

Tillamook Major Maintenance

July 26, 2004



View to NE

Nehalem
Bay

Existing Project Condition

400' of submerged
North Jetty



North Jetty

Root
Erosion

Weakened North
Jetty along Root

South Jetty

730' of submerged
South Jetty



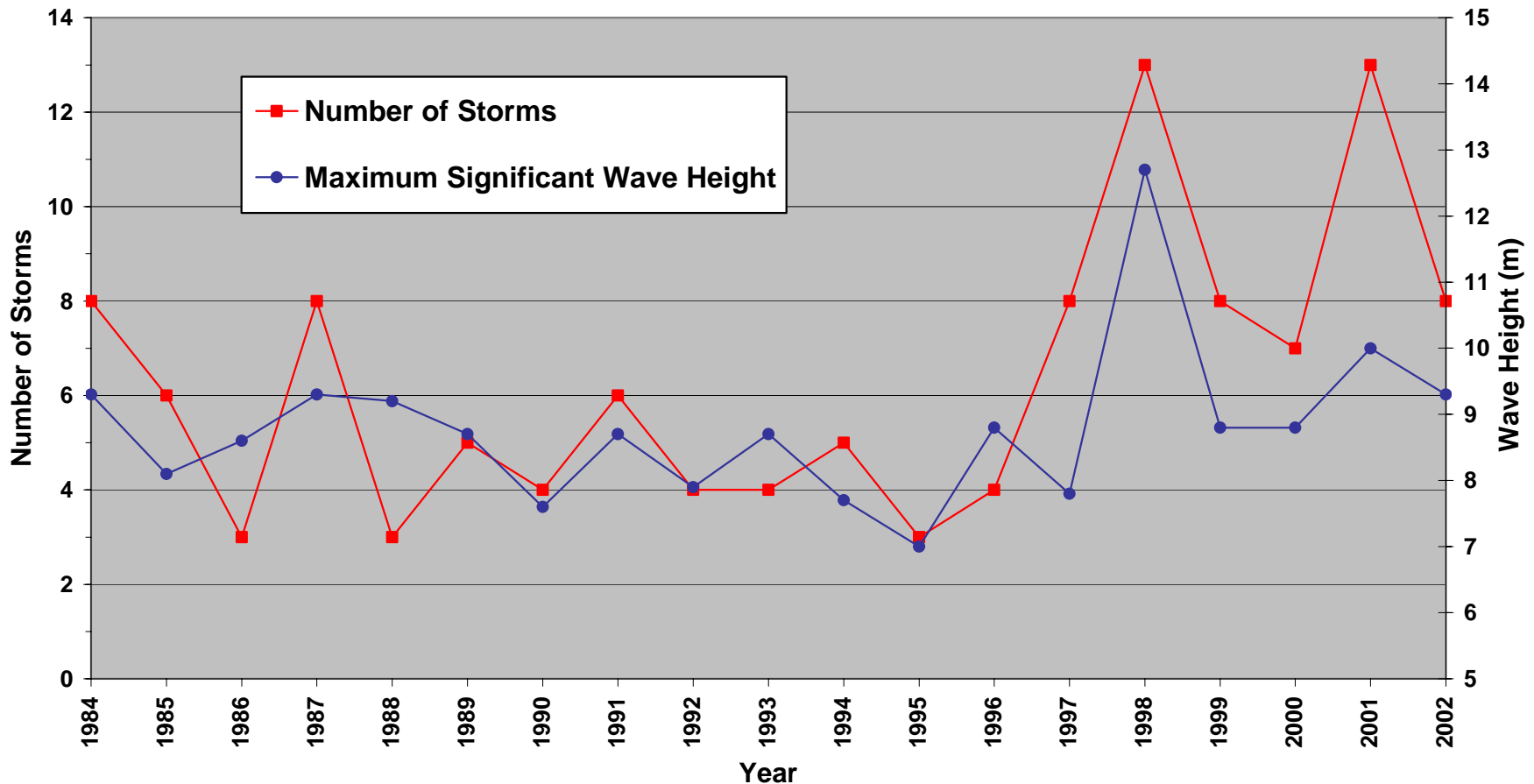
Figure 2.7.2



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Increasing Pacific Northwest Wave Climate

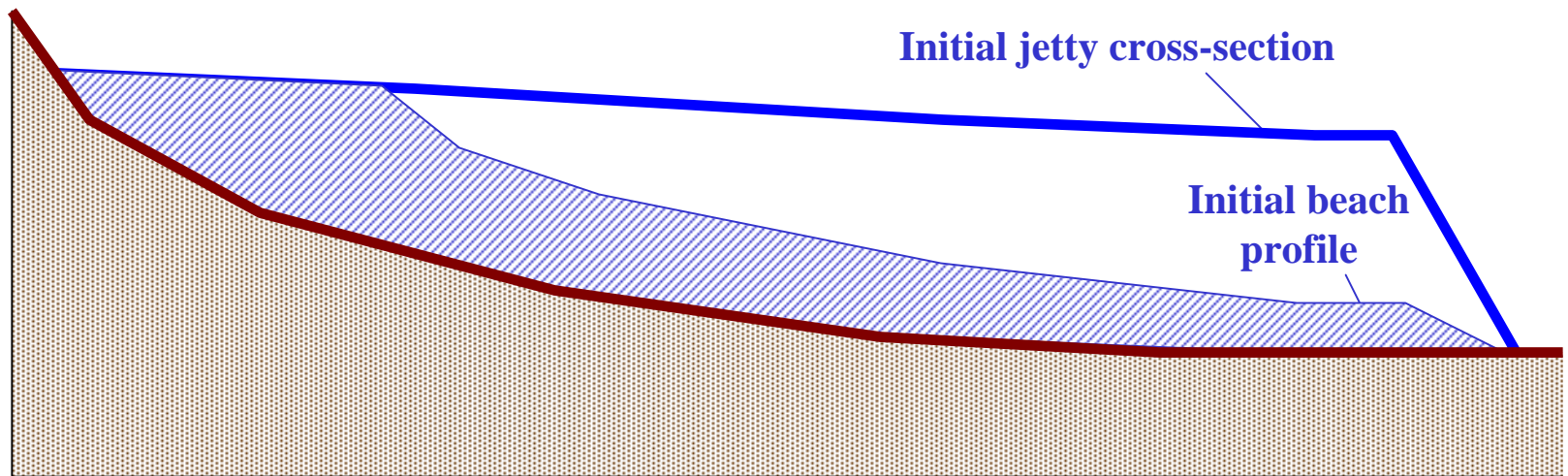
Storm Conditions at Columbia River Buoy
1984 - 2002





