The

Adapting to Rising Tides

Program

Oakland/Alameda Resilience Study

San Francisco Bay Conservation
and Development Commission

Agenda

9:00 Welcome, review agenda, and introductions

9:15 Review proposed adaptation responses

9:45 Discuss implementation pathways

10:45 Break

11:00 ART and local projects

11:30 Next steps and communication strategy

Meeting Objectives

- Develop an implementation path for priority actions
- Discuss communications strategy for study findings
- Plan for an ongoing relationship with the ART Program and other working group agencies

What have we been up to?

- Draft Phase I Report: Vulnerability and Risk Assessment
- City of Oakland Hazard Mitigation Plan Update
- Commissioner Workshops

…What have you been up to?

Where are we in Oakland/Alameda?

Implementation Pathways

- Actions
- Leads
- Partners
- Processes
- Funding
- Permits

Actions can be many different things such as studies, new governance arrangements, physical structures, public outreach campaigns.

Implementation Discussion

For each of the identified actions:

- What funding opportunities are there?
- Will advocacy be necessary?
- What information will be needed?
- What is the regulatory landscape?
- Are there institutional arrangements to support it?
- Would this action:
  - Build social resilience and equity?
  - Protect or enhance the environment?
  - Solve an information or governance challenge?
  - Build local or regional economic resilience
- What is the priority - is it only a local priority or is it also a regional priority?

Future Flood Risk (AECOM)

