

CITY OF LOS ANGELES

CALIFORNIA



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Date November 2, 2017 CF# 17-1037

To: Honorable Members of the City Council Public Safety Committee

From: Rob Freeman, Assistant General Manager
Emergency Management Department

RE: **LA TUNA FIRE RESPONSE AND RECOVERY SUMMARY REPORT**

On Wednesday, October 11, 2017, the Emergency Management Department (EMD) along with the Los Angeles Police Department (LAPD), Los Angeles Fire Department (LAFD) and Los Angeles Department of Transportation (LADOT) presented information to the City Council Public Safety Committee regarding the City's response to the La Tuna Fire which occurred on September 1, 2017. At the request and direction of the Public Safety Committee, EMD has compiled the following summary report on the response as well as recommended recovery and mitigation efforts for the burn area. The report includes direct input from the previously mentioned agencies as well as the Department of Public Works, Department of Recreation and Parks and Department of Animal Services. A detailed mitigation recommendation report from the Bureau of Engineering is attached for your information and review.

A. Incident Overview

On Friday September 1, 2017 at approximately 1:30 pm, LAFD units were dispatched to a reported vegetation fire near the intersection of La Tuna Canyon Road and Sunland Blvd. First arriving units found ¼ acre of brush burning alongside La Tuna Canyon Road on the north side. Companies made an aggressive attack on the flanks of the small fire and proceeded to position a hose line around the perimeter. Suddenly, a thunderstorm in the foothills to the north produced significant downdraft winds and spread the fire in a 360 degree pattern. This unexpected condition required the initial attack companies to retreat to safety.

At approximately 2:21 pm it was reported that the fire had jumped the 210 freeway and began to burn towards the Sunland area. Meanwhile the other open perimeter of the fire also began to spread aggressively towards Verdugo Peak and the City of Burbank. The escalation of the fire required a unified, multi-agency response.

B. Response Summary

1. LAFD/LAPD Unified Command

LAFD and LAPD co-located and established unified command within the first hour of the incident. An evacuation branch was developed within the Incident Command System.

Evacuation considerations were discussed immediately and staff began to work on identifying the locations that were most immediately impacted by the fire. With situational updates from field commanders, evacuation orders and locations were given through the first night and into the second day of the fire. Over 100 homes were evacuated during the two days. Shelters were designated and prepared for the arrival of the evacuees. Large animal evacuation was also underway with facilities being identified early on to house the animals.

Over the course of the incident there were unfortunately **5 residential structures** that were completely destroyed. There were also five outbuildings that also succumbed to the fire as well as a number of private vehicles.

- There were a total of **11 firefighter injuries** mostly related to heat and no reported civilian injuries.
- Total acreage burned in the fire including properties in Burbank and Glendale was **7,194 acres**. At the height of the incident **1291 personnel were assigned** to fight this fire.
- The command posture for this incident involved LAFD, LAPD, LA County Fire, Glendale and Burbank Fire in Unified Command
- The cause of the fire is still under investigation with no witnesses

2. Emergency Management Department Support

LAFD activated its Department Operations Center (DOC) on September 1 to ensure effective support to the Unified Command as well as inter-agency coordination. EMD provided a Liaison Officer to the DOC on September 2 and 3, 2017 and assisted with coordination of evacuation and mass care support with the Department of Recreation and Parks, Department of Animal Services and Department on Disability.

EMD assisted with the drafting of a Proclamation of Local Disaster in concert with the City Attorney's Office, the Mayor's Office of Public Safety and the Los Angeles County Office of Emergency Management. The Proclamation was signed by the Mayor on September 2, 2017 and then sent to the City Council for ratification.

EMD coordinated initial hillside and mitigation work on La Tuna Canyon Road with the Department of Transportation, Public Works Bureau of Engineering and Public Works Bureau of Street Services.

EMD assisted the Unified Command with public messaging through social media regarding receipt and management of donated good from the public. There was an outpouring of support for first responders by the community which resulted in large volumes of spontaneous donation of goods.

3. Department of Transportation Support

During the weekend of September 1-3, 2017, the Department of Transportation (LADOT) supported emergency responders through the unified command structure. LADOT

assisted in closing street segments to support fire fighting and evacuation activities. When the fire forced the closure of the I-210 Foothill Freeway in the Sunland-Tujunga area, LADOT facilitated the detouring traffic through the adjustment of traffic signal timing and the deployment of traffic officers as required.

When the boundaries of the freeway closure extended west to Wheatland Avenue, freeway traffic was detoured onto a section of Foothill Boulevard where LADOT had recently implemented a safety project between Wentworth Street and Sunland Boulevard. In April 2017, this section of Foothill Boulevard was reduced to one through travel lane in each direction following a comprehensive assessment of traffic and safety conditions. During the fire, the detouring freeway traffic exceeded the capacity of this section Foothill Boulevard, leading to extensive traffic congestion.

