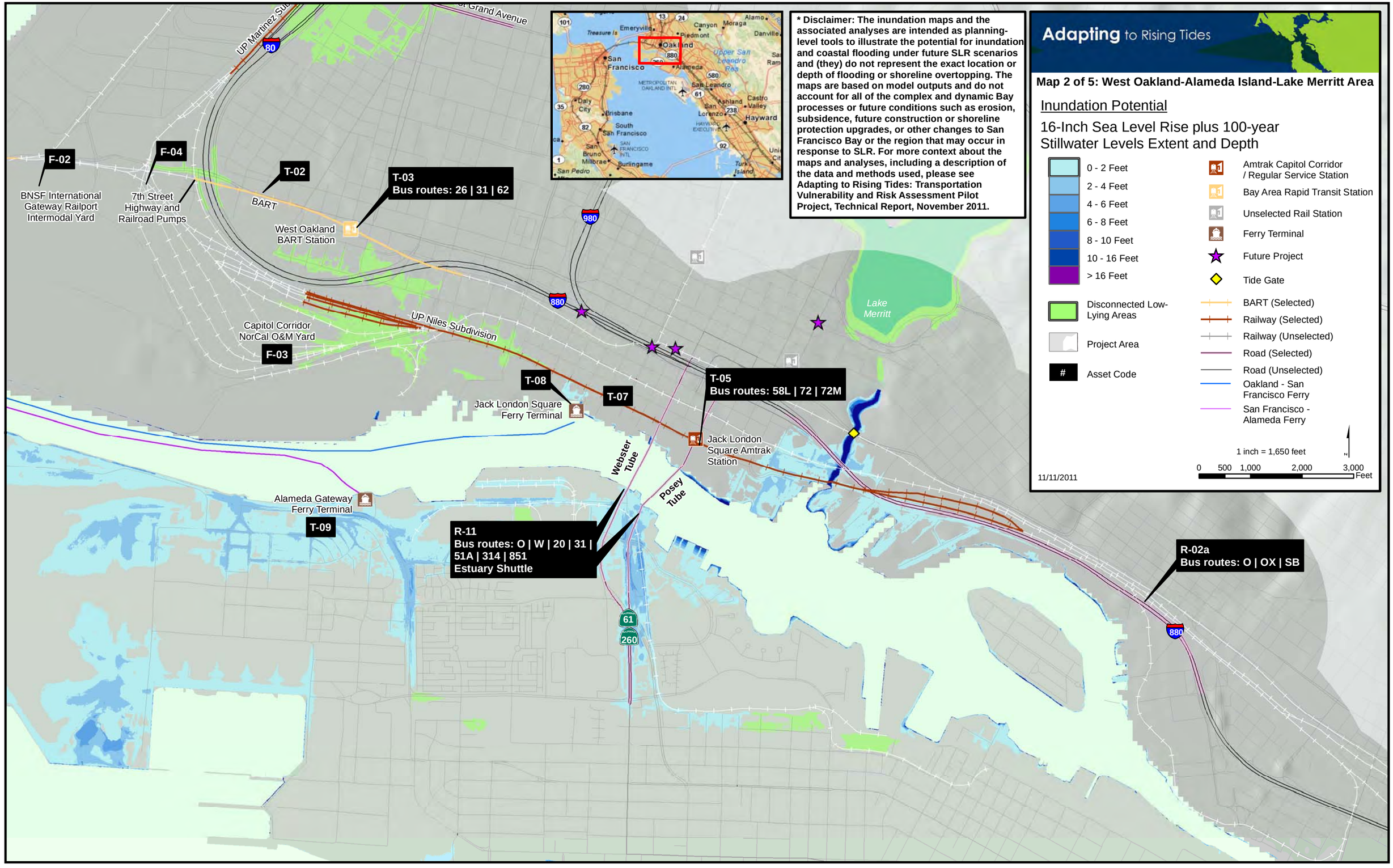

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Adapting to Rising Tides

Map 2 of 5: West Oakland-Alameda Island-Lake Merritt Area

Inundation Potential

16-Inch Sea Level Rise plus 100-year Stillwater Levels Extent and Depth

- 0 - 2 Feet
- 2 - 4 Feet
- 4 - 6 Feet
- 6 - 8 Feet
- 8 - 10 Feet
- 10 - 16 Feet
- > 16 Feet
- Disconnected Low-Lying Areas
- Project Area
- # Asset Code
- Amtrak Capitol Corridor / Regular Service Station
- Bay Area Rapid Transit Station
- Unselected Rail Station
- Ferry Terminal
- Future Project
- Tide Gate
- BART (Selected)
- Railway (Selected)
- Railway (Unselected)
- Road (Selected)
- Road (Unselected)
- Oakland - San Francisco Ferry
- San Francisco - Alameda Ferry

1 inch = 1,650 feet

0 500 1,000 2,000 3,000 Feet

11/11/2011

Adapting to Rising Tides

Map 3 of 5: Coliseum - Bay Farm Island Area

Inundation Potential

16-Inch Sea Level Rise plus 100-year Stillwater Levels Extent and Depth

- 0 - 2 Feet
- 2 - 4 Feet
- 4 - 6 Feet
- 6 - 8 Feet
- 8 - 10 Feet
- 10 - 16 Feet
- > 16 Feet
- Disconnected Low-Lying Areas
- Project Area
- # Asset Code
- Amtrak Capitol Corridor / Regular Service Station
- Bay Area Rapid Transit Station
- Unselected Rail Station
- Unselected Ferry Terminal
- Maintenance Yard
- Railway (Unselected)
- Road (Selected)
- Road (Unselected)

1 inch = 2,000 feet

0 600 1,200 2,400 3,600 Feet

11/11/2011

AC Transit Maintenance Facility
F-01
Coliseum / Oakland Airport BART Station
T-04
Bus routes: 45 | 46 73 | 98 | 356 | 805
Coliseum / Airport Amtrak Station
R-14
Bus routes: 314 | 356
Bay Farm Island Bridge
Bay Farm Island Bike/Pedestrian Bridge
Hegenberger Rd
R-05
Bus routes: 45 | 73 | 356 | 805
Harbor Bay Parkway
R-02b
R-05
BART Oakland Airport Connector
R-08
Bus route: 21
Ron Cowan Parkway
R-05
Bus routes: 73 | 805
Airport Dr

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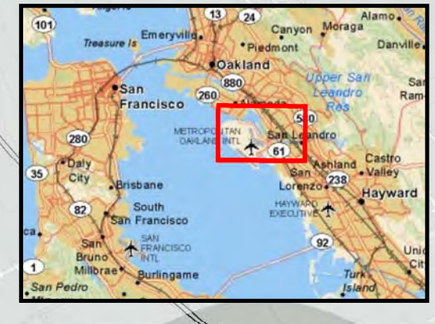

Adapting to Rising Tides

Map 4 of 5: San Leandro Marina Area

Inundation Potential

16-Inch Sea Level Rise plus 100-year Stillwater Levels Extent and Depth

- 0 - 2 Feet
- 2 - 4 Feet
- 4 - 6 Feet
- 6 - 8 Feet
- 8 - 10 Feet
- 10 - 16 Feet
- > 16 Feet
- Disconnected Low-Lying Areas
- Project Area
- # Asset Code
- Unselected Rail Station
- Pump Station
- Tide Gate
- Railway (Unselected)
- Road (Unselected)

1 inch = 1,667 feet

0 500 1,000 2,000 3,000 Feet

11/11/2011

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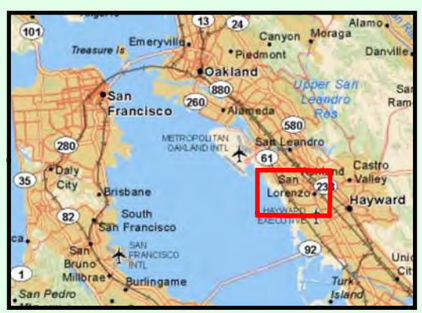

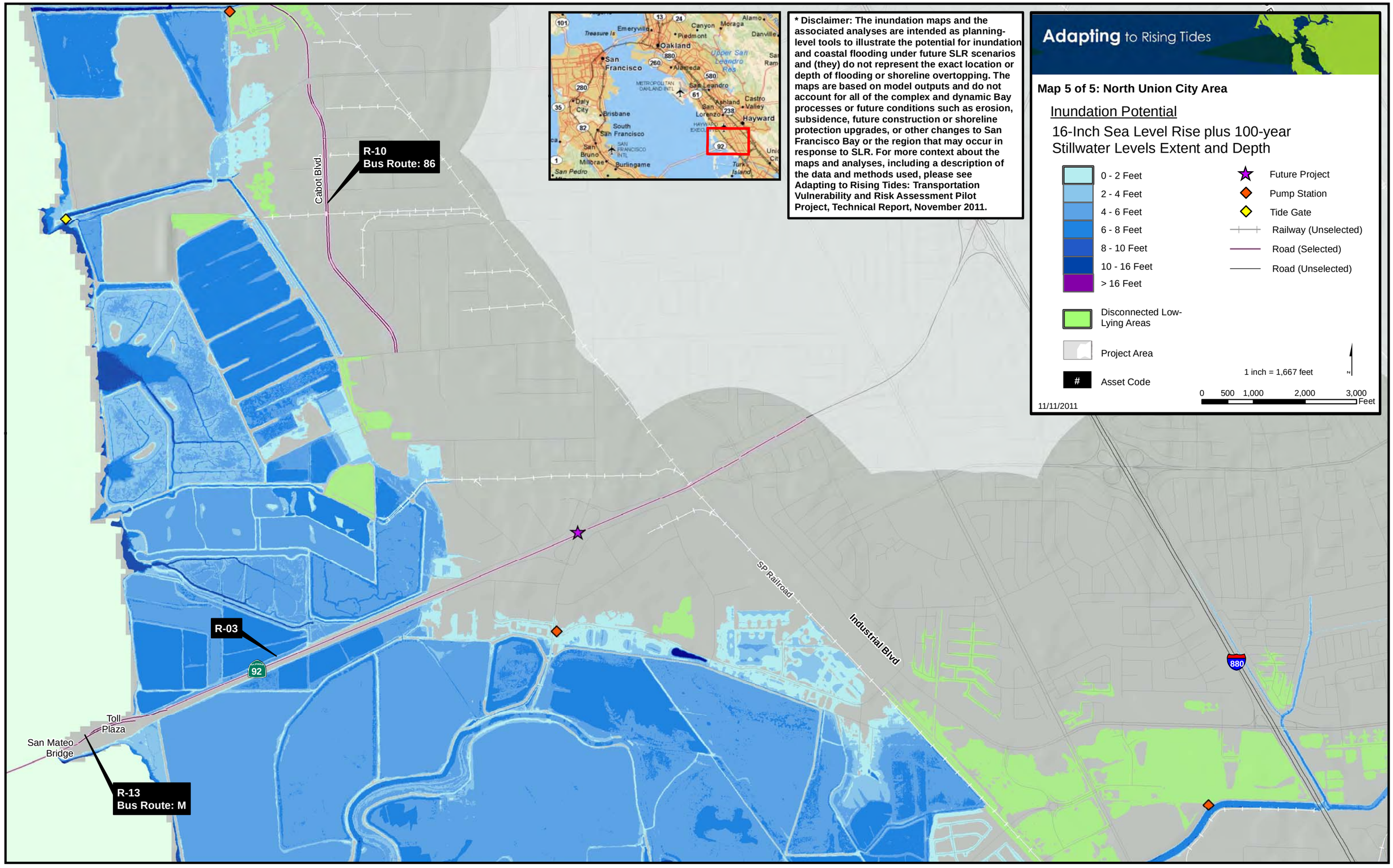

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Adapting to Rising Tides

Map 5 of 5: North Union City Area

Inundation Potential

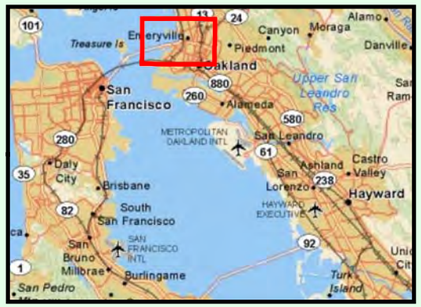
16-Inch Sea Level Rise plus 100-year Stillwater Levels Extent and Depth

- 0 - 2 Feet
- 2 - 4 Feet
- 4 - 6 Feet
- 6 - 8 Feet
- 8 - 10 Feet
- 10 - 16 Feet
- > 16 Feet
- Disconnected Low-Lying Areas
- Project Area
- # Asset Code
- Future Project
- Pump Station
- Tide Gate
- Railway (Unselected)
- Road (Selected)
- Road (Unselected)

1 inch = 1,667 feet

0 500 1,000 2,000 3,000 Feet

11/11/2011



Northern Project Extent

Adapting to Rising Tides

Map 1 of 5: Emeryville Crescent - I-80/880/580 Maze Area

16-Inch Sea Level Rise plus 100-year Stillwater Levels (extent and depth) with Potential Wind-Wave Zone

- 0 - 2 Feet
- 2 - 4 Feet
- 4 - 6 Feet
- 6 - 8 Feet
- 8 - 10 Feet
- 10 - 16 Feet
- > 16 Feet
- Potential Wind-Wave Zone
- Project Area
- # Asset Code
- Unselected Rail Station
- Pump Station
- BART (Selected)
- Railway (Selected)
- Railway (Unselected)
- Road (Selected)
- Road (Unselected)

1 inch = 1,650 feet

0 500 1,000 2,000 3,000 Feet

11/11/2011

R-06
Bus Route: EGR

R-01
Bus routes: C | F | FS | G | H | J | L | LA | EGR
Amtrak Thruway

R-12
Bus routes: B | BA | C | CB | E | F | FS | G | H J | L LA | NL | NX | NX1 | NX2 | NX3 | NX4 O | OX | P | S | SB | V | W | Z | 800
Caltrans Bike Shuttle | Amtrak Thruway

R-09

R-07
Bus route: 31

T-06

R-04
Bus route: NL

T-01

F-02

F-04

T-02

T-03
Bus routes: 26 | 31 | 62

Powell St
Toll Plaza
Burma Rd
Bay Bridge
Mandela Parkway
West Grand Avenue
UP Martinez Subdivision
BART Transbay Tube
BNSF International Gateway Railport Intermodal Yard
7th Street Highway and Railroad Pumps
BART

