

CITY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
Bureau of Engineering
GEOTECHNICAL ENGINEERING DIVISION

Date: November 14, 2023
GED File No.: 23-222
C.D. No. 11

SUMMARY OF FIELD INVESTIGATION

Location: Via De Las Olas @ Friends Street
2005 Thomas Guide: Page 631-A6
Requested By: Kevin Patton, RAP
In Attendance: Lisa Gerencher (Geotechnical Engineering Division), Richard Thompson, Arthur Rodriguez, Steven Hamilton (LAFD)
Date of Investigation: August 30, 2023

DESCRIPTION AND REMARKS

At the request of the Department of Recreation and Parks, the Geotechnical Engineering Division (GED) has completed a field investigation regarding the landslide that occurred below Via De Las Olas where it meets Friends Street in the Pacific Palisades area of the City. This field investigation has been prepared to summarize the observations made and to provide preliminary recommendations relative to the identified issues. A subsurface investigation was not performed as part of this study.

Summary of Observations and Background

As illustrated in "Vicinity Map" in Figure 1 the site is located approximately 1/4-mile northeast of the intersection of Temescal Canyon Road and the Pacific Coast Highway (PCH), within the Pacific Palisades.

The "Site Location Map" in Figure 2 shows that Via Del Las Olas was constructed at the edge of the Palisades Bluffs, extending along and above the PCH. The section of Via de Las Olas consists of a two-lane, approximately 35-foot wide, residential street. The street is paved with asphalt concrete pavement and concrete curbs and gutters on both sides of the roadway. The section being investigated has an approximately 50-foot long and 20-feet high pre-existing ribbed-metal bulkhead (Photos 1, 2 and 3), with a storm drain inlet located at the north end, the storm drain inlet and bulkhead being separate elements. Due to erosion, the bulkhead is partially undermined (Photo 3). It is unclear who constructed the bulkhead which is located in the City right of way. The storm drain, which according to NavigateLA, is owned by the City, consists of a 27-inch diameter High Density Polyethylene Pipe. In the vicinity of the bulkhead, the storm drain pipe is within the City right of way and varies in distance from 8 ft to 12 ft behind the bulkhead. The top of slope below the section of roadway and top of bulkhead has an approximate 30-foot vertical section drop off followed by a change in slope grade transitioning to an average gradient of approximately 1.5:1 H:V (horizontal to vertical). This slope angle transition represents the beginning of the head of a landslide located on Los Angeles City Department of Recreation

and Parks (RAP) property which extends to a maintenance access road for the George Wolfberg Park. As shown on Figure 1, the access road and slope immediately upslope of it are situated on California Department of Transportation (Cal Trans) property.

Due to the steepness and limited access of the slope, the Los Angeles Fire Department provided aerial photography and video via drone aircraft to allow GED to inspect the landslide and bulkhead.

According to Dibblee (T.W., Jr., 1991, Geologic Map of the Topanga and ½ Canoga Park South Quadrangles, Los Angeles County, California, Dibblee Geological Foundation Map #DF-35, scale 1:24,000), the bluffs are composed of Quaternary Older Alluvium (QoAl) Terrace deposits of slightly cemented silty clay and sandy gravel layers overlying Fernando Formation bedrock which consists of gray, vaguely bedded, friable, soft, massive silty claystone. Figure 2 shows that the general orientation of the Fernando Formation strikes N83E, with a 50-degree dip to the south-southeast. This bedrock orientation is dipping out-of-slope, which is unfavorable to gross slope stability. The northeast trending Malibu Coast Fault crosses the mouth of Potrero Canyon and dips to the north and is approximately 750 feet south east of the site.

In 1994 a rockfall took out a significant portion of the over-steepened and natural slopes above PCH and below Via de Las Olas. Based on a 1996 J. Byer Group (JBG) geologic report, the landslide was described as "a rock fall based upon the configuration of the failure and the exposed scarp." JBG concluded large blocks of the siltstone bedrock moved downslope along a combination of jointing and fracture planes that dipped towards the slope face. JBG recommended fill placement to buttress the slopes to mitigate the out of slope bedrock conditions. A buttress was subsequently placed by JBG. The buttress fill included a series of terrace drains leading to down drains.

