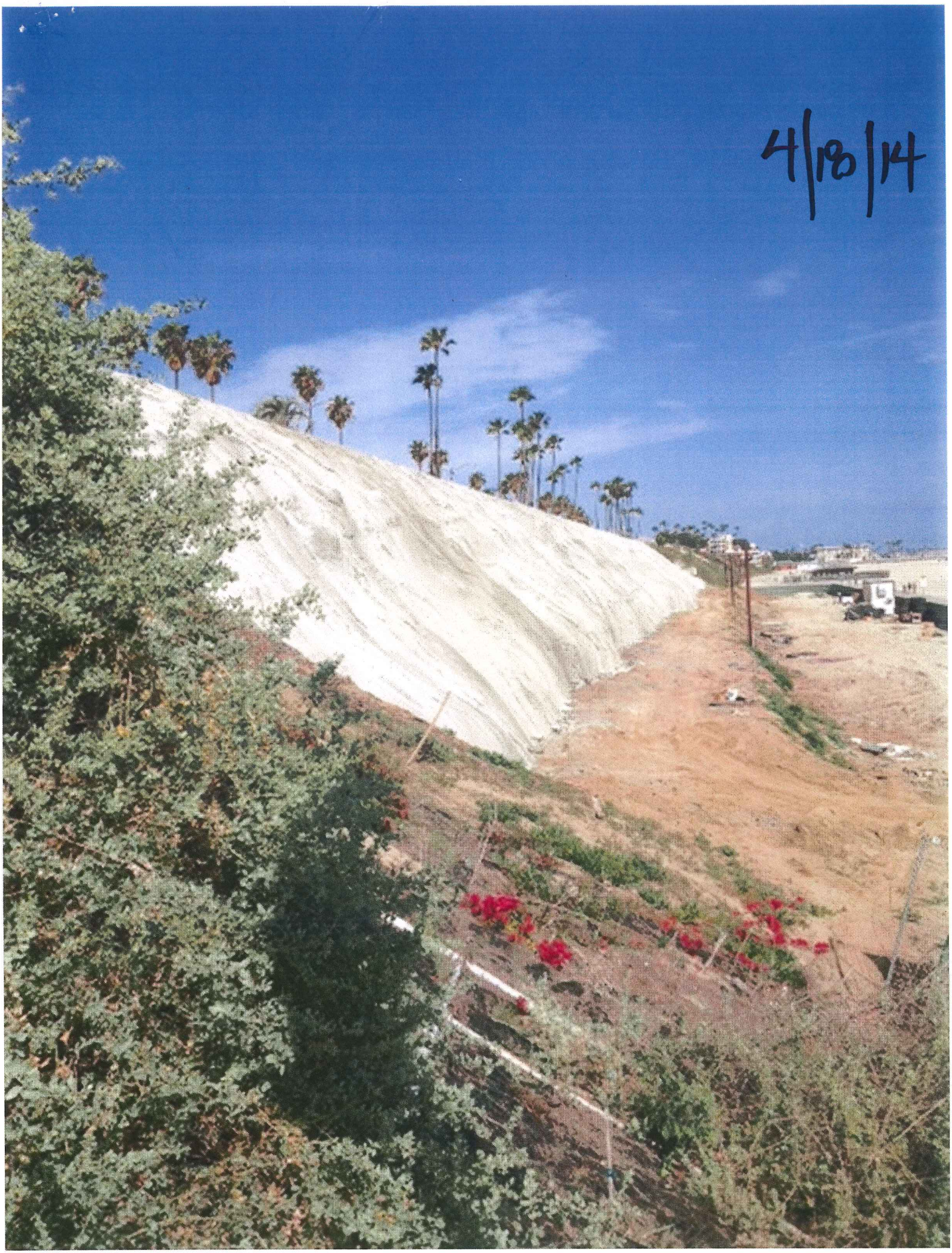
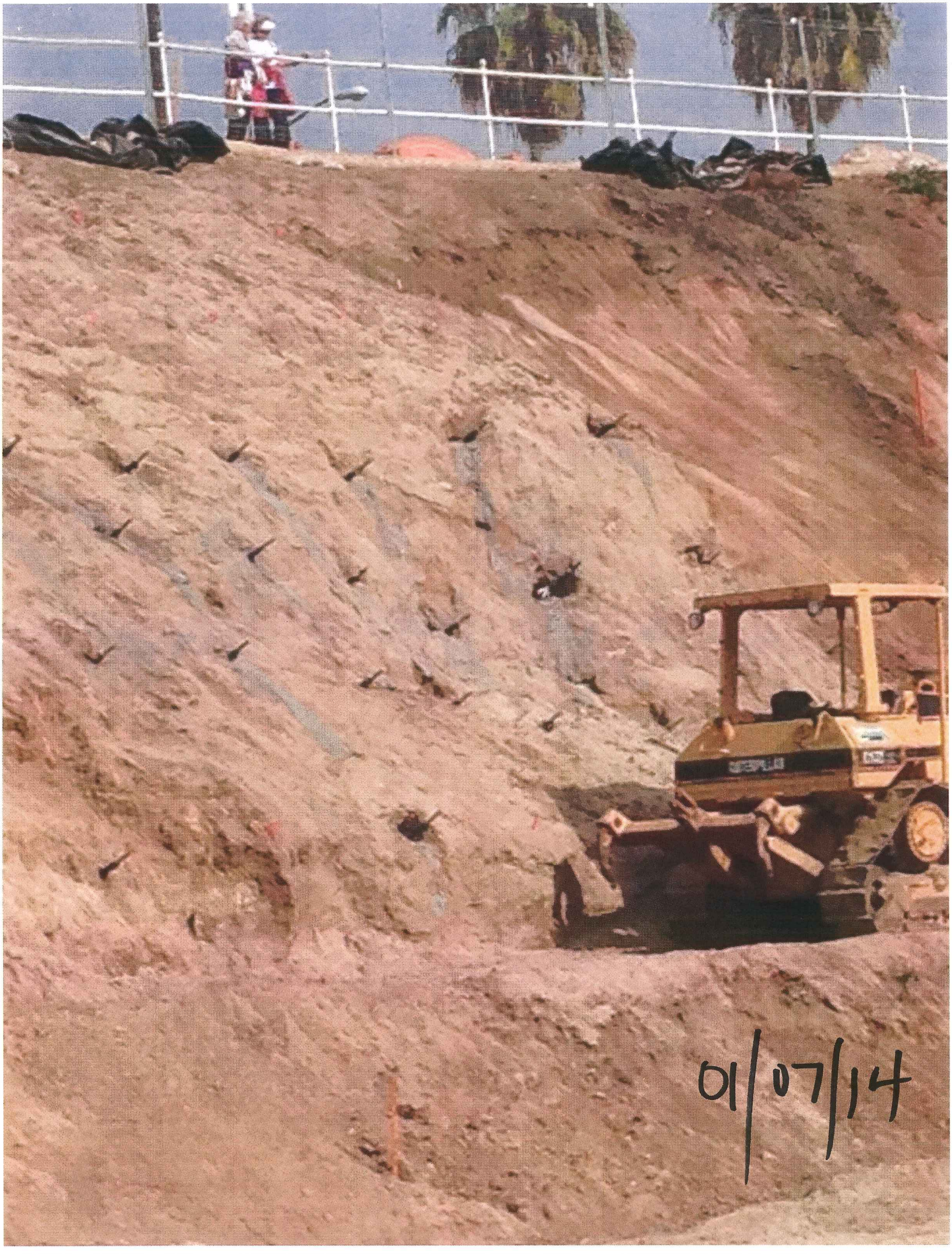