San Francisco Bay

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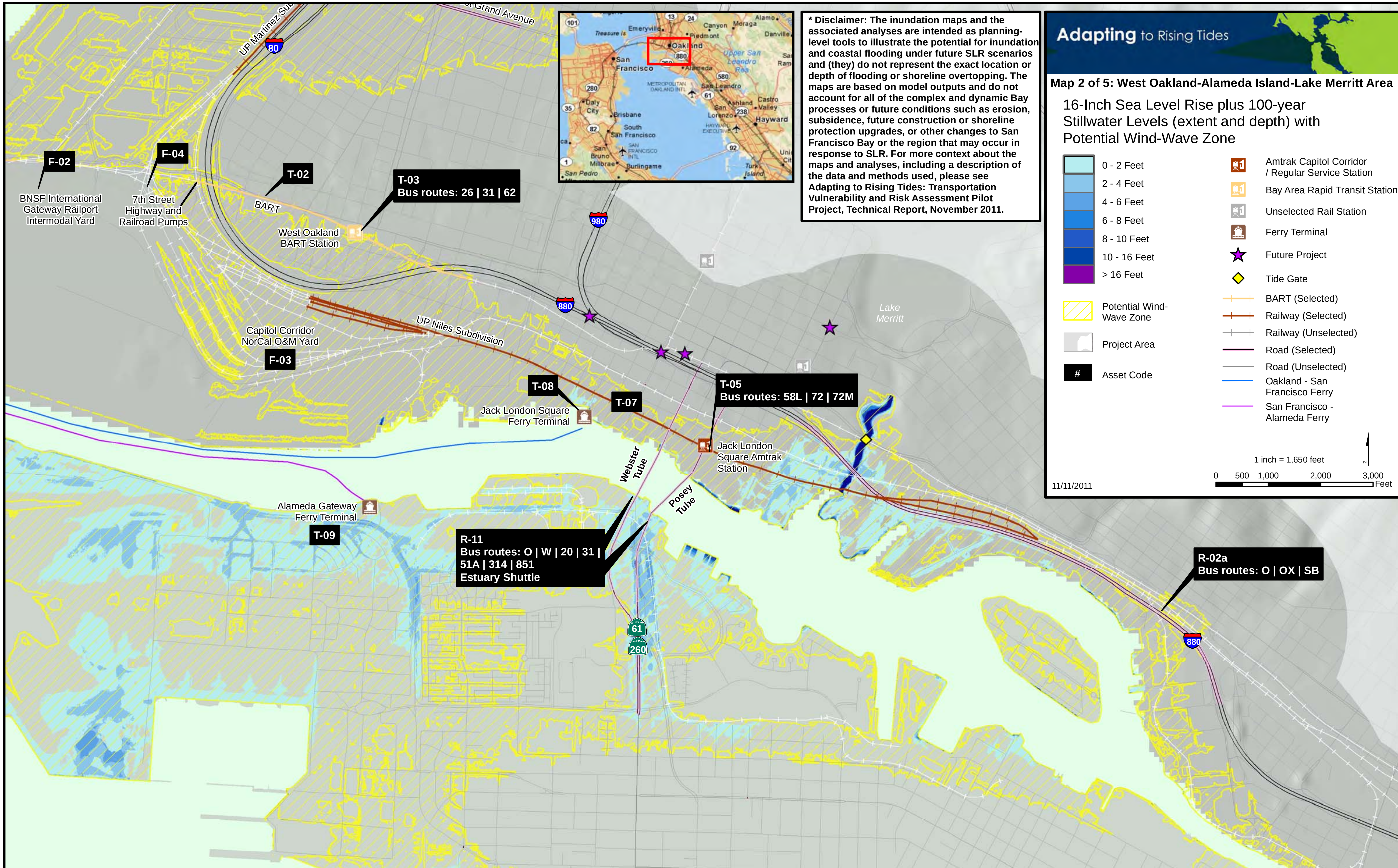
Adapting to Rising Tides
Map 2 of 5: West Oakland-Alameda Island-Lake Merritt Area
16-Inch Sea Level Rise plus 100-year Stillwater Levels (extent and depth) with Potential Wind-Wave Zone
0 - 2 Feet
2 - 4 Feet
4 - 6 Feet
6 - 8 Feet
8 - 10 Feet
10 - 16 Feet
> 16 Feet
Potential Wind-Wave Zone
Project Area
Asset Code
Amtrak Capitol Corridor / Regular Service Station
Bay Area Rapid Transit Station
Unselected Rail Station
Ferry Terminal
Future Project
Tide Gate
BART (Selected)
Railway (Selected)
Railway (Unselected)
Road (Selected)
Road (Unselected)
Oakland - San Francisco Ferry
San Francisco - Alameda Ferry
1 inch = 1,650 feet
0 500 1,000 2,000 3,000 Feet
11/11/2011
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F-02
BNSF International Gateway Railport Intermodal Yard
F-04
7th Street Highway and Railroad Pumps
T-02
BART
T-03
Bus routes: 26 | 31 | 62
West Oakland BART Station
UP Martinez Sub
Grand Avenue
80
980
880
Capitol Corridor NorCal O&M Yard
F-03
UP Niles Subdivision
T-08
Jack London Square Ferry Terminal
T-07
T-05
Bus routes: 58L | 72 | 72M
Jack London Square Amtrak Station
Lake Merritt
Webster Tube
Posey Tube
Alameda Gateway Ferry Terminal
T-09
R-11
Bus routes: O | W | 20 | 31 | 51A | 314 | 851
Estuary Shuttle
61
260
R-02a
Bus routes: O | OX | SB

Adapting to Rising Tides

Map 3 of 5: Coliseum - Bay Farm Island Area

16-Inch Sea Level Rise plus 100-year Stillwater Levels (extent and depth) with Potential Wind-Wave Zone

- 0 - 2 Feet
- 2 - 4 Feet
- 4 - 6 Feet
- 6 - 8 Feet
- 8 - 10 Feet
- 10 - 16 Feet
- > 16 Feet
- Potential Wind-Wave Zone
- Project Area
- # Asset Code

- Amtrak Capitol Corridor / Regular Service Station
- Bay Area Rapid Transit Station
- Unselected Rail Station
- Unselected Ferry Terminal
- Maintenance Yard
- Railway (Unselected)
- Road (Selected)
- Road (Unselected)

1 inch = 2,000 feet

0 600 1,200 2,400 3,600 Feet

11/11/2011

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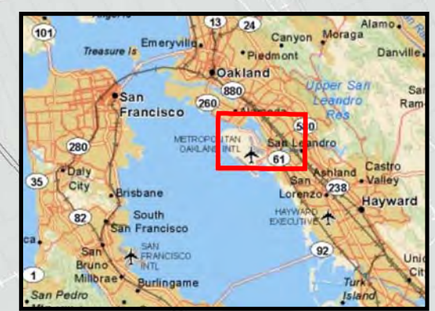

AC Transit Maintenance Facility

F-01

Coliseum / Oakland Airport BART Station

T-04
Bus routes: 45 | 46 73 | 98 | 356 | 805

Coliseum / Airport Amtrak Station

R-14
Bus routes: 314 | 356

Bay Farm Island Bridge

Bay Farm Island Bike/Pedestrian Bridge

Hegenberger Rd

R-05
Bus routes: 45 | 73 | 356 | 805

R-02b

R-05

Harbor Bay Parkway

BART Oakland Airport Connector

R-08
Bus route: 21

Ron Cowan Parkway

R-05
Bus routes: 73 | 805

Airport Dr

Adapting to Rising Tides

Map 4 of 5: San Leandro Marina Area

16-Inch Sea Level Rise plus 100-year Stillwater Levels (extent and depth) with Potential Wind-Wave Zone

- 0 - 2 Feet
- 2 - 4 Feet
- 4 - 6 Feet
- 6 - 8 Feet
- 8 - 10 Feet
- 10 - 16 Feet
- > 16 Feet
- Potential Wind-Wave Zone
- Project Area
- # Asset Code
- Unselected Rail Station
- Pump Station
- Tide Gate
- Railway (Unselected)
- Road (Unselected)

1 inch = 1,667 feet

0 500 1,000 2,000 3,000 Feet

11/11/2011

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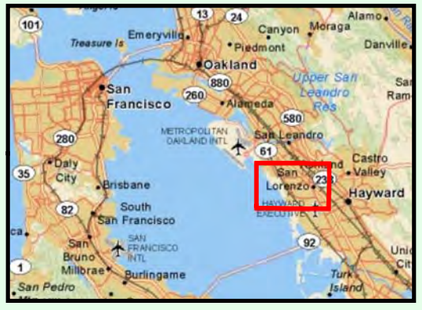
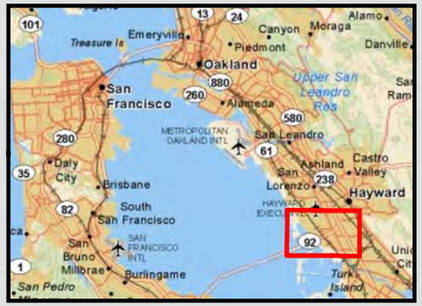


Adapting to Rising Tides

Map 5 of 5: North Union City Area

16-Inch Sea Level Rise plus 100-year Stillwater Levels (extent and depth) with Potential Wind-Wave Zone



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- 0 - 2 Feet
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- 8 - 10 Feet
- 10 - 16 Feet
- > 16 Feet
- Potential Wind-Wave Zone
- Project Area
- # Asset Code
- Future Project
- Pump Station
- Tide Gate
- Railway (Unselected)
- Road (Selected)
- Road (Unselected)

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0 500 1,000 2,000 3,000 Feet

11/11/2011

R-10
Bus Route: 86

Cabot Blvd.

R-03

92

Toll Plaza

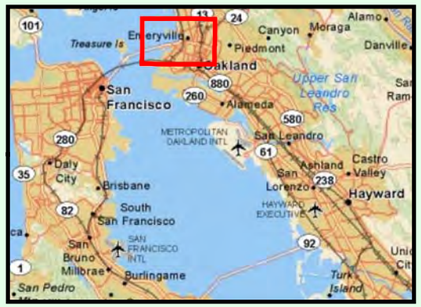
San Mateo Bridge

R-13
Bus Route: M

SP Railroad

Industrial Blvd

880



Northern Project Extent

R-06
Bus Route: EGR

Powell St

R-01
Bus routes: C | F | FS | G | H | J | L | LA | EGR
Amtrak Thruway

80

R-12
Bus routes: B | BA | C | CB | E | F | FS | G | H J | L LA | NL | NX | NX1 | NX2 | NX3 | NX4 O | OX | P | S | SB | V | W | Z | 800
Caltrans Bike Shuttle | Amtrak Thruway

Toll Plaza

Burma Rd

R-09

Bay Bridge

San Francisco Bay

580

880

R-07
Bus route: 31

Mandela Parkway

T-06

UP Martinez Subdivision

R-04
Bus route: NL

West Grand Avenue

80

T-01

BART Transbay Tube

F-02

BNSF International Gateway Railport Intermodal Yard

F-04

7th Street Highway and Railroad Pumps

T-02

BART

T-03
Bus routes: 26 | 31 | 62

980

Adapting to Rising Tides

Map 1 of 5: Emeryville Crescent - I-80/880/580 Maze Area

Inundation Potential

55-Inch MHHW Sea Level Rise Extent and Depth

- 0 - 2 Feet
- 2 - 4 Feet
- 4 - 6 Feet
- 6 - 8 Feet
- 8 - 10 Feet
- 10 - 16 Feet
- > 16 Feet
- Disconnected Low-Lying Areas
- Project Area
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- Unselected Rail Station
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0 500 1,000 2,000 3,000 Feet

11/11/2011

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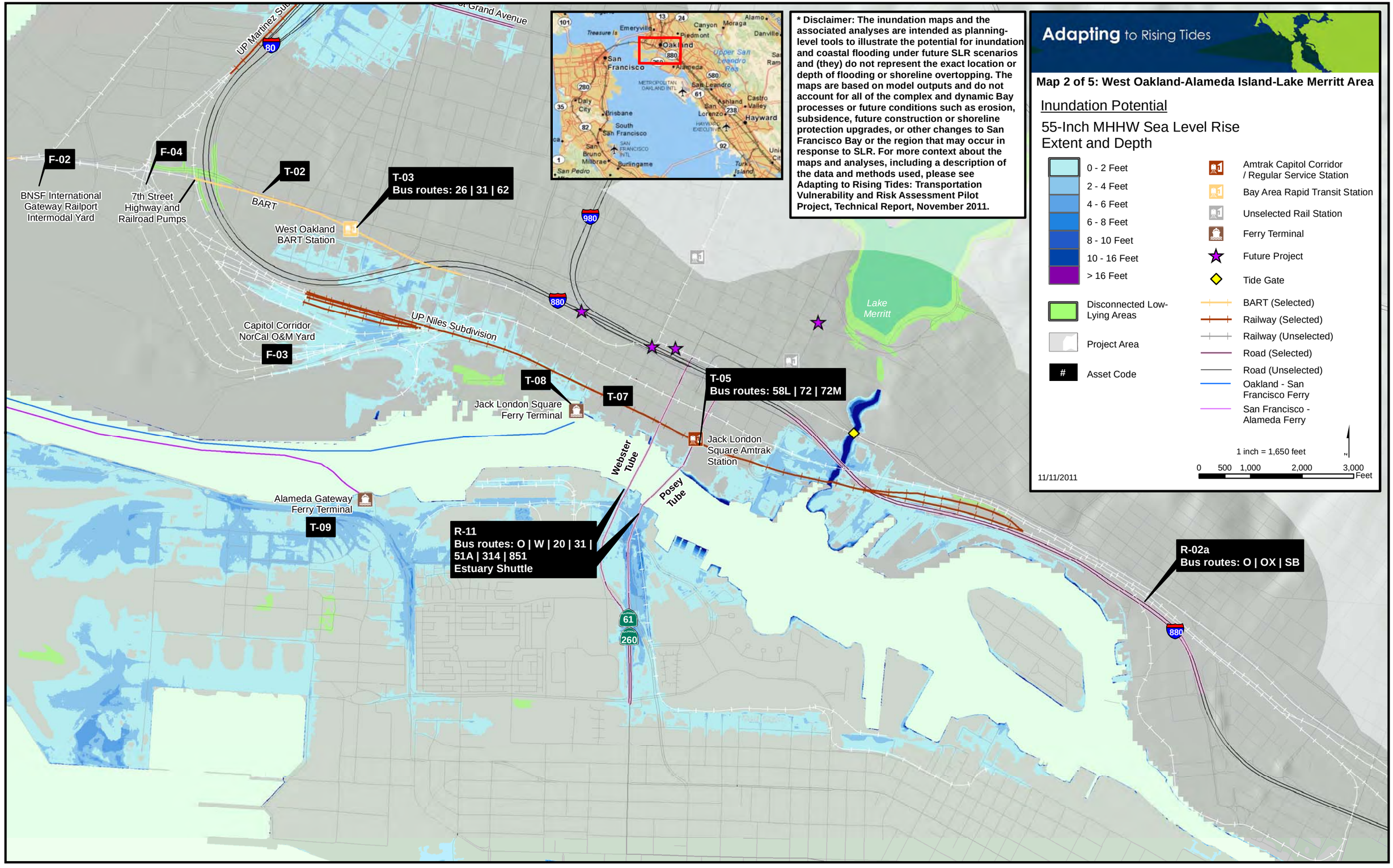

