City of Millbrae
Sea Level Rise Adaptation Assessment
FMA - September 5, 2019
The City of Millbrae

- Millbrae is a transportation hub
  - Bayshore freeway
  - BART
  - Caltrain
  - SFO-Adjacent
- Population 22,000
- Six Watersheds
  - 3 Pump Stations
  - Engineered Channels
  - 21 miles of Storm Drains
  - Existing, Newly Expanded Floodplains
About the Assessment - Overview

• Millbrae Received a Sea Change San Mateo County Community Resilience Grant
  • Assess Impacts of Sea Level Rise
  • Propose Potential Mitigations
• Build on Previous Studies
  • County Vulnerability Assessment
  • Bay Shoreline Adaptation Atlas
• Communication Tool
About the Assessment - Activities

• What’s Included:
  • Bay Inundation Mapping
  • Identify Impacted Assets
  • Collaboration & Outreach
  • Identify Conceptual Mitigations

• What’s NOT Included:
  • Combined Flooding Assessment
  • Feasibility
  • Design
  • Construction
Sea Level Rise in Millbrae

• The Bay Has Risen 8 Inches Since the 1800s\(^1\)

• Future Sea Level Rise Estimates Vary

• Assessment Builds on the County’s 2018 Study\(^3\)
  • 100-year FEMA mapping +3.3 feet
  • 100-year FEMA mapping +6.6 feet

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\(^1\) As reported at San Francisco’s Fort Point Gage
\(^2\) NOAA Technical Report NOS CO-OPS 083, 2017
\(^3\) Sea Level Rise Vulnerability Assessment, 2018
What’s At Risk

- City Drainage & Pump Stations
- Businesses
- Hotels
- Water Pollution Control Plant
- City Buildings
- Electrical & Gas Infrastructure
- Homes
Millbrae Is Not An Island

• Continuous Protection from “High Ground” to “High Ground” is Needed to Prevent the Bay from Entering

• Phased Approach:
  • Local Efforts for Lower Sea Level Rise
  • Regional Solution At Higher Sea Level Rise
Local Solutions Are Approachable

- Within the City’s Control
- Manageable Costs
- Address Near-Term Flooding Pathways
- Multiple Benefits
Local Infrastructure Opportunities

• Canal Raises
• Tide Gate Fixes
• Pump Station Upgrades
• Site-Specific Improvements
• Upper Watershed Retention
Local Non-Structural Opportunities

- Planning to Better Understand Risks and Responses
  - Storm Drain Master Plan
  - Hazard Mitigation Planning
  - Climate Action Plan
- Stricter Development Standards to Elevate and Protect Structures
Community Engagement

- Public Meetings
- New Webpage
- Online Survey
An Opportunity for Regional Consensus Building

- What Is At Stake?
  - Local Assets
  - Regional Assets
  - Economic Impacts are Far-Reaching

- What Should We Plan For?
  - How Far Will Sea Levels Rise?
  - When Do We Need to Have Each Piece In Place?

- How Should We Respond?
  - Communicating with Stakeholders and the Public
  - Positioning as a Team for Future Funding
Shoreline Protection Opportunities

• Millbrae Doesn’t Own Much Shoreline

• Shoreline Options
  • Levees
  • Sea walls
  • Rocky/Shell Shoreline Creation
  • Ecotone Levees/Wetlands
Shoreline Protection – Consensus Approach

• Plan for the Same Future
• Identify Practical Reaches
• Coordinate Ownership, Responsibility and Funding
• Listen
Discussion of Solutions – Shoreline Protection

• Levees – Some Pros:
  • Allow Access
  • Can Add Height Later to Phase

• Levees – Some Cons:
  • Requires Space to Construct
  • Can Block Shoreline Vistas
Discussion of Solutions – Shoreline Protection

• Floodwall/Sheet Piling – Some Pros:
  • Less Land Required to Construct
  • Possibly Align Along Old Bayshore

• Floodwall/Sheet Piling – Some Cons:
  • Can Block Shoreline Access/Views
  • May Be More Expensive Near Term

<table>
<thead>
<tr>
<th>Height Increase</th>
<th>Conventional Earthen Levee ($/linear ft)</th>
<th>Lightweight Fill Earthen Levee ($/linear ft)</th>
<th>Structural Floodwall ($/linear ft)</th>
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<tbody>
<tr>
<td>1 foot</td>
<td>$700</td>
<td>$1,200</td>
<td>$500</td>
</tr>
<tr>
<td>2 feet</td>
<td>$1,200</td>
<td>$1,700</td>
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<tr>
<td>3 feet</td>
<td>$1,800</td>
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<td>4 feet</td>
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<tr>
<td>5 feet</td>
<td>$2,700</td>
<td>$2,900</td>
<td>$2,700</td>
</tr>
</tbody>
</table>

Discussion of Solutions – Shoreline Protection

• Rocky/Shell Shoreline – Some Pros:
  • Ecological Value
  • Recreational Opportunities
  • Dissipate Wave Energy

• Rocky/Shell Shoreline – Some Cons:
  • Require Bay Fill & Permitting
  • May Encourage Birds, Putting Planes At Risk
Discussion of Solutions – Shoreline Protection

• Ecotone Levees/Marsh Land – Some Pros:
  • Recreational Benefits
  • Ecological Benefits
  • Maintain Viewscapes

• Ecotone Levees/Marsh Land – Some Cons:
  • Significant Risk of Impacts to SFO
  • Significant Fill or Easements Required
  • Cost
Next Steps For Millbrae

- Finalize Assessment
- Continue Collaboration
- Develop Priorities
- Integrate Findings Into Local and Regional Plans
- Identify Funding Opportunities
- Build for a Safer Future!
Closing Thoughts

- Local and Regional Approaches Can Progress Concurrently
- Projects Offer Multiple Benefits
- Bringing our Stakeholders Together Early Flagged Critical Issues
- Public Support is Needed for Future Investments
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