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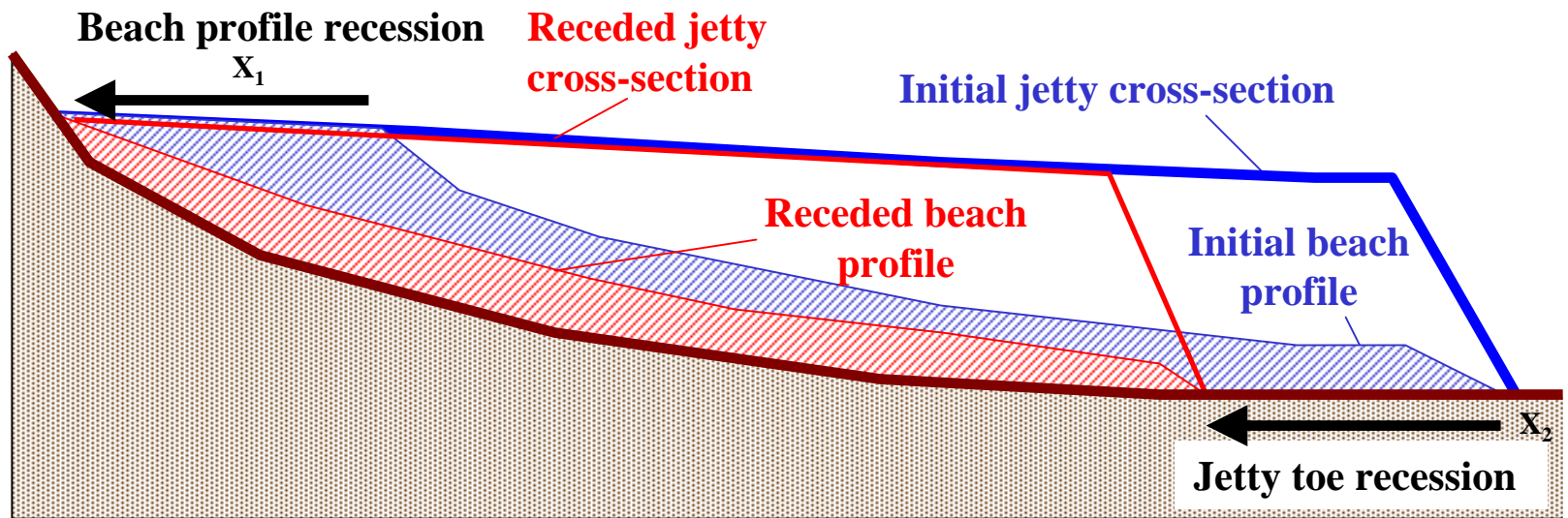
Jetty acts as a “wing-dam” to hold beach profile...





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Jetty acts as a “wing-dam” to hold beach profile...



... With jetty recession comes equal distance
beach profile recession ($X_1 = X_2$)



Last Maintained: 1918

**Last Maintained:
1965**





MAX. REV. L.

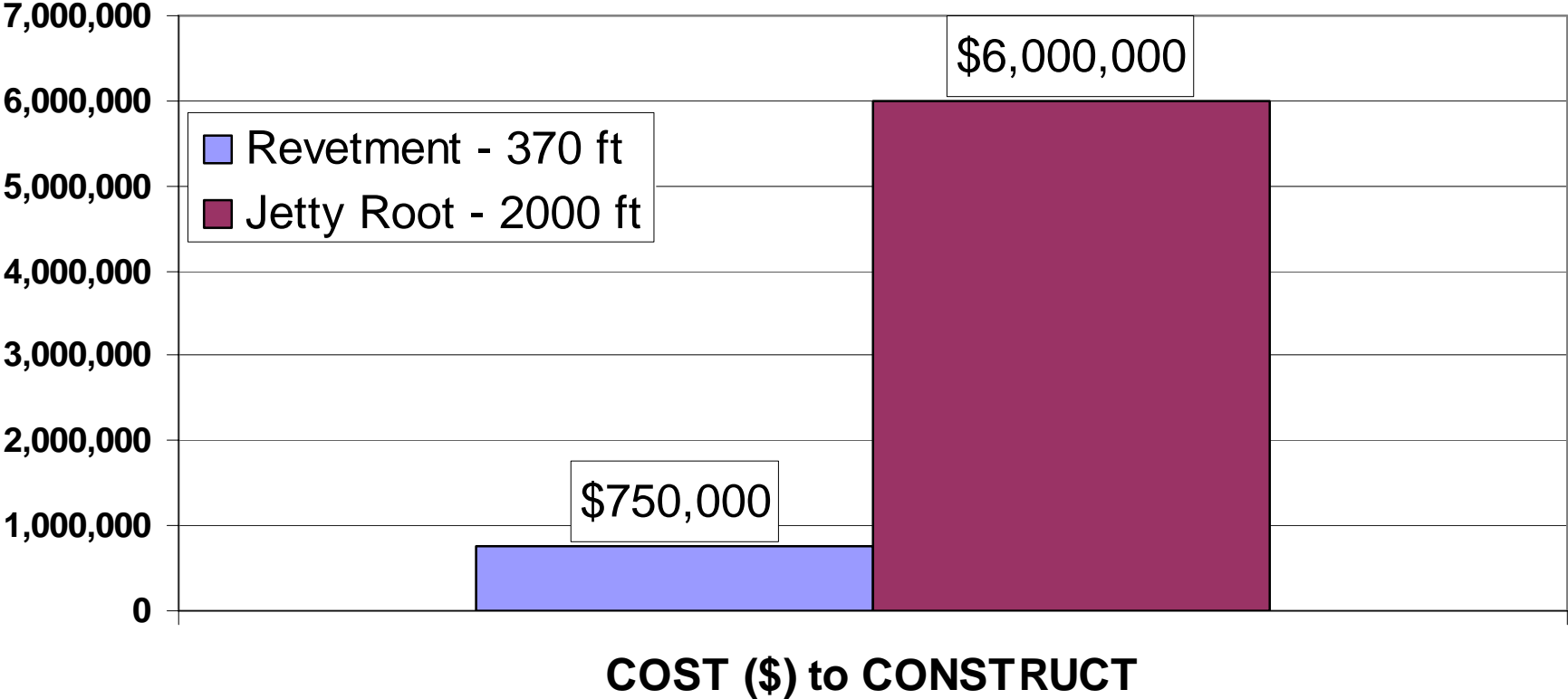
MIN. REV. L.

