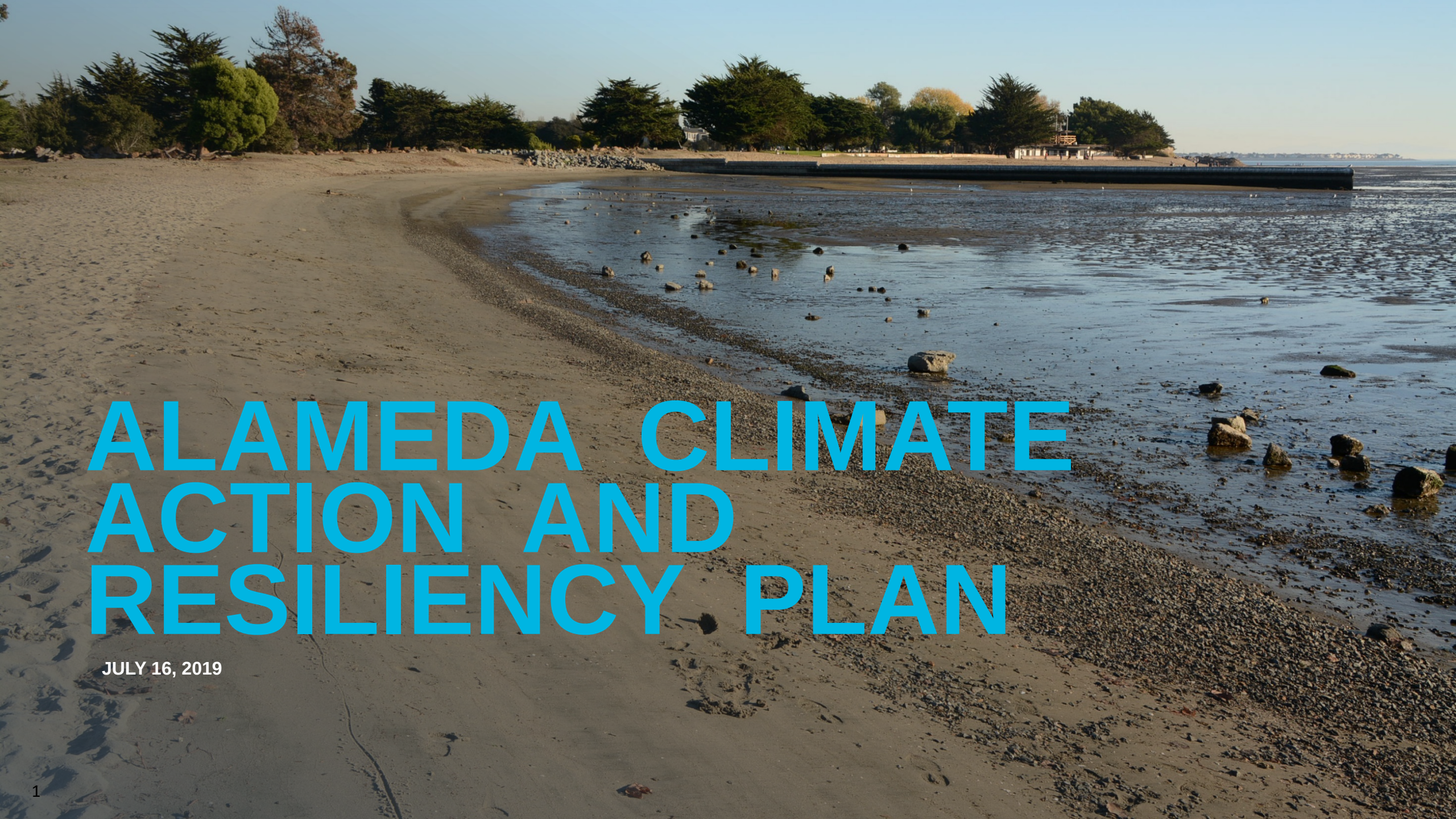


ALAMEDA CLIMATE ACTION AND RESILIENCY PLAN

JULY 16, 2019

AGENDA

01 Challenges of an Evolving Climate

02 Developing the Climate Action and Resiliency Plan

03 Reducing GHG Emissions

04 Adapting to Climate Change

05 Cost of Climate Change

06 Implementing the CARP

01 CHALLENGES OF AN EVOLVING CLIMATE

Alameda's Changing Climate

Sea level rise and storm surge

Extreme heat

Inland flooding

Wildfires

Drought

Liquefaction/ earthquakes

An Uncertain Future

Transportation

Public Utilities

Water and Food Supply

Public and Ecosystem Health

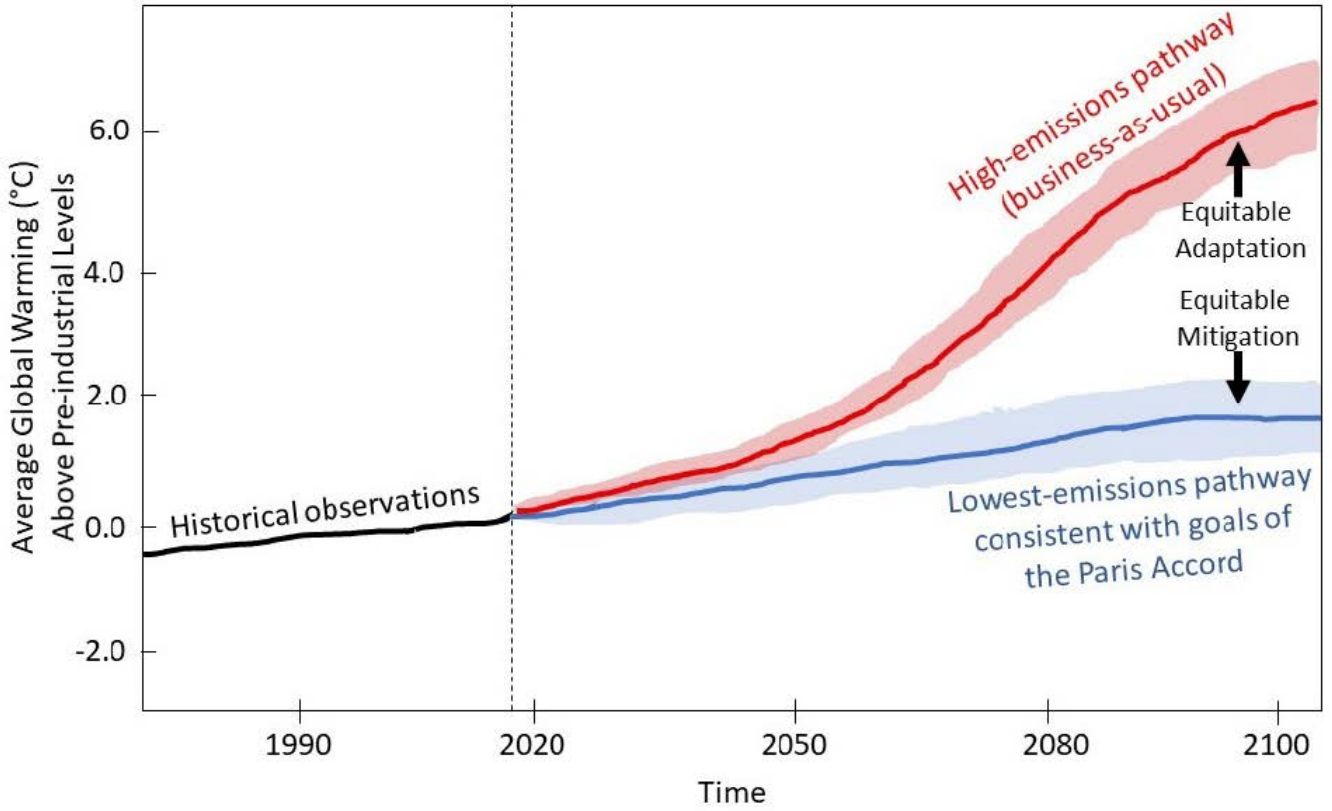
Air and Water Quality

Public and Personal Property

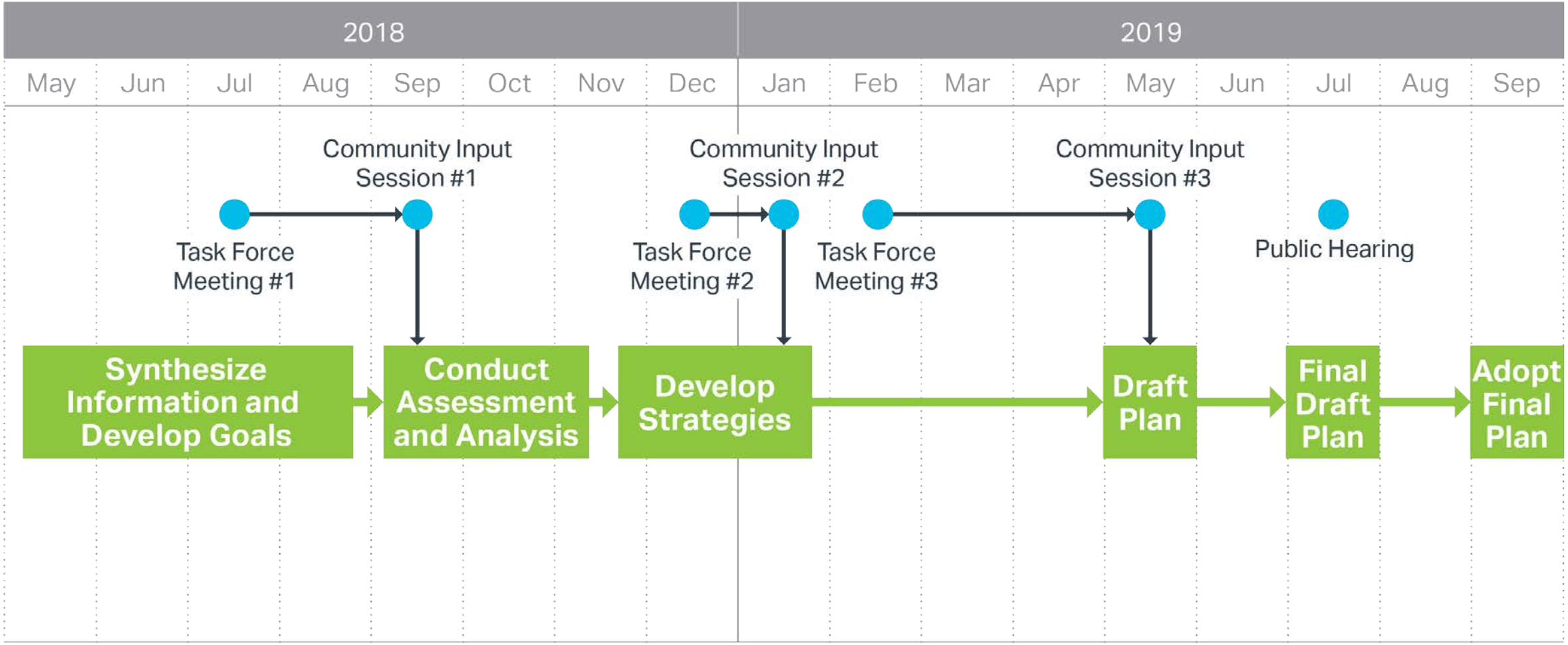
02 DEVELOPING THE CLIMATE ADAPTATION AND RESILIENCY PLAN

Alameda's Climate Safe Path

The combination of mitigation and adaptation into a single, actionable plan identifies significant co-benefits for Alameda.



CARP Development Process



A Proactive Response

- Local Action Plan for Climate Protection (2008)
- Developed Alameda Point Master Infrastructure Plan (2014) and Local Hazard Mitigation Plan (2016)
- With more recycling and composting, achieved 79% landfill diversion (2017)
- Won $40 million in transportation grants for mode-shifting projects (2017)
- Council referral to update Local Action Plan (2017)
- Ban on plastic straws (2018)
- Won funding for two Climate Fellows and grant for climate planning (2018)
- City Council Climate Emergency Declaration (2019)
- GHG emissions inventory and Climate Action and Resiliency Plan (2019)
- In 2020, GHG emissions reduced by 23% since 2008

LOCAL ACTION PLAN FOR CLIMATE PROTECTION

PREPARED BY THE CITY OF ALAMEDA
CLIMATE PROTECTION TASK FORCE AND THE PLANNING AND BUILDING DEPARTMENT

As Part of the Cities for Climate Protection Campaign

Adopted by the City Council of the City of Alameda on February 5, 2008

City of Alameda Planning and Building Department
2263 Santa Clara Avenue, Room 190, Alameda, CA 94501

A Community Response

- Climate change action originated from the community, CASA, and City Council
- CARP reflects input from hundreds of public comments and suggestions
- Youth engagement of middle and high school students. Watch their video!

