

TORREY PINES ROAD PRELIMINARY ENGINEERING STUDY

TECHNICAL MEMORANDUM FOR

RETAINING WALL CONSIDERATIONS



By

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June 2010



I. TOPIC DESCRIPTION

Technical items in Torrey Pines Road are being evaluated for a proposed improvement project between Prospect Place and La Jolla Shores Drive. Within the project area some bluffs and embankments, particularly, but not exclusively on the south side of the road are currently stabilized and some have not.

There are seven locations identified in the project area that will require retaining walls if the proposed improvements are constructed. These locations are shown in Figure 1 below.

The objective of this technical memorandum is to identify locations where new retaining walls would be beneficial to the new road and to recommend a safe and aesthetic retaining wall.

II. DISCUSSIONS OF FINDINGS

II.1. Why Retaining Walls?

Because of the presence of faults in the area, steep bluffs adjacent to the road and the proposed slight widening of the road into the bluffs, proper bluff stabilization is necessary. Existing stabilization systems, consisting of concrete retaining walls or shotcrete walls, appear to have been in service for many years. Some of these walls are showing signs of degradation, evidenced by some of the pictures in this technical memorandum. Improvements in the project area would necessitate improved structural and aesthetic retaining walls.

II.2. Other Studies In and Near the Project Area

A previous report titled "*Report of Geotechnical Evaluation, Torrey Pines Road Slope Repair between Little Street and Roseland Drive, La Jolla, San Diego, California*", by Geotechics (April 20, 2000), was prepared for a slope stabilization project (that is design complete). It summarized primary geotechnical concerns for bluff stabilization on the south side of the road near the east end of the project from approximate station 37+40 to 41+10 as follows:

1. Loss of support for the existing reinforced concrete Shotcrete facing resulting from piping and erosion of the bluff slope materials,
2. Ongoing erosion of the existing exposed slopes, and
3. Instability of the existing reinforced concrete Shotcrete structure under seismic shaking.

A separate preliminary geotechnical study is also part of this preliminary design project. The preliminary geotechnical study concentrates on items such as the geologic environment of the project including earthquake faulting in the project area and requirements for installing bluff and embankment stabilization.

In order to construct the proposed improvements, the project will require retaining walls in several locations on the south side of the road, as indicated on Cross Sections 3, 4, and 5 of the project plans (contained within this submittal package). Minor retaining walls may also be needed in several other locations. A retaining wall and landscaping walls will be required on the north side of the road as shown in Cross Section 2. This project will require a thorough geotechnical investigation and report early in the final design stage.





Figure 1

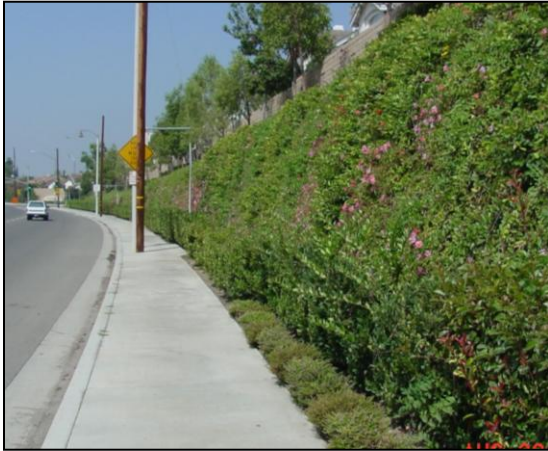
Aerial View of Project Showing Proposed Locations of Retaining Walls

(Yellow lines represent locations of proposed walls; red line represents location of designed wall by others. Line locations are approximate and line widths are not intended to represent the wall size)

II.3. Bluff/ Slope Improvements from Existing

The retaining wall proposed for the south side of Torrey Pines Road between Little St. and Roseland Drive is a soil nailed wall for structural stabilization with a Verdura or Loffelstein style wall face. This wall type leaves openings for plantings, which both provide decoration and the plant roots provide additional soil stabilization at the wall face. Examples of this type of wall are shown below. This wall is recommended because it is a safe soil retaining wall when properly designed, it can be planted to enhance its aesthetic qualities, and it has been selected for an adjacent area along Torrey Pines Road within the project area.

Where small retaining walls are required, a wall could be installed in accordance with the Regional Standard Drawings. Plantings above and/or below these walls to enhance the aesthetics is recommended.



Above, typical example of open block wall with Rosemary and trailing plants

Left and above left, two examples of open block walls covered with plantings along roadways

II.4. Existing Locations Where Retaining Walls will be required

Project plans show the stationing along the project which is used in this section. Locations are also shown in Figure 1 above.

