Why Stabilize the Bluff?

April 29, 2014
Prior Conditions

• Bluff failure

• Erosion causing severe undermining of sidewalks impacting public access

• Public safety hazard from potential collapse above and below bluff

• Dying and sparse vegetation

• Future seismic activity may hasten slumping and bluff recession
Prior Conditions
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Geotechnical Studies

- 2000 Final - Plan of Development Bluff Erosion & Enhancement Project
- 2000 and Revised 2003 Preliminary Geotechnical Investigation Proposed Belmont Shore Bluff Restoration
- 2009 Draft Possible Slope Improvement Options for Project Cost Estimating
- 2010 Geotechnical Study Proposed Slope Improvements
Community Consultations

- Historical Society of Long Beach
- Long Beach Museum of Art
- Alamitos Beach Association
- Bluff Park Association
- Model Plane Glider Group
- Bluff Park Front Runners
- Bixby Park Users
- Feral Cats Protectors
- Surfrider Foundation
The “Plan of Development – Bluff Erosion and Enhancement Project” focuses on the areas adjacent to and including the bluff and beach areas from Alamitos Avenue to 36th Place. The Project is bordered by the downtown Long Beach Marina to the west and the Belmont Pier to the east. The area is delineated in Figure 9.

Figure 9. Bluff Erosion and Enhancement Study – Project area.
Stabilization Options

• Re-grading

• New Vegetation
  - Irrigation
  - Drainage
  - Netting

• Slope Reinforcement
  - Retaining Walls
  - Gabions (No Longer Recommended)
  - Soil Nailing
  - Shotcrete
Non-Soil Nailing Examples

5th Place

12th Place
Options Evaluated for Bluff Park

Fill into the Beach
Options Evaluated for Bluff Park

Cutting the Park Back
Adopted Solution

- Soil Nails
- Shotcrete
- Landscaping
## Council Action

<table>
<thead>
<tr>
<th>Date</th>
<th>Action Description</th>
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<tbody>
<tr>
<td>Sept. 4, 2007</td>
<td>Specs Adopted for 12th Place Erosion Control</td>
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<tr>
<td>Nov. 16, 2010</td>
<td>Specs Adopted for Phase 1 of Bluff Erosion and Enhancement Project (Redondo Ave. to 36th Place)</td>
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<tr>
<td>Dec. 14, 2010</td>
<td>Specs Adopted for 5th Place and 7th Place Erosion Control</td>
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<tr>
<td>Jul. 9, 2013</td>
<td>Specs Adopted for Phase 2 of Bluff Erosion and Enhancement Project (20th Place to Redondo Ave.)</td>
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Bluff Park Area

20th Pl.

Orizaba Ave.

Redondo Ave.

36th Pl.
Phase 1

- Redondo Ave. to 36th Pl.
- Council approval November 16, 2010
- Work begins December 2010
- Work completed December 2011
- Irrigation and landscaping determined to be inadequate
Phase 1

Prior Condition
Phase 1

Shotcrete Application
Phase 1

Shotcrete Before Staining
Phase 1

Shotcrete After Staining
Phase 2

- 20\textsuperscript{th} Pl. to 36\textsuperscript{th} Pl.
- Council approval July 9, 2013
- Work begins October 21, 2013
- Major construction complete May 31, 2014
- Landscaping complete Fall/Winter 2014
Phase 2

Prior Condition
Phase 2

Soil Nailing
Phase 2

Rebar and Landscape Wells
Phase 2

Shotcrete Before Staining
Phase 2
Section 1 - Park View
Phase 2
Section 1 - Beach View
Phase 2
Section 2 - Park View
Phase 2
Section 2 - Beach View
Phase 2
Section 3 - Park View
Phase 2
Section 3 - Beach View
Bixby Park Annex (Cherry Park)

Grading, Landscaping and Pathways
Bixby Park Annex (Cherry Park)

Prior Condition

Current
Future Stabilization

- Museum of Art slope revegetation
- Gabion wall revegetation
- Rebuild historic access pathways and install new landscaping
Impacts of Delayed Construction

• Push completion into busy summer months
• Potential demobilization of contractor
• Potential re-engineering and/or new specifications
• Additional project costs
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