

MCC 7/27/2016



Eroded section of
West Shoreline Trail



promontory

exposed pipe

bedrock outcrop

2016 culvert replacement

old clogged drainage pipe



US Army Corps leveled and built the road out to Pillar Point to build the breakwater in 1959.



Looking south from
bedrock outcrop
toward promontory
(outside of frame)



Looking north from
bedrock outcrop
toward culvert



Exposed 14" OD abandoned sewer pipe containing asbestos presents construction challenges.



What erosion protection alternative would best avoid disturbing this thriving inter-tidal marine environment and enhance the natural aesthetics of the shoreline?





Natural bedrock at West Shoreline Trail –
a model for sculpted shotcrete soil-nail wall?

Harbor District Design Charrette, June 7, 2016

Erosion protection alternatives presented to agency staff:

- Soldier pile wall
- Rip-rap
- Rip-rap with planting
- Do nothing

existing



soldier pile wall
simulation



existing



rip rap simulation



existing



rip-rap with
planting simulation



existing



soldier pile wall simulation



existing



rip rap simulation



2012 West Trail Alternatives Report: Shotcrete and Soil Nail Wall

Advantages presented in the report:

- Aesthetics: can be sculptured/colored to mimic on-site bedrock
- Conforms to existing bank – minimal footprint – no backfill required
- Less future backfill maintenance after storm waves
- Construction time very quick and least disruptive to adjacent areas
- Relatively small equipment can operate from existing trail
- Repaired with less difficulty than other alternatives
- Low to moderate cost depending on surface treatment

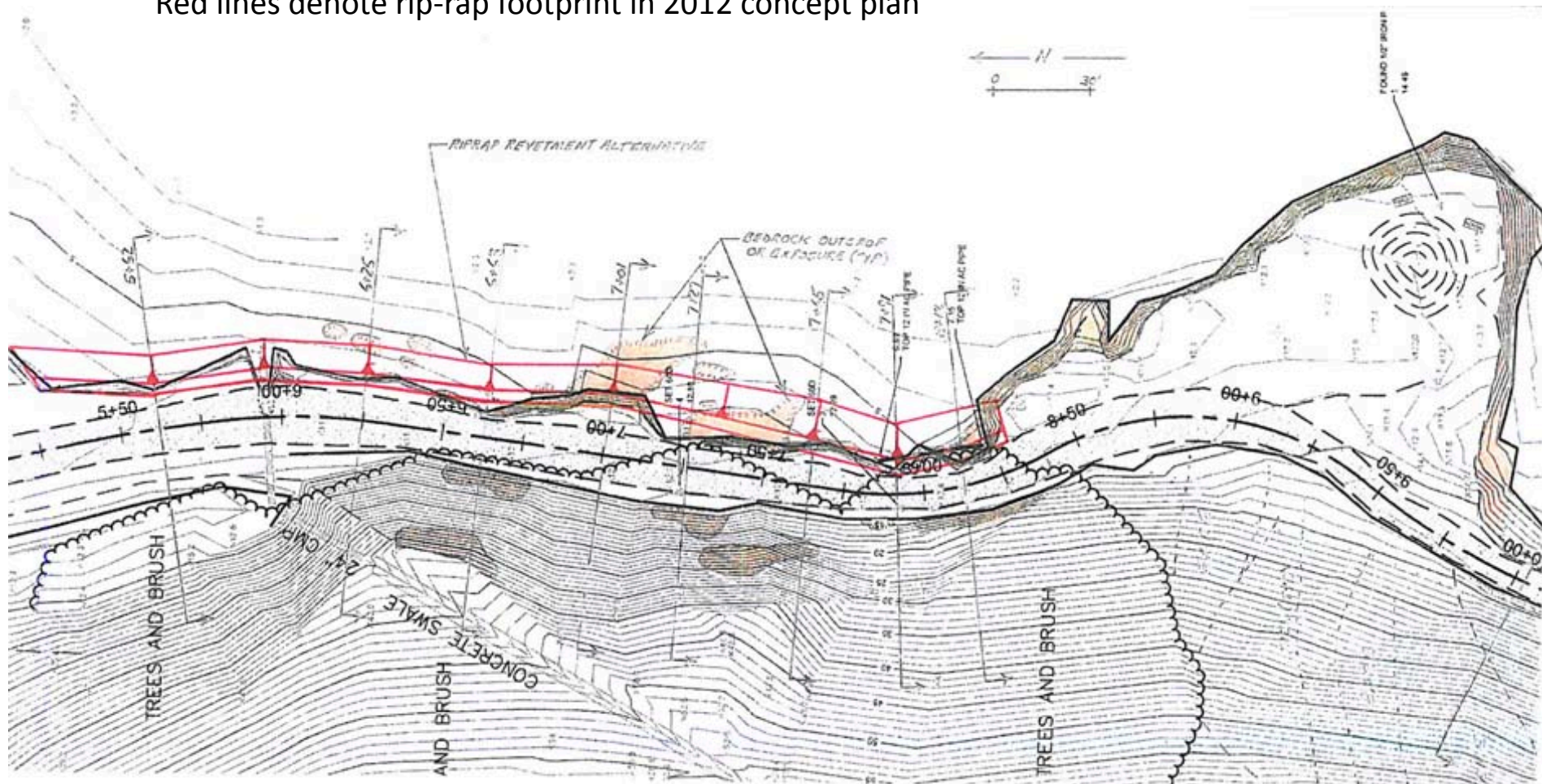
Disadvantages:

- Avoiding exposed pipeline may increase costs.
- Possible permit restrictions for shotcrete in marine environment?

Photo: 2004 gunnite wall at Cowell Beach, Santa Cruz, outlined by black dashed line – mimics shape and color of natural cliff.



Red lines denote rip-rap footprint in 2012 concept plan



RIPRAP REVETMENT ALIGNMENT CONCEPT 5+25 TO 8+25

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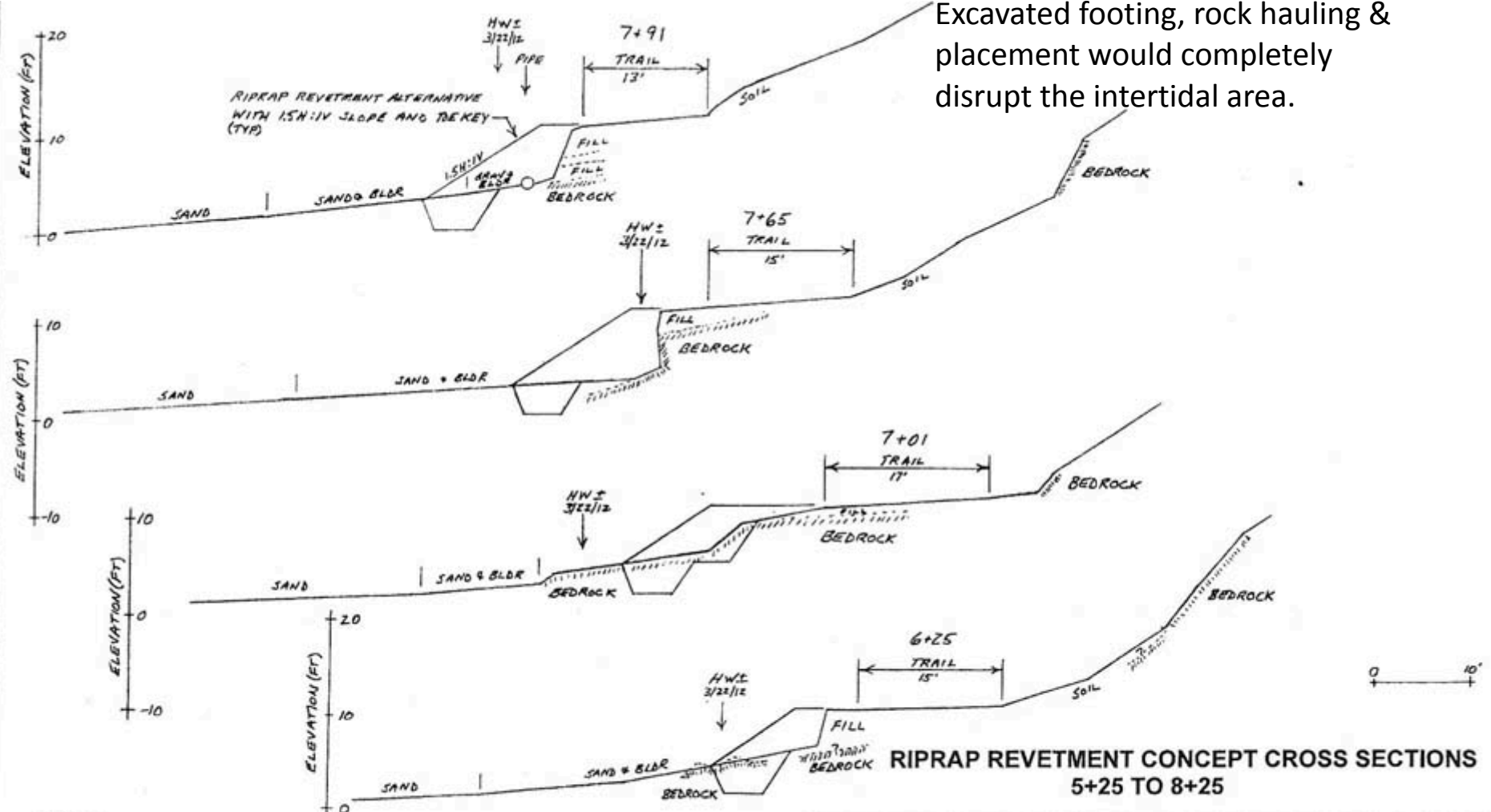
PILLAR POINT WEST TRAIL EROSION REPAIR
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3330

DATE
Mar 2012

FIGURE
7

2012 rip-rap concept cross section:
Excavated footing, rock hauling & placement would completely disrupt the intertidal area.