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Adapting to Rising Tides

Map 2 of 5: West Oakland-Alameda Island-Lake Merritt Area

Inundation Potential

55-Inch MHHW Sea Level Rise Extent and Depth

- 0 - 2 Feet
- 2 - 4 Feet
- 4 - 6 Feet
- 6 - 8 Feet
- 8 - 10 Feet
- 10 - 16 Feet
- > 16 Feet
- Disconnected Low-Lying Areas
- Project Area
- # Asset Code
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- Unselected Rail Station
- Ferry Terminal
- Future Project
- Tide Gate
- BART (Selected)
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- Railway (Unselected)
- Road (Selected)
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- Oakland - San Francisco Ferry
- San Francisco - Alameda Ferry

1 inch = 1,650 feet

0 500 1,000 2,000 3,000 Feet

11/11/2011

Adapting to Rising Tides

Map 3 of 5: Coliseum - Bay Farm Island Area

Inundation Potential

55-Inch MHHW Sea Level Rise
Extent and Depth

- 0 - 2 Feet
- 2 - 4 Feet
- 4 - 6 Feet
- 6 - 8 Feet
- 8 - 10 Feet
- 10 - 16 Feet
- > 16 Feet
- Disconnected Low-Lying Areas
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- Unselected Rail Station
- Unselected Ferry Terminal
- Maintenance Yard
- Railway (Unselected)
- Road (Selected)
- Road (Unselected)

1 inch = 2,000 feet

0 600 1,200 2,400 3,600 Feet

11/11/2011

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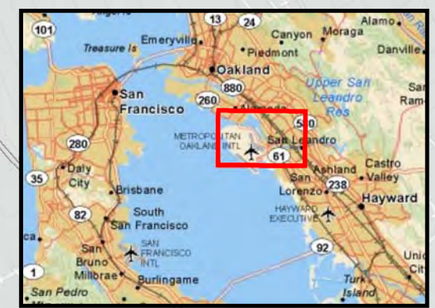

AC Transit Maintenance Facility
F-01

Coliseum / Oakland Airport BART Station
T-04
Bus routes: 45 | 46 73 | 98 | 356 | 805

Coliseum / Airport Amtrak Station

R-14
Bus routes: 314 | 356

Bay Farm Island Bridge

Bay Farm Island Bike/Pedestrian Bridge

Hegenberger Rd

R-05
Bus routes: 45 | 73 | 356 | 805

R-02b

R-05

Harbor Bay Parkway

BART Oakland Airport Connector

R-08
Bus route: 21

Ron Cowan Parkway

R-05
Bus routes: 73 | 805

Airport Dr

Adapting to Rising Tides

Map 4 of 5: San Leandro Marina Area

Inundation Potential

55-Inch MHHW Sea Level Rise
Extent and Depth

- 0 - 2 Feet
- 2 - 4 Feet
- 4 - 6 Feet
- 6 - 8 Feet
- 8 - 10 Feet
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0 500 1,000 2,000 3,000 Feet

11/11/2011

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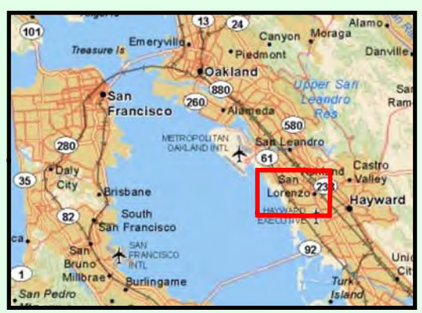

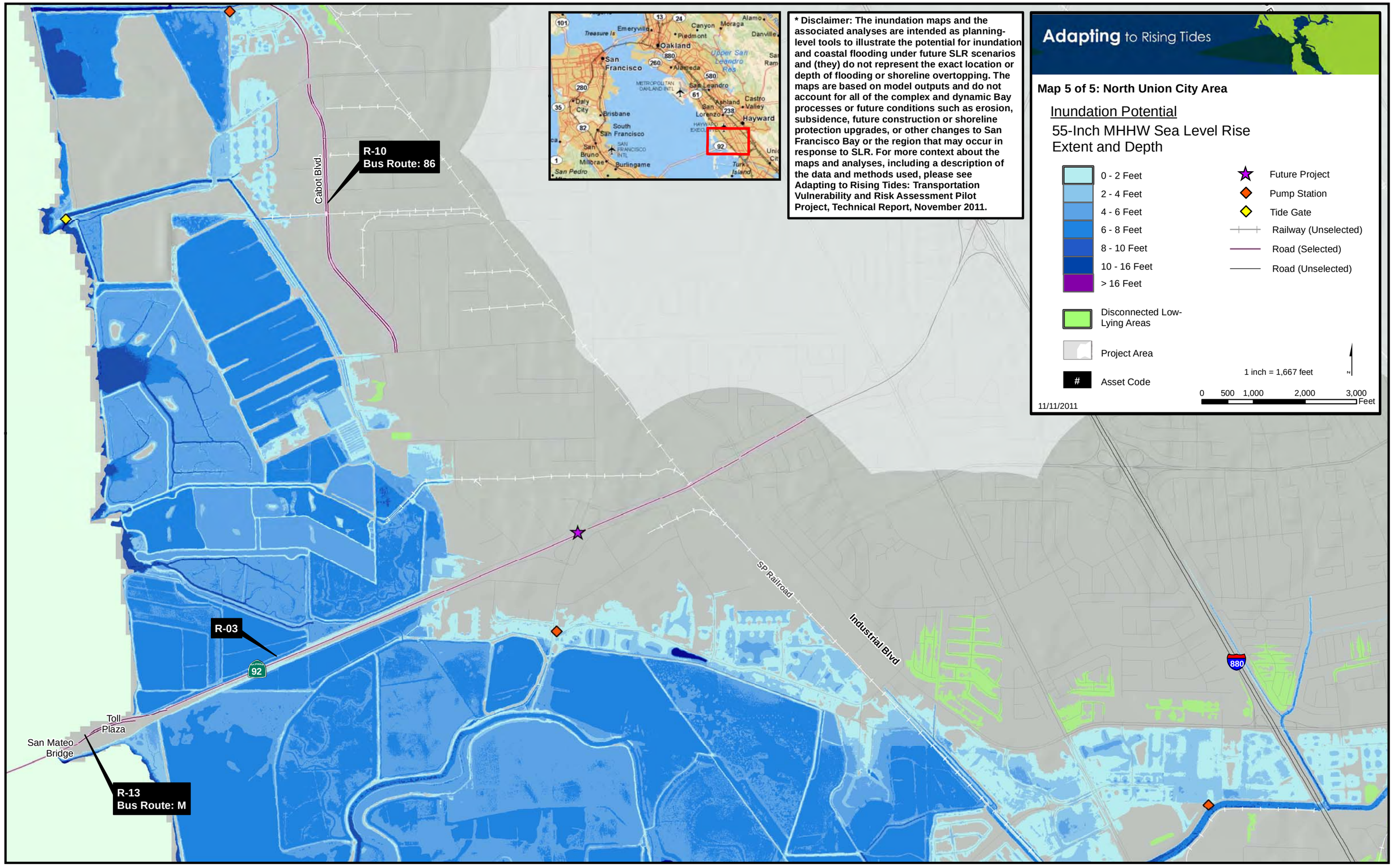

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Adapting to Rising Tides

Map 5 of 5: North Union City Area

Inundation Potential

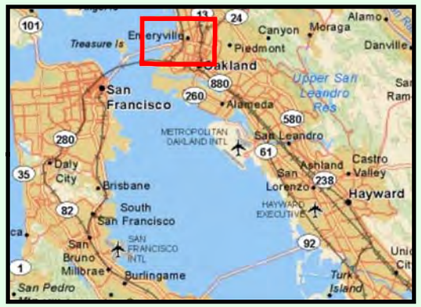
55-Inch MHHW Sea Level Rise
Extent and Depth

- 0 - 2 Feet
- 2 - 4 Feet
- 4 - 6 Feet
- 6 - 8 Feet
- 8 - 10 Feet
- 10 - 16 Feet
- > 16 Feet
- Disconnected Low-Lying Areas
- Project Area
- # Asset Code
- Future Project
- Pump Station
- Tide Gate
- Railway (Unselected)
- Road (Selected)
- Road (Unselected)

1 inch = 1,667 feet

0 500 1,000 2,000 3,000 Feet

11/11/2011



Northern Project Extent

Adapting to Rising Tides

Map 1 of 5: Emeryville Crescent - I-80/880/580 Maze Area

Inundation Potential

55-Inch Sea Level Rise plus 100-year Stillwater Levels Extent and Depth

- 0 - 2 Feet
- 2 - 4 Feet
- 4 - 6 Feet
- 6 - 8 Feet
- 8 - 10 Feet
- 10 - 16 Feet
- > 16 Feet
- Disconnected Low-Lying Areas
- Project Area
- # Asset Code
- Unselected Rail Station
- Pump Station
- BART (Selected)
- Railway (Selected)
- Railway (Unselected)
- Road (Selected)
- Road (Unselected)

1 inch = 1,650 feet

0 500 1,000 2,000 3,000 Feet

11/11/2011

R-06
Bus Route: EGR

Powell St

R-01
Bus routes: C | F | FS | G | H | J | L | LA | EGR
Amtrak Thruway

R-12
Bus routes: B | BA | C | CB | E | F | FS | G | H J | L LA | NL | NX | NX1 | NX2 | NX3 | NX4 O | OX | P | S | SB | V | W | Z | 800
Caltrans Bike Shuttle | Amtrak Thruway

Toll Plaza

Burma Rd

R-09

Bay Bridge

R-07
Bus route: 31

Mandela Parkway

T-06

R-04
Bus route: NL

West Grand Avenue

UP Martinez Subdivision

San Francisco Bay

T-01

BART Transbay Tube

F-02

BNSF International Gateway Railport Intermodal Yard

F-04

7th Street Highway and Railroad Pumps

T-02

BART

T-03
Bus routes: 26 | 31 | 62

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Adapting to Rising Tides

Map 2 of 5: West Oakland-Alameda Island-Lake Merritt Area

Inundation Potential

55-Inch Sea Level Rise plus 100-year Stillwater Levels Extent and Depth

- 0 - 2 Feet
- 2 - 4 Feet
- 4 - 6 Feet
- 6 - 8 Feet
- 8 - 10 Feet
- 10 - 16 Feet
- > 16 Feet
- Disconnected Low-Lying Areas
- Project Area
- # Asset Code
- Amtrak Capitol Corridor / Regular Service Station
- Bay Area Rapid Transit Station
- Unselected Rail Station
- Ferry Terminal
- Future Project
- Tide Gate
- BART (Selected)
- Railway (Selected)
- Railway (Unselected)
- Road (Selected)
- Road (Unselected)
- Oakland - San Francisco Ferry
- San Francisco - Alameda Ferry

1 inch = 1,650 feet

0 500 1,000 2,000 3,000 Feet

11/11/2011

F-02 BNSF International Gateway Railport Intermodal Yard

F-04 7th Street Highway and Railroad Pumps

T-02 BART

T-03 Bus routes: 26 | 31 | 62

West Oakland BART Station

UP Niles Subdivision

Capitol Corridor NorCal O&M Yard

F-03

T-08

T-07

Jack London Square Ferry Terminal

T-05 Bus routes: 58L | 72 | 72M

Jack London Square Amtrak Station

Lake Merritt

Webster Tube

Posey Tube

Alameda Gateway Ferry Terminal

T-09

R-11 Bus routes: O | W | 20 | 31 | 51A | 314 | 851 Estuary Shuttle

R-02a Bus routes: O | OX | SB

Adapting to Rising Tides

Map 3 of 5: Coliseum - Bay Farm Island Area

Inundation Potential

55-Inch Sea Level Rise plus 100-year Stillwater Levels Extent and Depth

- 0 - 2 Feet
- 2 - 4 Feet
- 4 - 6 Feet
- 6 - 8 Feet
- 8 - 10 Feet
- 10 - 16 Feet
- > 16 Feet
- Disconnected Low-Lying Areas
- Project Area
- # Asset Code
- Amtrak Capitol Corridor / Regular Service Station
- Bay Area Rapid Transit Station
- Unselected Rail Station
- Unselected Ferry Terminal
- Maintenance Yard
- Railway (Unselected)
- Road (Selected)
- Road (Unselected)

1 inch = 2,000 feet

0 600 1,200 2,400 3,600 Feet

11/11/2011

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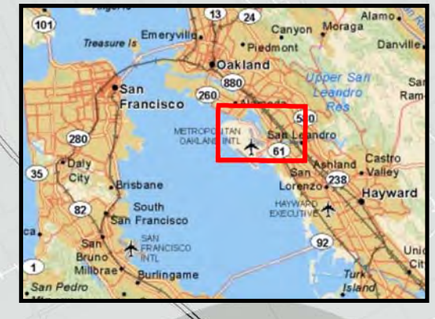

F-01
AC Transit Maintenance Facility

880

Coliseum / Oakland Airport BART Station

T-04
Bus routes: 45 | 46 73 | 98 | 356 | 805

Coliseum / Airport Amtrak Station

Hegenberger Rd

R-05
Bus routes: 45 | 73 | 356 | 805

R-02b

R-05

61

R-14
Bus routes: 314 | 356

Bay Farm Island Bridge

Bay Farm Island Bike/Pedestrian Bridge

Harbor Bay Parkway

BART Oakland Airport Connector

R-08
Bus route: 21

Ron Cowan Parkway

R-05
Bus routes: 73 | 805

Airport Dr

Adapting to Rising Tides

Map 4 of 5: San Leandro Marina Area

Inundation Potential

55-Inch Sea Level Rise plus 100-year Stillwater Levels Extent and Depth

- 0 - 2 Feet
- 2 - 4 Feet
- 4 - 6 Feet
- 6 - 8 Feet
- 8 - 10 Feet
- 10 - 16 Feet
- > 16 Feet
- Disconnected Low-Lying Areas
- Project Area
- # Asset Code
- Unselected Rail Station
- Pump Station
- Tide Gate
- Railway (Unselected)
- Road (Unselected)

1 inch = 1,667 feet

0 500 1,000 2,000 3,000 Feet

11/11/2011

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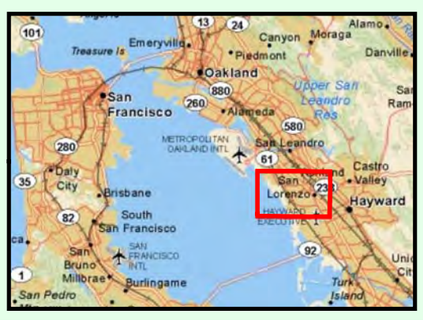

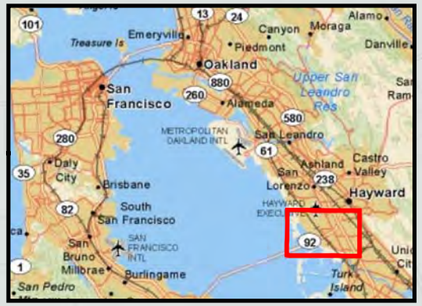

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Adapting to Rising Tides

Map 5 of 5: North Union City Area

Inundation Potential

55-Inch Sea Level Rise plus 100-year Stillwater Levels Extent and Depth

- 0 - 2 Feet
- 2 - 4 Feet
- 4 - 6 Feet
- 6 - 8 Feet
- 8 - 10 Feet
- 10 - 16 Feet
- > 16 Feet
- Disconnected Low-Lying Areas
- Project Area
- # Asset Code
- Future Project
- Pump Station
- Tide Gate
- Railway (Unselected)
- Road (Selected)
- Road (Unselected)

1 inch = 1,667 feet

0 500 1,000 2,000 3,000 Feet

11/11/2011

Cabot Blvd.