CASA
Community Action for a Sustainable Alameda

ALAMEDA

Bay Area Climate Adaptation Network
Bike Walk Alameda
Building Decarbonization Coalition
Building Industry Association of the Bay Area
Climate Readiness Institute
Community Action for a Sustainable Alameda
Earth Justice
Rocky Mountain Institute
San Francisco Estuary Institute
Sierra Club
StopWaste

Stakeholder Engagement

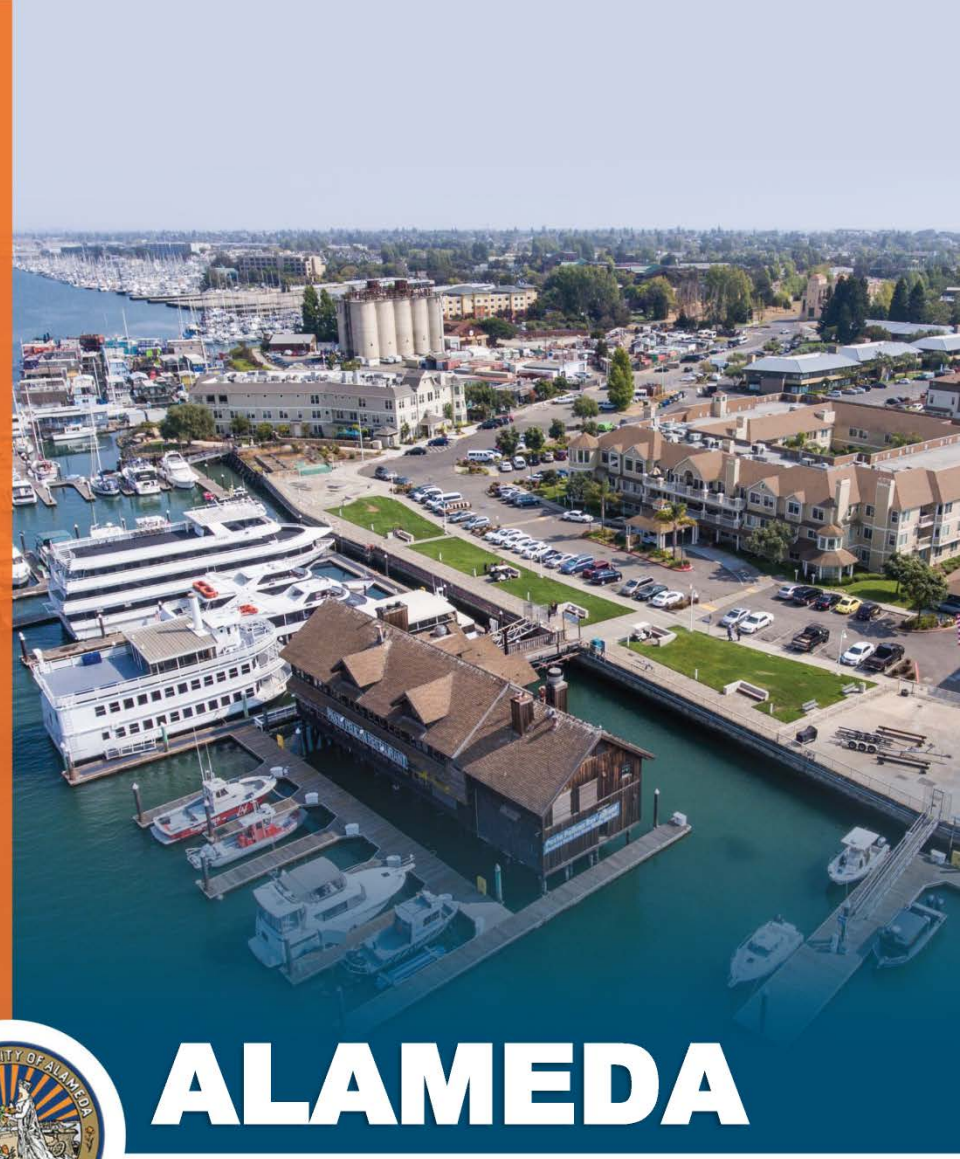
- Green Working Team
- Task Force
- Community Input Sessions
- Online Input
- City-Led Stakeholder Engagement

CARP Vision and Goals

"Alameda will be an **innovative leader** in achieving **net zero carbon emissions** and **community resilience** as soon as possible, and serve as an example that inspires similarly impacted cities to do the same. Our community members will be a vital part of this ongoing process."

Eight Targeted Goals:

- GHG reduction
- SLR and storm surges
- Inland flooding
- Drought
- Extreme heat
- Wildfires
- Earthquakes/liquefaction
- Effective implementation and capacity building



ALAMEDA

Climate Action and Resiliency Plan (CARP)

CARP Guiding Principles

Aligning with State Goals

- CARP aligns with state policies
- Develop plan to address mitigation and adaptation
- Reduce reliance on fossil fuels

Building on Regional Planning

- Expands work of BCDC's ART Program
- Draws upon latest climate projections
- Identifies opportunities for collaboration with City and neighboring jurisdictions

Committing to Equity

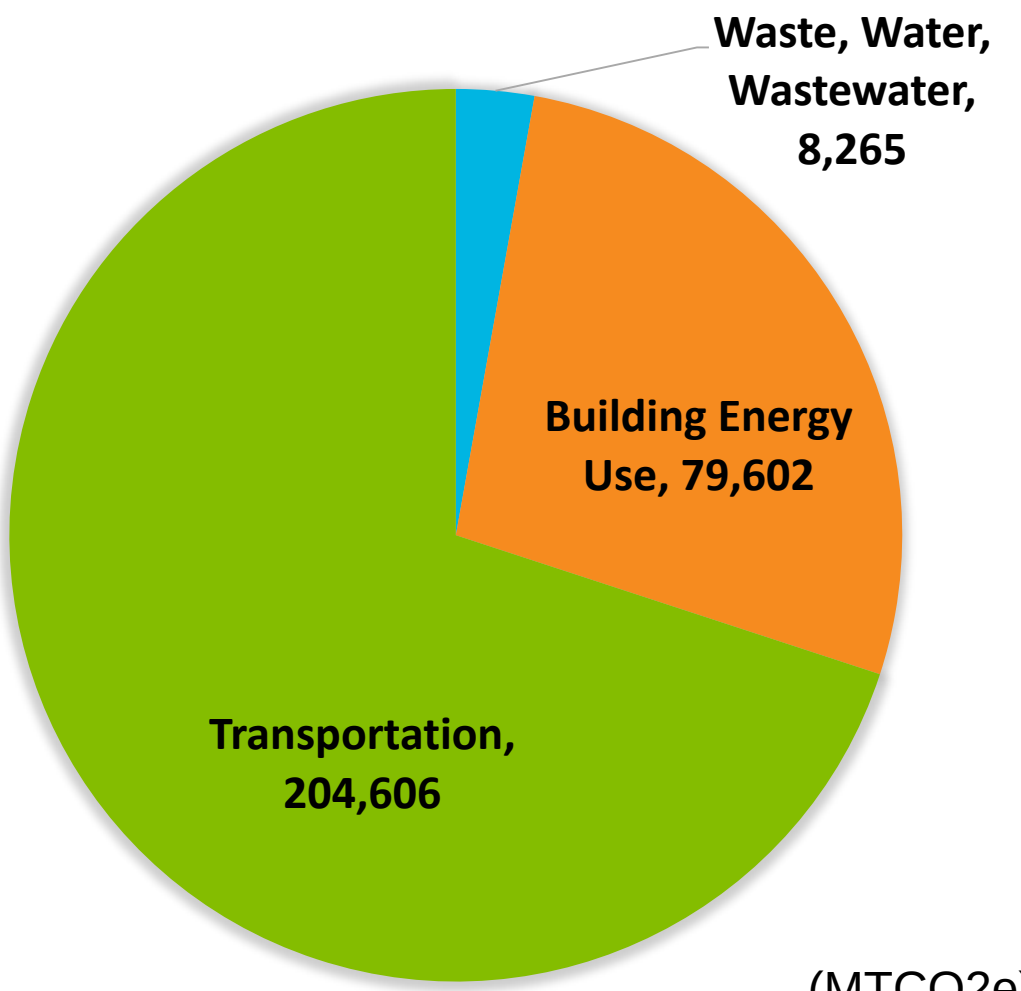
- Considered society and equity, economy, environment, and governance
- Conducted social vulnerability assessment
- Identified equitable mitigation and adaptation strategies

03 REDUCING GHG EMISSIONS

Greenhouse Gas Emissions

- City has worked to reduce GHG emissions since 2008
- City will achieve a 23 percent reduction relative to 2005 by 2020
- GHG reductions to date primarily from:
  - AMP's shift to 100 percent clean electricity
  - Zero Waste Implementation Plan (ZWIP)
  - Transportation Choices Plan (TCP)
  - Reduction in vehicle miles traveled (VMT)
- Future GHG reductions will come from transportation sector and natural gas consumption

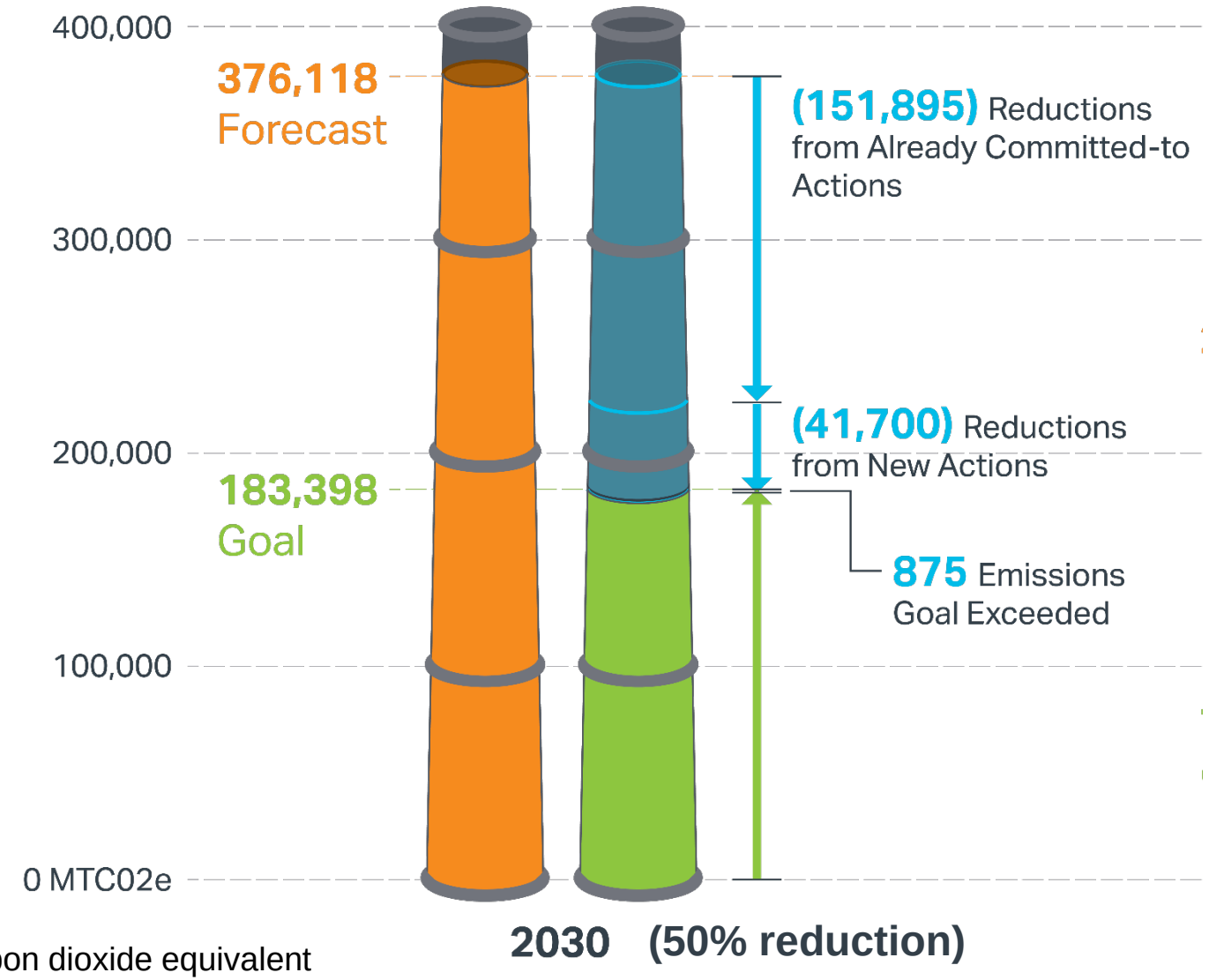
Alameda's 2020 GHG Projections



(MTCO2e)

Greenhouse Gas Reduction Goals

The City aims to reduce GHG emissions to **50% below 2005 levels by 2030** and reach **carbon neutrality as soon as possible**.