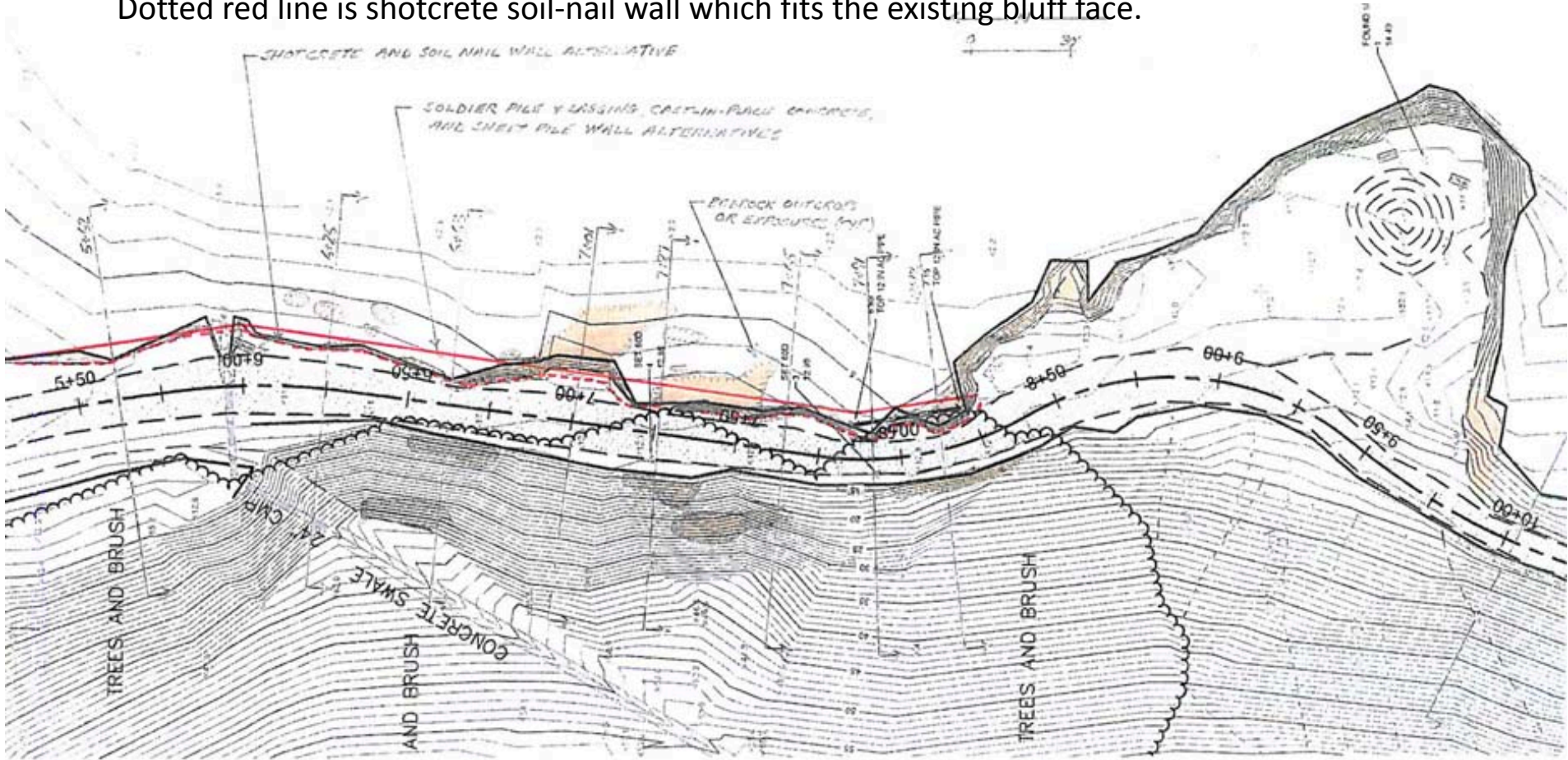


**RIPRAP REVETMENT CONCEPT CROSS SECTIONS
5+25 TO 8+25**

- NOTES:
1. CROSS SECTIONS ARE BASED ON MEASUREMENTS WITH HAND LEVEL AND TAPE AND SHOULD BE CONSIDERED APPROXIMATE.
 2. SURFACE AND SUBSURFACE CONDITIONS SHOWN ARE INFERRED FROM LIMITED SITE OBSERVATIONS AND SHOULD BE CONSIDERED APPROXIMATE.