R-10
Bus Route: 86

R-03

92

Toll Plaza

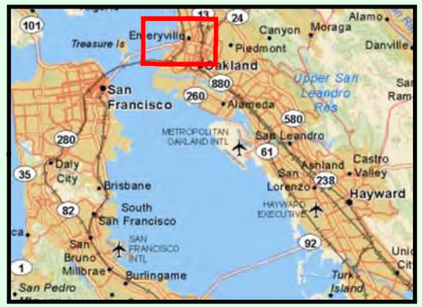
San Mateo Bridge

R-13
Bus Route: M

SP Railroad

Industrial Blvd

880



Northern Project Extent

R-06
Bus Route: EGR

Powell St

R-01
Bus routes: C | F | FS | G | H | J | L | LA | EGR
Amtrak Thruway

R-12
Bus routes: B | BA | C | CB | E | F | FS | G | H J | L LA | NL | NX | NX1 | NX2 | NX3 | NX4 O | OX | P | S | SB | V | W | Z | 800
Caltrans Bike Shuttle | Amtrak Thruway

Toll Plaza

Burma Rd

R-09

Bay Bridge

R-07
Bus route: 31

Mandela Parkway

T-06

R-04
Bus route: NL

West Grand Avenue

UP Martinez Subdivision

San Francisco Bay

T-01

BART Transbay Tube

F-02

BNSF International Gateway Railport Intermodal Yard

F-04

7th Street Highway and Railroad Pumps

T-02

BART

T-03
Bus routes: 26 | 31 | 62

80 580 880 980

Adapting to Rising Tides

Map 1 of 5: Emeryville Crescent - I-80/880/580 Maze Area

55-Inch Sea Level Rise plus 100-year Stillwater Levels (extent and depth) with Potential Wind-Wave Zone

- 0 - 2 Feet
- 2 - 4 Feet
- 4 - 6 Feet
- 6 - 8 Feet
- 8 - 10 Feet
- 10 - 16 Feet
- > 16 Feet
- Potential Wind-Wave Zone
- Project Area
- # Asset Code
- Unselected Rail Station
- Pump Station
- BART (Selected)
- Railway (Selected)
- Railway (Unselected)
- Road (Selected)
- Road (Unselected)

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0 500 1,000 2,000 3,000 Feet

11/11/2011

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Adapting to Rising Tides

Map 2 of 5: West Oakland-Alameda Island-Lake Merritt Area

55-Inch Sea Level Rise plus 100-year Stillwater Levels (extent and depth) with Potential Wind-Wave Zone

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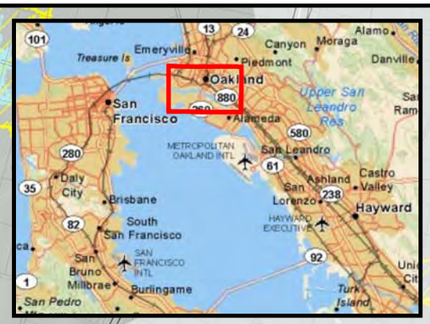

- 0 - 2 Feet
- 2 - 4 Feet
- 4 - 6 Feet
- 6 - 8 Feet
- 8 - 10 Feet
- 10 - 16 Feet
- > 16 Feet
- Potential Wind-Wave Zone
- Project Area
- # Asset Code
- Amtrak Capitol Corridor / Regular Service Station
- Bay Area Rapid Transit Station
- Unselected Rail Station
- Ferry Terminal
- Future Project
- Tide Gate
- BART (Selected)
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- Railway (Unselected)
- Road (Selected)
- Road (Unselected)
- Oakland - San Francisco Ferry
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11/11/2011

F-02 BNSF International Gateway Railport Intermodal Yard

F-04 7th Street Highway and Railroad Pumps

F-03 Capitol Corridor NorCal O&M Yard

T-02

T-03 Bus routes: 26 | 31 | 62

West Oakland BART Station

BART

UP Niles Subdivision

T-05 Bus routes: 58L | 72 | 72M

T-07

T-08

Jack London Square Ferry Terminal

Jack London Square Amtrak Station

Lake Merritt

Webster Tube

Posey Tube

T-09

Alameda Gateway Ferry Terminal

R-11 Bus routes: O | W | 20 | 31 | 51A | 314 | 851 Estuary Shuttle

R-02a Bus routes: O | OX | SB

UP Martinez Sub

Grand Avenue

80 880 980 61 260

Adapting to Rising Tides

Map 3 of 5: Coliseum - Bay Farm Island Area

55-Inch Sea Level Rise plus 100-year Stillwater Levels (extent and depth) with Potential Wind-Wave Zone

- 0 - 2 Feet
- 2 - 4 Feet
- 4 - 6 Feet
- 6 - 8 Feet
- 8 - 10 Feet
- 10 - 16 Feet
- > 16 Feet
- Potential Wind-Wave Zone
- Project Area
- # Asset Code

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- Unselected Rail Station
- Unselected Ferry Terminal
- Maintenance Yard
- Railway (Unselected)
- Road (Selected)
- Road (Unselected)

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0 600 1,200 2,400 3,600 Feet

11/11/2011

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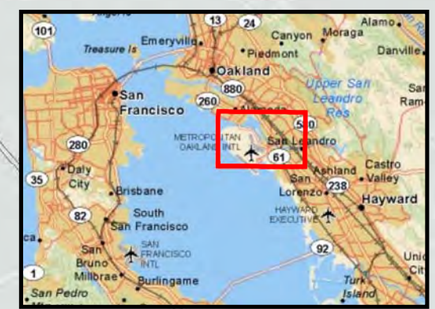

AC Transit Maintenance Facility

F-01

Coliseum / Oakland Airport BART Station

T-04
Bus routes: 45 | 46 73 | 98 | 356 | 805

Coliseum / Airport Amtrak Station

R-14
Bus routes: 314 | 356

Bay Farm Island Bridge

Bay Farm Island Bike/Pedestrian Bridge

Hegenberger Rd

R-05
Bus routes: 45 | 73 | 356 | 805

R-02b

R-05

Harbor Bay Parkway

BART Oakland Airport Connector

R-08
Bus route: 21

Ron Cowan Parkway

R-05
Bus routes: 73 | 805

Airport Dr

Adapting to Rising Tides

Map 4 of 5: San Leandro Marina Area

55-Inch Sea Level Rise plus 100-year Stillwater Levels (extent and depth) with Potential Wind-Wave Zone

- 0 - 2 Feet
- 2 - 4 Feet
- 4 - 6 Feet
- 6 - 8 Feet
- 8 - 10 Feet
- 10 - 16 Feet
- > 16 Feet
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- Project Area
- # Asset Code
- Unselected Rail Station
- Pump Station
- Tide Gate
- Railway (Unselected)
- Road (Unselected)

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11/11/2011

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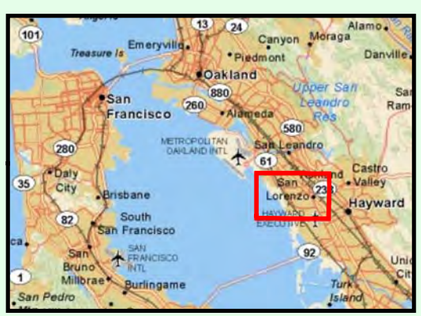
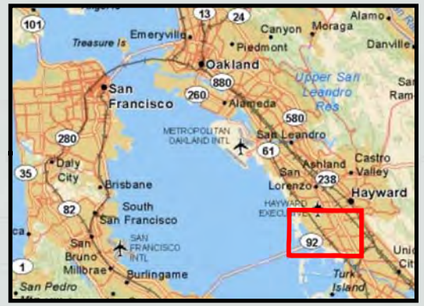


Adapting to Rising Tides

Map 5 of 5: North Union City Area

55-Inch Sea Level Rise plus 100-year Stillwater Levels (extent and depth) with Potential Wind-Wave Zone



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- 0 - 2 Feet
- 2 - 4 Feet
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- Potential Wind-Wave Zone
- Project Area
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- Future Project
- Pump Station
- Tide Gate
- Railway (Unselected)
- Road (Selected)
- Road (Unselected)

1 inch = 1,667 feet

0 500 1,000 2,000 3,000 Feet

11/11/2011

R-10
Bus Route: 86

Cabot Blvd.

R-03

92

Toll Plaza

San Mateo Bridge

R-13
Bus Route: M

SP Railroad

Industrial Blvd

880

MAPS SHOWING DEPTHS OF SHORELINE SYSTEMS OVERTOPPED

16" MHHW, MHHW + 100-yr SWEL, MHHW + 100-yr SWEL + wind waves (1)

55" MHHW, MHHW + 100-yr SWEL, MHHW + 100-yr SWEL + wind waves (1)