4/18/14


01/07/14


Dec 2013

ESA PWA

550 Kearny Street
Suite 900
San Francisco, CA 94108
415.896.5900 phone
415.896.0332 fax

www.esassoc.c

memorandum

date 4/22/2014

to: Mr. Patrick West, City Manager
City of Long Beach
333 W. Ocean Blvd.
Long Beach, CA 90802

from David Revell, PhD

subject Long Beach Bluff Top Park stabiliztaion alternatives

Dear Mr. West,

The current shotcrete bluff wall being constructed along the Bluff Top Park was recently brought to our attention. This site, located inside the Long Beach Harbor with a wide fronting beach, seems rather sheltered from wave action that would accelerate bluff erosion. The slope of the bluff as opposed to a vertical cliff indicates that landside terrestrial erosion processes are likely the primary factor causing slope instabilities. Upon a cursory review of site photographs it seems that control of non-native vegetation, surface water runoff and irrigation could reduce some of the factors likely affecting bluff erosion.

While we have not looked at this site extensively, it seems that there may be some alternatives to the current shotcrete wall that may be more aesthetically pleasing, and less expensive while still providing bluff stabilization benefits. The gabion mattresses used elsewhere along the Long Beach bluff have been improved substantially over the last several years and provide opportunities to combine soil reinforcement with vegetative strength. Many of these treatments fall into biotechnical stabilization categories and have been used widely around the world for stream bank, highway slopes and in some cases low energy wave environments.

Below please see a few examples that provide some sense of a range of well tested and commercially available alternatives that are utilized in a variety of slope stabilization projects. These provide opportunities to enhance the aesthetics of this highly used park along the Long Beach waterfront. It is our belief that these can be constructed in a more cost effective manner than the existing project.