4. Department of Recreation and Parks Support

The Department of Recreation and Parks (RAP) General Manager, as the Chief of the Public Welfare and Shelter Division of the City's Emergency Operations Organization (EOO), authorized the RAP Emergency Preparedness Section to coordinate the following public welfare and shelter activities in support of the La Tuna Fire emergency operations:

- Assigned and dispatched a Mass Care Agency Representative to the Unified Command Post at the request of LAFD.
- RAP Duty Officer provided coordination between the City and Outside Agencies (Emergency Management Department, American Red Cross, Department of Transportation, and Public Works: Sanitation, Los Angeles Fire Department, Los Angeles Police Department, and Los Angeles County Fire Department).
- RAP assisted with traffic control and information dissemination for the cancellation of the Rodeo Event at Hansen Dam Equestrian Center on Sunday, September 3, 2017.
- **Activation of Shelters**

RAP activated the following shelter facilities in support of the incident and evacuated residents:

- **Public Shelter:** Friday, September 1, 2017, through Sunday, September 3, 2017, to support mandatory and voluntary evacuation orders.
 - Sunland Senior Citizen Center
8640 Fenwick Street
Tujunga, CA 91040
 - Total Dormitory Counts: 15
 - RAP Services Provided:
 - 24-Hour Facility Management
 - 24-Hour Maintenance Staffing
 - Emergency HVAC Technician deployment
 - Oversight of Kennels for Pets
- **First Responder Shelter:** Sunday, September 3, 2017 through Friday, September 8, 2017

- Lake View Terrace Recreation Center
 - Total Dormitory Count: 335
 - RAP Services Provided:
 - 24-Hour City-Operated Shelter Management
 - Shelter Manager
 - Shelter Workers
 - Maintenance Staff
 - Emergency HVAC Technician deployment
 - Emergency Plumber Deployment
 - **Activation of Shower Facility**
- RAP activated the following facility to support first responders to the incident:
- **Public Shelter Shower:** Saturday, September 2, 2017, through Sunday, September 3, 2017.
 - Hubert Humphrey Swimming Pool
12560 Filmore Street
Pacoima, CA 91331
 - Total Visits: 0
 - RAP Services Provided:
 - Aquatic Facility Management
 - Maintenance Staff
 - **24 First Responder Shower:** Sunday, September 3, 2017 through September 7, 2017
 - Hansen Dam Aquatic Center
11798 Foothill Boulevard
Lake View Terrace, CA 91342
 - Total Visits: 239
 - RAP Services Provided:
 - 24-Hour Aquatic Facility Management
 - Maintenance Staff
 - **Unified Command Post/Base Camp Activation:** Friday, September 1, 2017, through Friday, September 8, 2017.
 - Hansen Dam Foothill Parking Lot
11798 Foothill Boulevard
Lake View Terrace, CA 91342
 - RAP Services Provided:
 - Maintenance Support

5. Department of Animal Services Support

The Department of Animal Services coordinated activation and use of the Hansen Dam large animal shelter to accommodate the evacuation and sheltering of more than 300 horses in the fire area. Animal Services dispatched an Agency Representative to the Hansen Dam facility to work with horse owners and livestock. Upon arrival at the scene Animal Services reported that more than one hundred horses were already at the facility

having been transported by their owners. They then coordinated the sheltering of another 200 horses there and established a contingency plan to activate an additional large animal shelter at Pierce College in Woodland Hills. Ultimately, that additional shelter was not needed.

6. Department on Disability Support

At the request of LAFD DOC, EMD Liaison Officer reached out to the Department on Disability (DoD) to assist with the transport of ten residents of the Shadow Hills Convalescent Hospital located at 10158 Sunland Blvd., Sunland, CA 91040 to a shelter facility. DoD was able to re-assign a specialized transit van deployed to the City's Fleet Week event at the Port of Los Angeles to this mission which was successfully performed.

7. Public Works Support

The Bureau of Street Services (BSS) and Bureau of Engineering (BOE) provided support to address initial burn area risk of rock and debris slides on a portion of La Tuna Canyon Road where roadside barricades and barrier guards were burned. Crews were dispatched to the scene on September 3 and worked in coordination with the Department of Transportation to assess the risk and then install K Rail barriers to mitigate the hazard.

BSS performed an assessment of damage caused by the fire to structures under our responsibility for maintaining. The inspection identified the following items requiring repair:

7256 Lin. Ft. of Guard Rail

1700 Lin. Ft. of timber slough wall

During the event, BSS crews removed and cleared debris on La Tuna Canyon from the 210 Freeway to Sunland Blvd. in support of Los Angeles Fire Department crews navigating this roadway. Due to the loss of vegetation, BSS crews placed K Rail along critically burned areas to mitigate future mud-flow debris runoff in the interest of protecting the motoring public based on Bureau of Engineering and Department of Transportation recommendations..

C. Improvement/Mitigation Recommendations

1. Overview

Concurrent with the response phase of the incident, EMD initiated an inter-agency coordination effort to assess recovery needs for the La Tuna Fire Burn Area and to identify recommended mitigation strategies and programs including possible funding sources. EMD has assembled and chairs the La Tuna Fire Burn Area Mitigation Task Force which includes the following standing members:

- Animal Services
- Building and Safety
- Bureau of Engineering

- Bureau of Sanitation
- Bureau of Street Services
- CAO's Office
- Council District 7
- DOT
- EMD
- LAFD
- LAPD
- Los Angeles County Department of Public Works
- Mayor's Office of Public Safety
- Recreation and Parks
- Water and Power

2. Recovery of Response Costs

LAFD and the CAO's Office are coordinating the capture and tracking of all City agency response costs for the La Tuna Fire. Reimbursement for these costs is being applied for through the Fire Management Assistance Grant (FMAG) program and the California Office of Emergency Services. The La Tuna Fire Burn Area Mitigation Task Force is not directly involved with this cost recovery effort but includes the CAO's Office in our meetings to ensure effective coordination of all recovery related matters.