II.4.1. Area 1

Slope stabilization will be required from Station 12+80 to 16+00 on the north side of the road. A new retaining wall is envisioned with landscape plantings to screen the facilities below, but allowing a good view of the ocean (see View Corridors technical memorandum for more information). Minor cuts and fills will be required along the alignment which will require slope stabilization. At Cross Section 2 near



station 13+75 on the project plans, a fence will be installed on top of, or just in front of, the new retaining wall (see technical memorandum on Fences for more information). The segment from Station 11+85 to 13+00 will be challenging due to the steep slope and narrow available R.O.W. An existing private gate in the R.O.W. must be eliminated or relocated. This area was identified in cross sections as having multiple vertical block walls for terraced plantings. The private gate is shown in the Picture 3360.



Picture 3360 - Private Gate

II.4.2. Area 2

A 300-foot long retaining wall on the south side of the road will be required from approximately Station 17+80 to 20+80 (See Cross Section 3 of the project plans). The proposed wall would be required to be just outside the right of way in private property to provide a sidewalk width of 9 feet, although the sidewalk will be within the current right-of-way (ROW). At approximate Station 20+00 a house on the bluff above may impact the retaining wall design, see Pictures 3943 and 3942 below. The 9-foot sidewalk plus landscape width may need to be reduced to 5 feet to fit the wall in the ROW in this location.



Picture 3943 - Station 19+00 South Slope with Existing Gunite Retaining Wall



Picture 3942 - Station 20+00 South Slope Home located behind Dense Tree



Picture 1345 - Concrete Block Retaining Wall near R.O.W.

II.4.3. Area 3

There is an existing concrete block retaining wall on the south side of the road from Station 22+70 to 25+50 – This wall is located in the right of way and will interfere with construction of the new sidewalk therefore a new wall will need to be reconstructed at the edge of the right of way.

II.4.4. Area 4

A short retaining wall may be necessary from Station 27+80 to 29+10 to accommodate the sidewalk on the south side of the road, see Picture 1345. In lieu of a retaining wall, the adjacent area may be regraded but existing landscaping may be affected.



Picture 4 - Slope May Require a Short Retaining Wall

II.4.5. Area 5

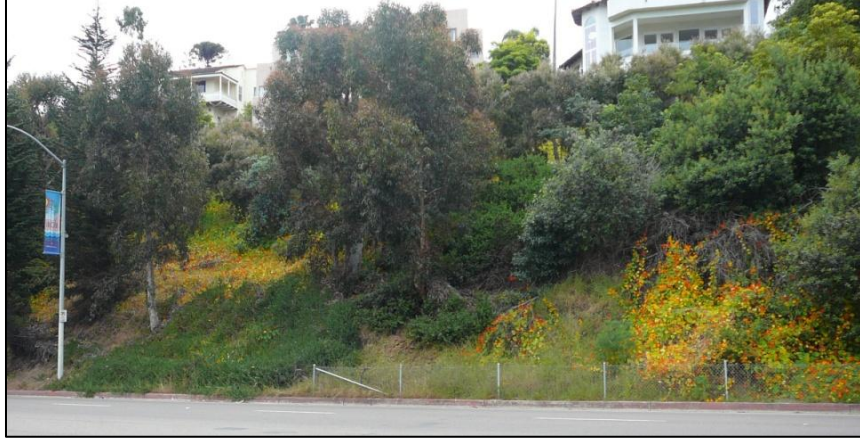
A major retaining wall will be required from Station 30+00 to 37+40 on the south side of the road, with an approximate 70 to 90 foot break around Station 35+00. Pictures 5, 6 and 7 below show the condition of the existing south bluff. Also see Cross Sections 4 and 5 on the project plans.