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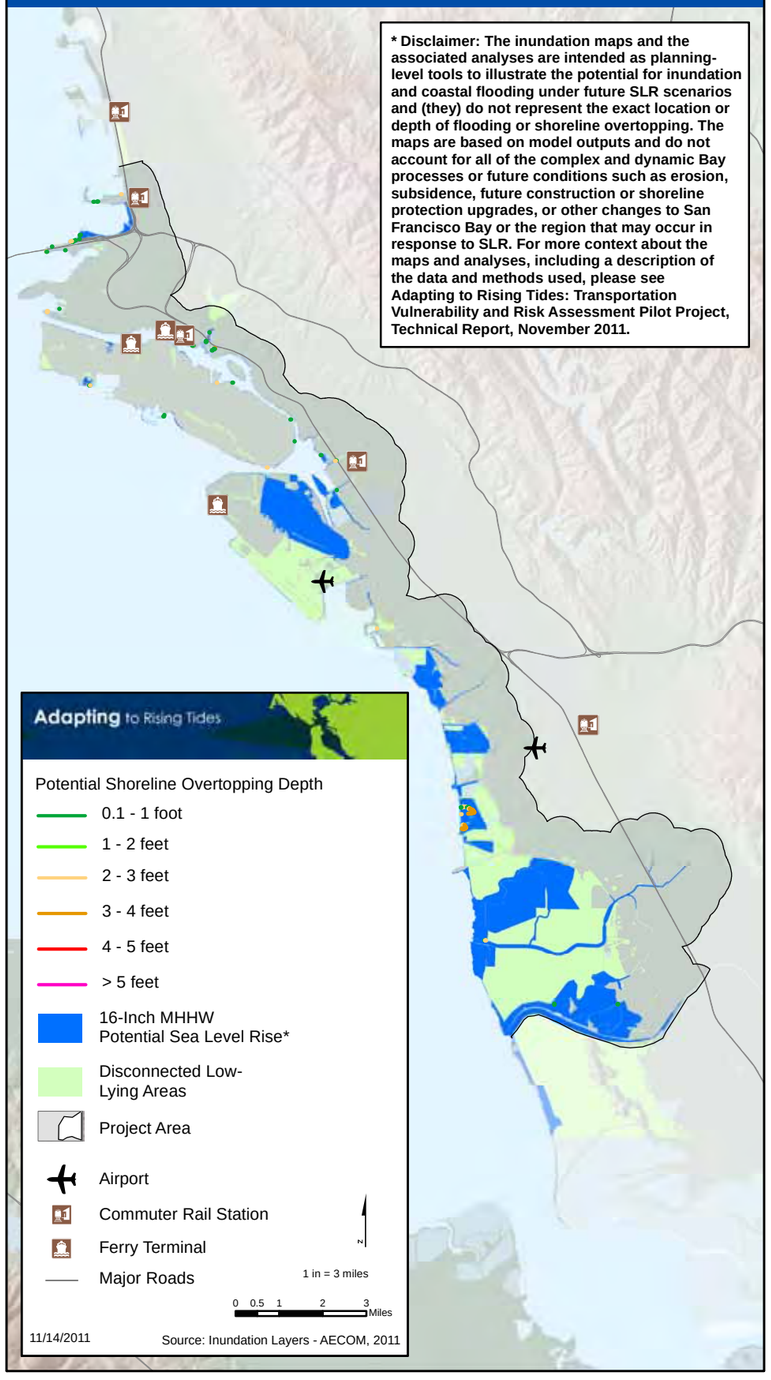
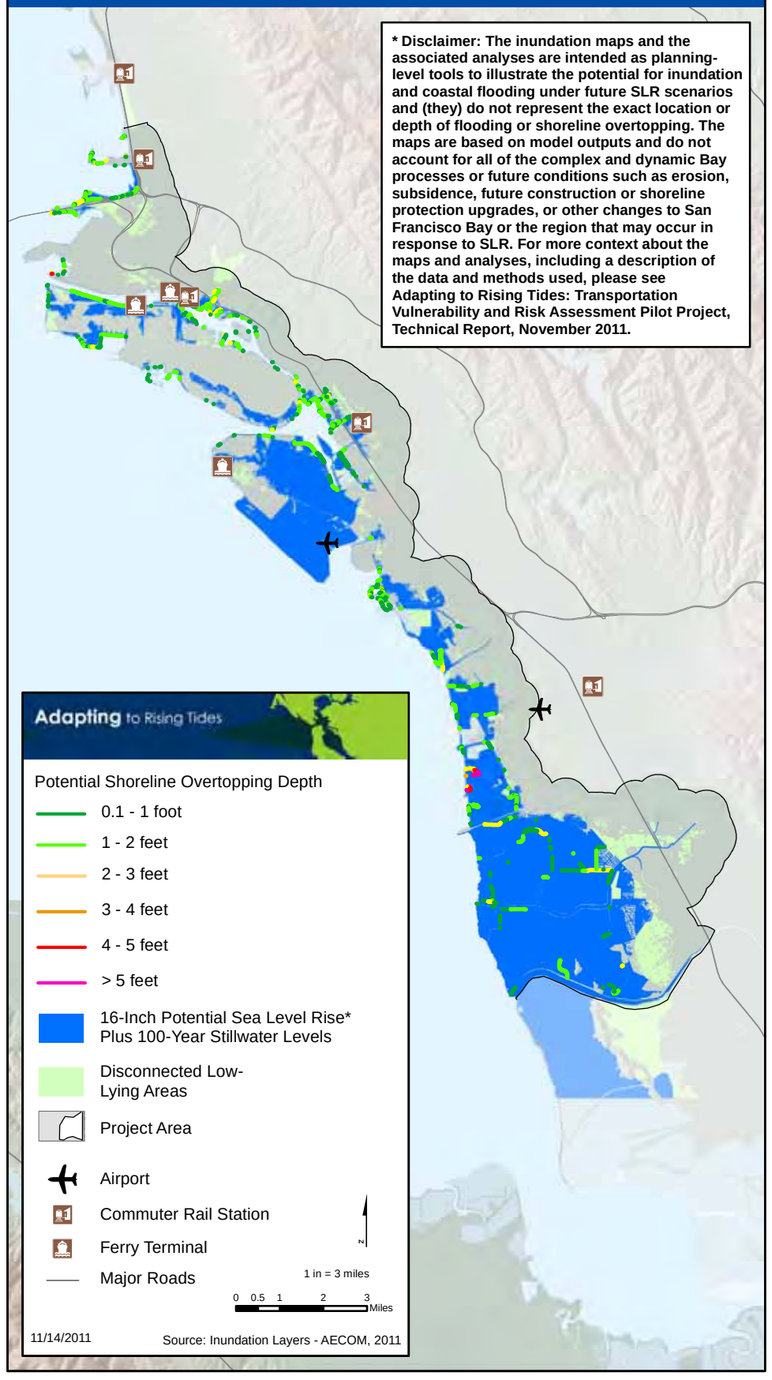
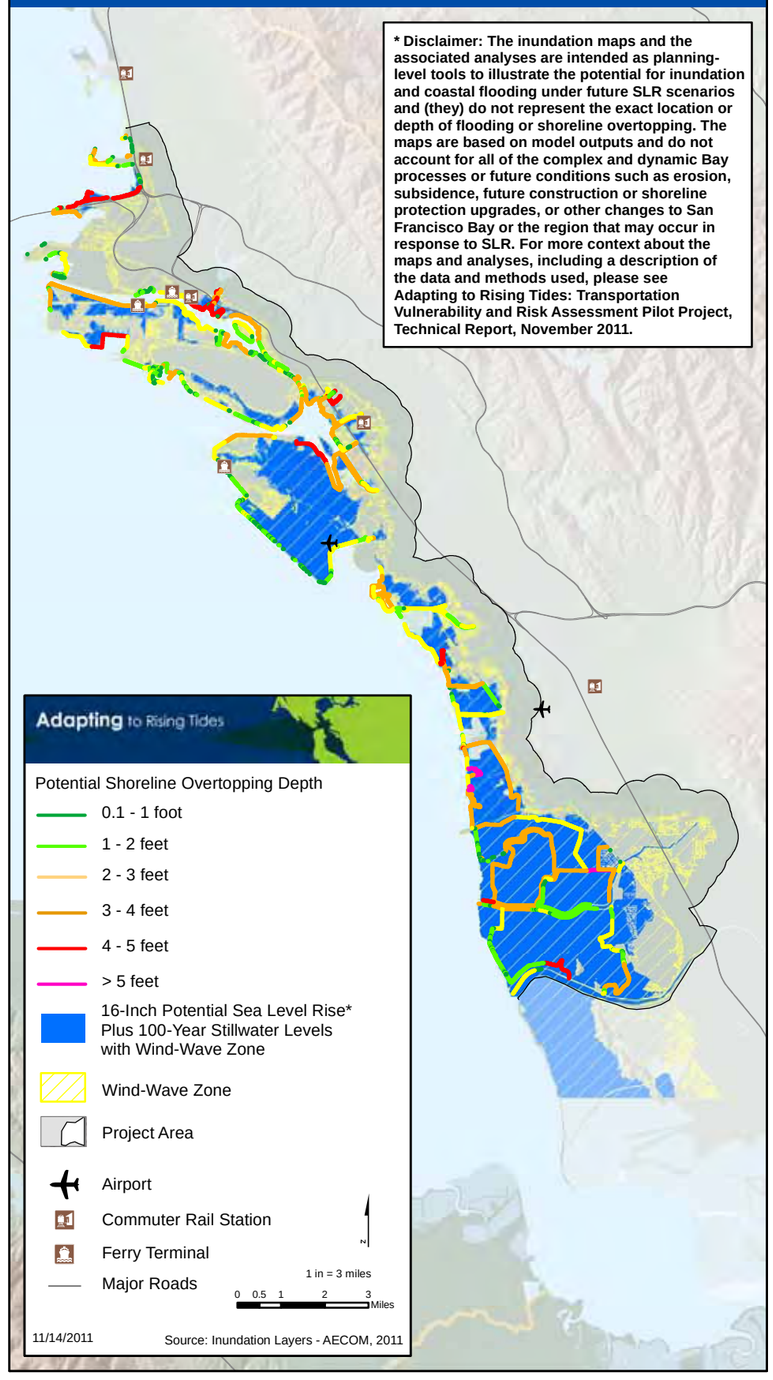
16-Inch MHHW Potential Sea Level Rise with Potential Shoreline Overtopping Depth



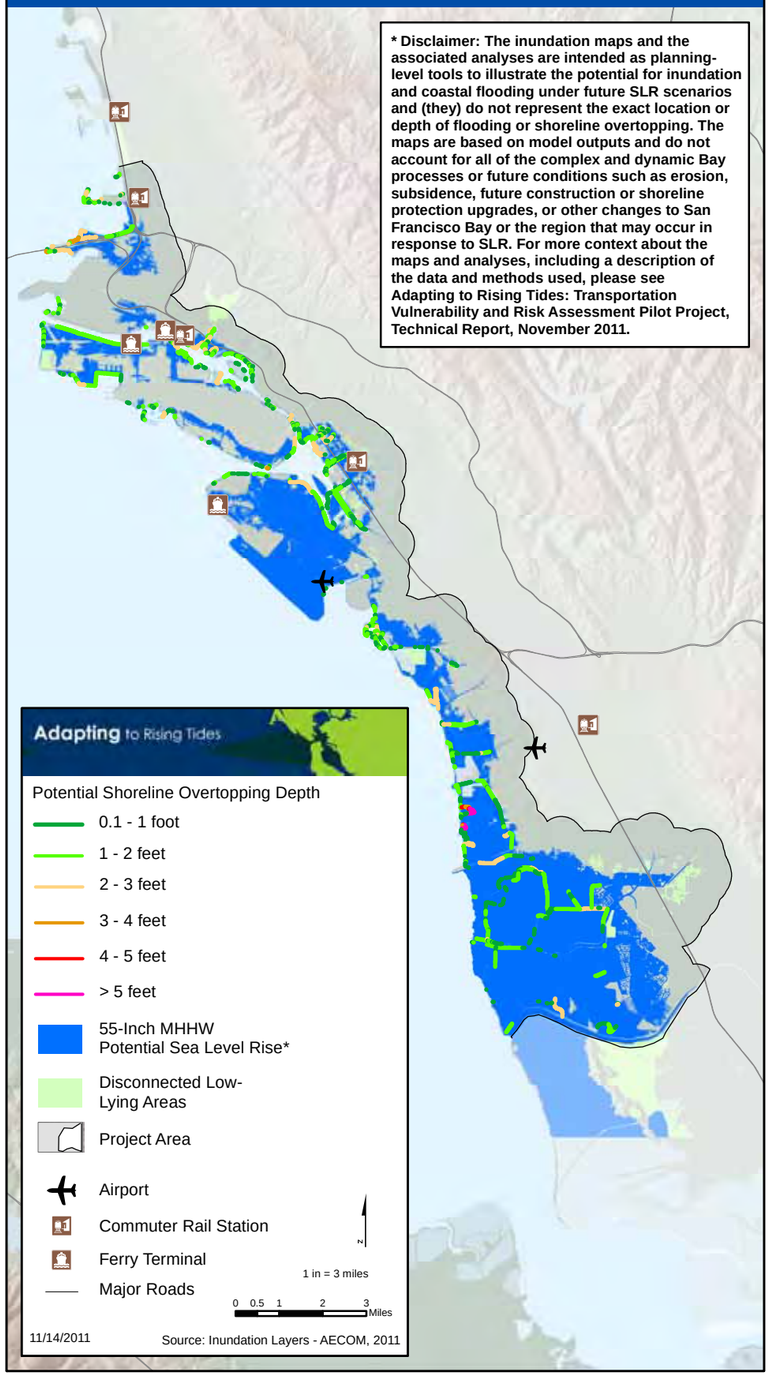
16-Inch Potential Sea Level Rise plus 100-Year Stillwater Levels with Potential Shoreline Overtopping Depth



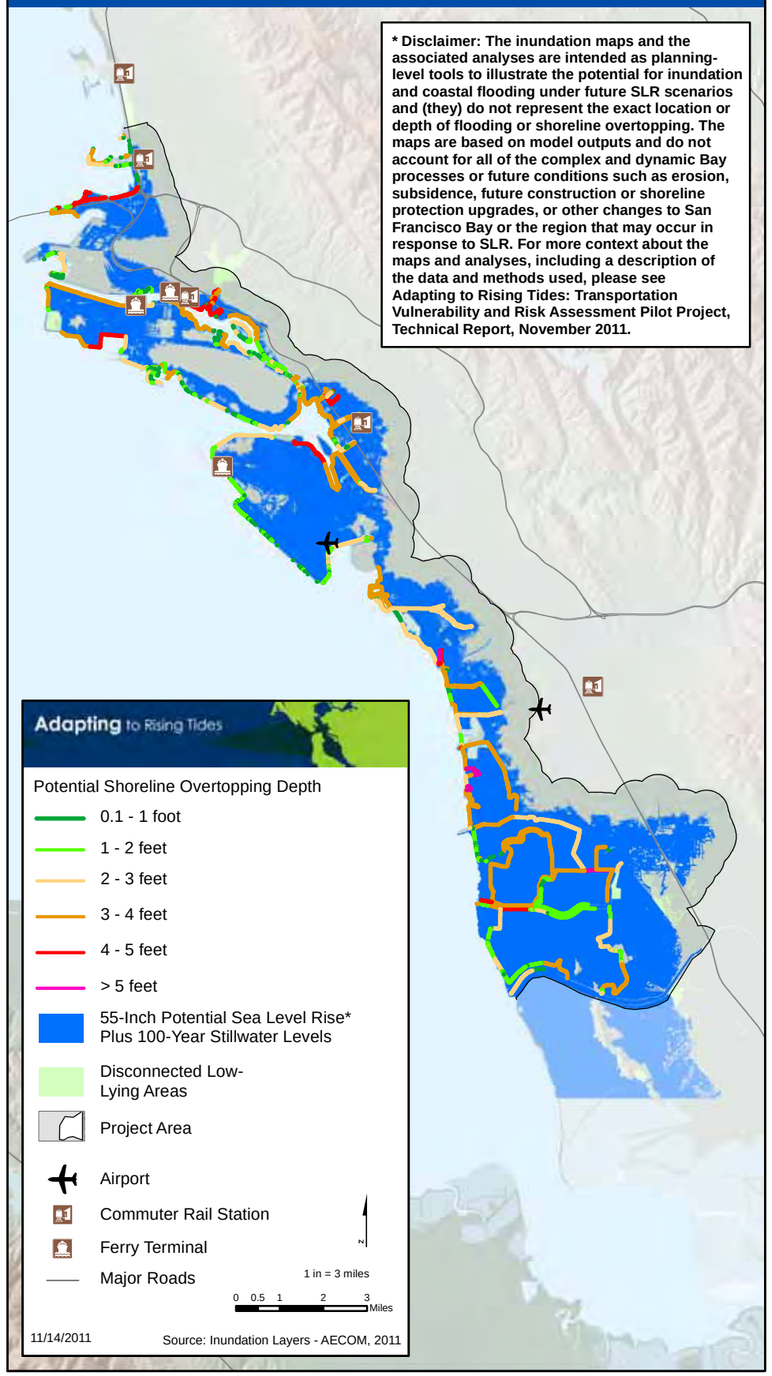
16-Inch Potential Sea Level Rise plus 100-Year Stillwater Levels With Wind-Wave Zone with Potential Shoreline Overtopping Depth



