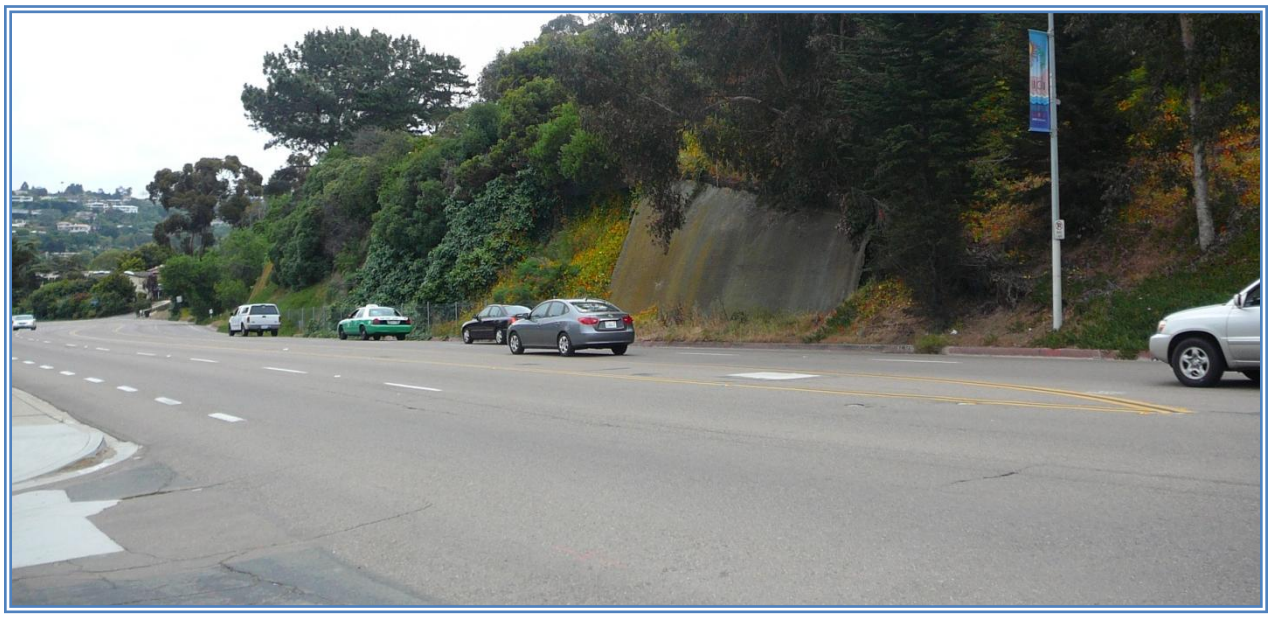
TORREY PINES ROAD PRELIMINARY ENGINEERING STUDY

TECHNICAL MEMORANDUM FOR

MEDIAN OPTIONS



By

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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 medians are intended to be designed and constructed to provide for safe left turns for residents and as a lane for emergency vehicles. This technical memo will look at methods for a safe median.

Median areas are located in the center of Torrey Pines Road throughout the project area.

I. DISCUSSIONS OF FINDINGS

The proposed improvements will maintain or create a 10-foot corridor between west-bound and east-bound traffic. The median corridor will be available for emergency vehicles and left-turns into adjacent streets and driveways.

II.1. Median Alternatives

Various commonly used types of medians in California considered are:

- Striping – double yellow lines or single yellow line with a broken stripe
- Striping with speed grooves
- Stamped concrete - Cobble stone appearance
- Grasscrete (with and without a rolled curb)
- Raised medians
- Depressed medians

At the present time the median area is paved with asphaltic concrete and is striped with yellow lines from Prospect Place (Station 10+00) to Roseland Drive (Station 45+00). Beginning at Roseland Drive, there are raised medians as shown in the photo below that continue east to the end of the project. the raised medians should be left or replaced to assure that vehicles from La Jolla Shores Drive don't try to cross traffic to make an illegal left turn. The beginning of the raised median to the west is shown in Picture 2721 below.

Picture 2721 - Raised Median at Roseland Drive

The recommended median type(s) must provide a suitable level of safety for its intended use. Maintenance is also an important consideration. Raised medians are not safe when the intended use is emergency vehicles, which would have a difficult time crossing over them. Depressed medians may create a safety issue if drivers inadvertently wander into the depressed medianand lose control causing

an accident. Grasscrete requires some maintenance and watering, which would be difficult and costly in the project area. Therefore these three alternatives are not considered further.

The three remaining alternatives are: double yellow striping, double yellow striping with grooved pavement (or similar effect), and stamped concrete in a cobblestone appearance.

II.2. Yellow Striping

Currently the pavement median is marked with yellow striping as shown in the Pictures 2361, 3965 and 3966 below. Yellow striping is required to alert motorists of the alignment of the traveled lanes.