3. Response Best Practices and Improvement Recommendations

This initial report is not a formal after action report but the response agencies have identified some specific areas of operation that worked effectively during this incident as well as recommendations for improvement in future incidents of this type.

Effective Practices

- Early identification of an escalating multiple day incident allowed for support teams to be activated early. These team members began to transition from initial attack to extended attack on the second day of the fire. This allowed us to develop an operational tempo that met the needs of the incident.
- Early application for the Federal Management Assistance Grant (FMAG) expedited its approval and a 75% cost share for the entire incident.
- Collaboration with adjacent agencies was seamless because of countless hours spent training for these types of fires.
- Activation of the Department Operations Center (DOC) facilitated the management of the rest of the Department.

Areas for Improvement

- During the first alarm of the incident LAFD had two helicopters that were performing hoist operations for injured hikers. This slightly delayed initial attack from the air in that only one airship was available immediately on the dispatch. Fortunately, because of the contract we have in place with Erickson, the Skycrane was dispatched immediately as well as air resources from LA County fire. We are also pursuing the purchase of a new A 139 that will complement and standardize our airship inventory.
- A FEMA Deployment to Hurricane Irma had many of LAFD's highly trained incident support members not available. Over 70 members from the LAFD were on this deployment. Unfortunately, the timing for this could not be predicted and the Department. The Department recognizes the need to continue to aggressively train our members in matters of large scale incident management. We had requested a training specialist for this fire to make certain that the members that were assigned were getting the appropriate documentation to gain credit for certifications.
- Due to an identified gap in large animal sheltering, RAP and Animal Services have developed and drafted a Standard Operating Procedure (SOP) for activating the Equestrian Center as a Large Animal Shelter. This SOP needs to be reviewed and updated to factor in lessons learned from the La Tuna Fire incident including more effective coordination with resident horse owners and the shelter sites.
- In future response efforts the City needs to more effectively utilize the NotifyLA emergency mass notification system. The system can alert residents regarding hazards or evacuation instructions through telephone, email and text. EMD, LAPD and LAFD are revising Standard Operating Procedures for use of the system and have already performed an initial test alert for residents in the La Tuna Fire Burn Area.
- EMD is reviewing our Donations Management policies and procedures in order to improve the City's ability to accept and manage donated goods from the public.

4. Public Works Hazard Assessment and Mitigation Recommendations

The Bureau of Engineering (BOE) is leading the City's effort to assess the risks facing the burn area and develop specific strategies and recommendations for mitigation work. The goal of this effort is to mitigate the potential for winter storm related damage to the burn area from mudslides and debris flows. BOE is working in cooperation with the Los Angeles County Department of Public Works to define and map the burn area, identify specific streets and properties at greatest risk and move forward with specific mitigation work that can be performed with available resources.

BOE's Geotechnical Engineering Division (BOE-GED) has investigated the area adversely affected by the fire and evaluated areas potentially posing significant erosion and debris

flow hazards to the City's right of way and infrastructure. A detailed analysis from BOE is attached to this report. The analysis identifies 16 sites and provides specific mitigation recommendations for each. The recommendations include installation of K Rail, removal of debris from catch basins, installation of debris fences and repair of slough walls.

The Bureau of Street Services (BSS) has confirmed their winter weather response plan includes direction for crews to monitor and remove runoff debris during rain as needed in addition to working with Los Angeles County to stage equipment to respond quickly to these events. Please refer to the attached report for a more comprehensive review of the recommendations.

The Bureau of Sanitation (LASAN) remains committed to performing all necessary maintenance, enacting the procedures to protect public health and the environment, and preventing flooding to the greatest extent possible during storm events. All critical elements of the storm drainage system, including the La Tuna Burn Area have been inspected and maintained in anticipation of the upcoming rainy season. Additionally the La Tuna area has been added to the Bureau's Wet Weather Preparedness and Operations Plan to ensure crews will inspect the area during storm events. Nevertheless localized flooding and mudslides can be expected during heavy rain events, so LASAN will coordinate resources with its partners in both the City and County to mitigate all hazards that may arise.

BOE and EMD are working closely with our partners in the Los Angeles County Department of Public Works. The County has developed a set of detailed "phase maps" that show specific areas of the City that are at risk for mudslides or debris flows during winter storms. These maps are intended for use by first responders only, additional maps are being prepared that can be shared with all response and support agencies. During a storm event, the information on these maps will be used by the City to identify areas requiring evacuations based on warning provided by County Public Works engineers. This will assist ongoing efforts by BOE-GED geotechnical engineers to assess storm risk and advise LAFD and LAPD regarding the need for proactive evacuation and community notification and alert.

County Public Works has already coordinated debris removal from the two major debris basins within the City that they maintain; La Tuna Debris Basin and Chandler Debris Basin. The City facilitated access to the sites and confirmation of haul routes to ensure minimal impact on those affected communities. These basins are now ready for winter storm weather but may need to be cleared out again following storm events.

County Public Works has also offered to repair and or replace several damaged "rail and timber" debris structures which they installed in the 1980s. This effort requires gaining access to private property which is being coordinated by the Department of Building and Safety and the Bureau of Engineering.

The NRCS and BOE in concert with Recreation and Parks (RAP) have also identified the need for a new rail and timber structure to protect RAP property in the burn area. Due to the concern of possible mud flows, as a result of burned slopes on RAP owned park lands in Verdugo Mountain Park, -which is bordered by residents along the southern edge- RAP

is in the process of performing a geotechnical study of the Verdugo Mountain Park. We will be working with the contracted vendor that performed the same type of study after the Griffith Park Fire.