In early January 2022, a 40-foot wide by 150-foot-long section of this fill-buttress slope along with terrace drains collapsed in a surficial landslide onto the Potrero Canyon Access Road below the existing bulkhead. As shown in Photo 1, based on aerial photographs from December 2021 (before the slide occurred) and January 2022 (following the slide), the landslide occurred at the geologic contact between QoAl and the Fernando Formation. Subsequently, the material that slid in 2022 was reactivated due to the heavy rains in early 2023 and again came down onto the Potrero Canyon Access Road.

Photo 3 shows the deteriorated state of the ribbed-metal bulkhead. The soil in front of the bulkhead looks to have sloughed away, the date of which this occurred is unknown, and the base of the bulkhead looks to be slightly undermined. The bulkhead also has vegetation roots that have broken through the corroded face of the bulkhead.

As shown by Photo 4, no tension cracks were observed to be affecting the Via de Las Olas/Friends Street roadway above. In addition, the storm drain system and the northern end of the in-place bulkhead does not show any signs of damage or water buildup. The storm drain inlet appears to be dry while the seepage at the slope face below the bulkhead is continuous.

Conclusions and Recommendations

The bluffs form an eroding cliff with the downslope component facing the sea with a history of constant erosion and landslides. The bluffs by their nature being composed of sandy and gravelly material are highly transmissive of subsurface water which moves through the formation and ultimately discharges to the slope face where the QoAI meets the less permeable silty-claystone Fernando Formation below it. It does not appear likely that the water emanating from the slope face is a result leaking storm water infrastructure. From previous review of available literature concerning the area and the seepage, GED feels that the seepage emanating from the slope face is a combination of groundwater and urban recharge on the mesa, the majority of which likely comes from irrigation water that seeps into the subsurface and ultimately discharges at the slope face as a contact spring. Considering the lithology of the subsurface, the dip of the bedrock formation, and the constant water seepage, the slope beneath the existing bulkhead is susceptible to further movement and erosion which will cause the undermining of the bulkhead to continue.

With respect to the current field conditions of the landslide that occurred in 2022 and 2023 below the existing bulkhead; a review of NavigateLA indicates the main mass of the slide is located on RAP property with approximately the lower 30% of the slide mass being situated on Cal Trans property. At a minimum, it is expected a repair of this slide will require the cooperation between RAP and Cal Trans under the review of the Los Angeles Department of Building and Safety. GED recommends the terrace drains adjacent to the landslide in Recreation and Parks property be cleaned out as necessary to allow for drainage control over the slope. In addition, GED recommends the landslide to be investigated and characterized to determine the appropriate slope and drainage repair.

The orientation of the Fernando formation shows to be dipping out-of-slope, unfavorable to gross slope stability. While a section of slope below the in-situ bulkhead may be susceptible to further slope movement, the Via de Las Olas/Friends Street roadway above appears to be in good condition and shows no signs of distress. While the in-situ ribbed-metal bulkhead does appear to be stable, it is in an ever-deteriorating condition. GED is referring the bulkhead issue to the Hillside Slope Stability Program for ranking as a possible Capitol Improvement Project.

Questions regarding this field investigation should be directed to Lisa Gerencher at (213) 847-0475 or Morton Price at (213) 847-0466.

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File Copy

ATTACHMENTS:

- Figure 1: Vicinity Map
- Figure 2: Site Location Map
- Photos 1 through 4

Box\GED\PROJECTS\23-222 Existing Bulkhead @ Via De las Olas and Friends Street



Photo 1: Photo on the left is of December 2021 before the slide occurred, and photo on the right is from January 2022 following the slide. The yellow outline illustrates the approximate limits of the slide on the before picture.



