

# ENCINITAS AND SOLANA BEACH COASTAL STORM DAMAGE REDUCTION PROJECT

## SAN DIEGO COUNTY, CALIFORNIA



### PROJECT OVERVIEW

March 2017

The Encinitas and Solana Beach shoreline study area is located along the Pacific Ocean in the Cities of Encinitas and Solana Beach, in San Diego County, California. The shoreline has narrow beaches with coastal bluffs exposed to crashing waves, particularly during the winter storm season. As sea levels rise, the bluffs will be even more exposed to crashing waves, which carve notches into the bluffs. Bluffs affected by these notches are then prone to episodic collapse. Consequently, public facilities and residential properties on the upper bluff experience land loss and damages to the property. The bluff failures also represent a significant safety issue for those recreating on the beach. The purpose of the Project is to effectively reduce risks to public safety and economic damages associated with bluff and beach erosion along the shorelines of the Cities of Encinitas and Solana Beach. A secondary purpose is to reduce erosion and shoreline narrowing to improve recreational opportunities.



### ECONOMIC AND COST ANALYSIS

FY17 Price Level

**BCR:** 1.42 at 2.875% Discount Rate

**Average Annual Net Benefits:** \$5,536,000

**TOTAL CONSTRUCTION COST (50 YEARS):**  
\$173,805,000

**INITIAL CONSTRUCTION:** \$32,173,000  
(\$20,952,750 Fed; \$11,220,250 Non-Fed)

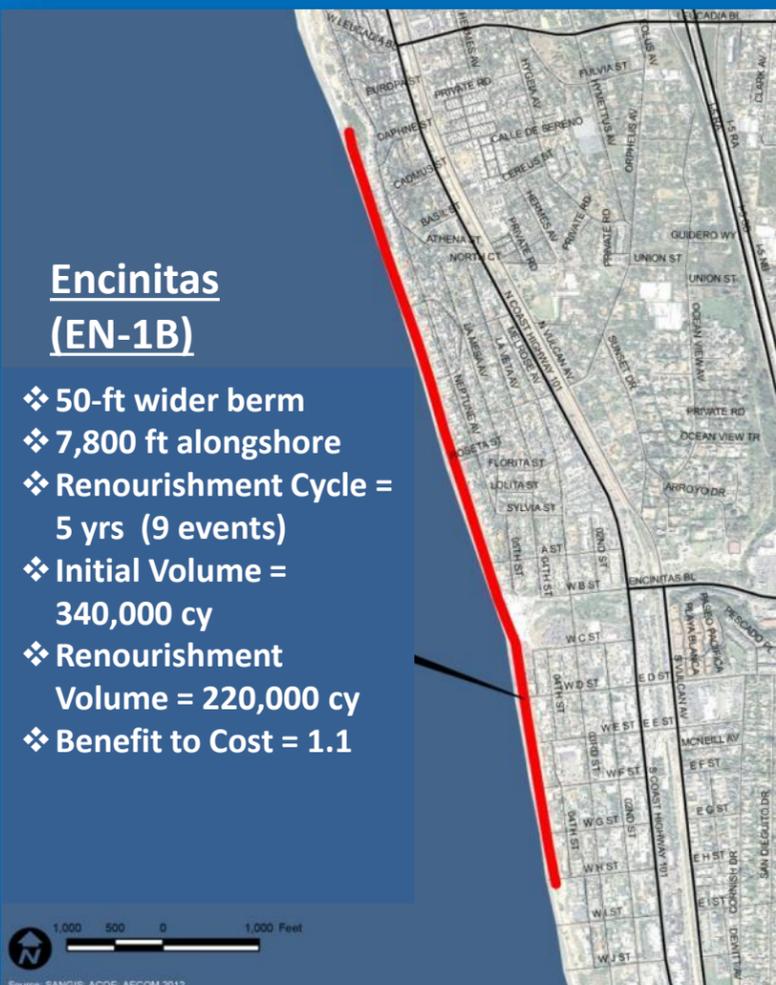
**13 RENOURISHMENTS:** \$141,570,000  
(\$70,785,000 Fed; \$70,785,000 Non-Fed)

Economic Analysis of Recommended Plan (Locally Preferred Plan)			
	Segment 1 (Encinitas)	Segment 2 (Solana Beach)	Total
Average Annual Investment Cost	\$2,240,000	\$1,648,000	\$3,888,000
OMRR&R	\$0	\$0	\$0
<b>Total Average Annual Costs</b>	<b>\$2,240,000</b>	<b>\$1,648,000</b>	<b>\$3,888,000</b>
<b>Average Annual Benefits</b>	<b>\$2,453,000</b>	<b>\$3,083,000</b>	<b>\$5,536,000</b>
<b>Net Average Annual Benefits</b>	<b>\$213,000</b>	<b>\$1,435,000</b>	<b>\$1,648,000</b>
<b>Benefit to Cost Ratio (BCR) of LPP</b>	<b>1.09</b>	<b>1.87</b>	<b>1.42</b>
<b>BCR of NED Plan</b>	<b>1.48</b>	<b>1.99</b>	<b>1.68</b>