BOE and EMD are also working closely with the Natural Resource Conservation Service (NRCS) Emergency Watershed Protection program to determine which of our mitigation strategies and recommendations may be eligible for cost recovery. Approved projects can be reimbursed up to 75% of the total cost. EMD has filed a formal notice of interest with NRCS that has been received and acknowledged. Staff from their Lancaster Field Office visited the burn area October to study the damage and risks. Members of our La Tuna Fire Burn Area Mitigation Task Force joined these site visits. We anticipate a formal report on their findings will be issued within the next two weeks. EMD and BOE will then coordinate application for any specific projects that are deemed eligible. Preliminary discussions with NRCS indicate that some of the mitigation recommendations made by BOE in their report may be eligible for reimbursement grant funding. EMD will advise the Public Safety Committee regarding the NCRS report and next steps moving forward.

5. Community Outreach

Throughout the response phase and into the recovery and mitigation phase, it is critical that the City provide timely, accurate information about the impact of winter weather on the burn area. County Public Works crews have been on site to survey over three hundred residences in the City that would be impacted and have provided information on storm preparedness to the residents. All of the departments on the City's Task Force are following suit to make information available to residents through their websites, social media and in person.

Council District 7 County Supervisor Barger have organized a Town Hall meeting for November 14, 2017 where residents in the burn area will be able to hear presentations from first responder and support agencies and ask them questions about storm preparation and steps the City is taking to protect property and infrastructure. We are also reaching out to CD2 to arrange an additional Town Hall meeting for their constituents.

LAPD Foothill Division has utilized the Foothill Area application, Facebook, and Instagram to post information concerning the NotifyLA system test, to encourage community members to subscribe to NotifyLA system. The social media outlets were utilized to educate the public concerning the benefits of receiving the alerts for critical weather, flood and evacuation information.

Foothill Senior Lead Officers (SLOs) have educated the community at neighborhood watch and neighborhood council meetings concerning the La Tuna Canyon Fire task force preparation, mitigation efforts, and the NotifyLA system and have discussed the fire and task force efforts at the Community Police Advisory Board meeting.

EMD's Public Information Officer is coordinating social media outreach with all Task Force member agencies and efforts to encourage residents to register for NotifyLA so they can

receive alerts.

6. Transportation Efforts

Following the fire's containment, many members of the community expressed concerns to the Department of Transportation (LADOT) about how the safety project along Foothill Boulevard could affect evacuations, as well as detoured freeway traffic. The Department has analyzed both conditions.

While Foothill Blvd. was not part of any evacuation route during the La Tuna Canyon fire, in the event that a section of Foothill Blvd. is used as an evacuation route, the street would be closed to inbound traffic. Under these conditions, the full street width could be made available for evacuation traffic, regardless of the normal lane configuration.

To facilitate detour traffic during an incident that requires a long-term freeway closure in this section, LADOT has developed a plan to temporarily convert the street to two lanes in one or both directions as needed. Signs will be deployed along the project section to clarify the temporary lane assignment during the incident.

In preparation for this detour operation, approximately half of the existing plastic delineators will be removed to facilitate ease of access across them. When such a freeway closure is anticipated to last for 12 hours or longer, LADOT field personnel will have the ability to implement temporary traffic controls (cones, barricades, signs) to add additional capacity and ease traffic congestion during the detour.

D. Conclusion

This preliminary report provides an overview of response efforts and proactive planning efforts moving forward to recover and prepare for winter storms. Requests for additional or more detailed information can be directed to Rob Freeman of the EMD for response. Individual departments are also available to address concerns that are specific to their area of operation.

Attachment:


BOE La Tuna Fire Burn Area Mitigation – Assessment and Recommendations W.O.
E1908261

CITY OF LOS ANGELES
INTER-DEPARTMENTAL CORRESPONDENCE

DATE: November 1, 2017

TO: Aram Sahakian, General Manager
Emergency Management Department

Attn.: Robert Freeman, Assistant General Manager

FROM: Gary Lee Moore, City Engineer 
Bureau of Engineering

SUBJECT: **La Tuna Fire Burn Area Mitigation – Assessment and Recommendations**
W.O. E1908261 **BOE-GED File No. 17-200**

The Bureau of Engineering's Geotechnical Engineering Division (BOE-GED) has investigated the area adversely affected by the subject wildfire and evaluated areas potentially posing significant erosion and debris flow hazards to the City's right-of-way and infrastructure.

The attached "Site Location Map" illustrates the burn area limits, local city boundary, and locations of sites evaluated by the BOE-GED. The attached table "Table 1 – Evaluation Sites" provides the assigned site number, location, description and mitigation recommendations. Photos of the sites and two Field Investigation Reports prepared following the fire are presented after the table.