MTCO2e = Metric cubic tons of carbon dioxide equivalent

GHG Emissions Reduction Actions

Transportation

- Encourage mode shift
- Encourage electric vehicle use

Sequestration

- Draw down carbon from atmosphere
- Plant trees

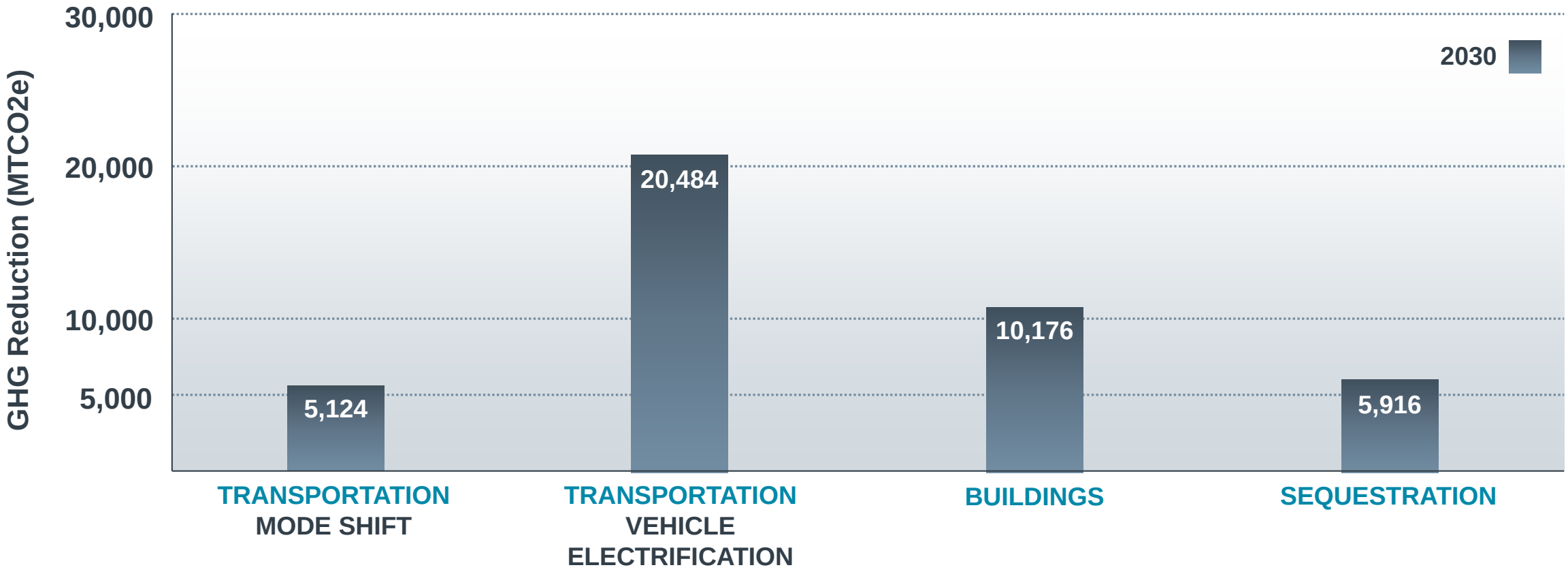
Buildings

- Reduce natural gas use
- All-electric new residential development
- Replace gas appliances in existing buildings

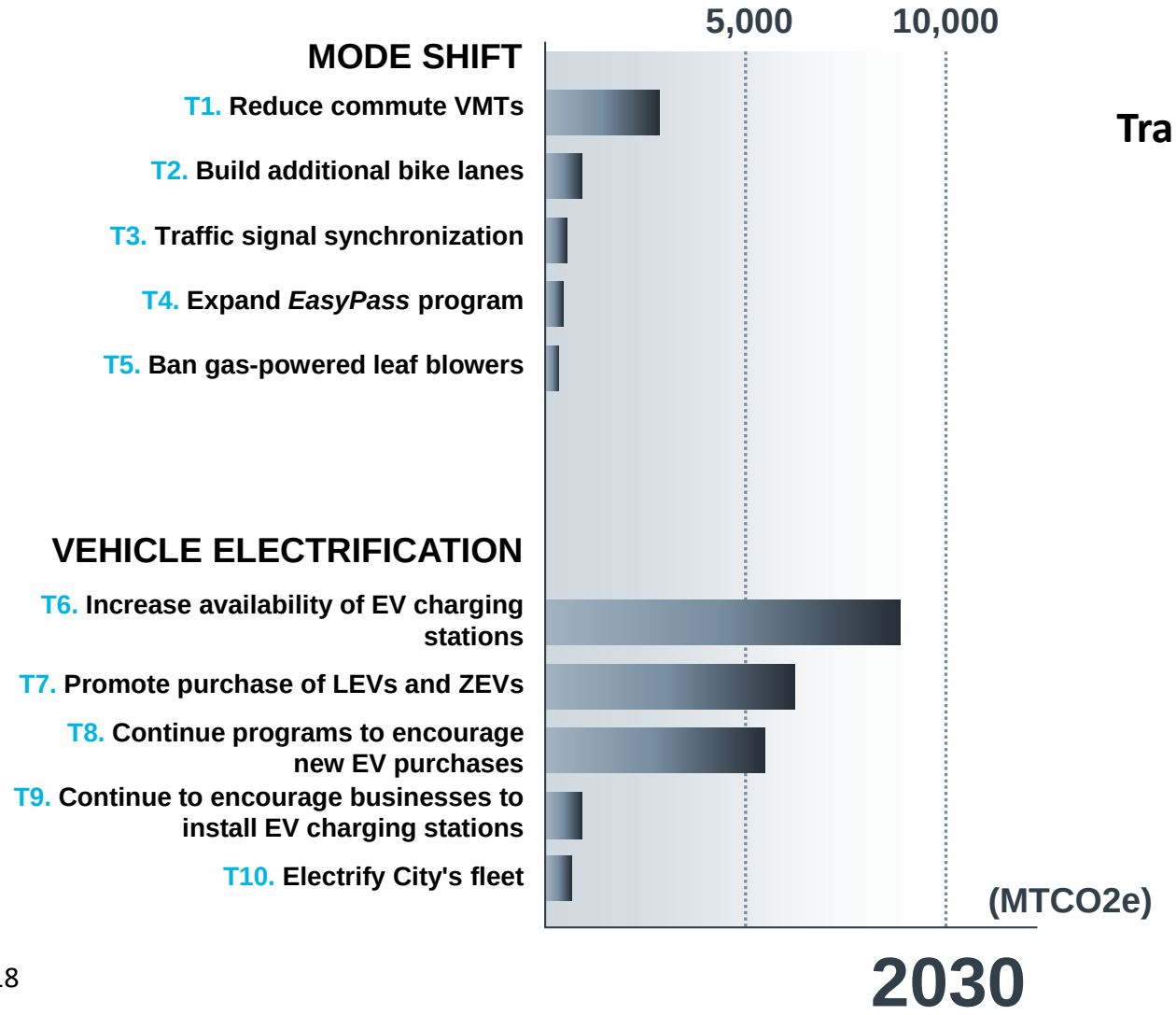
Already Committed to:

- 100% clean energy
- Implement the TCP
- Implement the ZWIP
- Plant new trees

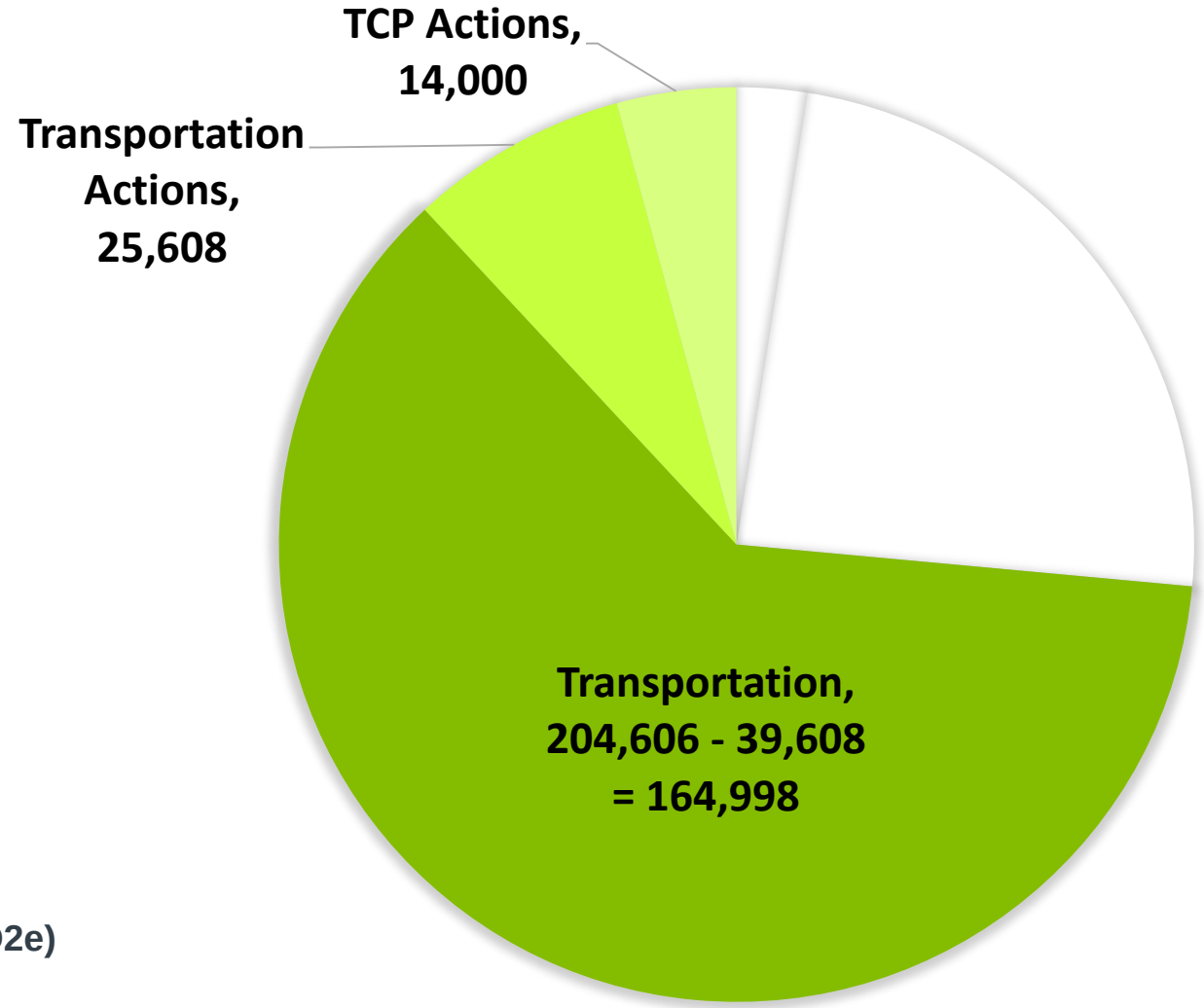
GHG Emissions Reductions Actions



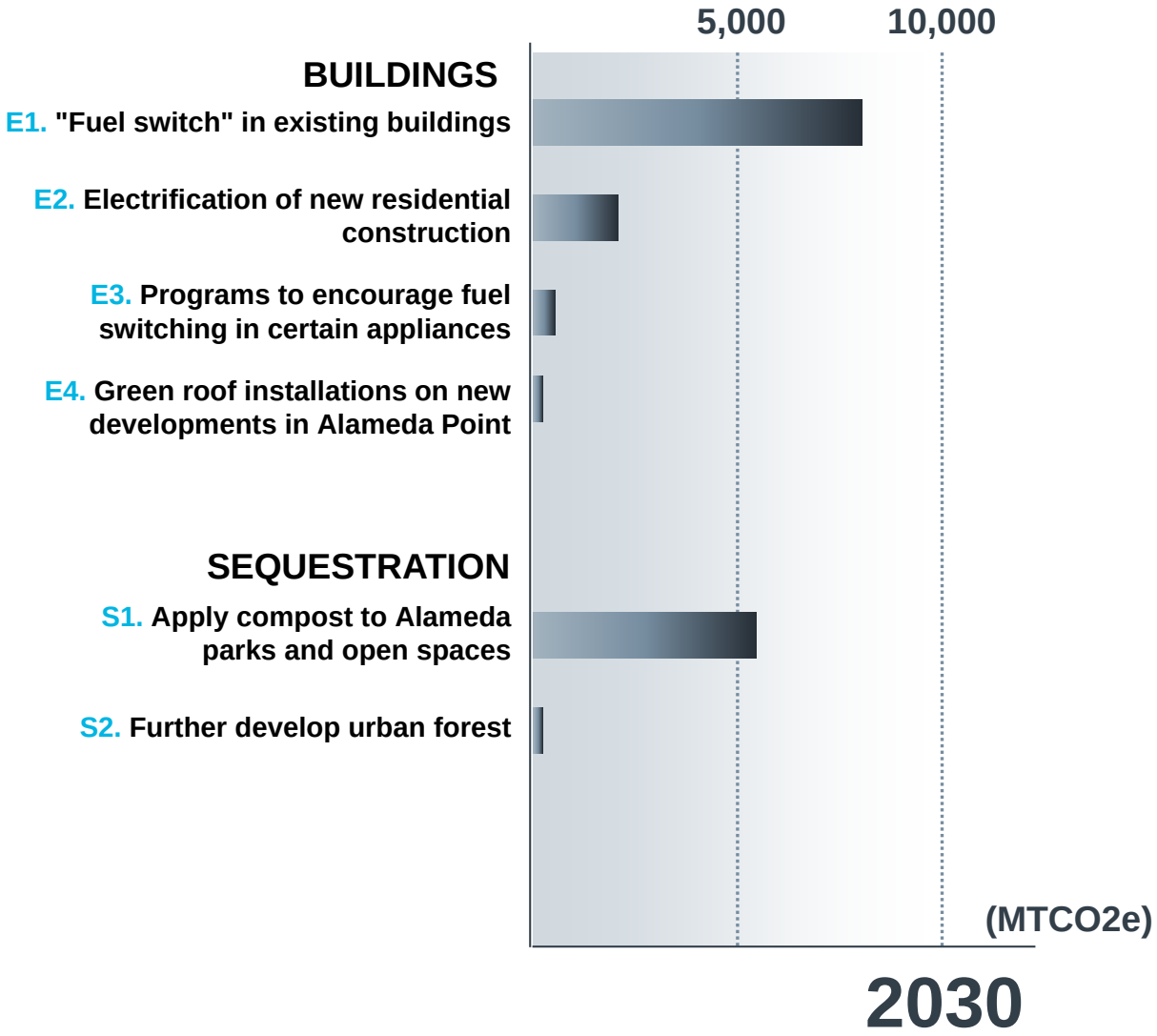
GHG Emissions Reductions Actions: Transportation