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2012 retaining wall concepts: Solid red line is soldier pile wall with backfill.
 Dotted red line is shotcrete soil-nail wall which fits the existing bluff face.

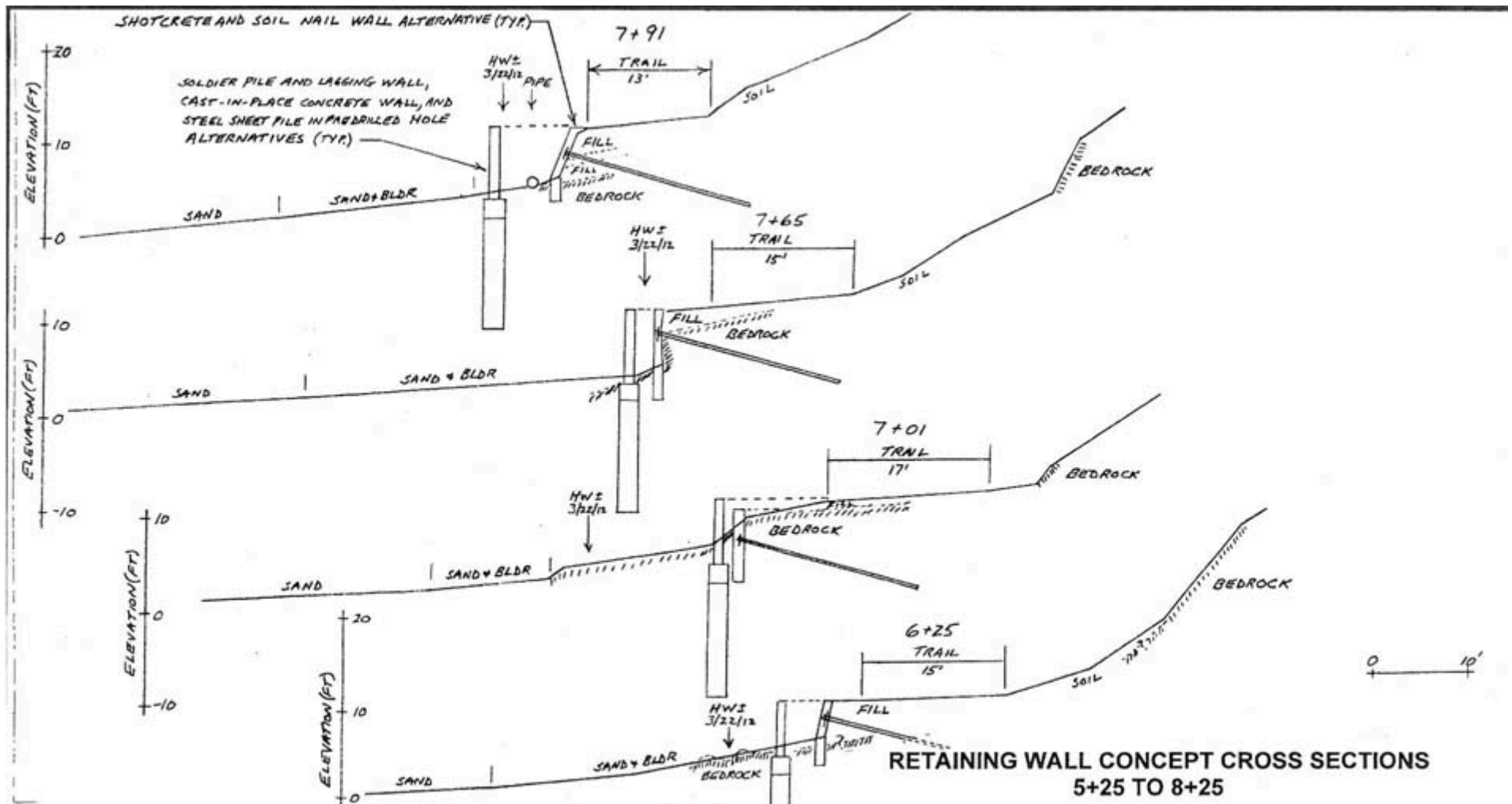


RETAINING WALL ALIGNMENT CONCEPT 5+25 TO 8+25

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2012 cross sections of retaining wall concepts

Note the difference in placement and anchoring between soldier pile and soil nail walls.



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FIGURE
10