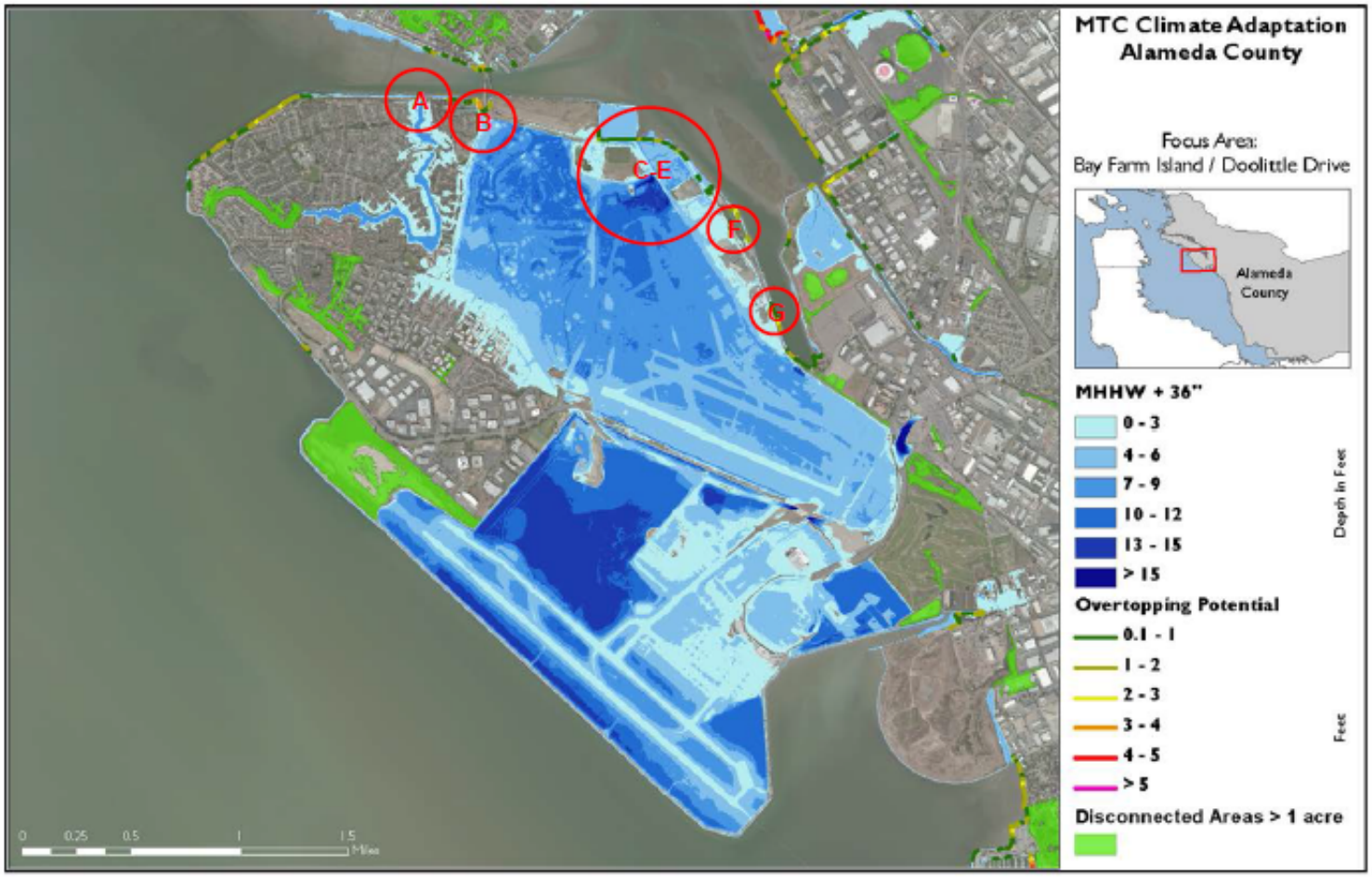


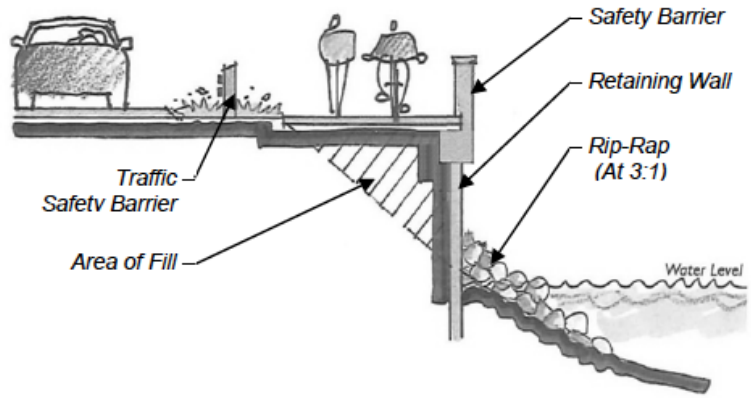
Figure 12. Updated Inundation and Flooding Analysis Using the Modified DEM

Note: System-wide inundation of Bay Farm island is expected at 36 inches of SLR. The tide gate wing-wall (Site A), the Harbor Bay Club shoreline (Site B), and sites along Doolittle Drive (Sites C-G) are the critical inundation pathways in this scenario.

Proposed Bay Trail Options

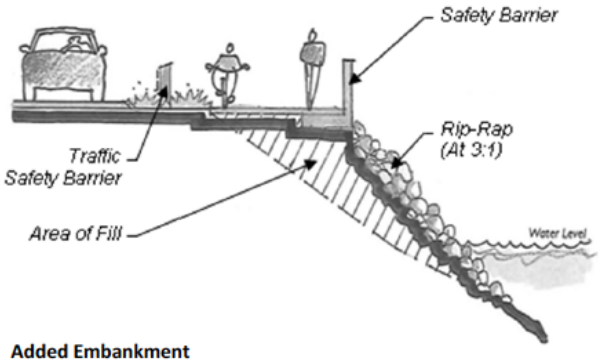
B. EMBANKMENT WIDENING BY RETAINING WALL TRAIL TYPE

Conceptual Engineering Design Features

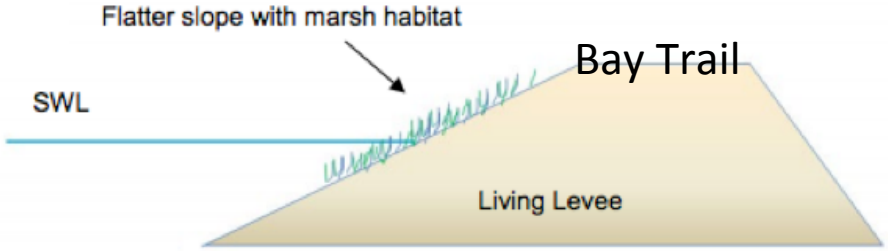


Retaining Wall with Soldier Pile and Lagging Wall or Precast Concrete Sheet Pile

C. ADDED EMBANKMENT TRAIL TYPE



Added Embankment



November Evaluation Criteria Meeting

- Coordination is difficult to envision given current timelines (FEMA appeal, EBRPD Bay Trail)
- Agencies are not eager to form new governance arrangements (JPAs, easements, etc)
- Permit requirements make it difficult to do multi-objective projects
- Desire to do green infrastructure projects but little clarity on what that could look like here

Bay Farm Island/OAK Flooding

How to address low spots along Doolittle which contribute to flooding on Port of Oakland property and in the community?

1) Individual actions by OAK, EBRPD and Caltrans

2) Coordinated action to make recreation, airport operations, and transportation more resilient.