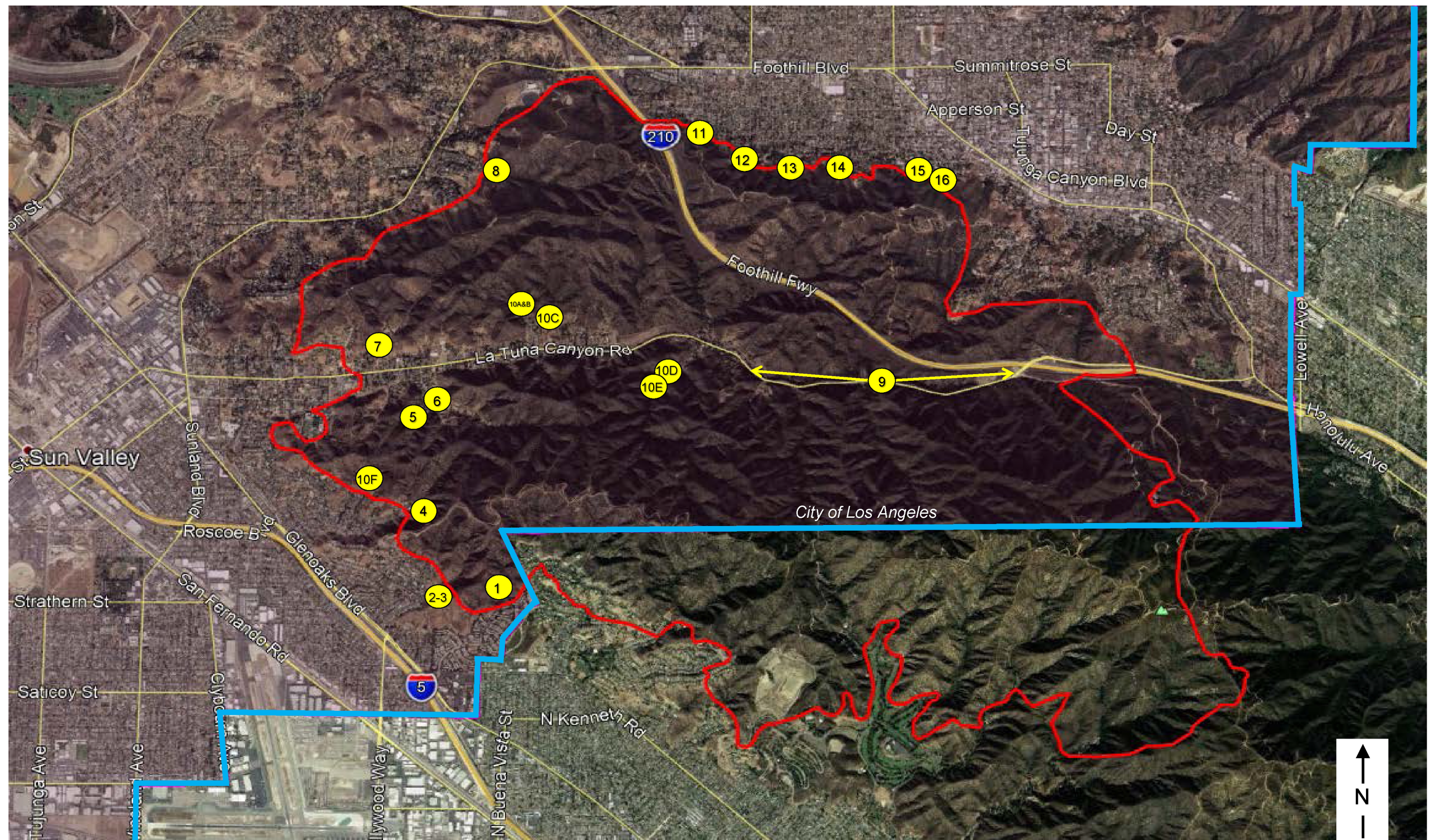
We understand the Emergency Management Department is compiling information prepared by the responding departments and that the information provided herein will be included in a coordinated, single report to the Council.

If you have any questions, please contact Patrick Schmidt, of my staff, at (213) 847-0535.

GLM/AM/PS:ab

Q:\GLM\City Engineer\GLM Signed Documents\2017 Documents\La Tuna Fire Burn Area Mitigation 11012017.pdf

cc: Ken Redd, Bureau of Engineering
Alfred Mata, Bureau of Engineering
Patrick Schmidt, Bureau of Engineering