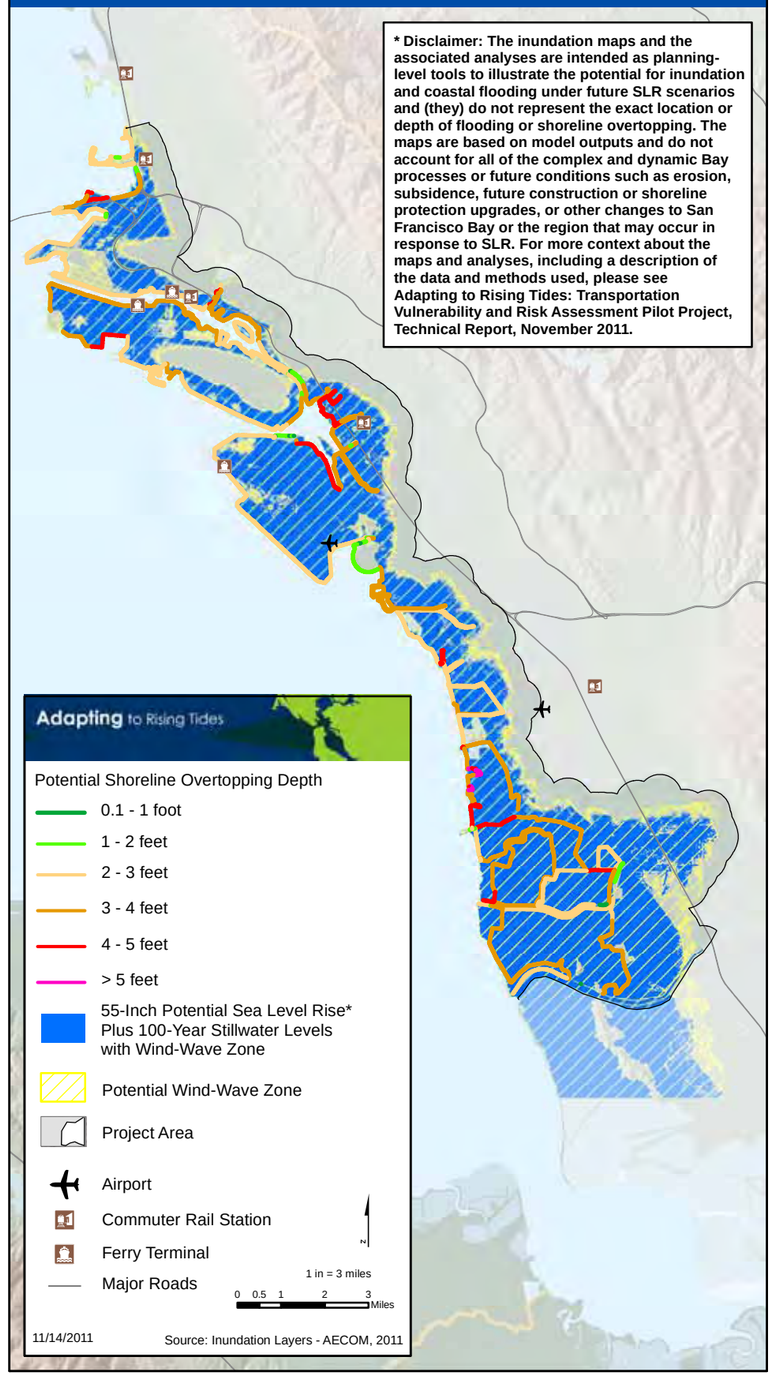
55-Inch MHHW Potential Sea Level Rise with Potential Shoreline Overtopping Depth



55-Inch Potential Sea Level Rise plus 100-Year Stillwater Levels with Potential Shoreline Overtopping Depth



55-Inch Potential Sea Level Rise plus 100-Year Stillwater Levels With Wind-Wave Zone with Potential Shoreline Overtopping Depth



MAPS SHOWING PERCENTAGES OF SHORELINE SYSTEMS OVERTOPPED

16" MHHW, MHHW + 100-yr SWEL, MHHW + 100-yr SWEL + wind waves (1)

55" MHHW, MHHW + 100-yr SWEL, MHHW + 100-yr SWEL + wind waves (1)

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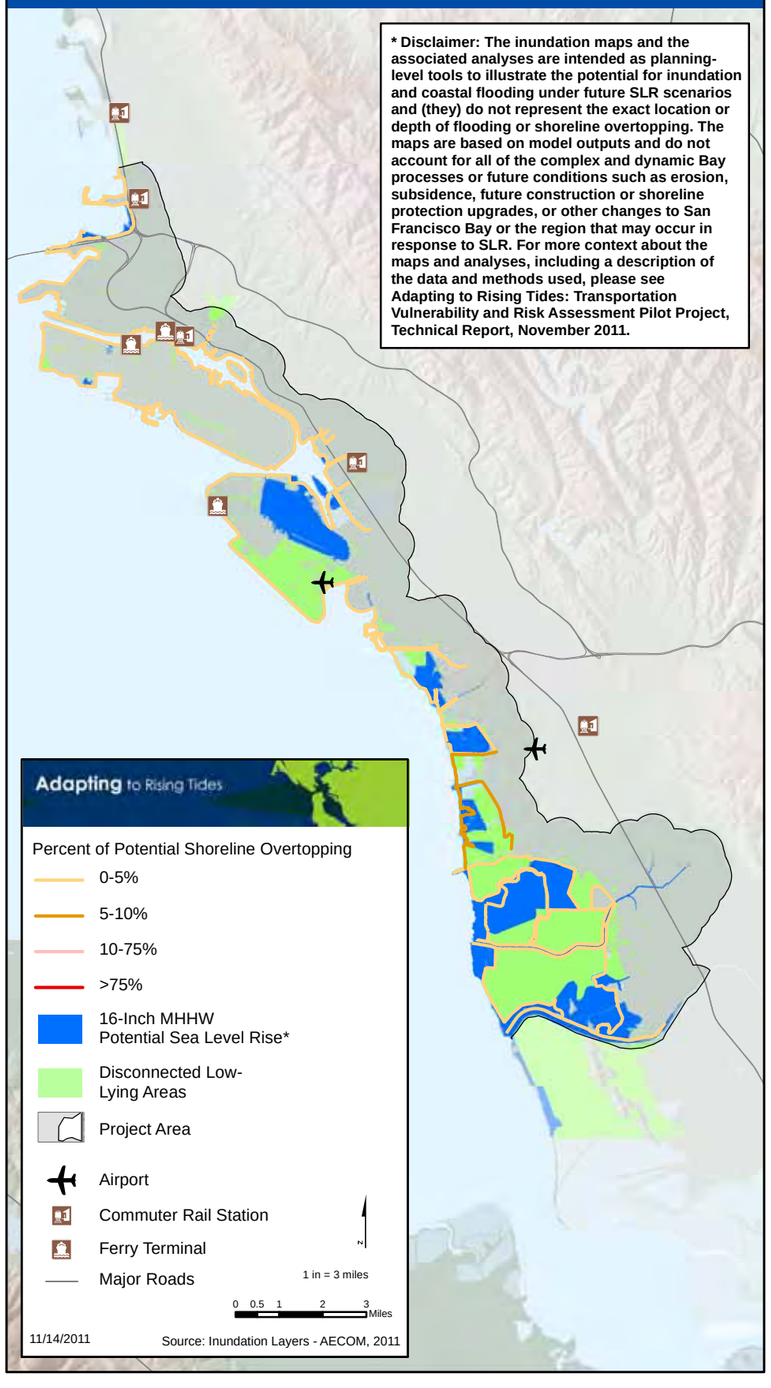
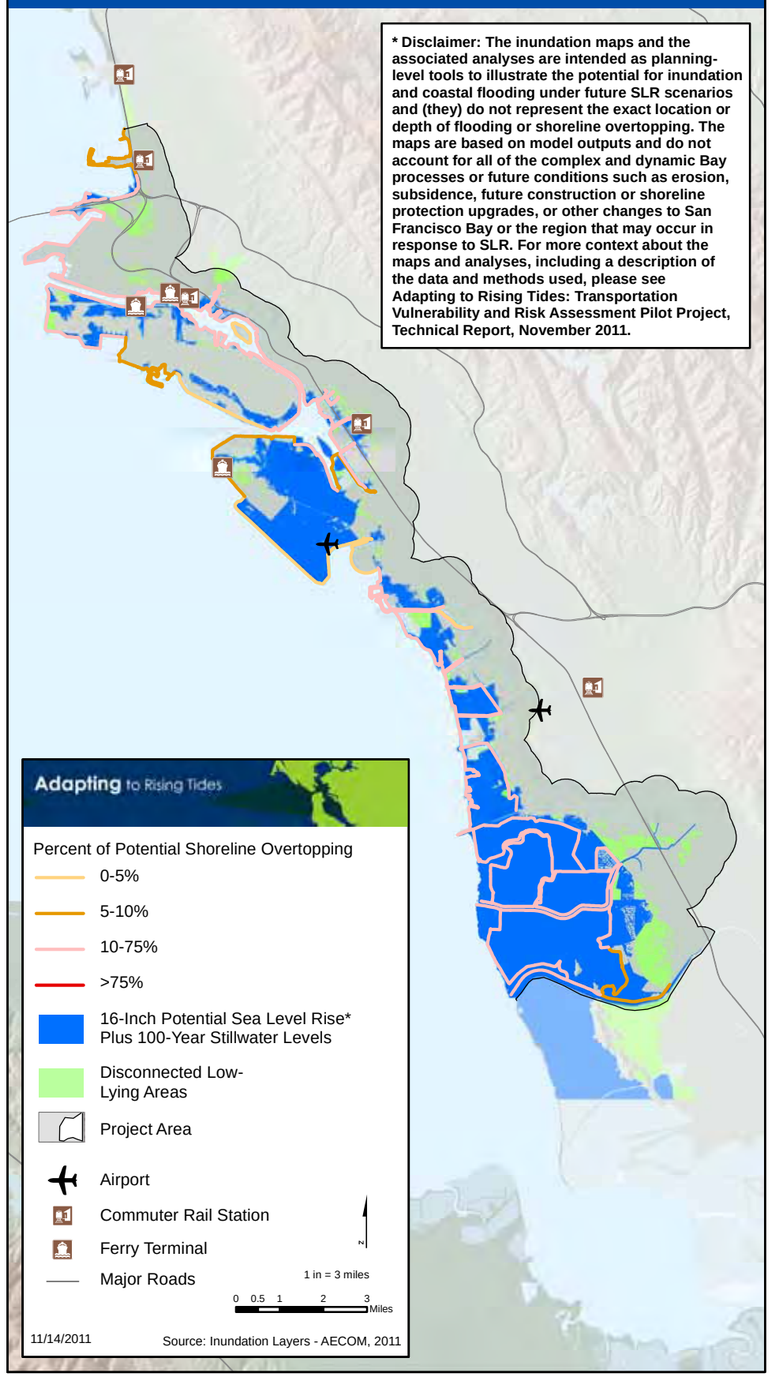
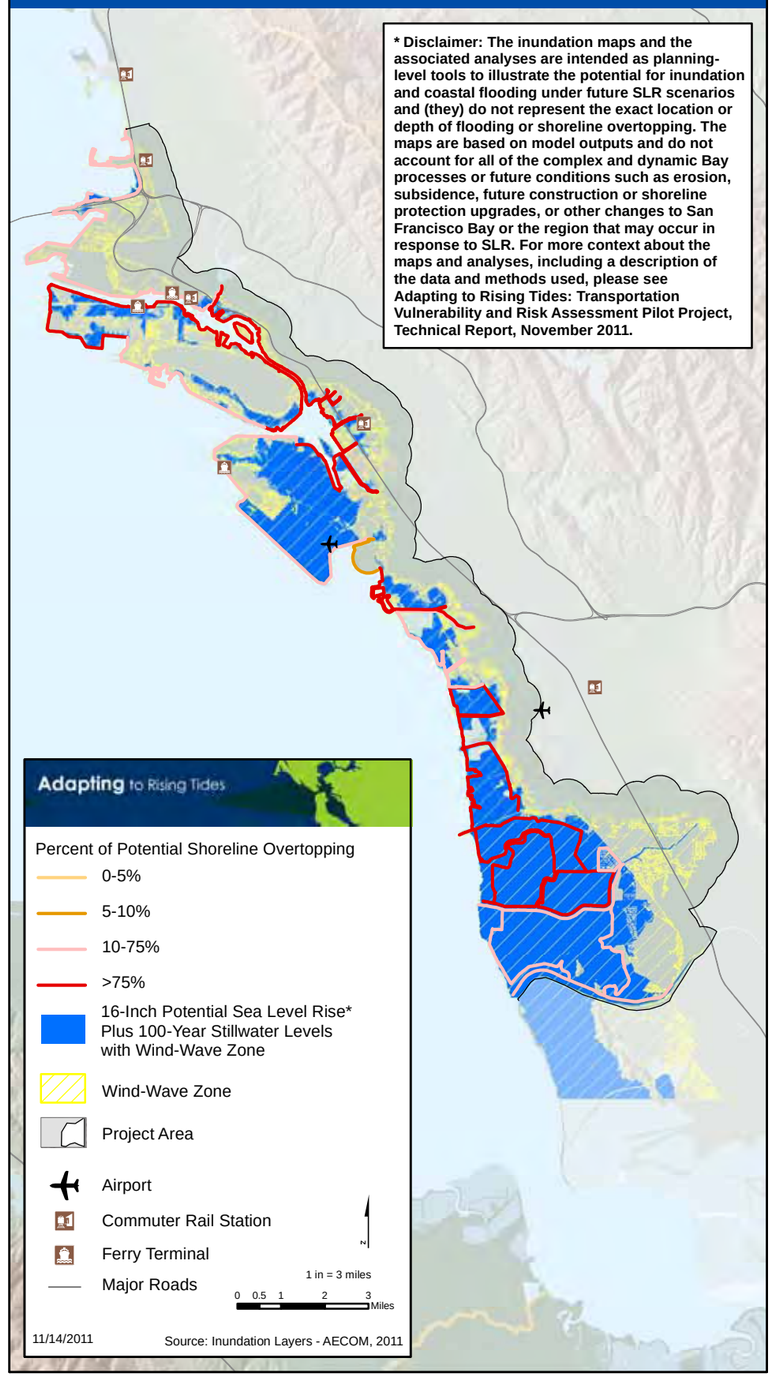
16-Inch MHHW Potential Sea Level Rise with Potential Shoreline Overtopping Percentages