Implementation Discussion

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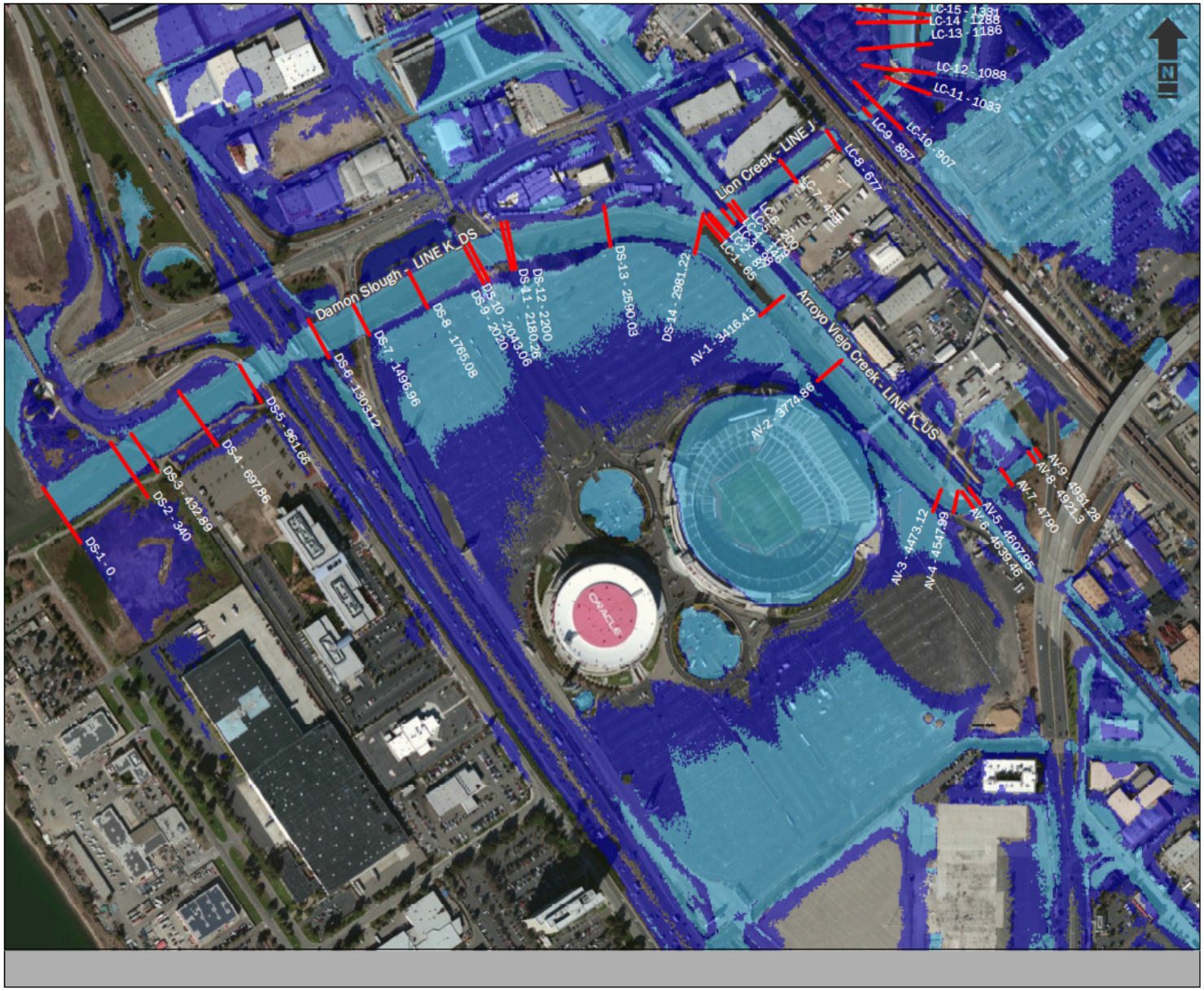
Coliseum Area Flooding

How to address joint coastal and riverine flooding?

How to make planned redevelopment more resilient?