LEGEND

City of Los Angeles Boundary

Fire Perimeter

Evaluation Site Number

Scale (ft.)
3000 1500 0 3000

SITE LOCATION MAP

LA TUNA FIRE

BUREAU OF ENGINEERING
GEOTECHNICAL ENGINEERING DIVISION
(BOE-GED)
GED FILE NO.: 17-200

FIGURE 1

La Tuna Fire

Table 1 - Evaluation Sites

| Site No. | Location | Description | Recommendation |
|----------|--|--|--|
| 1 | Villa Cabrini Park, 9401 N. Cabrini Drive West | A south-trending drainage empties into the park. No debris basin is present. Runoff is vaguely directed through the Park to a culvert inlet structure immediately adjacent to the street. | Install 160 LF of K-rail on top of the embankment immediately N/O the street and E/O the culvert inlet structure. |
| 2 | 8024 Hollywood Way | Runoff from a drainage located on Rec. & Park property is directed to an unlined debris basin, which drains to a cinderblock standpipe. | Remove accumulated soil and rock from the debris basin to increase it's capacity. Install a 25' (L) x 10' (H) revetment/debris rack in front of the standpipe to prevent it from becoming clogged. |
| 3 | 8120 Hollywood Way | Runoff from a drainage located on Rec. & Park property is directed to an unlined debris basin, which drains to a CMP standpipe. | Remove accumulated soil and rock from the debris basin to increase it's capacity. Install a 65' (L) x 4' (H) debris fence in front of the standpipe to prevent it from becoming clogged. |
| 4 | 9901 W. Roscoe Blvd. | Runoff from a drainage located on Rec. & Park property is directed to the Los Angeles County's Chandler Debris Basin. | The debris basin has been cleaned out by the County. No further action is required. |
| 5 | 8945 Morning Glow Way | Runoff from two drainages located on Santa Monica Mountain Conservancy property is directed into two concrete-lined debris basins, which direct runoff into a cul-de-sac. | According to City Plan No. D-29272, both debris basins ("A" & "B") are privately owned and maintained. Both basins have been cleaned out. No further action is required. |
| 6 | 9046 Morning Glow Way | Runoff from a sizeable east-west trending drainage is directed to a large concrete-lined debris basin. The debris basin is clogged with vegetation, including trees and bushes. | According to City Plan No. D-29272, this debris basin ("A") is to be maintained by the City of Los Angeles. The debris basin needs to be cleaned out. The Bureau of Sanitation has been notified. |
| 7 | 301 N. Del Arroyo Drive | Two large south-trending drainages converge at this property. Unable to gain access due to a warning signs and a locked gate. | Due to inaccessibility, unable to make any recommendations. |
| 8 | 9958 Sunland Blvd. | A large northwest-trending drainage directs runoff into and along the entire length of Teazle Canyon Road--a private roadway. The drainage course, which is located entirely in private property, was intensely burned and represents a high debris flow hazard. No debris containment devices or improvements are present. | If possible, have General Services Real Estate Division obtain a written agreement with the property owner and have Los Angeles County install a 70' (L) and 10' (H) revetment/debris rack across the drainage. |
| 9 | 7400-8400 La Tuna Canyon Road | Refer to Field Investigation 17-200 (attached) for detail. | Install K-rail and repair slough walls per the recommendations contained in Field Investigation 17-200 (attached). In addition, this portion of the roadway should be closed before forecasted high-intensity rainfall events and remain closed until the road is inspected and cleared of any debris. |
| 10 A-E | Debris fences located in various locations | Refer to Field Investigation 17-205 (attached) for detail. | If possible, have General Services Real Estate Division obtain written agreements with the various property owners and have Los Angeles County repair the debris fences per the recommendations contained in Field Investigation 17-205 (attached). |
| 11 | 8564 Day Street | A moderately sized drainage located on private property directs runoff towards the intersection of Sherman Grove Avenue and Day Street. The drainage was not burned by the fire. | No action is required. |
| 12 | 8422 W. McGroarty Street | A drainage on private property directs runoff towards McGroarty Street near Oro Vista Avenue. The upper portions of the drainage burned with moderate intensity, while the lower portions were unburned. The drainage channel has a relatively long and gently sloping runoff on private property. | It is BOE-GED's opinion that debris would be contained on private property. No action is required. |
| 13 | 10032 N. Chapin Way | Drainages on private property direct runoff towards Chapin Way and Chapin Lane. The drainages were largely unburned. | No action is required. |
| 14 | 10007 N. Moy Lane | Runoff from drainages on private property is directed towards Moy Lane. Substantial portions of the drainages were unburned. Where the drainages were burned, the fire burned with low to moderate intensity. Additionally, the drainage channels have relatively long and gently sloping runouts on private property. | It is BOE-GED's opinion that debris would be contained on private property. No action is required. |
| 15 | 7700 W. McGroarty Street | Moderately steep and undeveloped slopes on private property descend directly to a City street. The slopes were unburned. | No action is required. |
| 16 | 7570 W. McGroarty Terrace | Multiple north-south trending drainages are located on Rec. & Park property and drain towards a City street and park. The western drainages are largely unburned and debris is contained behind a debris fence located west of the McGroarty Cultural Center Building. The east drainage is partially burned, represents a moderate debris flow hazard, and empties towards a stacked cobble and mortar-filled catch basin and energy dissipator located east of the McGroarty Cultural Center Building. | Remove the soil and debris accumulations behind the existing debris fence west of the McGroarty Cultural Center Building. To increase capacity, remove soil and debris accumulations from the catch basin east of the McGroarty Cultural Center Building. Also, install a 40' (L) x 4' (H) debris fence behind the stacked cobble and mortar-filled wall to increase capacity and prevent the catch basin from becoming clogged. |



Site 1: Looking northeast across Cabrini Drive West towards Villa Cabrini Park. The yellow arrow points out a culvert inlet structure, which collects and directs runoff away from the park.



Site 1: Looking west across the front of the park. The double yellow arrow points out where 160 linear feet of K-rail has been recommended to be placed in order to prevent debris flow from entering the street.



Site 2: Looking east across Hollywood Way towards a drainage swale located in the middle of Edmore Place.



Site 2: Close up of a concrete block outlet structure located at the eastern end of the drainage swale.



Site 2: Looking west across the debris basin towards the embankment comprising the western side of the debris basin.



Site 2: Looking east across the debris basin and the burned and denuded slopes surrounding the basin.



Site 2: Looking west towards the channel leading to the outlet structure.



Site 2: Looking south across the channel leading to the outlet structure. The double yellow arrow points out where a 25' (L) x 10' (H) revetment or debris rack has been recommended to be installed across the channel to prevent the outlet structure from becoming clogged with debris.



Site 3: Looking north across a debris basin located adjacent to the property of 8125 Hollywood Way. Note the amount of debris that has accumulated in the basin.



Site 3: Looking west towards the outlet structure. The double yellow arrow points out where 65 linear feet of debris fencing has been recommended to be installed in order to prevent the outlet structure from becoming clogged with debris.



Site 3: Looking south across the debris basin.



Site 3: Looking north and up the drainage which empties into the northern end of the debris basin. Note the amount of accumulated soil and rock in this portion of the basin.