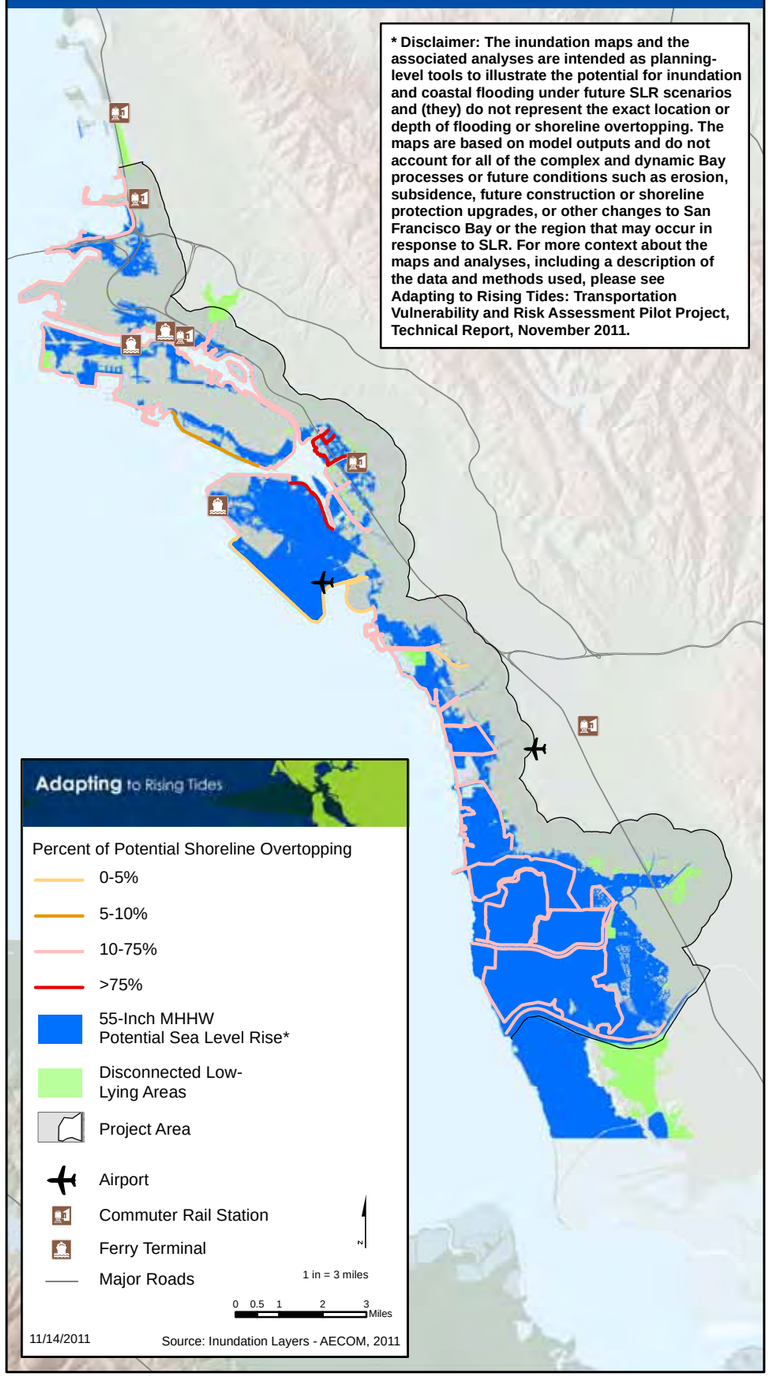
16-Inch Potential Sea Level Rise plus 100-Year Stillwater Levels with Potential Shoreline Overtopping Percentages



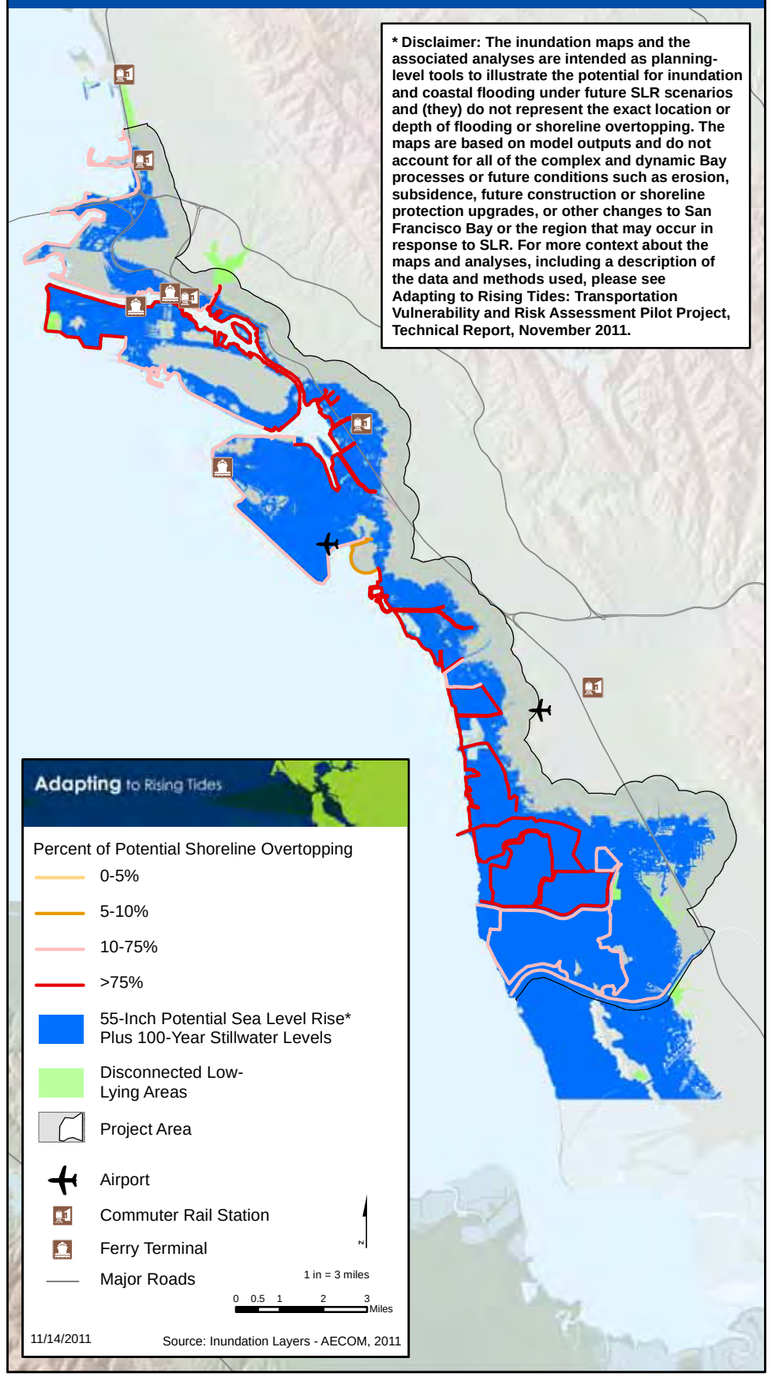
16-Inch Potential Sea Level Rise plus 100-Year Stillwater Levels With Wind-Wave Zone with Potential Shoreline Overtopping Percentages



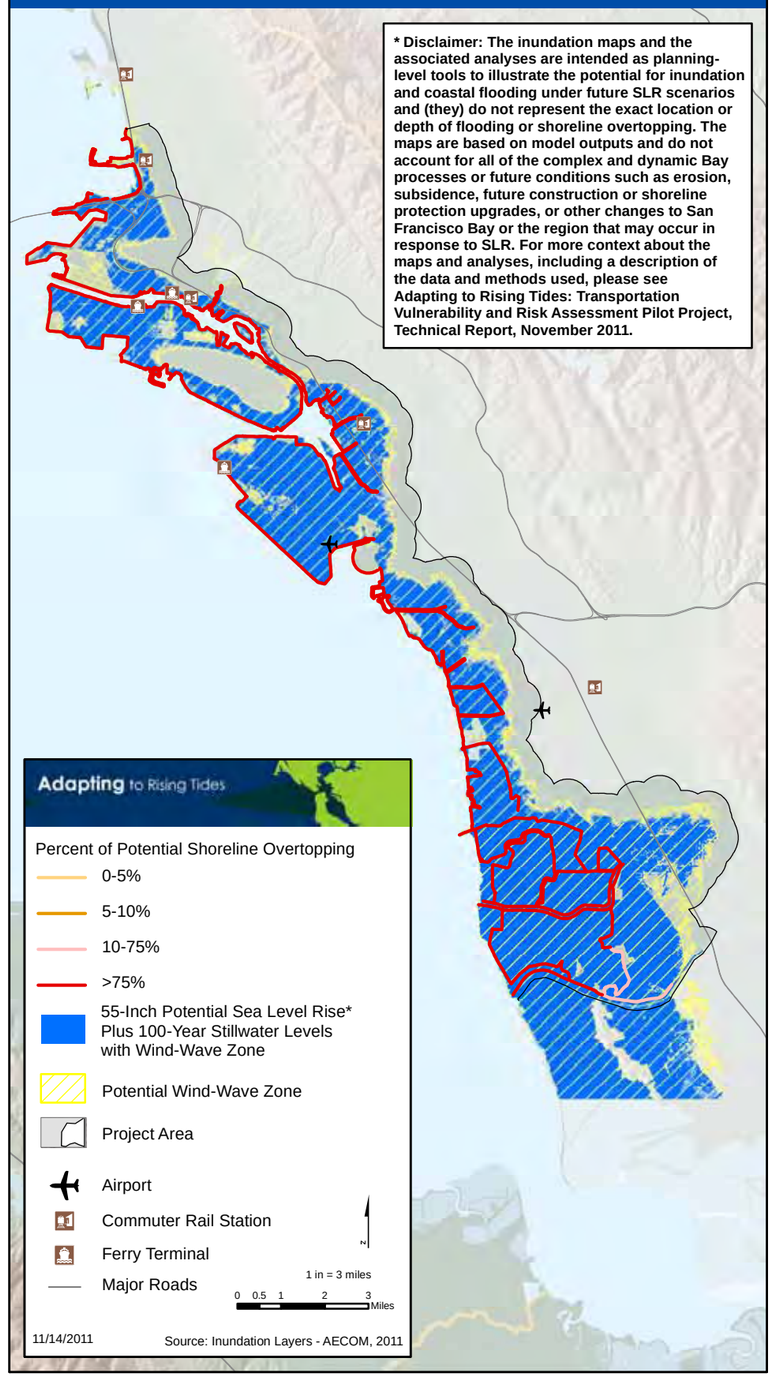
55-Inch MHHW Potential Sea Level Rise with Potential Shoreline Overtopping Percentage



55-Inch Potential Sea Level Rise plus 100-Year Stillwater Levels with Potential Shoreline Overtopping Percentage



55-Inch Potential Sea Level Rise plus 100-Year Stillwater Levels With Wind-Wave Zone with Potential Shoreline Overtopping Percentage



OVERTOPPING DEPTH ZOOM-IN MAPS SHOWING THE SELECTED TRANSPORTATION ASSET LOCATIONS

16" MHHW + 100-yr SWEL (5)

55" MHHW + 100-yr SWEL (5)

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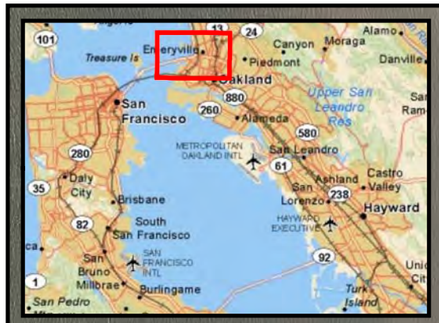

Northern Project Extent

System 1

R-06

Powell St

R-01

80

580

R-07

Mandela Parkway

R-04

West Grand Avenue

880

T-06

UP Martinez Subdivision

80

R-12

Bay Bridge

System 2

Toll Plaza

Burma Rd

R-09

San Francisco Bay

T-01

System 3

BART Transbay Tube

F-02

BNSF International Gateway Railport Intermodal Yard

F-04

7th Street Highway and Railroad Pumps

T-02

BART

T-03

980

Lake Merritt

Adapting to Rising Tides

Map 1 of 5: Emeryville Crescent - I-80/880/580 Maze Area

Shoreline Overtopping Potential

16-Inch Sea Level Rise plus 100-year Stillwater Levels Overtopping Depth Along Shoreline Feature

- 0.1 - 1 foot
- 1 - 2 feet
- 2 - 3 feet
- 3 - 4 feet
- 4 - 5 feet
- > 5 feet
- Shoreline System
- Shoreline System Boundary
- # Shoreline System Number
- # Asset Code
- Project Area
- Unselected Rail Station
- Pump Station
- BART (Selected)
- Railway (Selected)
- Railway (Unselected)
- Road (Selected)
- Road (Unselected)

1 inch = 1,650 feet

0 500 1,000 2,000 3,000 Feet

11/11/2011

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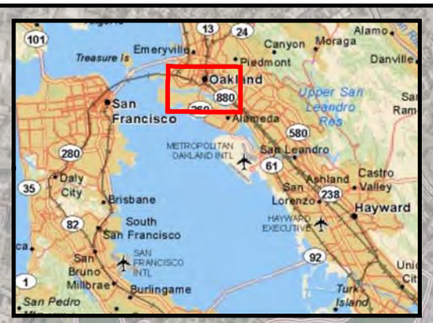

Adapting to Rising Tides

Map 2 of 5: West Oakland-Alameda Island-Lake Merritt Area

Shoreline Overtopping Potential

16-Inch Sea Level Rise plus 100-year Stillwater Levels Overtopping Depth Along Shoreline Feature

- 0.1 - 1 foot
- 1 - 2 feet
- 2 - 3 feet
- 3 - 4 feet
- 4 - 5 feet
- > 5 feet
- Shoreline System
- Shoreline System Boundary
- # Shoreline System Number
- # Asset Code
- Project Area
- Amtrak Capitol Corridor / Regular Service Station
- Bay Area Rapid Transit Station
- Unselected Rail Station
- Ferry Terminal
- Future Project
- Tide Gate
- BART (Selected)
- Railway (Selected)
- Railway (Unselected)
- Road (Selected)
- Road (Unselected)
- Oakland - San Francisco Ferry
- San Francisco - Alameda Ferry

1 inch = 1,650 feet

0 500 1,000 2,000 3,000 Feet

11/11/2011

F-02 BNSF International Gateway Railport Intermodal Yard
F-04 7th Street Highway and Railroad Pumps
F-03 Capitol Corridor NorCal O&M Yard
T-02 BART
T-03 West Oakland BART Station
T-08 Jack London Square Ferry Terminal
T-07
T-05 Jack London Square Amtrak Station
T-09 Alameda Gateway Ferry Terminal
R-11
R-02a
UP Martinez Subdivision
UP Niles Subdivision
Webster Tube
Posey Tube
System 3
System 4
System 12
System 13
System 16
System 28
System 5
System 15
80
880
980
61
260

Adapting to Rising Tides

Map 3 of 5: Coliseum - Bay Farm Island Area

Shoreline Overtopping Potential

16-Inch Sea Level Rise plus 100-year Stillwater Levels Overtopping Depth Along Shoreline Feature