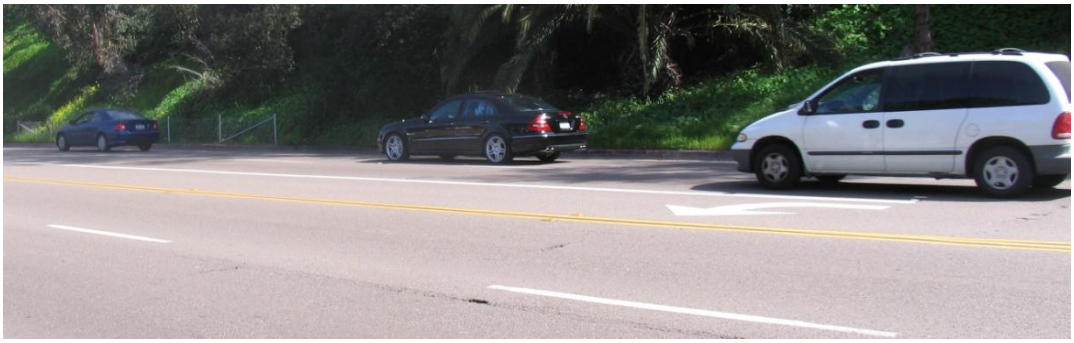
Picture 2361- Two Double Yellow Lines Define the Median

There are solid double yellow lines where there are no houses and no turns are permitted. There is single yellow line and a broken yellow line that defines the median area where turns are permitted for access to driveways. Each of these striping patterns are shown below in the project area.

Picture 3965 - Solid Yellow and Broken Yellow Stripes on Each Side of Median

Picture 3966 - Double Solid Yellow Strips on Each Side of Median

Left turn pockets are marked out in several locations for left hand turns onto side streets as shown in picture 2356 below.



Picture 2356 - Left-Turn Pocket in the Median

Defining the median with striping could be used in the proposed improvement project. It is one of the most common methods and motorists are accustomed to it. It is also the least expensive.

II.3. Grooved (Rumble Strips) Pavement

In order to provide a possible traffic calming effect, provide a more distinct and safer median; grooves could be placed in the pavement as done along edges of highways to warn drivers when they are out of the travelled way. There are many types of groove patterns, including longitudinal, and transverse, and diamond. This is an added precautionary measure since grooves do not eliminate striping of the highway. Regulations require yellow stripes on each side of the median area. Studies performed have shown throughout the U.S. that grooved pavement has reduced accidents and injuries on rural highways by as much as 20%.

If installed correctly many highway departments find low maintenance cost with grooved pavement. Grooves are relatively easy and cost effective to create. The cost to groove pavement is approximately $3 per square yard.

Diamond Grooved Pavement

Grooved Pavement on freeway (also note decorative strip at edge of shoulder)

A Special Effect Material

II.4. Stamped Concrete

Caltrans states that "Patterned (or stamped) concrete is standard concrete pavement that is colored and/or stained and imprinted with a pattern prior to curing. Best uses for patterned concrete pavement are in urban and suburban areas at high visibility locations including road edges, median strips and slope paving. Concrete is a good choice when longevity, visual quality and context adaptability outweigh initial cost considerations."

Stamped concrete could be used, which would provide a very distinctive median. Emergency vehicles could easily go over such a surface if designed correctly. It may also provide a traffic calming effect. There is a wide variety of colors and patterns available for use. Left-turn pockets would not have the stamped concrete, just normal pavement with appropriate arrows and other markings. Regulations would require double yellow stripes on each side of the median area.

Maintenance is required. Stamped concrete should be cleaned and resealed every few years, so maintenance costs would be higher than with other alternatives. Repairs can be difficult to match to original color and pattern.

The stamped concrete shown in picture 7 above also acts as a second rumble strip. This may be a more cost effective alternative to stamping the entire median however it does not compare to the lower cost of grooved pavement.

The cost of stamped concrete is estimated to be from $50 to $100 per square foot.

III. Evaluation and Recommendations

Improvements in Torrey Pines Road involve selecting a safe and effective median for residents and emergency vehicles. Following is a summary of the median

Median Type	Additional Cost to Striping	Advantages	Disadvantages
Yellow Striping	No additional Cost	Easily visible in good weather familiar to motorists	Sometimes difficult to see in poor weather (rain, fog, etc.)
Grooved (rumble strip) Pavement	$1 per foot	Provides alert to drivers who are not alert to their passing into the median. Can be placed on the edge of the median so emergency vehicles do not continuously travel over it.	Must be installed properly
Stamped concrete	$50-$100 /square foot Stamped strip cost = $50-$100/ linear foot	Can be highly attractive when decoration is selected properly.	Costly. Higher maintenance Difficult to repair to match pattern or color

Yellow stripes along both edges of the median are a basic requirement. The addition of grooves is a relatively beneficial and inexpensive addition. Stamped concrete is much more expensive, but provides a special look and may have a traffic calming effect.

It is recommended to include stamped concrete in the median area if monies are available. Otherwise it is recommended to groove the median area on the edges, and stamped concrete can be kept as an option for the future.

IV. Appendices

1. Caltrans Main Streets: Flexibility in Design & Operations, January 2005
2. A Comparison of Transverse Tined and Longitudinal Diamond Ground Pavement Texturing for Newly Constructed Concrete Pavement by Pennsylvania Transportation Institute Penn State University
3. Design Of Medians For Principal Arterials by Center For Transportation Research the University of Texas at Austin

APPENDICES