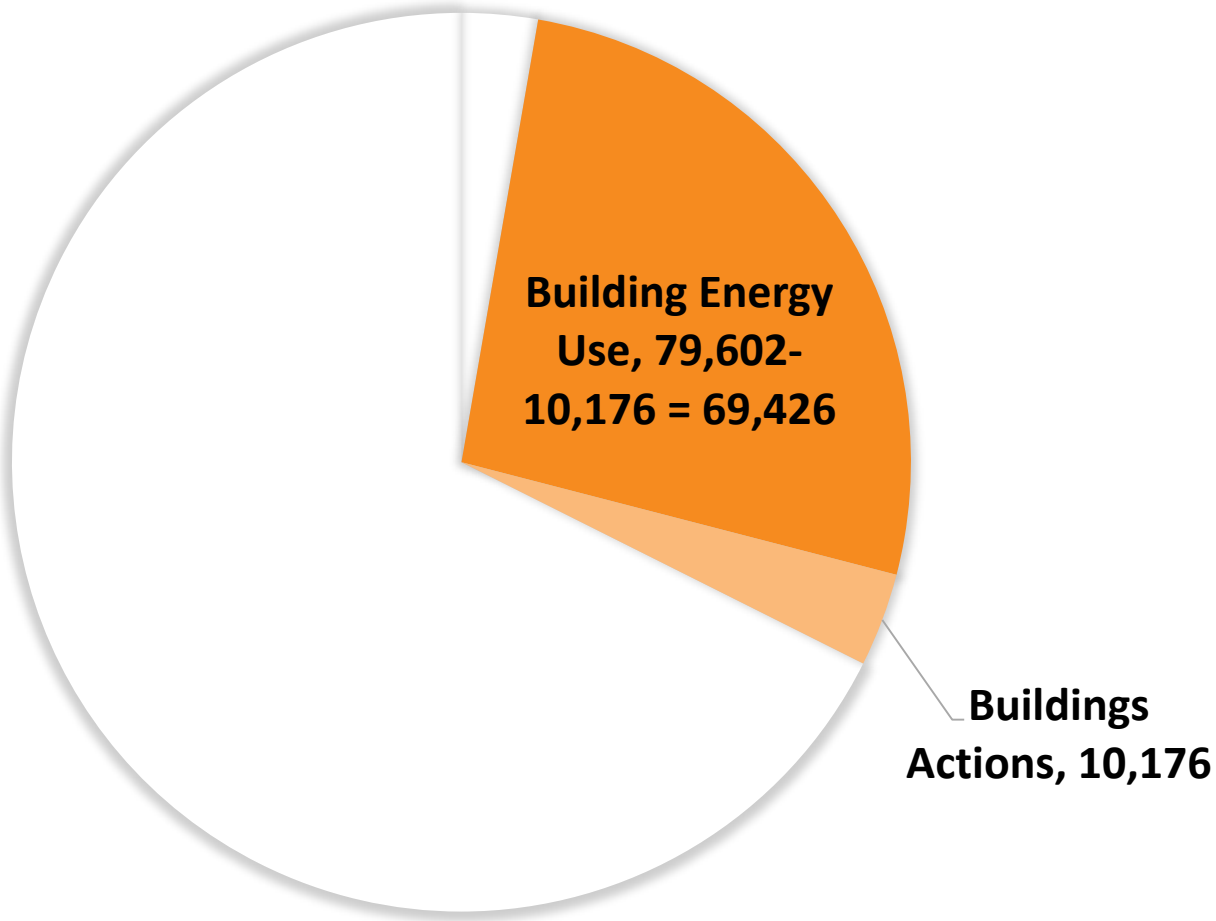
Alameda's 2030 GHG Reductions



GHG Emissions Reductions Actions: Buildings and Sequestration



Alameda's 2030 GHG Reductions



Sequestration reduction = 5,916

04 ADAPTING TO CLIMATE CHANGE

Climate Hazard-Specific Goals

Sea level rise and storm surge

Protect assets from SLR and storm surge, plan future land use to avoid impacts, and enhance natural shoreline habitat to mitigate impacts.

Inland flooding

Increase resiliency and capacity of the stormwater system to prevent flooding of assets during extreme precipitation events

Liquefaction/ earthquakes

Ensure building and infrastructure retrofit and new design standards in areas at high risk of liquefaction consider both seismic risk and SLR impacts.

Drought

Reduce water consumption and increase drought-resistant landscaping.

Extreme heat

Reduce heat island effect and protect vulnerable populations from heat impacts during heat waves

Wildfires

Protect public health from smoke impacts during wildfire events, especially among vulnerable populations.

Alameda's Adaptation Planning Process

Existing and Future Conditions

- Define baseline and future climate conditions based on best available science

Vulnerability Assessment

- Identify key vulnerabilities and impacts to infrastructure, residents, economy, and environment

Adaptation Strategies

- Develop strategies and actions at asset and citywide scale

Climate Hazard-Specific Goal Areas

Sea level rise and storm surge

Extreme heat

Inland flooding

Wildfires

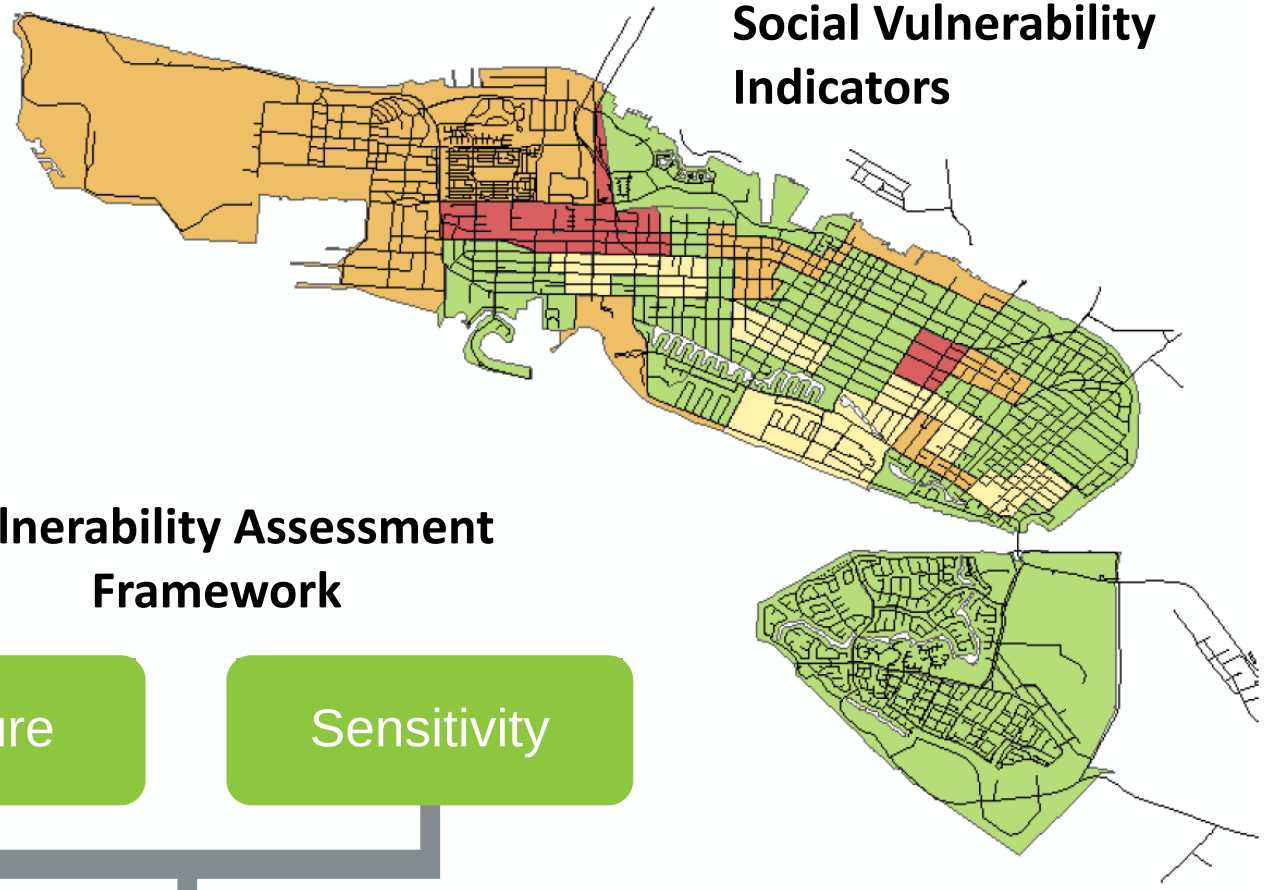
Drought

Liquefaction/ earthquakes

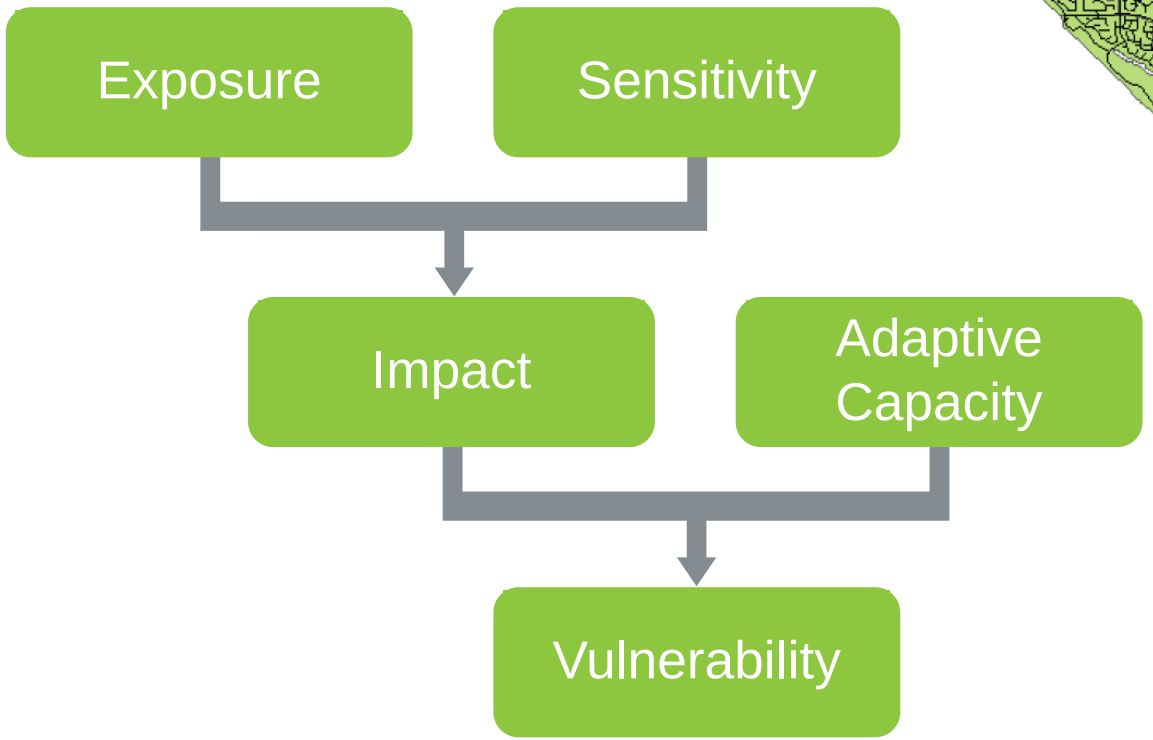
Climate Change Vulnerability Assessment

- Social vulnerability assessment
  - o Social factors affect population sensitivity
  - o Considered factors such as age, income, transit-dependence, education, language, etc.
  - o Identified portions of Alameda with high social vulnerability
- **Location-based** priority flooding areas (exposed soonest with greatest consequence)
- **Citywide** sectors evaluated