Site 4: Looking northeast towards Los Angeles County's Chandler Debris Basin. The property of 9901 Roscoe Blvd. is located left of the channel.



Site 4: Debris being removed from behind the Chandler Debris Basin.



Site 5: Looking southeast towards a concrete-lined debris basin located on Santa Monica Mountain Conservancy property, which is located immediately adjacent to 8948 Morning Glow Way.



Site 5: Looking southwest towards a concrete-lined debris basin located on Santa Monica Mountain Conservancy property, which is located immediately adjacent to 8945 Morning Glow Way.



Site 6: Looking northwest across a private access road towards a relatively large concrete-lined debris basin located between 9046 Morning Glow Way to the north and Sun Glow Way to the south.



Site 6: Looking southwest across the debris basin. Note how the basin is overgrown and clogged with vegetation.



Site 8: Looking west towards a culvert inlet structure, located adjacent to Sunland Blvd. and approximately 100 feet south of the intersection of Sunland Blvd. and Teazole Canyon Road (a private street), which directs runoff from Teazole Canyon to the City's stormwater collection system.



Site 8: Looking southeast and up Teazole Canyon which has been severely burned. The double yellow arrow points out where a revetment or debris rack has been recommended to be installed across the channel.



Site 11: Looking south towards the unburned drainage located southwest of the intersection of Sherman Grove Avenue and Day Street.



Site 12: Looking southwest towards the upper portions of the drainage which burned with moderate intensity. Note the drainage channel is relatively gently sloping.



Site 12: Looking northeast along the unburned lower portions of the drainage. Note the drainage channel is gently sloping and has a relatively long runout on private property.



Site 13: Looking south along Chapin Way. Note the unburned drainages above Chapin Way.



Site 14: Looking south towards one of two drainages above Moy Lane. Substantial portions of this drainage were unburned.



Site 14: Looking south towards the second of two drainages above Moy Lane. Note the low to moderate intensity of the burn. Also note the relatively gently sloping nature of the drainage channel.



Site 15: Looking southeast towards the slope that descends directly to McGroarty Street. Note, the slope is unburned.



Site 16: Looking southwest towards the debris fence that is located west of the McGroarty Cultural Center Building. Note, the accumulations of soil and debris behind the debris fence.



Site 16: Looking south towards the stacked cobble and mortar-filled catch basin. The double yellow arrow points out where a 40' (L) and 4' (H) debris fence has been recommended to increase debris storage capacity and prevent the catch basin from clogging.

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

FWB
9/21/17

Date: September 21, 2017
GEO File No.: 17-200
C.D. No. 7

SUMMARY OF FIELD INVESTIGATION

Location: 7400-8400 La Tuna Canyon Road
2005 Thomas Guide: Page 503-G7-J7
Requested By: Ed Yu (LADOT)
In Attendance: Eric Noreen (Geotechnical Engineering Group)
Date of Investigation: September 4 and September 13, 2017

DESCRIPTION AND REMARKS

At the request of the LADOT, the Geotechnical Engineering Group (GEO) has completed a field investigation regarding potential rockfall and debris flow hazards which may result from the La Tuna Canyon fire. This field investigation has been prepared to summarize the observations made and to provide preliminary recommendations relative to the identified problems. A subsurface investigation was not performed as part of this study.

Summary of Observations

As illustrated in the Vicinity Map (Figure 1), the site is in a relatively undeveloped area of the Verdugo Mountains south of the 210 Freeway and the Sunland/Tujunga communities of Los Angeles. This site is within the boundaries of the La Tuna Canyon Fire that burned over 7,000 acres over the Labor Day weekend earlier this month. The Field Investigation site consists of the roadway, adjacent shoulders, and immediate slopes from 7400 to 8400 La Tuna Canyon Road.

GEO was requested to assist in locating K-Rail along La Tuna Canyon Road on Monday September 4th, while the fire was approximately 70% contained and the road was closed. GEO drove the subject length of La Tuna Canyon Road with Street Services and LADOT to assess the immediate hazards posed to the roadway due to the fire. Several sections of timber lagging slough walls on the south side of the street were observed to have burned out bays of lagging below high steep slopes with boulder/debris potential.

GEO worked directly with Street Services in placement of K-Rail barriers in the most critical areas to prevent rockfall from migrating onto the road. GEO also recommended and observed placement of K-Rail at a gully confluence that is at grade with the road which may have a high potential for mud flows in the upcoming rain season. Approximately 480 linear feet of K-Rail was placed on September 4th.

GEO visited the site again on September 13th to more fully assess the fire damage adjacent to the road as well as hazards posed to vehicular traffic along this section of La Tuna Canyon Road. Numerous photos (200+) were taken of the observed burn area,