MTC CLIMATE ADAPTATION
Damon Slough Focus Area
Alameda County

FLOODING EXTENTS

10-YR Extreme Tide + 10-YR Peak Flow

10-YR Extreme Tide (24" SLR) + 10-YR Peak Flow

HEC-RAS XS

0 250 500 1,000 Feet

North American Vertical Datum 1988

NAD 1983 StatePlane California III FIPS 0403 Feet

AECOM

4/20/2014

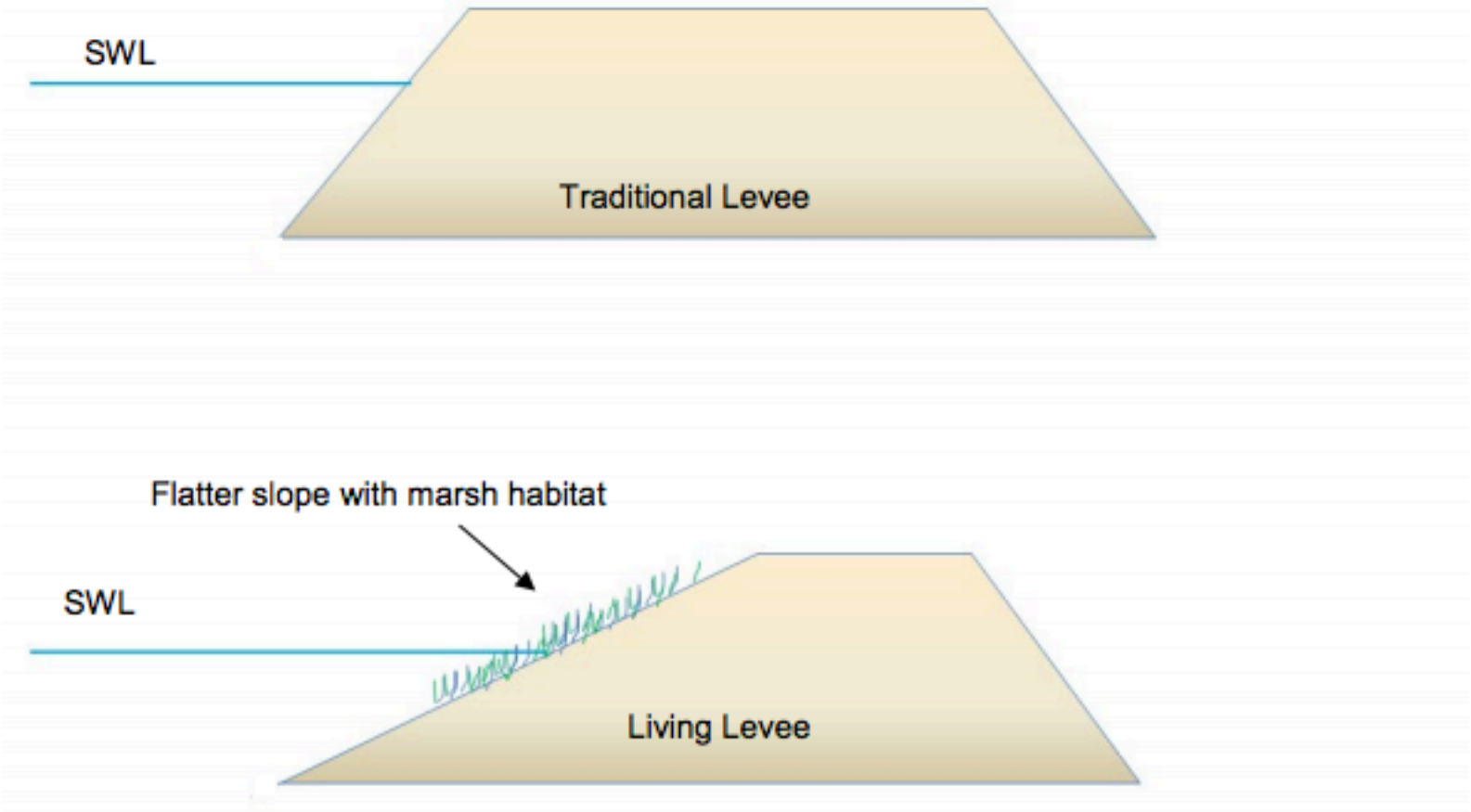
FIGURE 2

Damon Slough Improvements

Figure 6-5: The layout and footprint of the living levee (brown) and the section where seawall might be necessary due to space limitations

Damon Slough Flooding

Figure 6-4: Conceptual diagrams of a traditional levee (top) and living levee (bottom)



Watershed Storage

AECOM

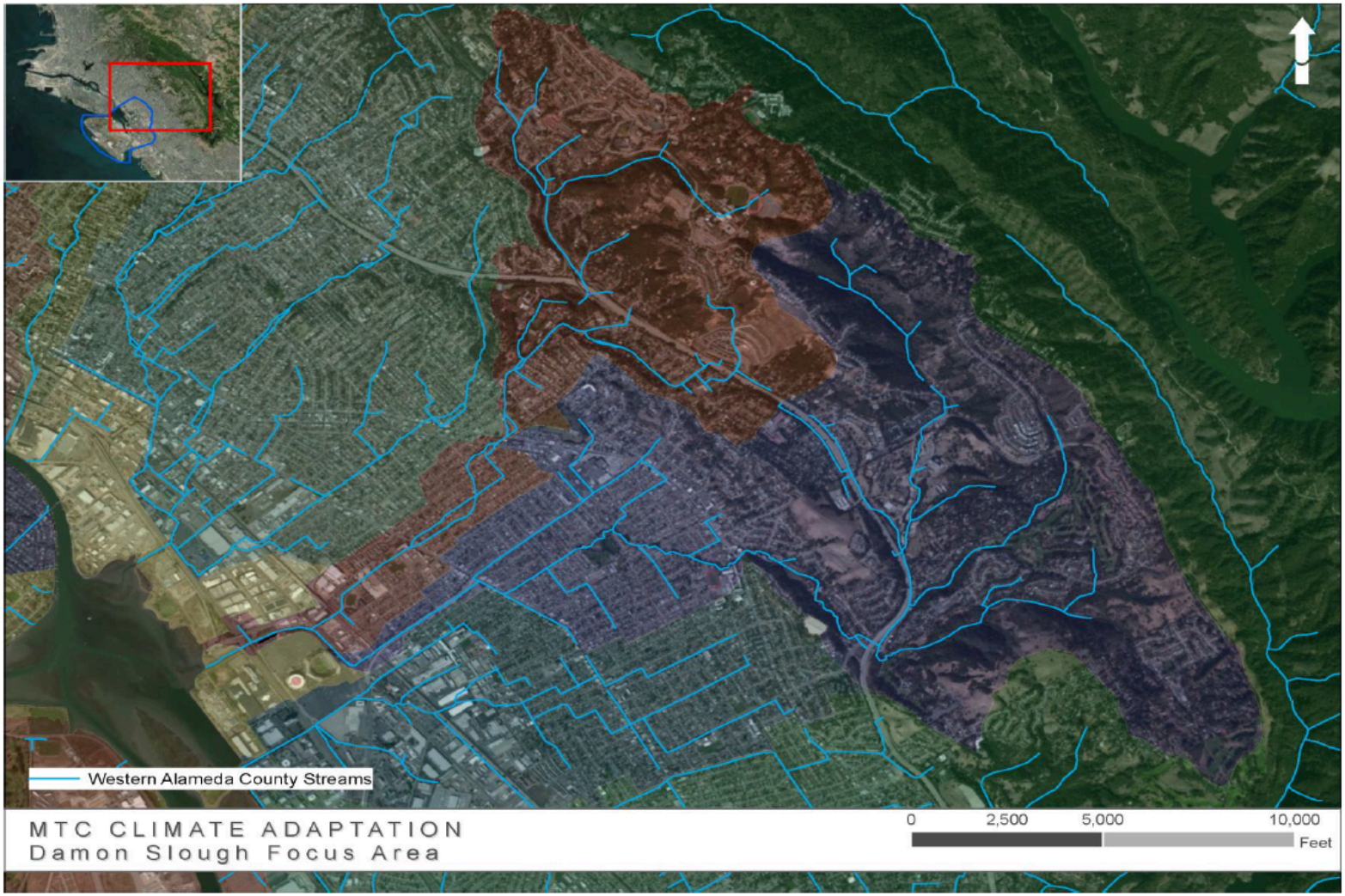
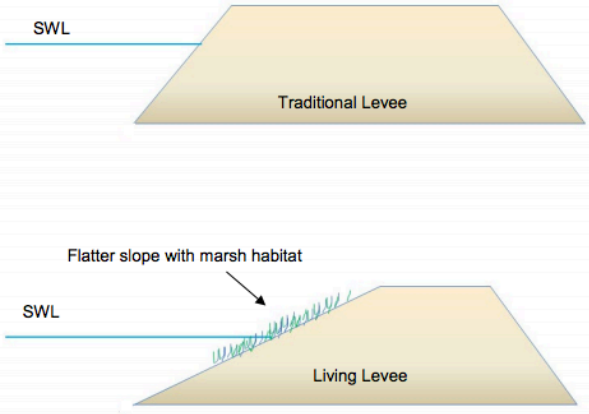