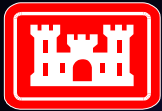
17 September 03



Investment Comparison to Protect Navigation Project

Revetment vs. Jetty Root Fix





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Jetty Root Deterioration At Coos Bay North Jetty



Prior to emergency repair,
North Jetty root was last
repaired in 1939 with a crest
elevation 9 ft lower than the
rest of the structure \Rightarrow allowed
windblown sand to erode and
move into the channel



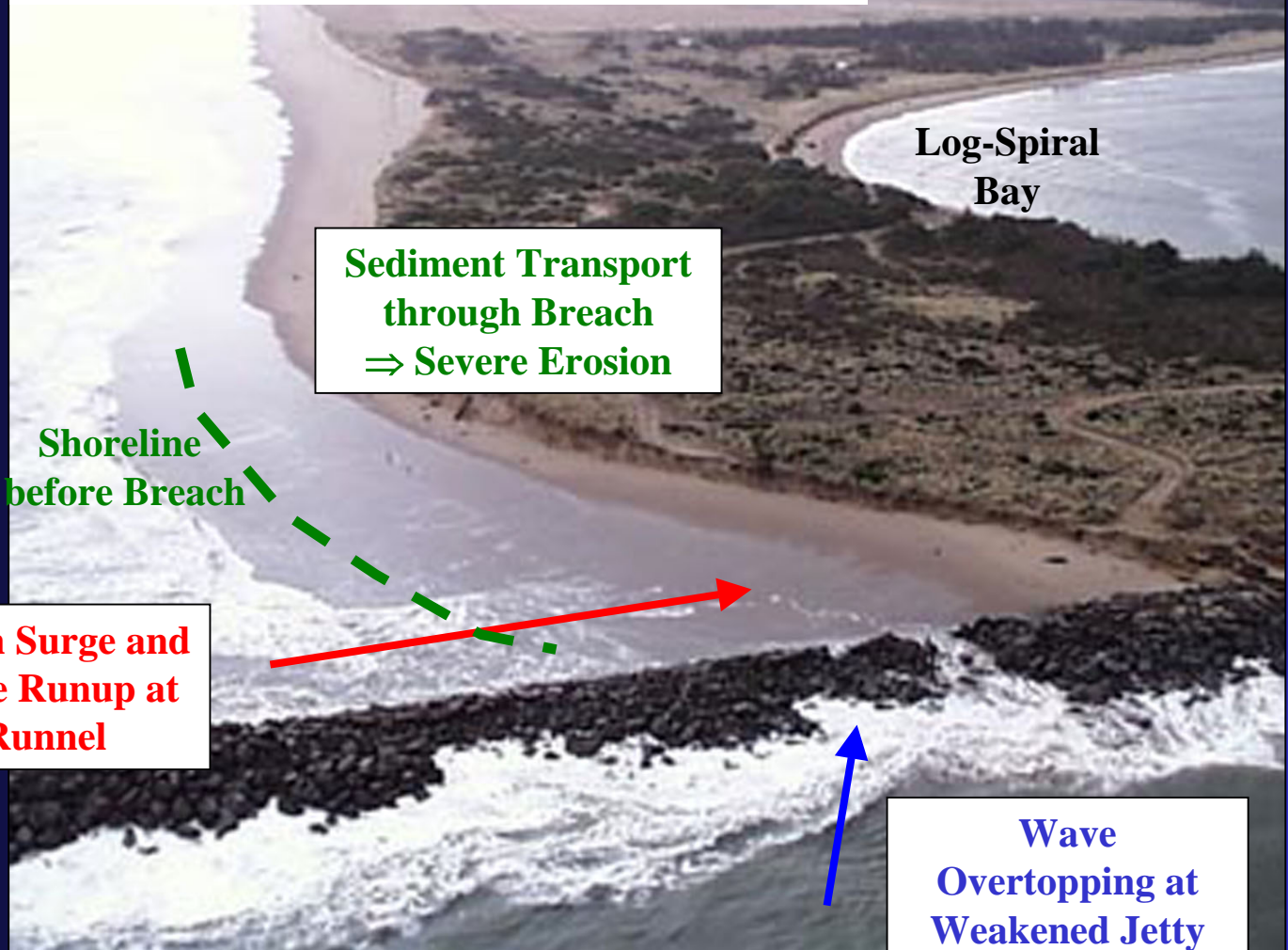
Rock used for
1939 repair was
sandstone, not
very durable
stone



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Coos Bay North Jetty Breach and Emergency Repair

November 8, 2002 North Jetty Breach



Log-Spiral
Bay

Sediment Transport
through Breach
⇒ Severe Erosion

Shoreline
before Breach

Storm Surge and
Wave Runup at
Runnel

Wave
Overtopping at
Weakened Jetty
Root



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Coos Bay North Jetty Breach and Emergency Repair