Social Vulnerability Indicators



Vulnerability Assessment Framework



Increasing Resiliency by Sector

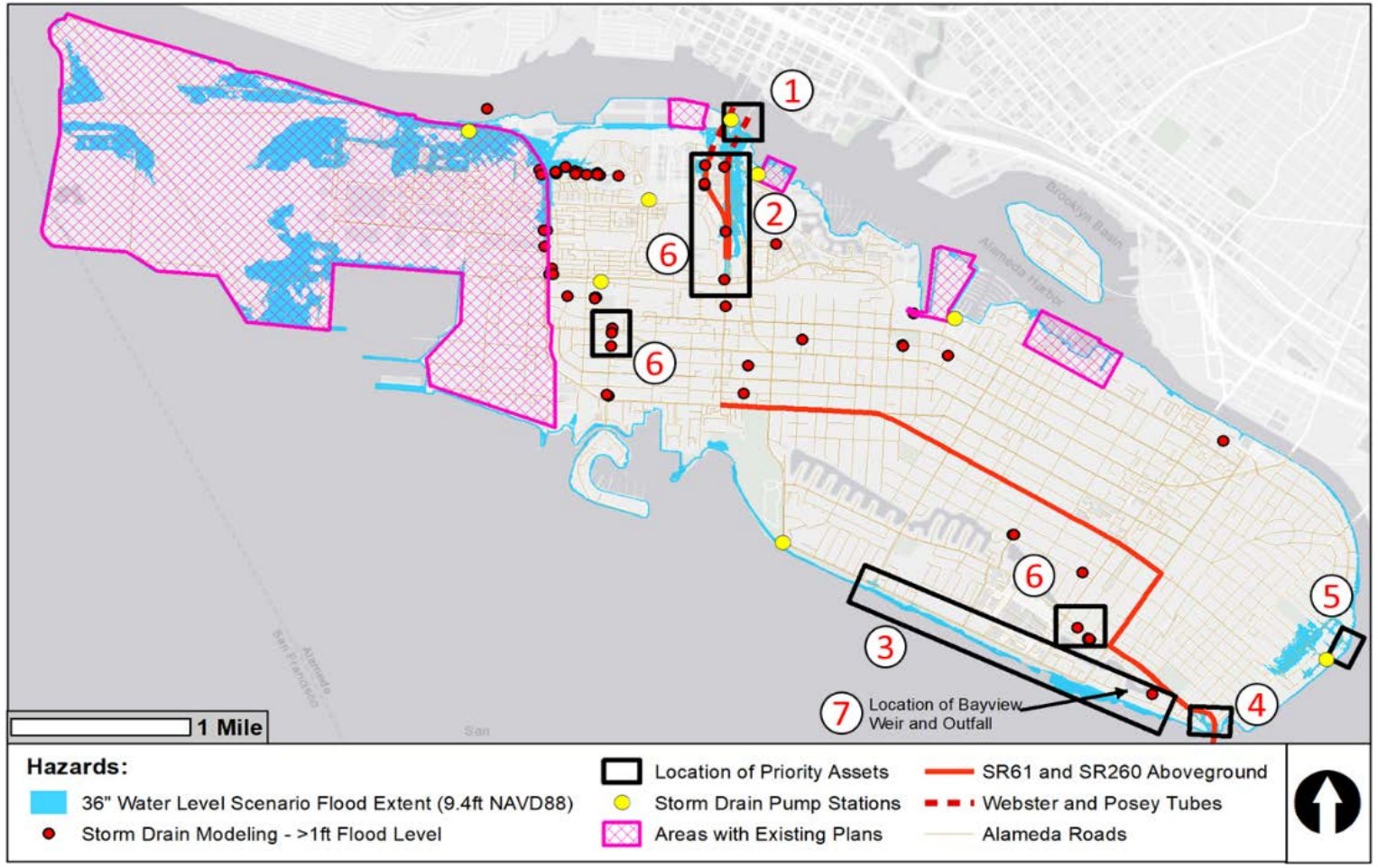
- Buildings
- Critical services
- Land use
- Shoreline and natural areas
- Transportation
- Contaminated lands and waste
- Utilities
- Public health and welfare

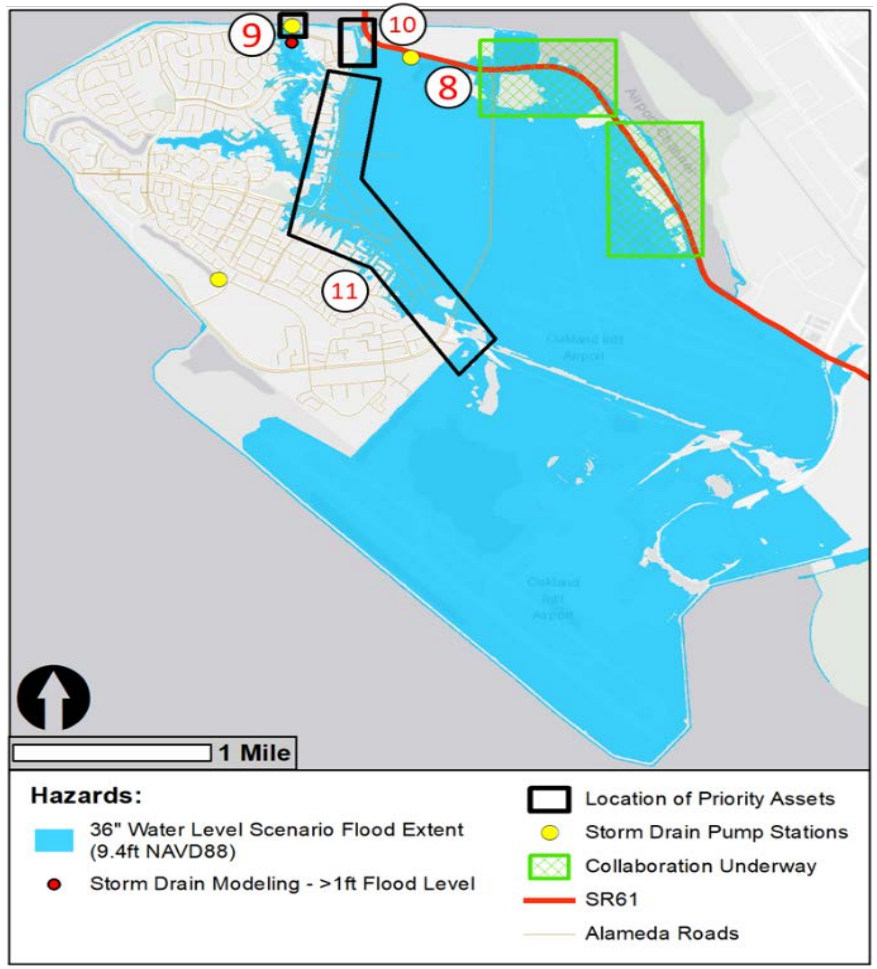
CARP includes list of potential strategies, relative cost, responsible entity, and timeline for each sector.

Case studies are also included.

Location-based Priority Flooding Areas

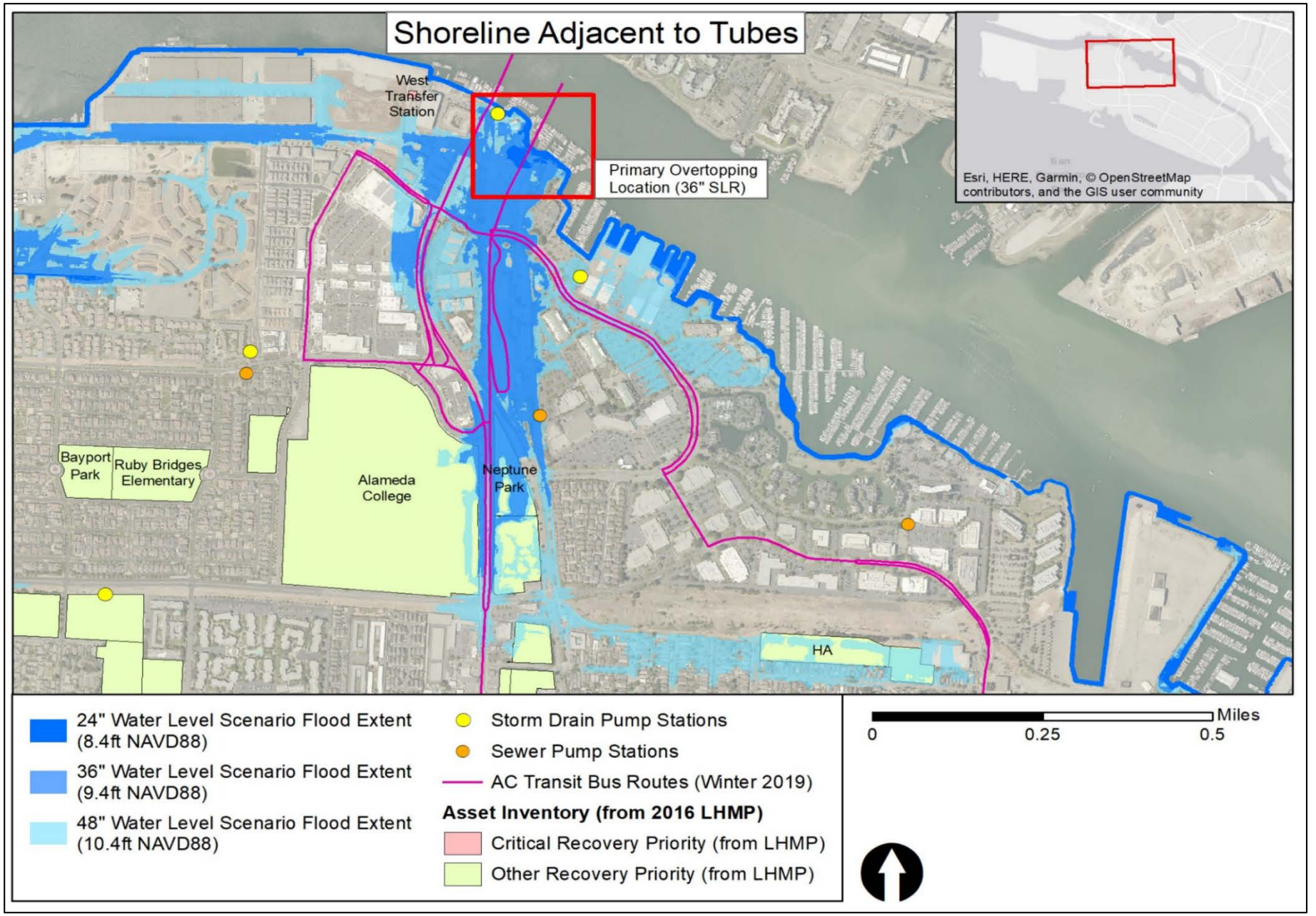
Shoreline and Natural Areas | Utilities | Transportation



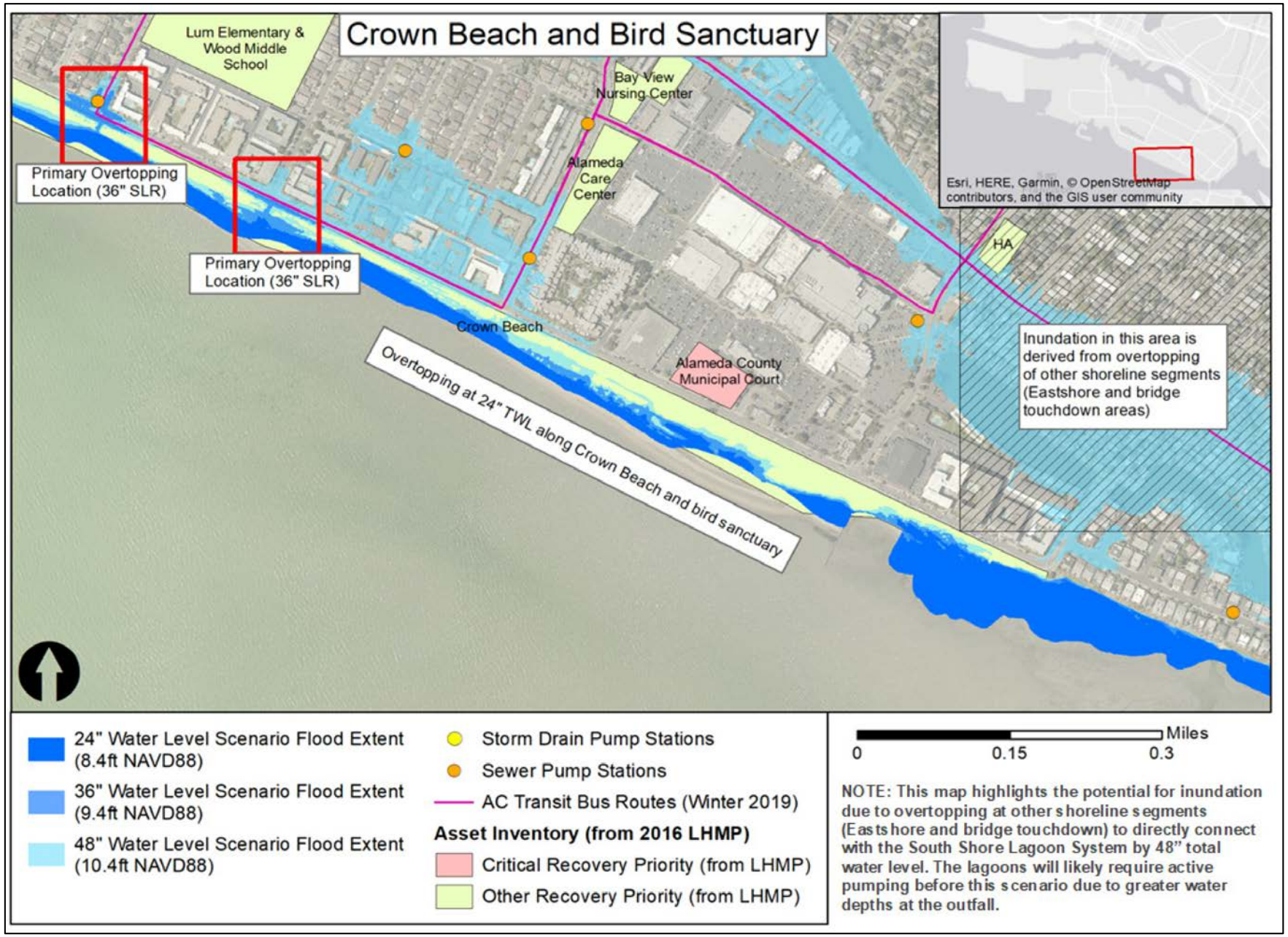


1 – Shoreline at Webster and Posey Tubes
2 – SR 260 and Posey/Webster Tubes
3 – Crown Beach and Bird Sanctuary
4 – Bay Farm Island Bridge Touchdown Area
5 – Eastshore Drive
6 – Critical and High-Use Roadways
7 – Bayview Weir and Outfall
8 – SR 61/Doolittle Drive
9 – Bay Farm Island Lagoon System 1 Outlet
10 – Veteran's Court Seawall
11 – Stormdrain System (Citywide)