Figure 2 – Watershed Map for Oakland Coliseum Focus Area[3]

Coliseum Area Options

Figure 6-5: The layout and footprint of the living levee (brown) and the section where seawall might be necessary due to space limitations

Figure 6-4: Conceptual diagrams of a traditional levee (top) and living levee (bottom)



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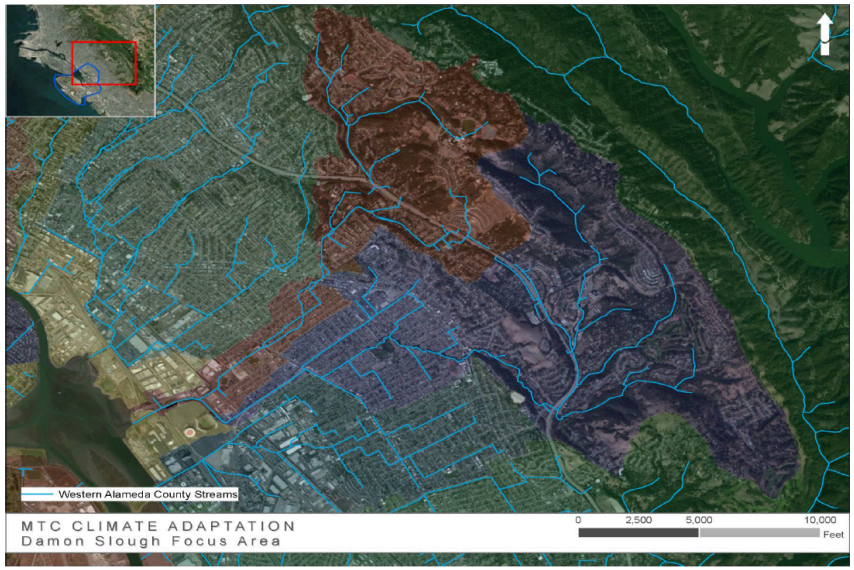

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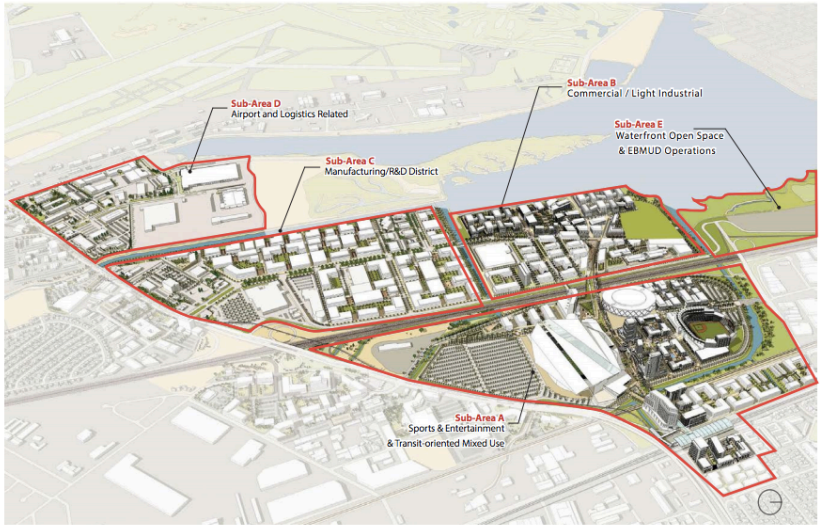

Figure 1.2: Coliseum Area Specific Plan Conceptual Buildout
Source: JRDV / City of Oakland

November Evaluation Criteria Meeting

- Information gaps about the potential for watershed storage
- This area may need innovative flood storage methods
- No current developer for the Coliseum area
- Desire to do green infrastructure projects but little clarity on what that could look like here
- Uncertain about rail and road connections to regional network

Implementation Discussion

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ART Outreach and Engagement

Communication is a critical component of the ART Program and local outreach is generally led or framed by working group members and agencies who know local audiences

Alameda County: Presented to boards, committees, commissions and developed material for use by cities, the county and agencies and organizations to communicate the findings and outcomes of the project

Regional Public Engagement:
San Rafael Art Walk, radio, print and television interviews, King Tides Initiative, workshops in Solano and Napa Counties, BCDC Commissioner workshops, San Mateo and Marin public meetings.

