Bolinas Lagoon North End Restoration Project

Phases 1 & 2: Site Conditions and Conceptual Designs

State of the Lagoon
March 30, 2017
AECOM, Watershed Sciences, Carmen Ecological Consulting, Peter Baye Consulting
Overview of the Project

• Characterize environmental conditions of:
  – uplands, streams, roads, fringing marsh, & lagoon habitats
• Identify issues and concerns
  – Flooding (expected to worsen with sea-level rise (SLR))
  – Degraded stream corridors and riparian areas
  – Roadway safety
• Conceptual design solutions

Consideration of restoration, land use and ownership, cost, reducing flooding, climate resiliency, and safety
Overview of Goals

- Rehabilitate/enhance stream and riparian corridor habitat and connection with the lagoon
- Improve road safety and reduce flooding
- Adapt to Sea Level Rise

Goals are interconnected
Climate Change and Sea Level Rise Adaptation

• Sea level rise scenarios consistent with County’s approach (NAVD88)
  – Mean Higher-High Water (MHHW) Current: 5.6 Ft
  – Mid-Century Sea Level Rise (MHHW + 3 Ft): 8.6 Ft
  – End-of-Century Sea Level Rise (MHHW + 5.5 Ft): 11.1 Ft

• Design Elevations are even greater (15.5+ Ft)
  – Includes SLR, SWEL (Stillwater Elevation: astronomical tide + storm surge + freshwater discharge), & freeboard
Phase 1: Existing Conditions Report

- Report comprised of field, desktop, and literature surveys
  - Topics:
    - Stream Hydrology/Geomorphology
    - Vegetation and Wildlife
    - Cultural Resources
    - Traffic, Infrastructure, and Safety
    - Regulatory Environment
    - Sea Level Rise
    - Additional Data Needs

Phase 2: Conceptual Design Alternatives

- Conceptual Design Alternatives Development
  - Results of Phase 1 Site Conditions Report
  - Partner input (BLAC, stakeholders, public)
  - Technical expertise

- Final Report
  - 3 Alternatives + phasing
  - Opportunities & constraints analysis
  - Cost estimates

- Geotechnical boring report and piezometer installation
  - Subsurface engineering analysis - road stability & groundwater

- Landscape architecture renders
Potential Roadway Modifications

Types of changes:

• Bridges and Causeways (viaduct-like structures)
• Raised roadway on fill/embankments with culverts
• Retaining walls
• Roadway relocation

Baseline understanding:

• Different roadway changes *enable* different restoration options
• Removal of Crossover Road will increase safety and won’t increase traffic congestion
Commonalities among Alternatives

• **Roadways:**
  – Removing Crossover Road
  – Reconfiguring “the Wye”
  – Raising Hwy 1, Olema Bolinas Road and Fairfax-Bolinas Road
  – Upgrading culverts at Fairfax-Bolinas Road and Olema Bolinas Road

• **Upgrading Lewis Gulch Creek Culverts/Bridges:**
  – Hwy 1 north of Wilkins Ranch
  – Olema Bolinas Road

• **Restoration (rehabilitate & enhance):**
  – Wilkins Gulch Creek & Lewis Gulch Creek
  – Vegetated shoreline/soft erosion protection
  – Improving habitat for wildlife and plants
  – Preservation of Wilkins Ranch viewshed
Alternative 1

• Rehabilitate/enhance the connection of Wilkins Gulch Creek to the floodplain *downstream* of Wilkins Ranch
• Minimal grading necessary to remove barriers to flow
• Highway 1 would be elevated onto a causeway in two sections
• Lewis Gulch Creek restoration and bridge/culvert upgrades
  *(same as all alternatives)*
Alternative 2

- Reconnect Wilkins Gulch Creek to *upstream end* of former surface of alluvial fan & allow the stream to:
  - Develop new or reoccupy relict channel(s) to the lagoon
  - Using plug-and-pond technique (habitat and cost)
- Highway 1 would be elevated onto a causeway in two sections
Alternative 3

• Reconnect Wilkins Gulch Creek to *upstream end* of former surface of alluvial fan & allow the stream to:
  – Develop new or reoccupy relict channel(s) to the lagoon
  – Using plug-and-pond technique (habitat and cost)
• Highway 1 elevated on a single-span causeway over Wilkins Gulch and Salt creeks
• Fairfax Bolinas Road elevated on causeway and fill
## Alternatives Summary Table

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Floodplain Connectivity</th>
<th>Roadway Raising</th>
<th>Reconfigure Wye</th>
<th>Vegetated Shoreline Resilience</th>
<th>Lewis Gulch Creek Culvert Upgrade</th>
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Culverts and fill

Culverts under roadway and through wall

Typical Sections for Hwy 1 or Olema-Bolinas Rd
Reconfigured Wye Intersection
Olema-Bolinas Road

Bolinas Lagoon North End Restoration Project

Olema-Bolinas Road Conceptual Design Alternatives
Vegetated Shoreline Protection

- Ecologically-based approach
- Reduces reliance on hard-engineered approaches
- Wave attenuation and wave runup height reduction during extreme high winter tides and onshore winds
In Summary

• Alternatives developed by technical experts
• Input & review by BLAC, public, and partner agencies
  – GFNMS, PRNS, GGNRA, County DPW, Caltrans
• Initial phases of long-term project underway
  – Safety components in Phase 1
• The project is:
  – Good for people and wildlife;
  – Aims to safeguard the community;
  – Aims to adapt landscape/habitat to SLR; and
  – An excellent example of local community action
The North End Project 2017 and Beyond

Spring 2017
- State of Lagoon
- BLAC
- Board of Supervisors

Fall 2017
- Begin Phase 1 CEQA
- Construction Designs

2021
- Construction of Phase 1

2022
- Phase II
Next Steps

• Please Fill out comment cards
• Questions or comments? Contact:
  Veronica Pearson, Project Manager, Marin County Parks
  415-473-5086
  vpearson@marincounty.org
  Website: http://www.marincountyparks.org/depts/pk/our-work/os-main-projects/north-end-project

• Our team of experts is in the back to answer your questions
• Several more opportunities to discuss this project as we go to the BLAC, Board of Supervisors, and begin CEQA
• Final Opportunities and Constraints Report
Discussion / Q & A

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