**High tide flow through jetty root
transports ~ 40,000 cubic yards
of sand into channel**

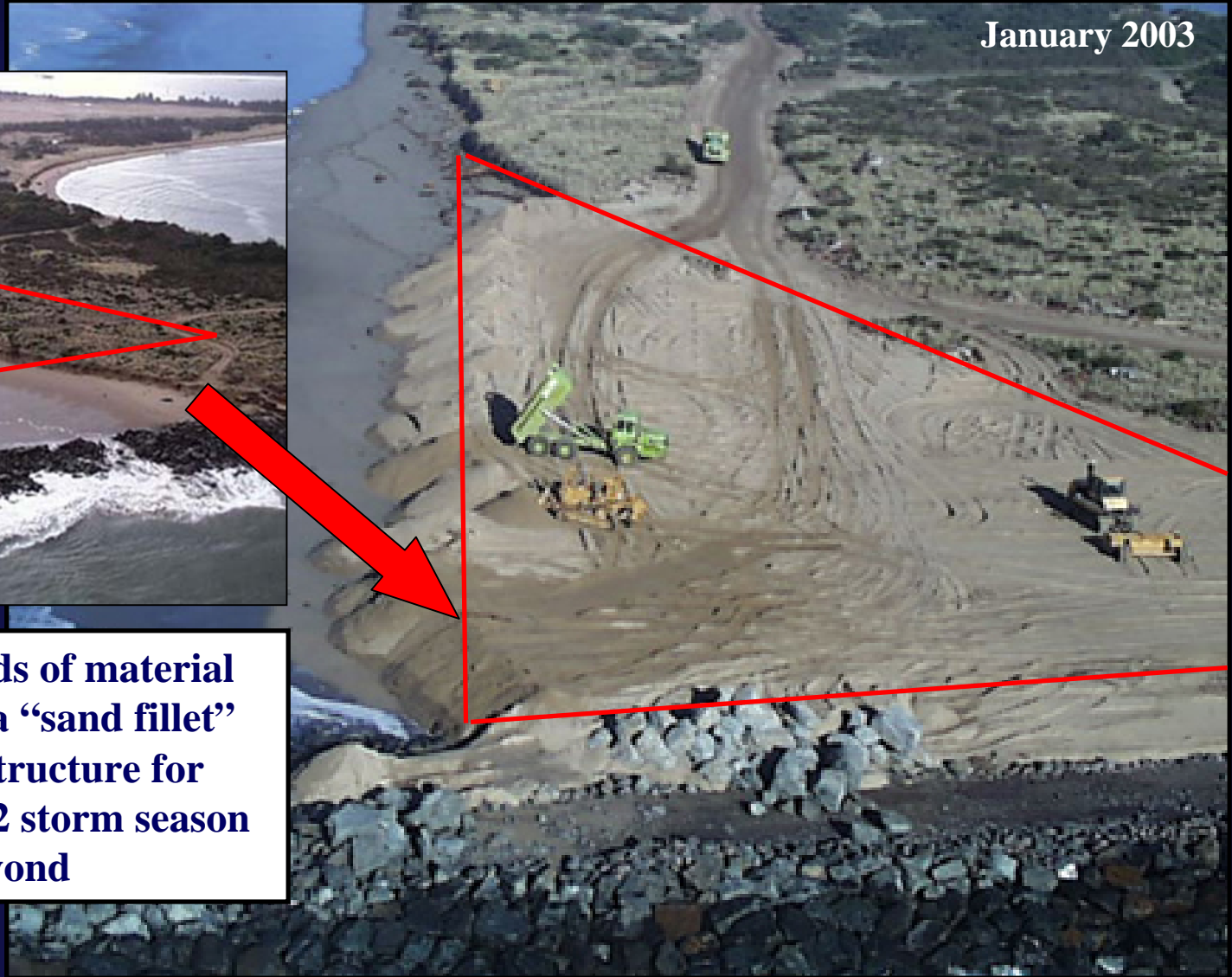


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Coos Bay North Jetty Breach and Emergency Repair

January 2003

December 2002



**50,000 cubic yards of material
placed to create a "sand fillet"
⇒ Protecting structure for
remainder of 2002 storm season
and beyond**



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Alternatives Considered

■ Improvements to the North Jetty

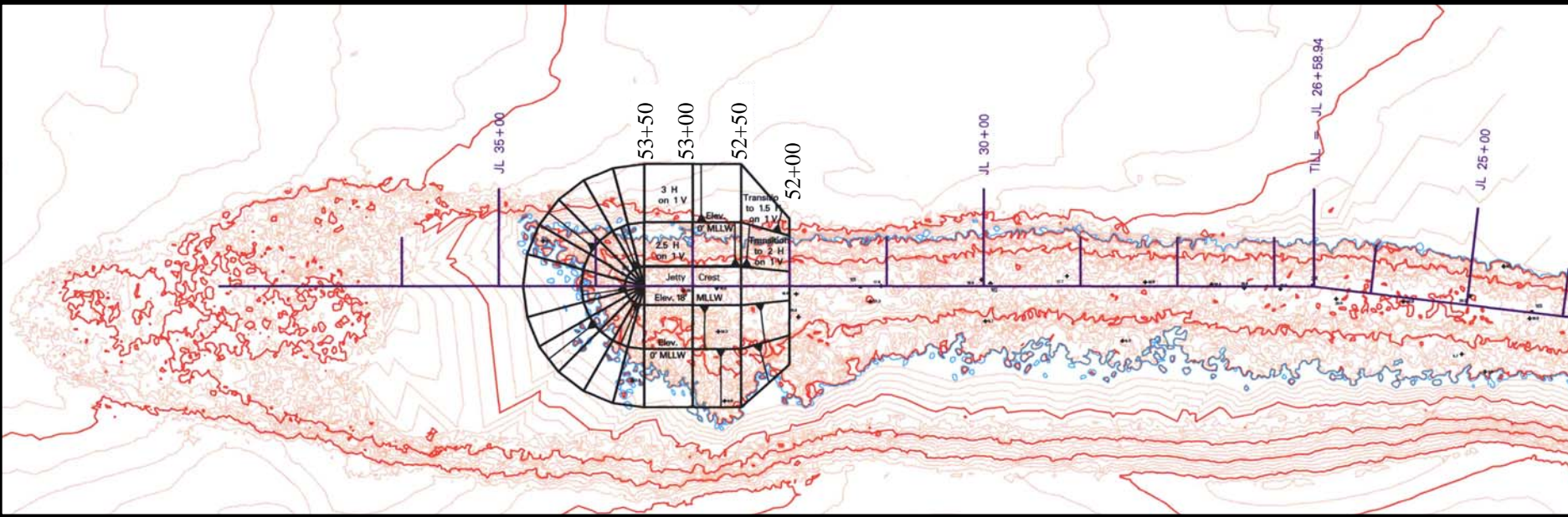
- Revetment in conjunction with various jetty lengths; including restoring to the authorized length
- Above actions and repairs to the root of the jetty