### THE PLAN

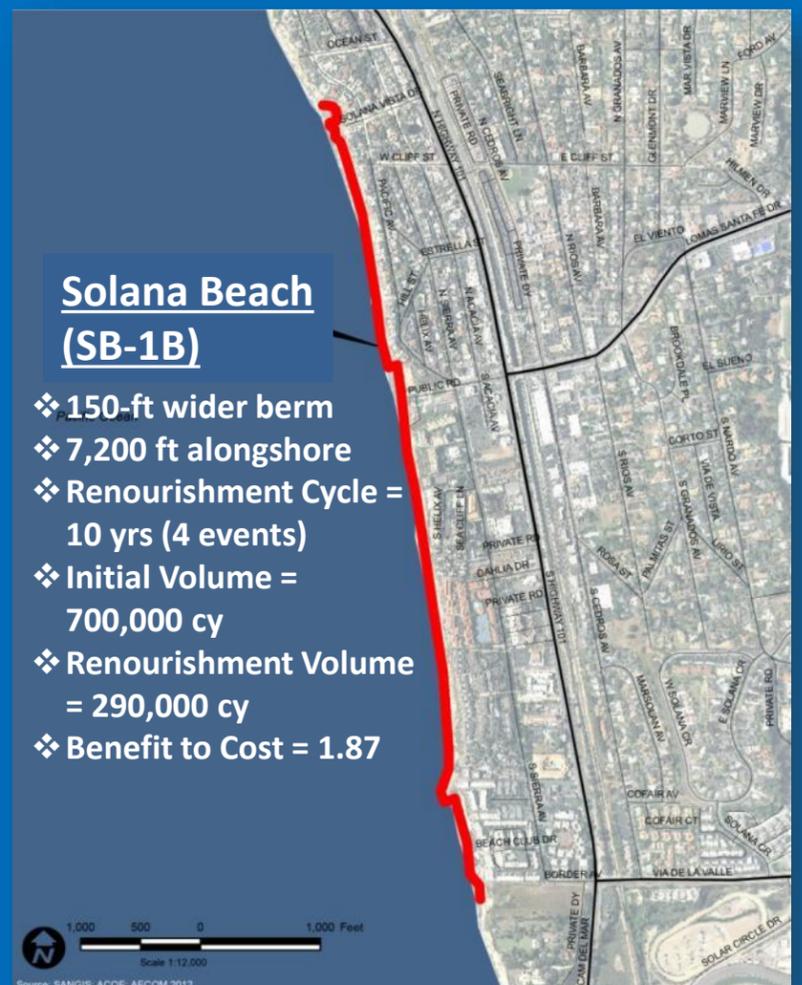
#### Encinitas (EN-1B)

- ❖ 50-ft wider berm
- ❖ 7,800 ft alongshore
- ❖ Renourishment Cycle = 5 yrs (9 events)
- ❖ Initial Volume = 340,000 cy
- ❖ Renourishment Volume = 220,000 cy
- ❖ Benefit to Cost = 1.1



#### Solana Beach (SB-1B)

- ❖ 150-ft wider berm
- ❖ 7,200 ft alongshore
- ❖ Renourishment Cycle = 10 yrs (4 events)
- ❖ Initial Volume = 700,000 cy
- ❖ Renourishment Volume = 290,000 cy
- ❖ Benefit to Cost = 1.87



# PLAN FORMULATION OVERVIEW

## PROBLEMS

### INFRASTRUCTURE

The impending threat of bluff failure has forced many private homeowners to build seawalls to protect the base of the bluff. Permits for seawalls have been granted to protect existing structures, but the Coastal Act prohibits new construction that requires protective devices for erosion control that substantially alter landforms along bluffs.

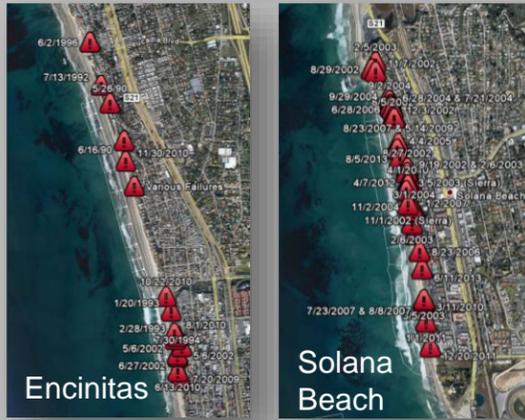


### PUBLIC SAFETY

Bluff erosion is caused by wave action against the base of the bluff undermining the bluff. Both communities have been subject to repeated bluff collapse resulting in property damage, large debris falling to the beach, and even loss of life. Since the collapses are episodic, with little or no warning, city officials have displayed signs along the beach cautioning beach-goers to stay a safe distance from the base of the bluff at all times.



Bluff Failures



### RECREATION

Beach recreational use is directly related to beach width. Not only does beach erosion decrease available "towel space" but it also cuts off access to other "pocket" beaches that are accessible only by walking along the shoreline.



## PLANNING OBJECTIVES

Reduce coastal storm damages to property and infrastructure along the study area shoreline and the bluff top, prior to the need for emergency action, throughout the 50-year period of analysis.

Improve public safety in the study area by reducing the threat of life-threatening bluff failures caused by wave action against the bluff base, throughout the 50-year period of analysis.

Reduce coastal erosion and shoreline narrowing to improve recreational opportunities for beach users within the study area throughout the 50-year period of analysis.

## NED vs LPP

ENCINITAS SEGMENT	Alternative EN -1A: Beach Nourishment (NED)	Alternative EN-1B: Beach Nourishment (LPP)
Initial Placement Volume (cy)	680,000	340,000
Added Beach MSL Width (feet)	100	50
Re-Nourishment Cycle	5-year	5-year
Net Average Annual Benefits	\$1,295,000	\$213,000
Benefit to Cost Ratio	1.48	1.09
Residual Risk	32%	62%
SOLANA BEACH SEGMENT	Alternative SB -1A: Beach Nourishment (NED)	Alternative SB-1B: Beach Nourishment (LPP)
Initial Placement Volume (cy)	960,000	700,000
Added Beach MSL Width (feet)	200	150
Re-Nourishment Cycle	13-year	10-year
Net Average Annual Benefits	\$1,775,000	\$1,435,000
Benefit to Cost Ratio	1.99	1.87
Residual Risk	45%	56%