We welcome an opportunity to support an investigation of more specific site alternatives and technical details that could help the city create a vision for a more cost effective and attractive solution to this bluff stabilization project.

Figure 1. Shows a combination of geotextile erosion control fabric with live vegetative cuttings

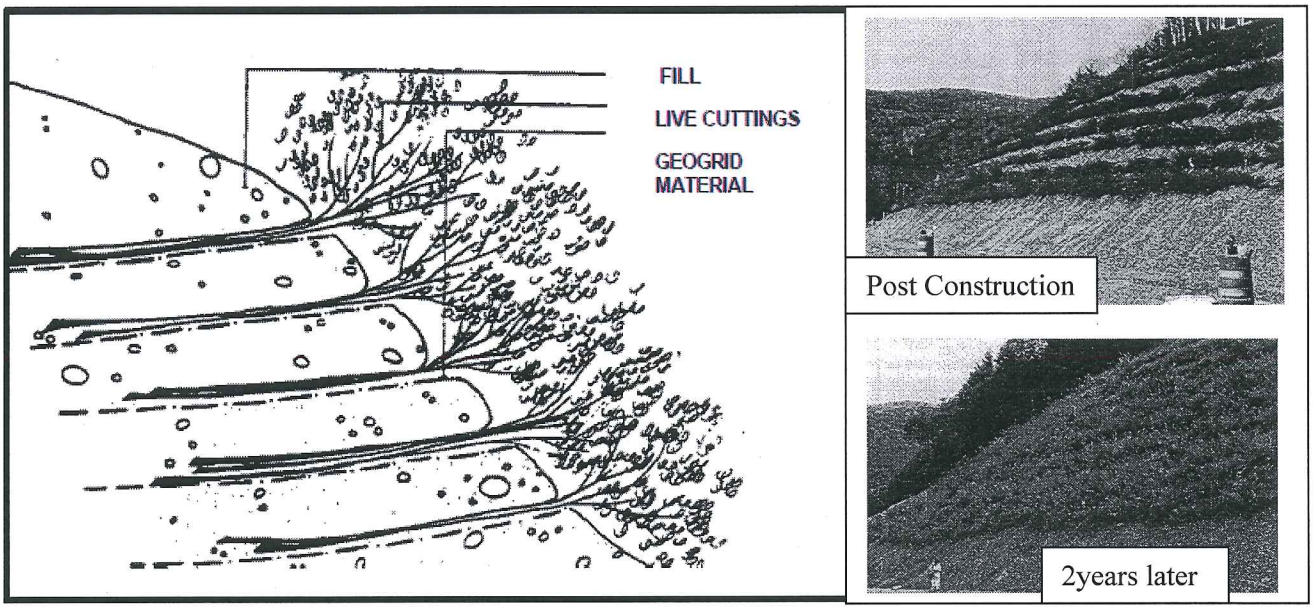
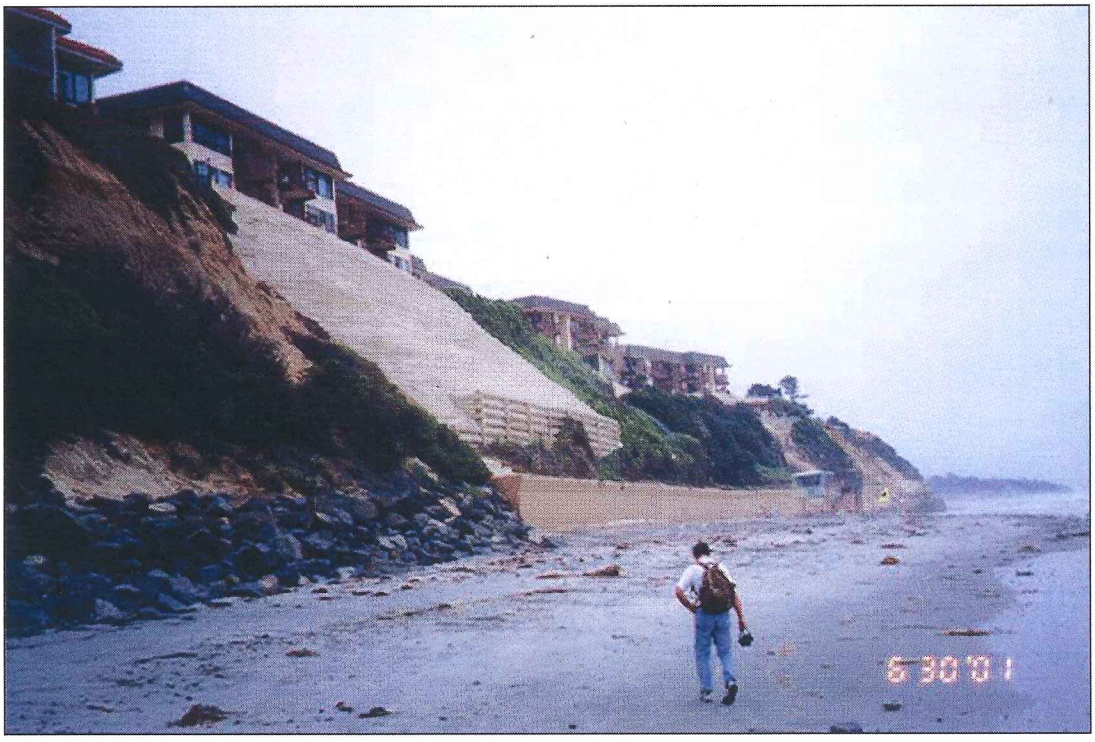