Hayward Shoreline Resilience Study:
Presented to the Chamber of Commerce, participated in the Hayward Area Shoreline Planning Agency decision to continue its JPA, input on the East Bay Dischargers Authority project determining options for future operations, participated in public engagement through "Sharks in my Backyard" and EBRPD events

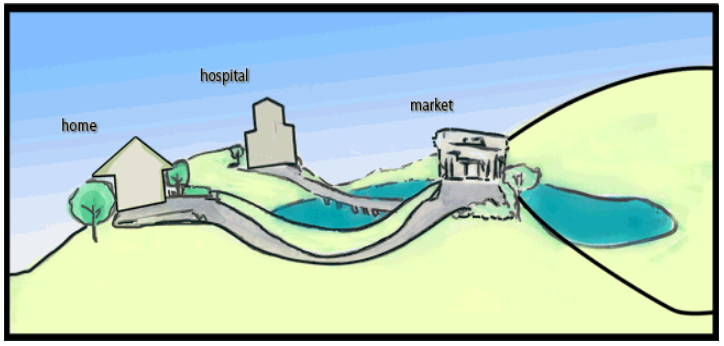
ART Outreach and Engagement

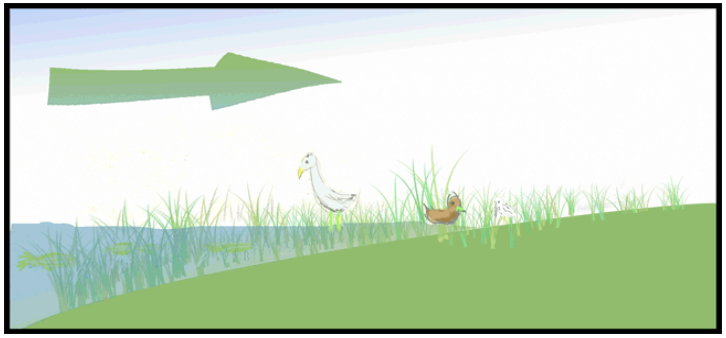
Oakland/Alameda Resilience Study So Far:

- Presentations to City of Oakland Mayor's Office, Planning and Sustainability staff
- Presentations to the City of Alameda Planning, Public Works and other department staff
- Participation in the City of Oakland's Resilient Oakland initiative and presentations to community members, community groups, stakeholders and others
- Working sessions with the Port of Oakland staff
- Field trips with working group members to assist with a better understanding of the issues
- Development of material that to be used by the cities and agencies to communicate the project to their constituents

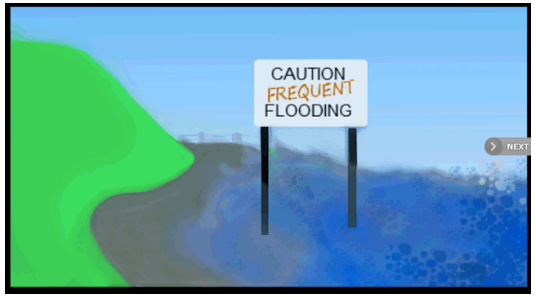
ART Outreach and Engagement

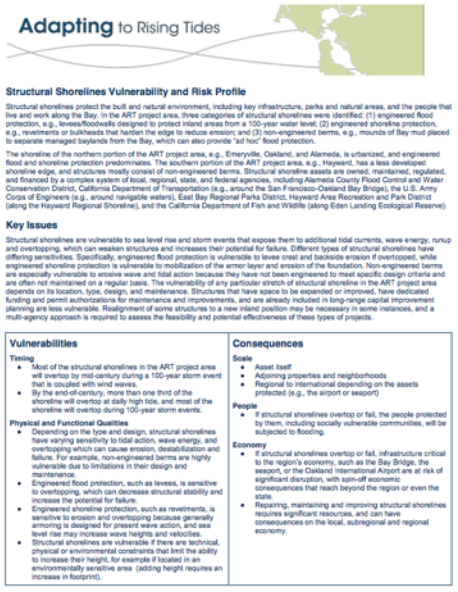
- Clear description or story of the project and its findings
- Summary presentations
- Handouts on key issues or topics
- Graphics and slides for partner presentations
- Concise summaries of assessment findings
- Assistance developing customized communication materials or making presentations to working group member agencies, organizations or the public





ART Outreach and Engagement Materials





Adapting to Rising Tides

Structural Shorelines Vulnerability and Risk Profile

Structural shorelines protect the built and natural environment, including key infrastructure, parks and natural areas, and the people that live and work along the Bay. In the ART project area, three categories of structural shorelines were identified: (1) engineered flood protection, e.g., levees/floodwalls designed to protect inland areas from a 100-year water level; (2) engineered shoreline protection, e.g., revetments or bulkheads that harden the edge to reduce erosion; and (3) non-engineered berms, e.g., mounds of Bay mud placed to separate managed baylands from the Bay, which can also provide "ad hoc" flood protection.