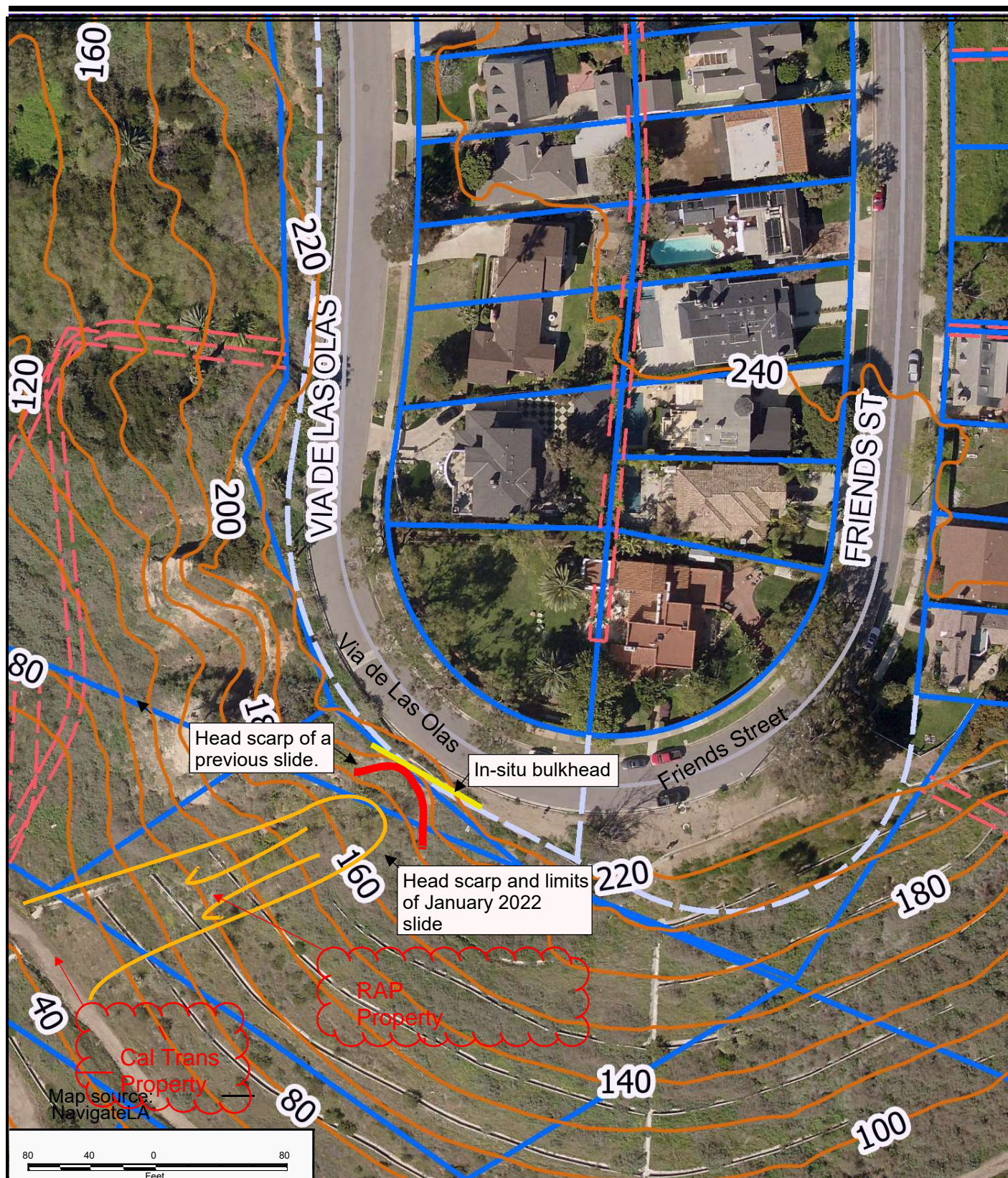
Photo 2: An August 30, 2023 LAFD aerial drone image shows a closer image of the head scarp of the slide. The geologic contact is outlined in red. Groundwater which has reached the surface emanates as a spring, where the alluvial terrace overlies the less permeable siltstone Fernando formation below.



Photo 3: The deteriorated state of the ribbed-metal bulkhead. The soil in front of the bulkhead looks to have sloughed off, the date of which it occurred is unknown, and the base of the bulkhead looks to be slightly undermined. The bulkhead also has roots that have broken through the corroded face of the bulkhead.



Photo 4: No tension cracks are observed to be affecting on the street, and the storm drain system and the northern end of the in-place bulkhead does not show any signs of damage or water buildup. As the drain appears dry, it does not appear likely that the water emanating on the slope is a result of a leaking storm drainpipe.