Figure 2 shows an example of a Vegetated Reinforced Soil Slope with a mix

Figure 3. Shows an example of a Geoweb slope protection that allows for vegetation plantings providing slope stability and in an aesthetically pleasing manner.

Why Shot-Crete ?!



This is not the problem at Bluff Park

FIGURE 3.6-4

Typical Gunite Covering

amec

Environmental/Solana Beach Bluff Ord EIR/**Typical Gunite Covering.FH8**


Bluff Sidewalk

San Diego Municipal Code

Land Development Code: Coastal Bluffs and Beaches Guidelines

D. 143.0143(g) Erosion Control Measures

Erosion control measures include, but are not limited to, retaining walls, air-placed concrete, and other structures, devices or methods appropriate for controlling or minimizing erosion of the sensitive coastal bluff. All feasible methods of erosion control shall be considered, including sandbags, revegetation, and drainage diversion and improvements.

Erosion control measures do not include those preventive measures required for soil stabilization or drainage.

Air-placed concrete, retaining walls, and buttress fills shall only be used to protect existing principle structures, or public improvements not capable of being relocated, and if it is determined that no other feasible less impacting method will accomplish the erosion control. Alternatives may include relocation or removal of existing improvements, if feasible, to avoid significant alteration of the bluff. Such measures shall not be used to accommodate proposed development nor to increase the area of the top of bluff.

The installation of erosion control measures shall not affect the location of the coastal bluff edge.

City of Solana Beach Municipal Code

Chapter 17.62
SHORELINE AND COASTAL BLUFF PROTECTION

17.62.020 Policy.

A. The safety element of the city's general plan provides that the city shall discourage the use of seawalls. [Goal 3.2, Objective 4.0, Policy 4.b.] The open space and conservation element of the city's general plan provides that the city shall require new developments to be subjected to visual impact analyses where potential impacts upon sensitive locations are identified, and further shall require that new structures and improvements be integrated with the surrounding environment to the greatest possible extent. [Goal 3.2, Objective 3.0, Policy 3.a., and 3.b.] Therefore, it is the policy of the city council of the city of Solana Beach to strictly regulate the construction of new seawalls, revetments, bluff retaining walls, gunite covering*, metal or wood armoring and other similar shoreline defense structures. Such protection measures generally will not be allowed when other feasible shoreline or coastal bluff protection measures are available. Permits for the construction of seawalls, revetments, bluff retaining walls, gunite coverings* metal or wood armoring and other similar structures will be issued only when necessary to accomplish one of the following purposes:

1. To protect existing legally built structures on property when the structure or structures are threatened with imminent danger or destruction from bluff failure due to erosion and other methods of protecting the structure or structures are not feasible, and the benefit of protecting the structure as opposed to removing it outweighs the adverse impact resulting from the construction of the protective device; or

2. To preserve economically viable use of property, when it is demonstrated that without the proposed protection measure the property could not be used for any economically viable purpose and other methods of protecting or economic usefulness of the property are not feasible; or

3. To abate a public nuisance when other methods of abatement including, but not limited to, removal of a structure or improvement would result in a severe economic hardship to the owner of private property or the loss of a significant public benefit.

(*) Gunite is a generic expression for Shot-Crete

SAFE HARBOR
ENVIRONMENTAL MANAGEMENT
HABITAT RESTORATION

Stabilizing Very Steep Slopes & Coastal Bluffs

Above: Two images of steep coastal bank in Brewster, taken 1 year apart.

Natural systems offer sustainable stabilization performance at lower costs.
Gordon Peabody, Safe Harbor, May 2013 **www.safeharborenv.com**

Alternative-