■ Improvements to the South Jetty

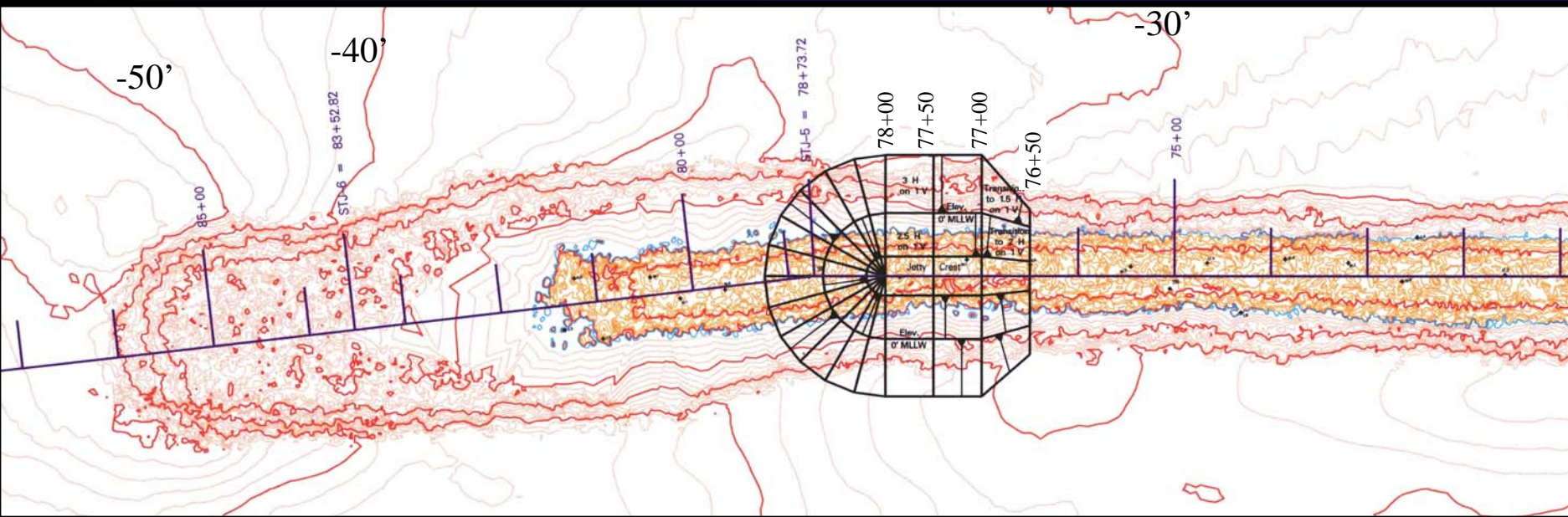
- Various jetty lengths; including restoring to the authorized length
- Above actions and repairs to the root of the jetty

■ Proposed Action

- North Jetty; revetment and 100 ft cap, South Jetty; 100 ft cap



North Jetty 100' Cap



South Jetty 100' Cap



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Beach Dynamics Design Elements

- Burying toe of revetment in beach
- Placing excavated sand on top of buried revetment toe
- Placing additional quantity of **coarse-grained** sand
- Total sand placement = 11,000 cy
- Cobble Fill at North End of Revetment