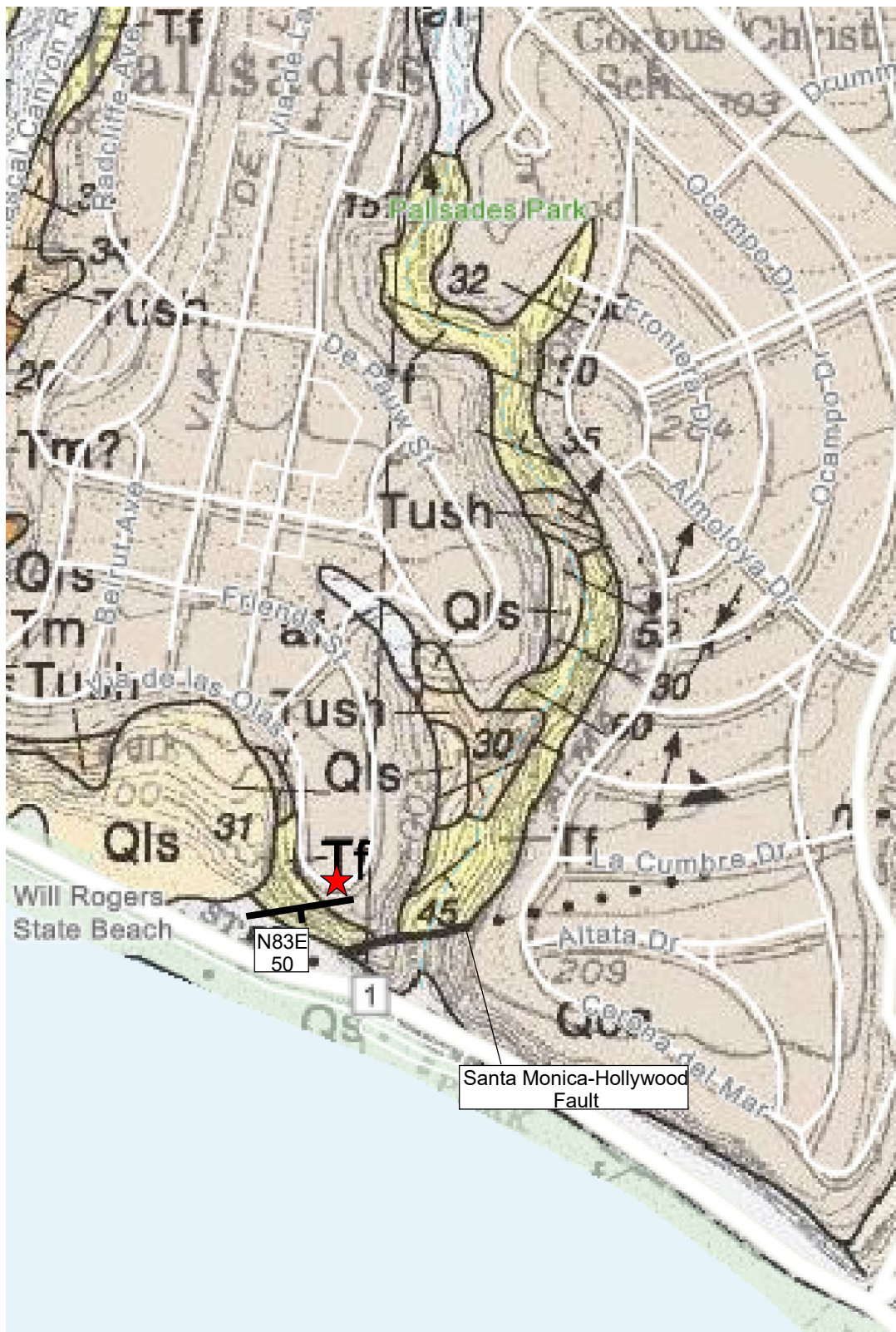


VICINITY MAP

Via De Las Olas at Friends Street

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FIGURE
No. 1



LEGEND



Fault, dashed
where inferred



Strike and dip of beds

N83E
50



SITE LOCATION/ REGIONAL GEOLOGIC MAP

Via De Las Olas at
Friends Street

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FIGURE
No. 2

Reference: Dibblee, T.W. and Ehrenspeck, H.E., Geologic map of the T.W., Jr., 1991, Geologic Map of the Topanga and ½ Canoga Park Quadrangles, Los Angeles County, California, Dibblee Geological Foundation Map #DF-35