- 0.1 - 1 foot
- 1 - 2 feet
- 2 - 3 feet
- 3 - 4 feet
- 4 - 5 feet
- > 5 feet

Shoreline System

Shoreline System Boundary

Shoreline System Number

Asset Code

55-Inch Sea Level Rise with 1/2-Mile Buffer

Amtrak Capitol Corridor / Regular Service Station

Bay Area Rapid Transit Station

Unselected Rail Station

Unselected Ferry Terminal

Maintenance Yard

Railway (Unselected)

Road (Selected)

Road (Unselected)

1 inch = 2,000 feet

0 600 1,200 2,400 3,600 Feet

11/11/2011

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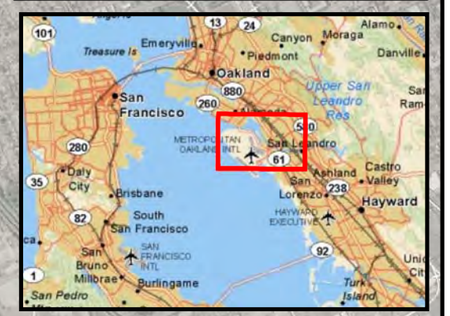


System 5
System 14
System 15
System 6
System 7
System 8
System 10
System 13
System 11
System 17
R-14
R-08
R-05
R-02b
F-01
T-04
AC Transit Maintenance Facility
Coliseum / Oakland Airport BART Station
Coliseum / Airport Amtrak Station
Bay Farm Island Bridge
Bay Farm Island Bike/Pedestrian Bridge
Harbor Bay Parkway
Hegenberger Rd
BART Oakland Airport Connector
Ron Cowan Parkway
Airport Dr
880
61

Adapting to Rising Tides

Map 4 of 5: San Leandro Marina Area

Shoreline Overtopping Potential

16-Inch Sea Level Rise plus 100-year Stillwater Levels Overtopping Depth Along Shoreline Feature

- 0.1 - 1 foot
- 1 - 2 feet
- 2 - 3 feet
- 3 - 4 feet
- 4 - 5 feet
- > 5 feet

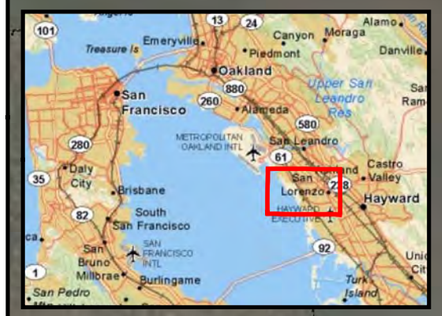
- Unselected Rail Station
- Pump Station
- Tide Gate
- Railway (Unselected)
- Road (Unselected)
- Shoreline System
- Shoreline System Boundary
- # Shoreline System Number
- # Asset Code
- Project Area

1 inch = 1,667 feet

0 500 1,000 2,000 3,000 Feet

11/11/2011

System 17
System 18
System 19
System 20
System 21
System 22
Fairway Drive
880
Lewelling Blvd
Grant Ave
Bockman Rd



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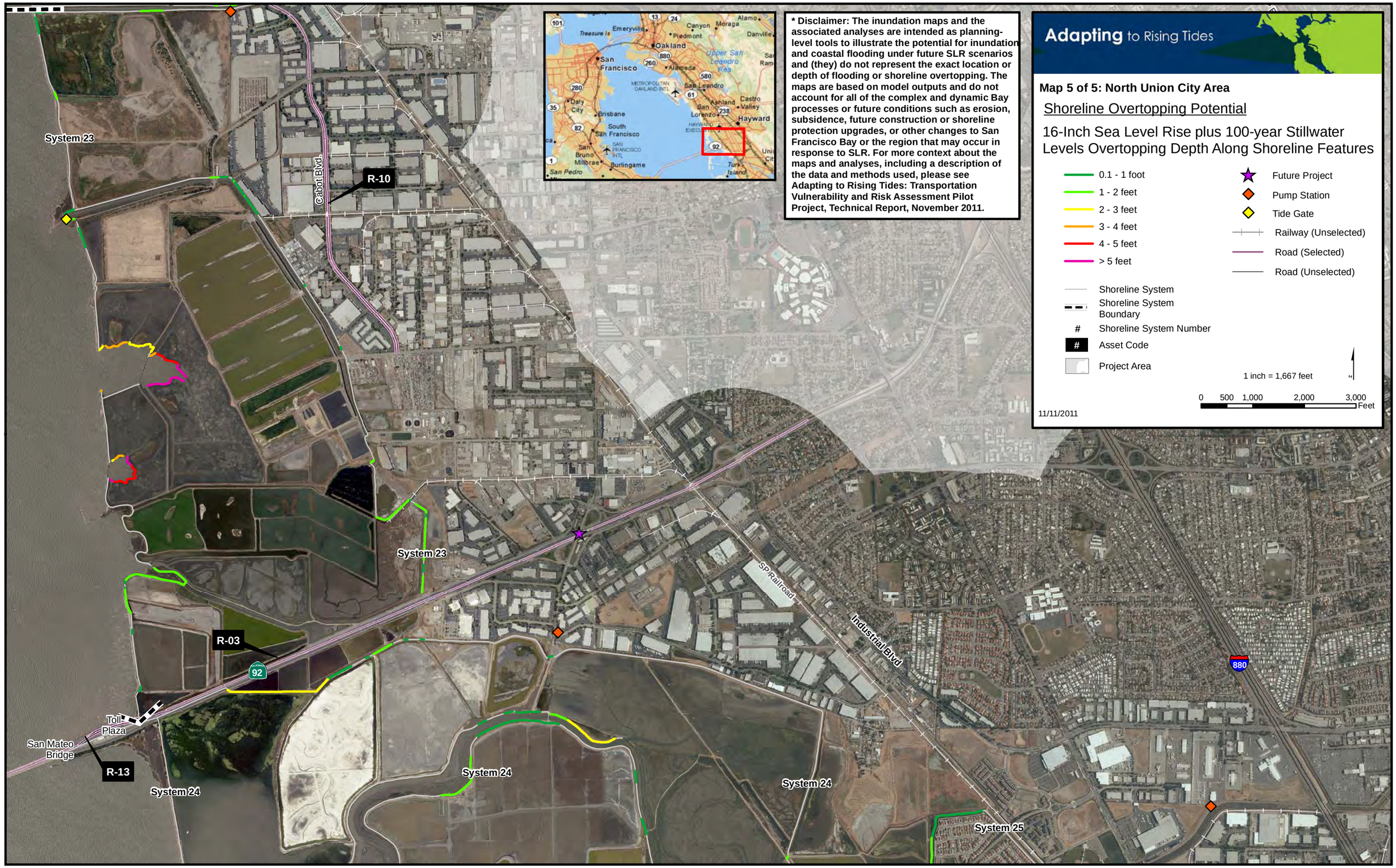

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Adapting to Rising Tides

Map 5 of 5: North Union City Area

Shoreline Overtopping Potential

16-Inch Sea Level Rise plus 100-year Stillwater Levels Overtopping Depth Along Shoreline Features

- 0.1 - 1 foot
- 1 - 2 feet
- 2 - 3 feet
- 3 - 4 feet
- 4 - 5 feet
- > 5 feet

- Future Project
- Pump Station
- Tide Gate
- Railway (Unselected)
- Road (Selected)
- Road (Unselected)

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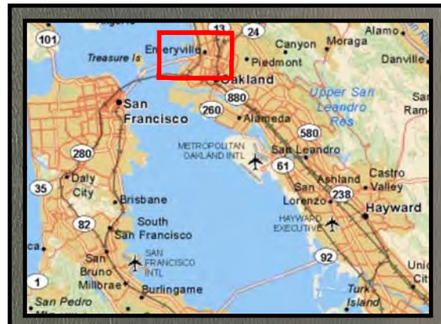

Northern Project Extent

System 1

R-06

Powell St

R-01

80

580

R-07

Mandela Parkway

R-04

West Grand Avenue

880

T-06

UP Martinez Subdivision

80

R-12

System 2

Toll Plaza

Burma Rd

R-09

Bay Bridge

San Francisco Bay

T-01

System 3

BART Transbay Tube

F-02

BNSF International Gateway Railport Intermodal Yard

F-04

7th Street Highway and Railroad Pumps

T-02

BART

T-03

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Lake Merritt

Adapting to Rising Tides

Map 1 of 5: Emeryville Crescent - I-80/880/580 Maze Area

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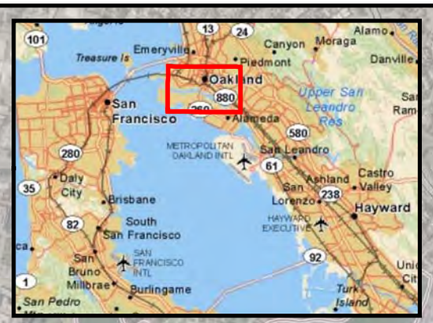

Adapting to Rising Tides

Map 2 of 5: West Oakland-Alameda Island-Lake Merritt Area

Shoreline Overtopping Potential

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11/11/2011

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System 12

System 13

System 16

System 28

System 5

System 15

Adapting to Rising Tides

Map 3 of 5: Coliseum - Bay Farm Island Area

Shoreline Overtopping Potential

55-Inch Sea Level Rise plus 100-year Stillwater Levels Overtopping Depth Along Shoreline Feature

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- 4 - 5 feet
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Shoreline System

Shoreline System Boundary

Shoreline System Number

Asset Code

55-Inch Sea Level Rise with 1/2-Mile Buffer

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Bay Area Rapid Transit Station

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Unselected Ferry Terminal

Maintenance Yard

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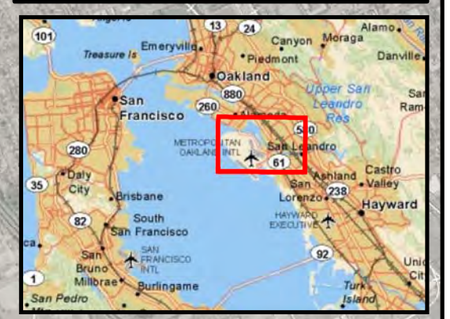

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Adapting to Rising Tides

Map 4 of 5: San Leandro Marina Area

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11/11/2011

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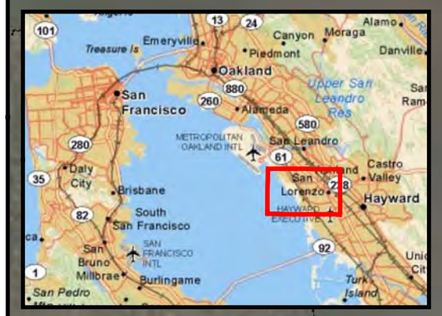

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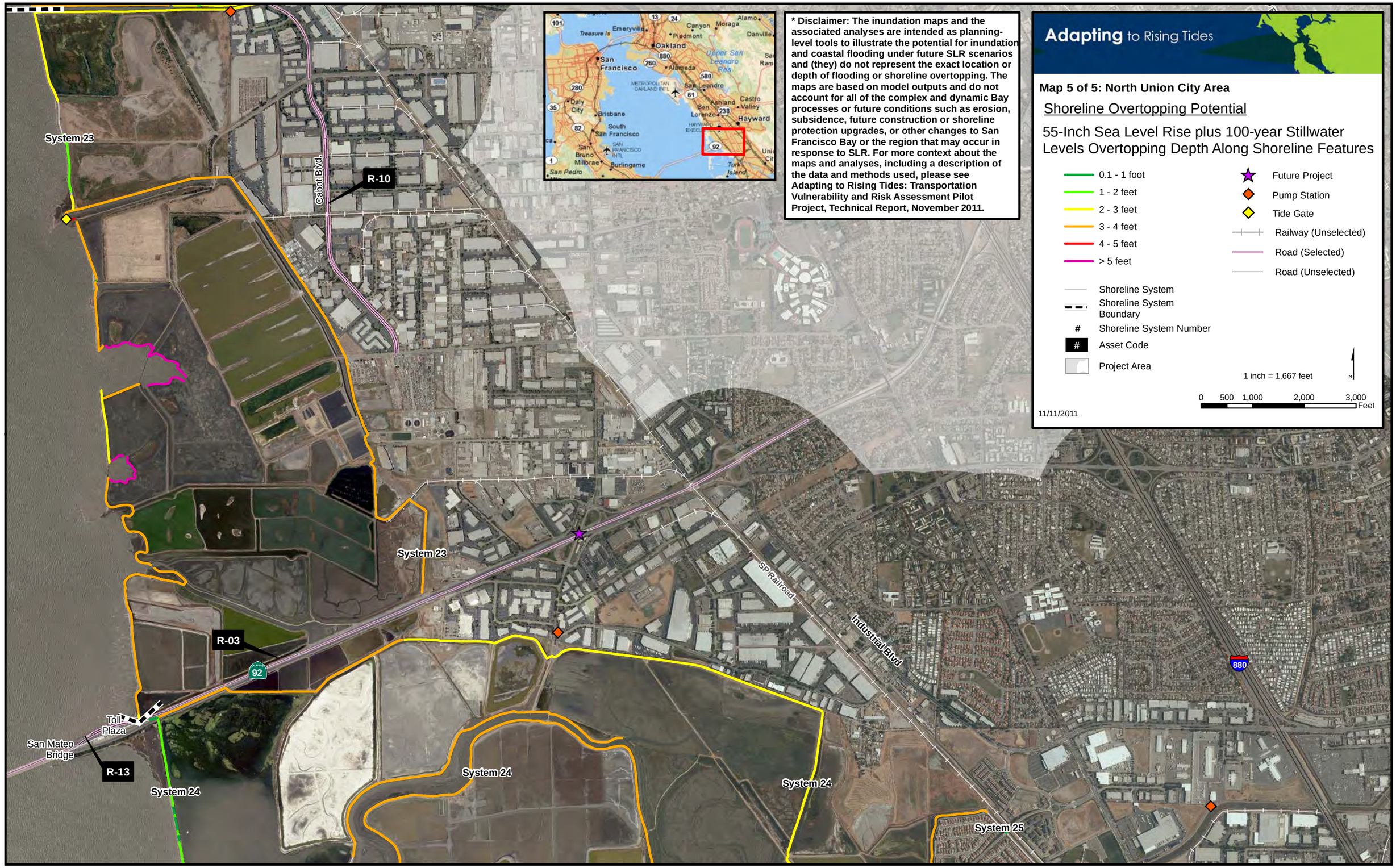

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Adapting to Rising Tides

Map 5 of 5: North Union City Area

Shoreline Overtopping Potential

55-Inch Sea Level Rise plus 100-year Stillwater Levels Overtopping Depth Along Shoreline Features

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