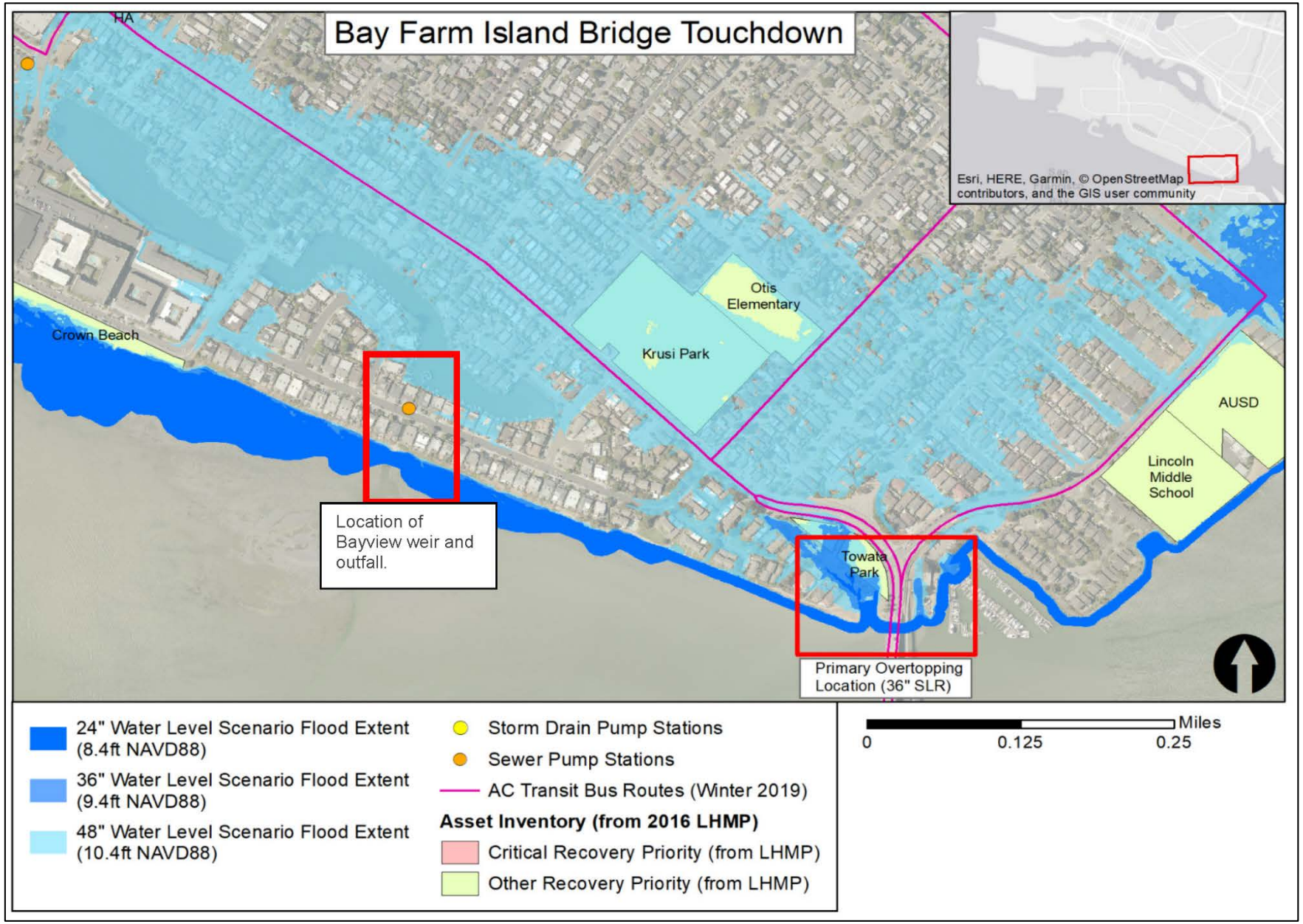
1 & 2 – Posey / Webster Tubes



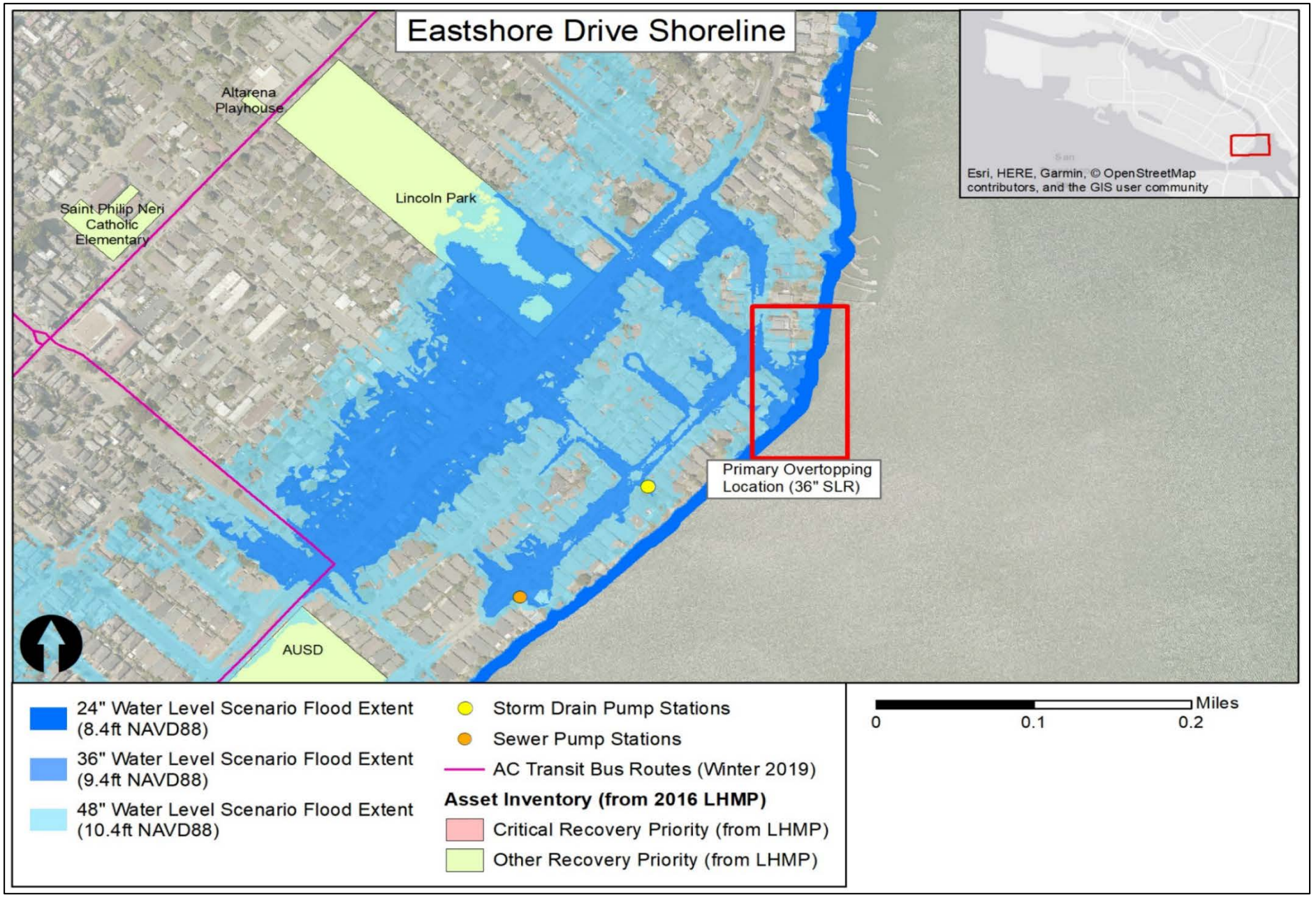
3 – Crown Beach and Bird Sanctuary



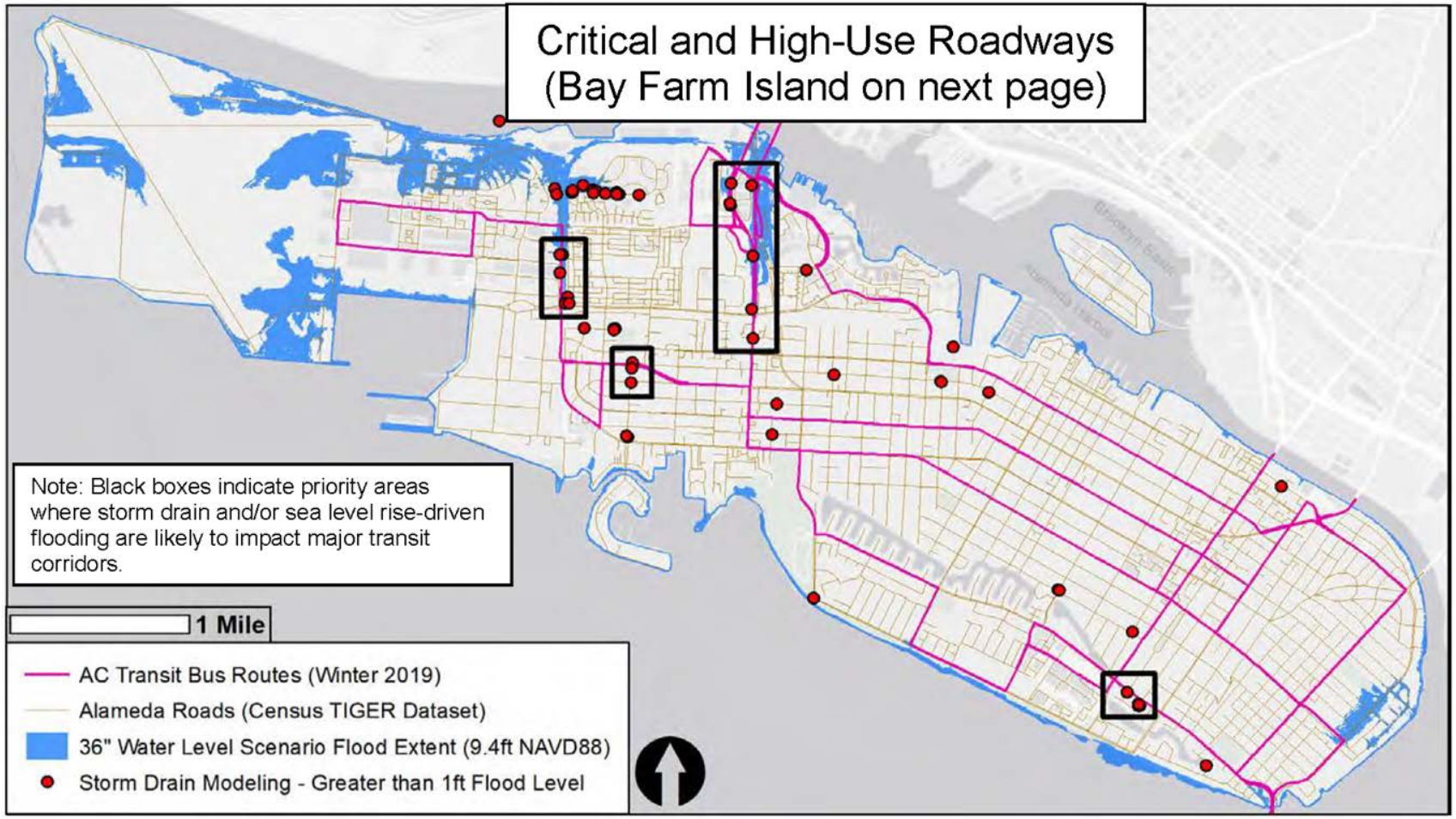
4 – Bay Farm Island Bridge Touchdown Area