The shoreline of the northern portion of the ART project area, e.g., Emeryville, Oakland, and Alameda, is urbanized, and engineered flood and shoreline protection predominates. The southern portion of the ART project area, e.g., Hayward, has a less developed shoreline edge, and structures mostly consist of non-engineered berms. Structural shoreline assets are owned, maintained, regulated, and financed by a complex system of local, regional, state, and federal agencies, including Alameda County Flood Control and Water Conservation District, California Department of Transportation (e.g., around the San Francisco–Oakland Bay Bridge), the U.S. Army Corps of Engineers (e.g., around navigable waters), East Bay Regional Parks District, Hayward Area Recreation and Park District (along the Hayward Regional Shoreline), and the California Department of Fish and Wildlife (along Eden Landing Ecological Reserve).

Key Issues

Structural shorelines are vulnerable to sea level rise and storm events that expose them to additional tidal currents, wave energy, runup and overtopping, which can weaken structures and increases their potential for failure. Different types of structural shorelines have differing sensitivities. Specifically, engineered flood protection is vulnerable to levee crest and backside erosion if overtopped, while engineered shoreline protection is vulnerable to mobilization of the armor layer and erosion of the foundation. Non-engineered berms are especially vulnerable to erosive wave and tidal action because they have not been engineered to meet specific design criteria and are often not maintained on a regular basis. The vulnerability of any particular stretch of structural shoreline in the ART project area depends on its location, type, design, and maintenance. Structures that have space to be expanded or improved, have dedicated funding and permit authorizations for maintenance and improvements, and are already included in long-range capital improvement planning are less vulnerable. Realignment of some structures to a new inland position may be necessary in some instances, and a multi-agency approach is required to assess the feasibility and potential effectiveness of these types of projects.

Vulnerabilities

Timing

- Most of the structural shorelines in the ART project area will overtop by mid-century during a 100-year storm event that is coupled with wind waves.
- By the end-of-century, more than one third of the shoreline will overtop at daily high tide, and most of the shoreline will overtop during 100-year storm events.

Physical and Functional Qualities

- Depending on the type and design, structural shorelines have varying sensitivity to tidal action, wave energy, and overtopping which can cause erosion, destabilization and failure. For example, non-engineered berms are highly vulnerable due to limitations in their design and maintenance.
- Engineered flood protection, such as levees, is sensitive to overtopping, which can decrease structural stability and increase the potential for failure.
- Engineered shoreline protection, such as revetments, is sensitive to erosion and overtopping because generally armoring is designed for present wave action, and sea level rise may increase wave heights and velocities.
- Structural shorelines are vulnerable if there are technical, physical or environmental constraints that limit the ability to increase their height, for example if located in an environmentally sensitive area (adding height requires an increase in footprint).

Consequences

Scale

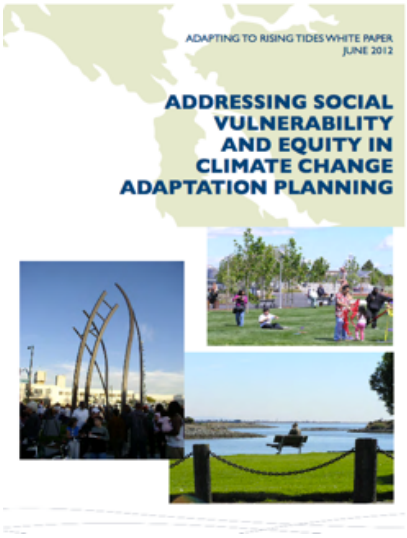
- Asset itself
- Adjoining properties and neighborhoods
- Regional to international depending on the assets protected (e.g., the airport or seaport)

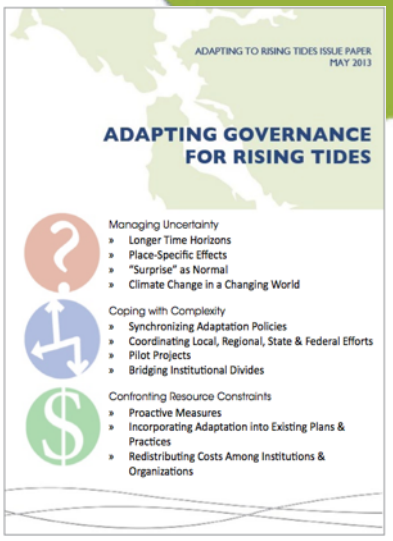
People

- If structural shorelines overtop or fail, the people protected by them, including socially vulnerable communities, will be subjected to flooding.

Economy

- If structural shorelines overtop or fail, infrastructure critical to the region's economy, such as the Bay Bridge, the seaport, or the Oakland International Airport are at risk of significant disruption, with spin-off economic consequences that reach beyond the region or even the state.
- Repairing, maintaining and improving structural shorelines requires significant resources, and can have consequences on the local, subregional and regional economy.