Picture 5 - Bluff at Approximate Station 31+50

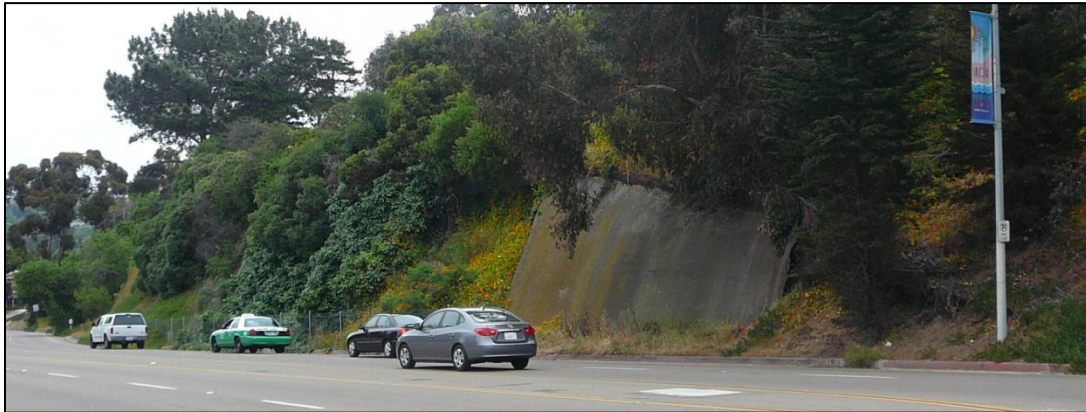


Picture 6 - Bluff at Approximate Station 33+00



Picture 7 - Slope at Approximate Station 36+50

At Station 37+40 on the south side of the road the wall will join a 350-foot long wall that has been designed titled, *“Torrey Pines Road Slope Reconstruction between Little Street and Roseland Drive”* by Leighton and Associates (Project #32132, W.O. No. 526740). The area for construction is shown in the Picture 8 below. The design is for a soil nail wall with a facing of Verdura type block that can support landscape plants. It is recommended that a similar type wall be considered for consistent appearance, and because the backcut area is not large, the construction time is less than some other alternatives, and the cost is not excessive. From Station 30+50 to 33+00 the retaining wall will have to be built on private property with a construction easement, or additional ROW will have to be acquired (see Plan for ROW and property lines).



Picture 8 - Location of Proposed Soil Nail Wall to be constructed by others

II.4.6. Area 6

A short retaining wall may be required from Station 41+50 to 43+50 along the sidewalk on the south side of the road. A typical design from the San Diego Regional Standard Drawings can be used.

II.4.7. Area 7

From Station 45+00 to 45+80 there is an existing retaining wall that needs to be replaced and set farther back to accommodate the sidewalk on the south side.



Picture 9 - Existing Wall at Approximate Station 45+50

II.5. Cost Estimates

The following costs for the type of wall have been compiled for preliminary estimating purposes only and not intended to include all costs associated with the project. Costs are in 2010 dollars. The approximate cost of a crib block wall is \$32 per square foot. Soil nailing was assumed for 75% of each wall at a cost of approximately \$75 per square foot. An average height of approximately 10 feet was assumed for these walls.

For straight masonry retaining walls an approximate cost of \$38 per square foot was assumed. An approximate height of 3.5 feet was assumed. Therefore an approximate cost of \$140 per linear foot was assumed.

Costs for acquisition of property or easements to place retaining walls outside the right of way are not included.

III. Recommendations

Improvements to Torrey Pines Road between Prospect Place and La Jolla Shores Drive will involve widening the road, which will affect bluffs and slopes on both sides of the road. The project as laid out on the Project plans and locations for retaining walls have been identified. Further detailed geotechnical investigations must be carried out at all locations to confirm assumptions for wall support. There are seven locations where retaining walls are identified. These are shown on the project plans and Figure 1 shown in Section 1 of this technical memorandum and listed below:

Station	Approx. Length	Estimated Cost	Notes & Comments
12+80 - 16+00	320'	See Conceptual Cost Estimate	Remove an existing gate as required. Construct soil nailed wall where necessary and retaining wall. Between Station 11+85 and 13+00 on the north side of the road, the right of way constrains the project.
17+80 - 20+80	300'		Retaining wall requires construction outside right of way on the south side of the road. Recommend soil nail and open block wall. A home is close to bluff and may impact wall support method. Alternatively reduce sidewalk width to reduce wall outside right of way.
22+70 - 25+50	280'		Replace existing block wall on the south side of the road to provide space for new sidewalk. Recommend soil nail and open block wall where necessary. Right of way constrains the project. New wall may be outside right of way.



Station	Approx. Length	Estimated Cost	Notes & Comments
27+80 - 29+10	130'	See Conceptual Cost Estimate	Retaining wall may be required to accommodate sidewalk. Could be City standard block wall. Maximize aesthetics with cement block color selection
30+00 - 37+40	740'		New retaining wall to provide space for new sidewalk. Recommend soil nail and open block wall right of way constrains project between station 30+00 and 33+00. This wall will meet the wall constructed by others which starts around station 37+40.
41+50 - 43+50	200'		New retaining wall to accommodate the sidewalk. Wall would be short. Recommend City standard block retaining wall or open block retaining wall to allow for planting and to blend with other walls in the area. Maximize aesthetics with cement block color selection.
45+00 - 45+80	80'		Replace existing block wall to provide space for new sidewalk. Retaining wall could be cement block or open block