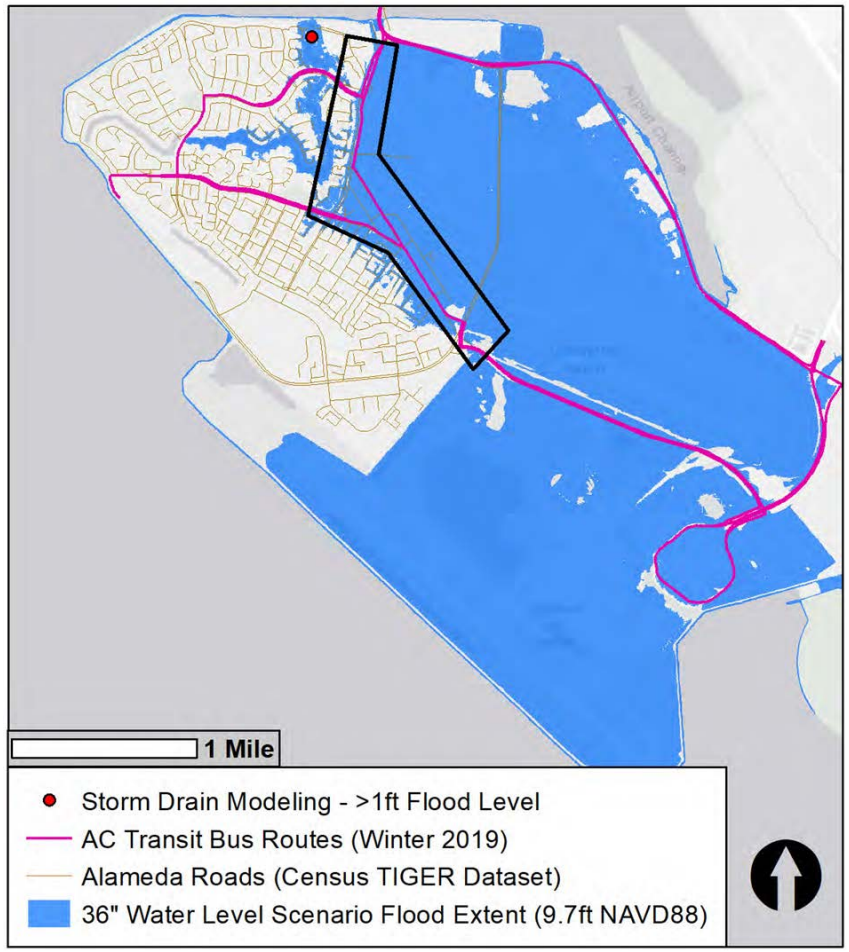


5 – Eastshore Drive Shoreline



6 – Critical and High Use Roadways

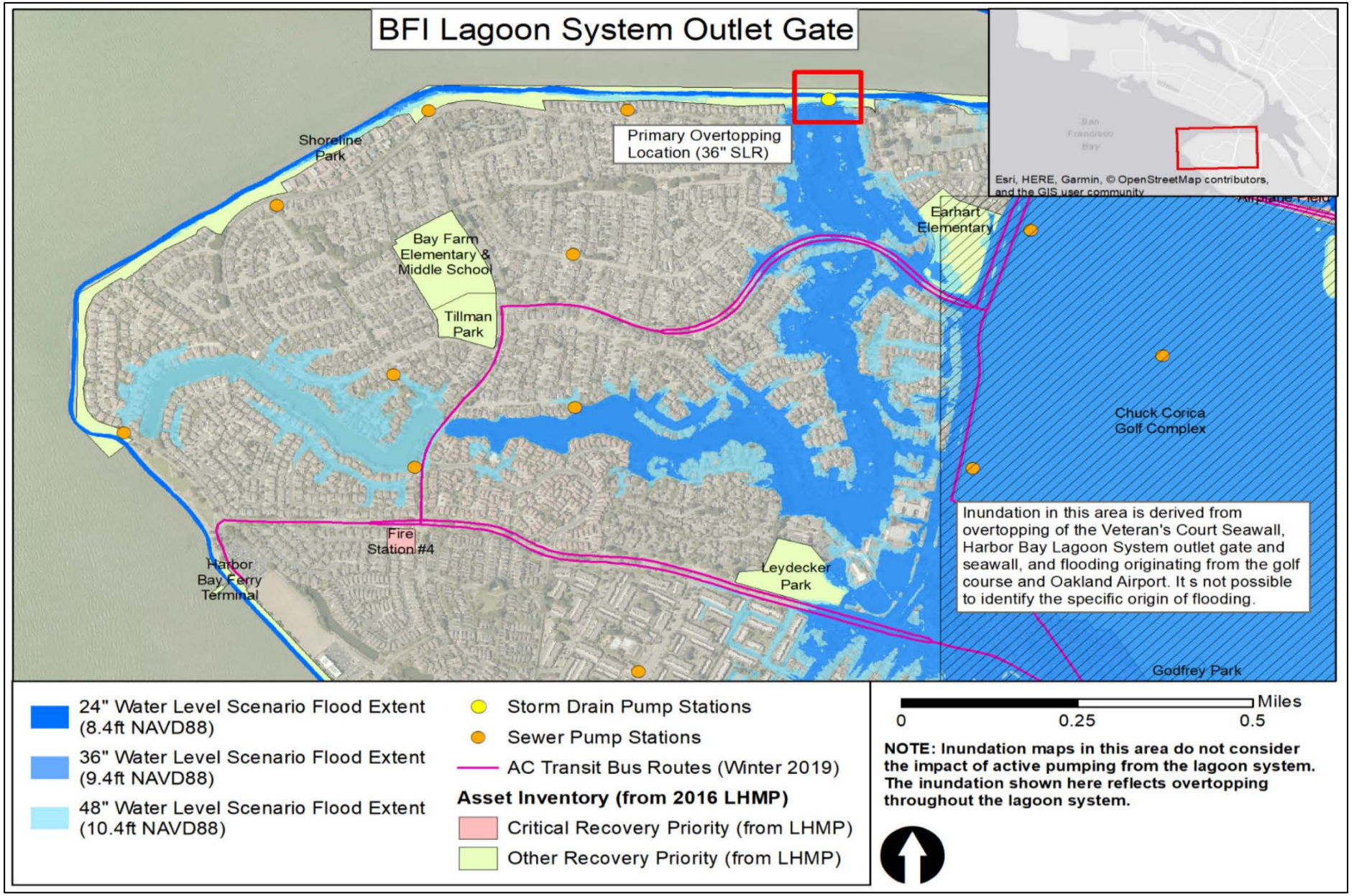




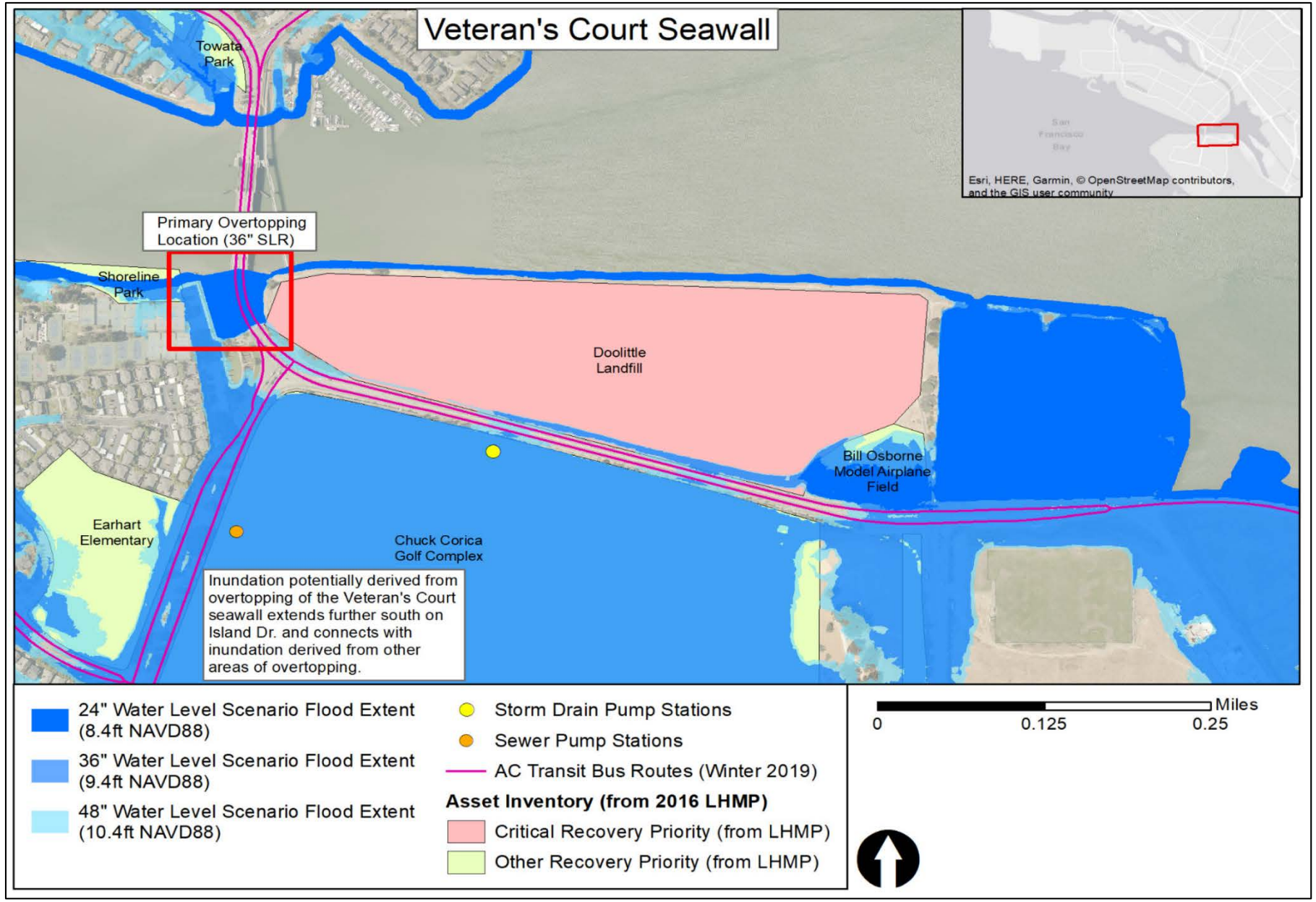
7 – Bayview Weir and Outfall

8 – SR 61 / Doolittle Drive

9 – Bay Farm Island Lagoon Outlet



10 – Veteran's Court Seawall



Alameda's Adaptation Strategy Approach

- Asset-specific strategies for 11 location-based priority flooding assets
- Sector-based citywide strategies
- Focus on assets impacted soonest and with greatest consequence
- Identify short-term (< 5 years), mid-term (5-10 years), and long-term (>10 years) actions
- Develop adaptation pathways that accommodate end-of-century conditions
- Monitor changing conditions and climate projections to adaptively manage adaptation response
- Consider broad range of evaluation criteria and co-benefits

Example Strategies for Priority Flooding Areas

Physical / Infrastructure

- Dune beach nourishment
- Mudflat sediment augmentation
- Remove existing impervious surfaces to aid drainage
- Install flood-proofing
- Upgrade existing pump station
- Heighten existing seawalls and levees

Governance

- Coordinate with EBRPD on site masterplan
- Coordinate with homeowners on protection strategy
- Coordinate with Oakland on Bay Farm Island flood protection
- Develop ordinance to require flood retrofits to homes
- Consider future water levels in stormwater design

Informational

- Study marsh resilience to SLR
- Compile land ownership inventory along shoreline
- Conduct geotechnical investigation of shoreline
- Evaluate structural characteristics of weir and outfall

05 COST OF CLIMATE CHANGE

Making Economically Informed Climate Change Decisions

The CARP evaluates the following:

- Cost of inaction
- Cost and benefits of taking action to address SLR and storm surge
- Costs of GHG reduction actions
- Funding and financing for the CARP

"We must demonstrate that investments will achieve maximum benefits and are implemented most cost-effectively."

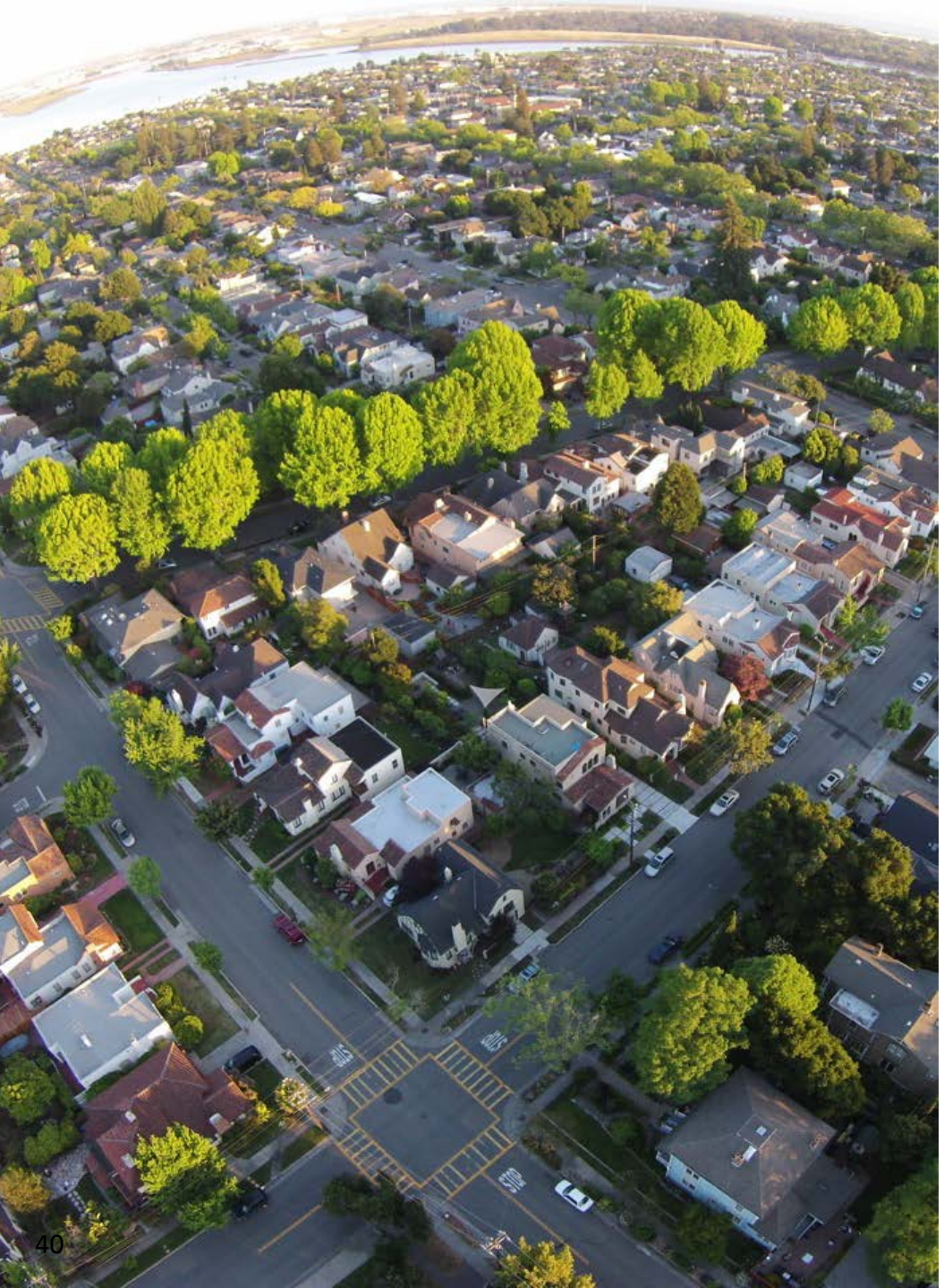
The Cost of Inaction and Action

Cost of inaction and action considered:

- 2030, 2050, and 2100 scenarios
- Permanent inundation and temporary flooding (100-year storm surge)
- Economic impacts (building damage, land and infrastructure loss) and protective costs

Scenario	High-End Cost ($M)	Avoided Loss ($M)
2030	$285	$1,490
2050	$559	$2,018
2100	$1,056	$8,061

With conservative assumptions and incomplete calculation of benefits, in all scenarios, **for every dollar spent on adapting, at least $3.50 in loss is avoided**.



Costs of GHG Reduction Actions

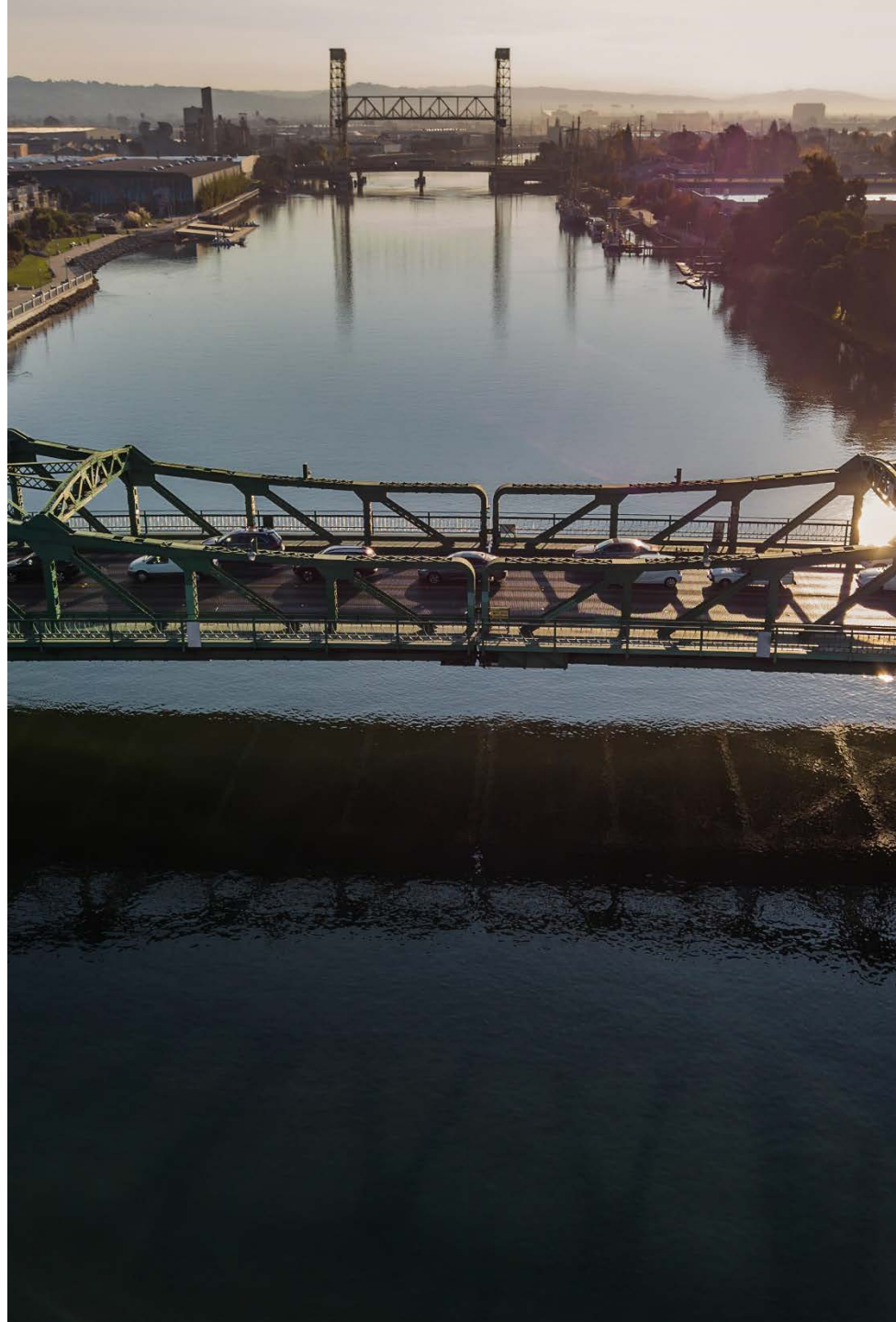
The CARP evaluates the following:

- Capital and ongoing costs for implementation of GHG reduction measures
- Costs presented in terms of "$/MTCO2e reduced" for transportation (mode shift and vehicle electrification), buildings, and sequestration actions

Relative Cost	Cost ($/MTCO2e Reduced)	Example Actions
Low	<$100	Bike lanes, EasyPass program, peak hour congestion pricing, EV charging stations
Medium	<$1000	Traffic signal synchronization, fuel switching programs, electrification of new construction
High	>$1000	Ban gas-powered leaf blowers, Green roof installations at Alameda Point, new BART station

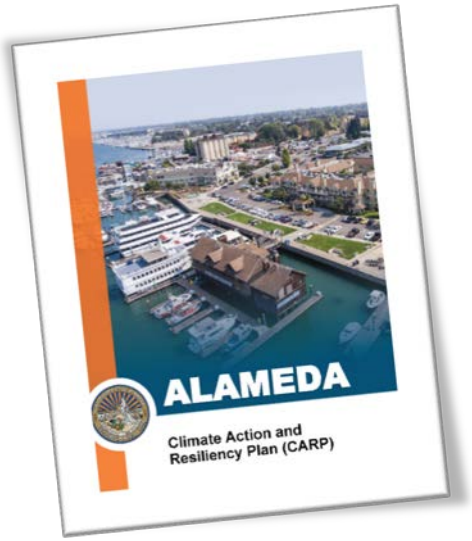
Funding and Financing the CARP

- The CARP recommends creating a new Climate Fund for GHG emissions reduction and climate change adaptation
- Funding may also come from state and federal dollars and grants
- Other local funding mechanisms include:
  - Infrastructure bonds
  - Flood assessments
  - Special districts
  - Stormwater fees
  - Enhanced Infrastructure Financing Districts



06 IMPLEMENTING THE CARP

From Plan to Action



The CARP presents an implementation framework that charts the City's course going forward.

To start, the City will:

- Continue meetings of the Green Team, Adaptation/Sequestration Working Group, and Fuel Switching Working Group
- Establish progress metrics and tracking on public-facing dashboard
- Initiate annual reporting on progress
- Continue work on regional governance and collaboration
- Hire a Sustainability Coordinator

CARP Phase 1 Milestones (Years 1-2)

OPERATIONAL

- Reassess City's organization and staffing
- Implement "Climate Impacts" section in staff reports
- Hire Sustainability Coordinator
- Reconvene Green Working Group
- Reconvene Climate Task Force
- Submit first annual report

GHG REDUCTION

- Continue implementing TCP, ZWIP Update, and AMP's Strategic Plan and EV Plan

Mode Shift

T1: Encourage telecommuting
T3: Improve traffic signal synchronization
T5: Ban gas-powered leaf blowers

Vehicle Electrification

T7: Promote purchase of LEVs and ZEVs
T8: Continue programs to encourage EV purchases
T9: Encourage businesses to install EV charging stations
T10: Electrify City's fleet

Buildings

E1: Fuel switch in existing buildings
E2: Require new residential construction to be all-electric
E3: Programs to encourage appliance full switching charging stations

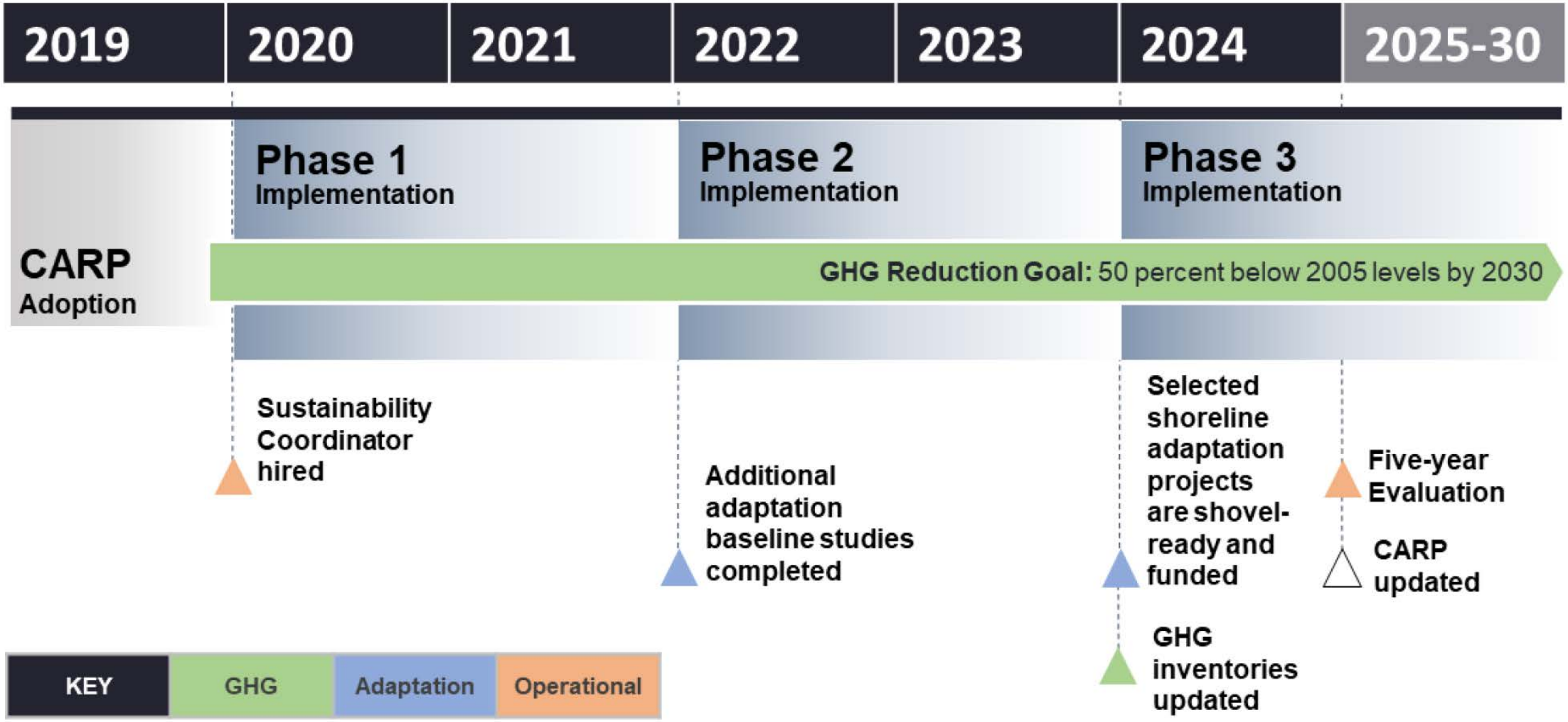
Sequestration

S1: Complete composting feasibility study
S2: Develop urban forest and update Master Street Tree Plan

ADAPTATION

- Update Alameda Point MIP for CARP consistency
- Develop Veteran's Court seawall adaptation project
- Study SLR impacts on groundwater rise
- Coordinate with County on outreach during weather emergencies
- Raise stormwater fees to implement Storm Drain Master Plan
- Finalize, approve, and begin implementing Green Infrastructure Plan
- Continue water conversation and drought-resistant landscaping programs
- Consider infrastructure bond for adaptation and mitigation projects

CARP Timeline and Milestones



Q&A