Beach Fill



**Cobble Stone
Transition**

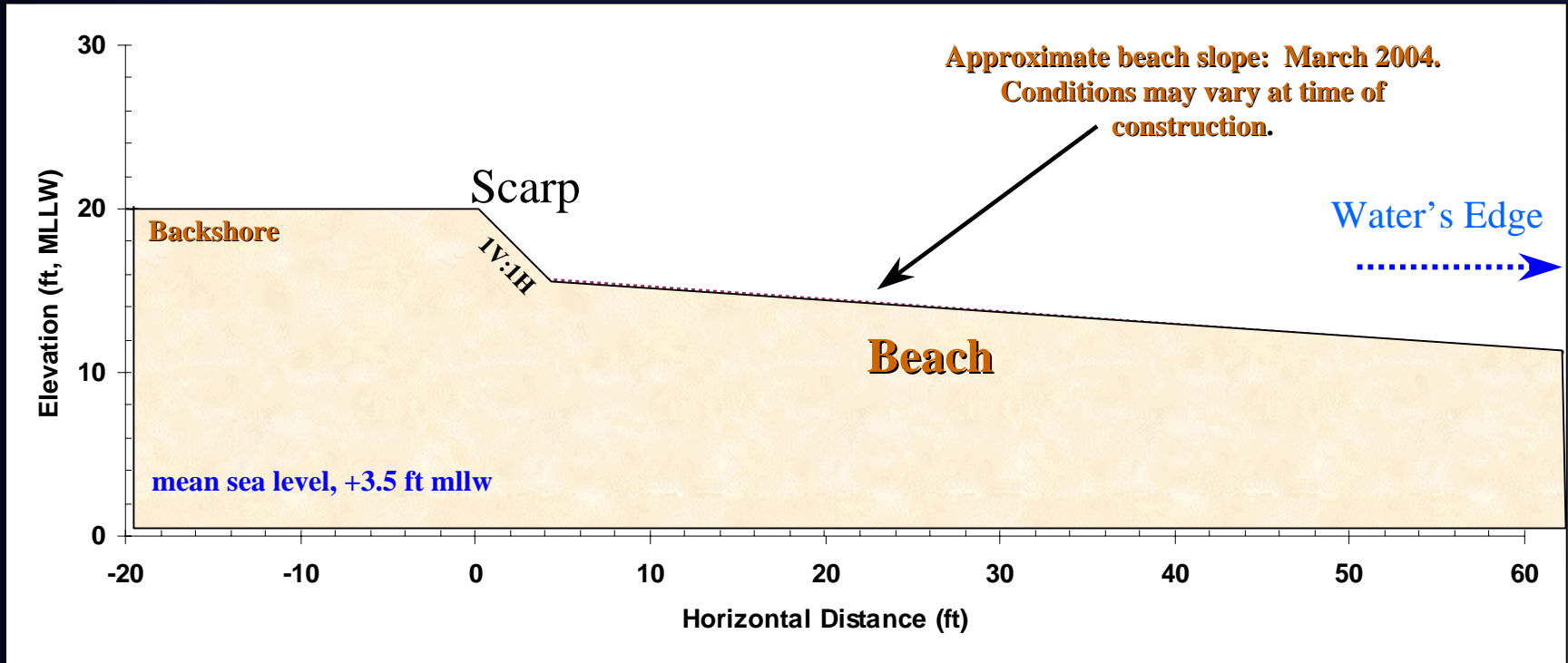


Stone Revetment



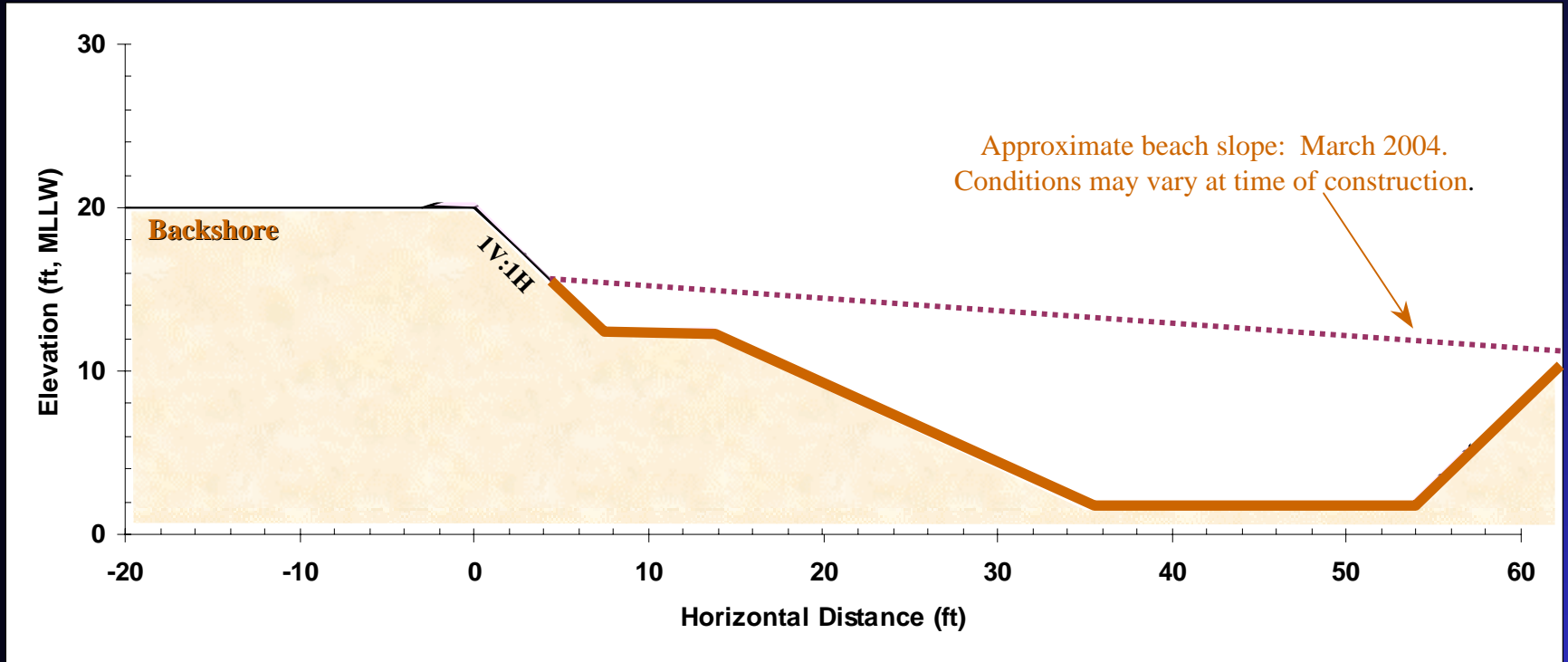
Typical Cross Section:

View Toward Jetty-Thru Present Beach Line

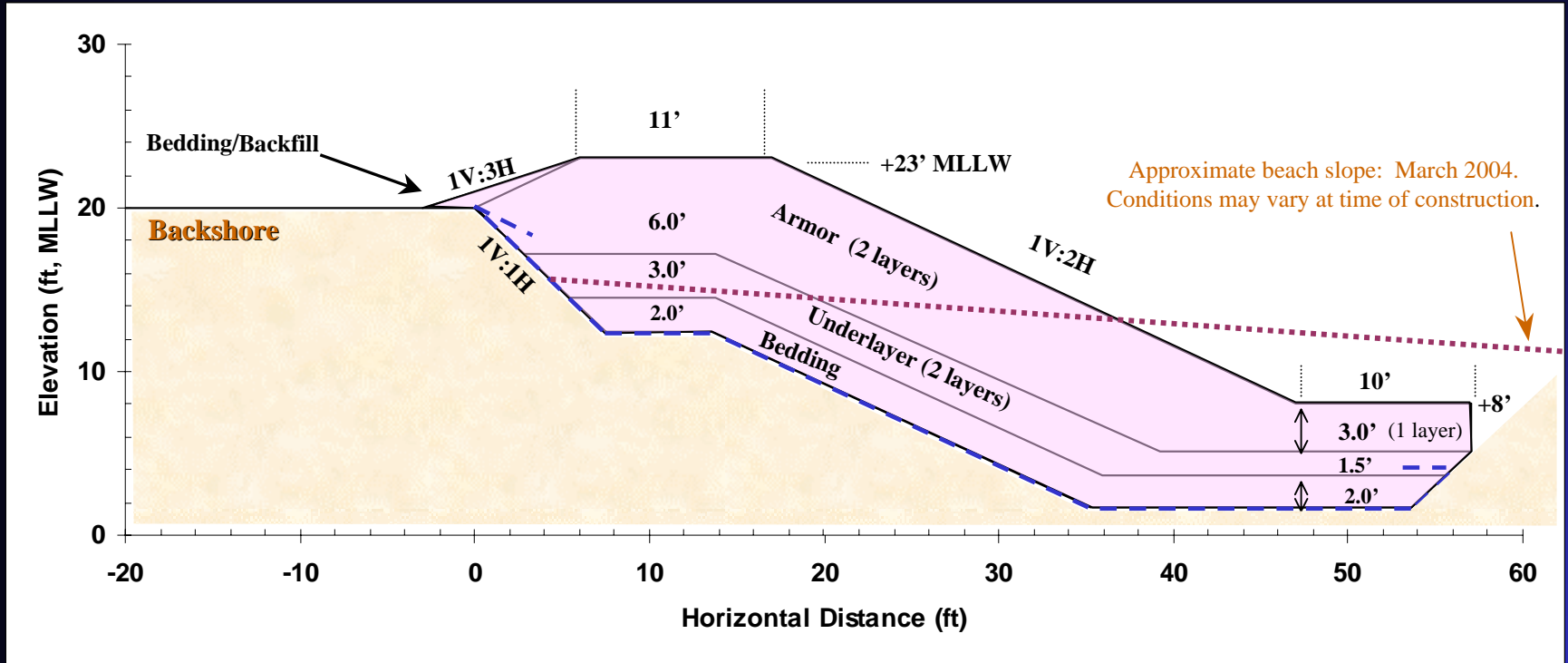


Typical Cross Section:

Excavate Sand

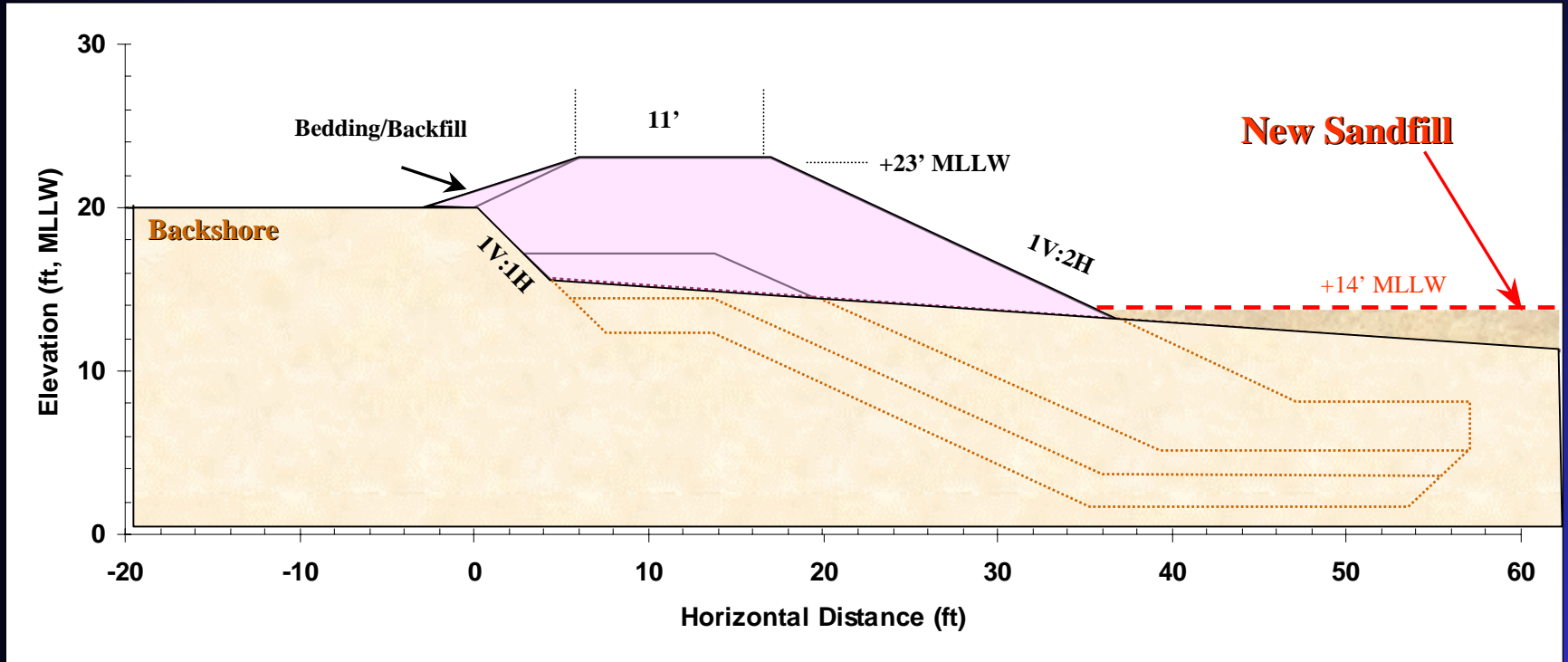


Typical Cross Section: Construct Revetment

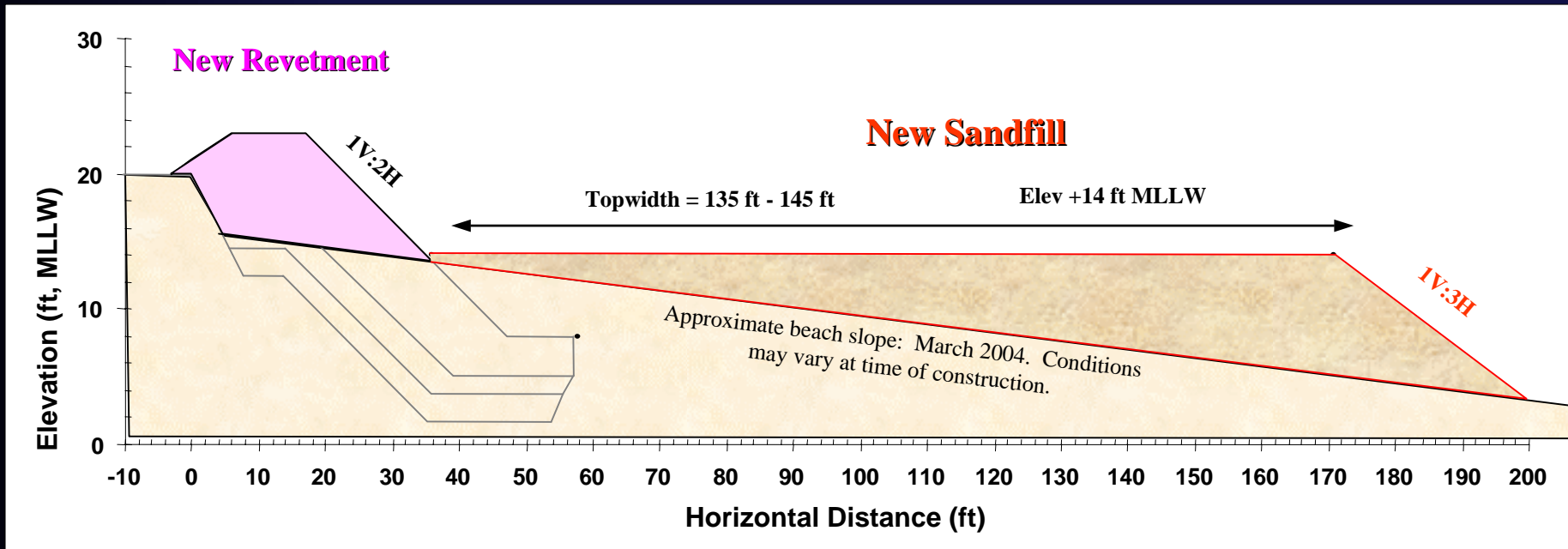


Typical Cross Section:

Construction Complete with Sand Backfill



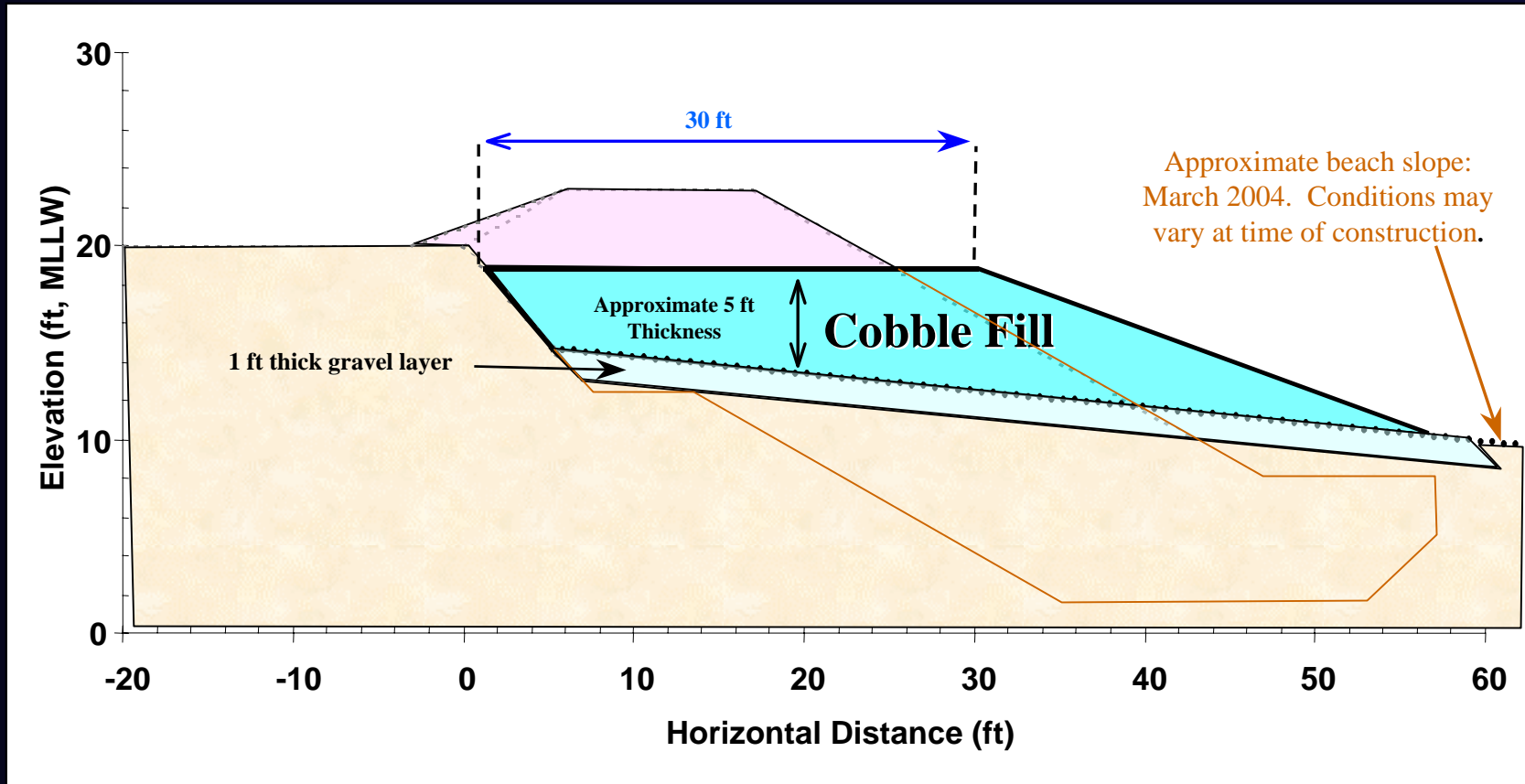
Typical Cross Section: Sandfill



Note:

- (1) Existing beachslope and elevation will determine necessary topwidth to apply full sandfill volume.
- (2) Construction of revetment will need to be fully accepted prior to sandfill placement over toe of revetment.
- (3) Place imported sand first. Place excavated sand on top of imported sand.

Typical Cross Section 4 - Cobble Fill Section - 100 ft North of Revetment



Notes:

- (1) Cross section shown will be applied for a length of 75 ft north of revetment; remaining 25 ft of cobble fill will taper to beach elevation.
- (2) 730 cy of cobble fill will be applied over the 100 ft length north of revetment.
- (3) Cobble stone will be placed on top of a 1 ft gravel layer to minimize settlement of cobble stone into the beach sand.



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Local Concern and Corps Responses

Revetment will not protect jetty from breaching

Corps Response:

- Thin saddle of foredune separates the ocean from the lower crest, 1918 constructed jetty root
- Area of wave focusing observed at jetty root tie-in with shoreline
- 3000 ft low-lying, intertidal zone parallels remainder of jetty root

Revetment will be undermined by local currents

Corps Response:

- Revetment toe is buried into existing beach



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Local Concern and Corps Responses

Revetment will cause erosion in front of and north of the structure

Corps Response:

- Revetment will only be impacted by waves at highest water levels
- Elements were included in revetment design to address beach dynamics
- Stabilization of north jetty head would reduce future erosion potential

Better fix would be repair of jetty root

Corps Response:

- Due to length and condition of jetty root shoreward of foredune, cost to reliably protect navigation project would be close to \$6M (8 times more)



Wave Action & Erosion at North Jetty Root



12/16/02

If this narrow section of beach is breached, the north jetty root will likely fail soon afterward





Sandbags placed by locals in April 2002

**Figure 2-3 North Jetty shoreline erosion and sandbags placed in April 2002.
Photo 9/23/2002**

A photograph showing a shoreline with a large pile of dark, angular riprap in the foreground. The riprap is partially submerged in shallow water. Behind the riprap, there is a sandy beach area. A green arrow points from a white text box to a specific area of the beach. In the background, there is a grassy dune area with some driftwood, a white car, and a green pickup truck. A tall metal structure, possibly a tower or observation post, is visible on the right side. The background features a large, forested hillside.

Riprap and shoreline erosion

**Figure 2-2 North Jetty shoreline erosion and riprap placed winter 2001.
Photo 1/18/2002**