Transportation Adaptation Response — **Adapting to Rising Tides**

Functional Vulnerability

Vulnerability T6: The temporary disruption or permanent loss of public transportation assets due to sea level rise and storm events, and the lack of sufficient alternatives, could leave residents in some communities unable to travel on a day-to-day basis, compounding evacuation challenges during an emergency.

Action Number	Action	Action Type	Process	Possible Actors	Action Characterization
T6.1	Identify at-risk public transportation assets that serve transit-dependent populations	Evaluation	Long-range Planning, Operations, New Initiative	MTC, Caltrans, BART, AC Transit, County, Cities, CMA, CCJPA, UP, WETA, County Health, CBOs	Unlocking, Local, Regional
T6.2	Proactively protect public transportation assets that serve transit-dependent populations, or prioritize development of alternative transit options to serve these populations	Program/ operation	Capital Planning, Operations, Codes and Standards, Project Planning and Design	MTC, Caltrans, BART, AC Transit, County, Cities, CMA, CCJPA, UP, WETA, County Health, CBOs	Dependent, Local, Regional
T6.3	Include strategies that ensure the safe evacuation of transit-dependent populations in emergency response plans, e.g., designate evacuation routes and bus assignments, coordinate with local school bus fleets, transportation service providers, and wheelchair accessible vehicles to expand the pool of available vehicles for evacuation	Program/ operation	Emergency and Hazard Planning	ABAG, MTC, Caltrans, BART, AC Transit, County, Cities, CMA, CCJPA, UP, WETA, County Health, CBOs, CalEMA	Multi-benefit, Local, Regional

Adapting to Rising Tides

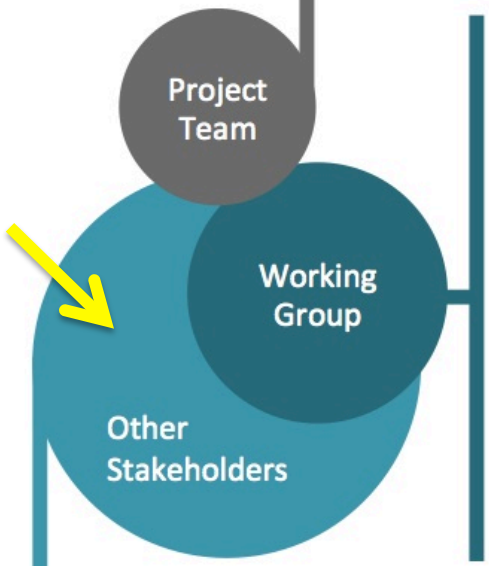
Vulnerability & Risk Assessment Report

September, 2012

SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION
50 California Street, Suite 2600 San Francisco, CA 94111
Information: (415) 352-3600 Fax: (415) 352-3606
Web site: http://www.bcdc.ca.gov

ART Outreach

The team that leads and manages the project, engages the stakeholder working group, and completes work products including the assessment and development of adaptation responses for the project.



Stakeholders from public, non-profit and private sectors, community members and issue experts representing the relevant expertise, local knowledge, regulatory oversight and asset management for the project area and assets.

Working group stakeholders actively participate in the project, attend project meetings, and work with the project team to provide data and information, local knowledge and best professional judgment for the assets, communities and services that they manage and represent in the project area.

The working group also coordinates and communicates about the project with their stakeholders – both internal and external to their organizations – to bring additional expertise, perspectives and concerns to the project.

A wide range of organizations and individuals that have interests and perspectives that are related to the project scope, follow the progress of the project, provide feedback on draft materials, and comment on project components and outcome, but are not responsible for providing data and information. These stakeholders are not participating actively in the project.

Outreach Recommendations

- Establish communication goals and the focus of outreach and engagement (e.g., the assessment, a subset of strategies, the role of community or agency)
- Define the audiences that need to be reached to achieve communication goals
- Determine and identify any concerns regarding communication with different audiences and ensure the outreach is appropriate for the audience
- Identify partners to assist with communication (e.g. community groups, elected officials, business community)

Communications Strategy

- Final products added to ART Portfolio
- Public meetings in study area (in progress)
- Data and information for local processes
- Communicating findings at the regional and state level
- Other local and regional venues?
- Working group volunteers to invite and/or present?

Ongoing Coordination and Support

We aren't leaving! We will still participate in and support local and regional efforts in the study area.

- Resilient Oakland
- Oakland Hazard Mitigation Plan Update and Recovery Plan
- Alameda Hazard Mitigation Plan Update
- Resilience by Design
- BCDC Workshops
- OAK FEMA Appeal
- EBRPD Bay Trail extension
- Others?

Next Steps

- Phase 2 Report-Draft in April
- Finalized profile sheets and adaptation responses
- Resilience by Design
- CHARG
- The Resilient Oakland Initiative
- Oakland LHMP Update-Tonight!

Oakland/Alameda Resilience Study

For more information:

http://www.adaptingtorisingtides.org/working-group/oakala/

Contact:

Maggie Wenger

Maggie.wenger@bcdc.ca.gov

415-352-3647