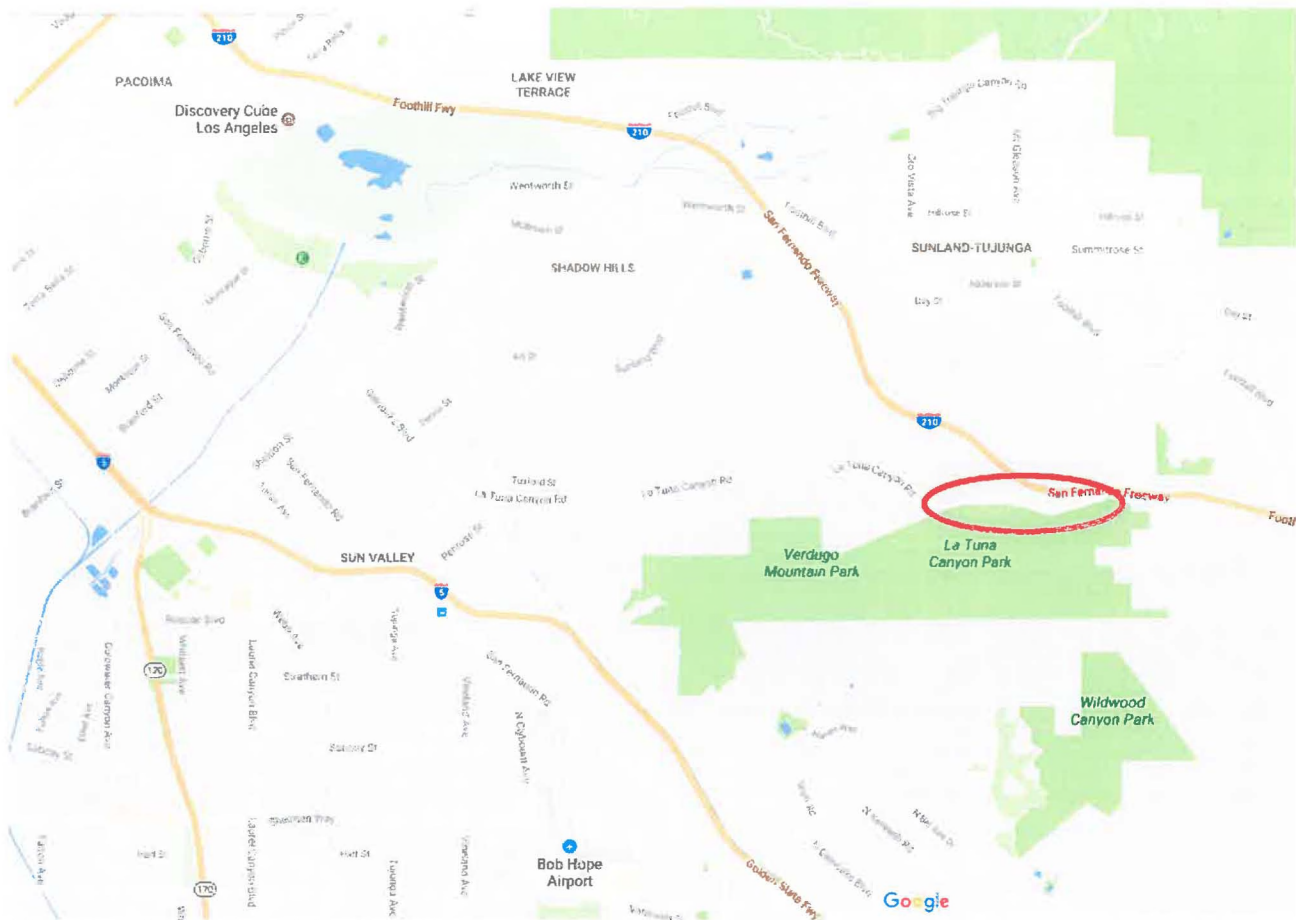


Figure 1: Vicinity Map of the site area denoted by the red circle.

damage, and hazards to the roadway. Several of these photos are reproduced herein as examples of the type of damage or hazard observed. These photos will be retained by GEO for review by others upon request.

As indicated in Photo 1, the fire completely burned out some sections of lagging of the slough walls on the south side of La Tuna Canyon Road. For the subject section of road, the timber lagging of the slough walls was burnt out in the fire as indicated on attached Plates 3-6.

As indicated in Photo 2, the north side of La Tuna Canyon Road has guard rail on the shoulder that has had significant amounts of its supporting posts burnt out. While there are a few sections of guard rail that has metal posts, most the guard rail present is supported by wood. Along this stretch of road, the wooden guard rail posts have either completely burnt out or were burned enough as to no longer provide adequate impact resistance as indicated on attached Plates 3-6.

As indicated in Photo 3, there are culverts that intersect the roadway on the south side to convey stormwater under the roadway to outlet into the canyon on the north side of the road. Several of these culverts do have debris fences in place adjacent to the pipe inlets or upslope within a channel as indicated on attached Plates. However, some of the culvert locations do not have any debris fences. Also, there are several gully's that intersect the road that do not have a culvert or any debris fences.

As indicated by Photo 4, there are areas on the south side of the road that do not have slough walls or any other means of protecting the roadway from debris or rockfall.

As indicated by Photo 5, some of the in-place hazard mitigation improvements are currently overwhelmed or are ineffective. The chain link fence seen in the photo is standard property line fencing that is not designed to retain debris. Several sections of this fencing have failed.

It was observed that the posted speed limit for this section of road is 50 miles per hour and some vehicles using this road exceed this limit.

From a review of NavigateLA records, it appears that the properties adjacent to the public right of way on the south side of the road are owned by the State of California (Caltrans.)



Photo 1: View west along the south side of La Tuna Canyon Road. Note the sections of lagging that are completely burnt out as well some sections that are relatively intact. Also note the debris piles behind the slough wall.



Photo 2: View west along the north side of La Tuna Canyon Road. Note the burnt-out wood support posts for the guard rail.



Photo 3: View east from the shoulder area next to a culvert along the south side of La Tuna Canyon Road. Note the two debris fences.



Photo 4: View south towards an active debris apron.



Photo 5: View south towards an active debris and rubble apron that has overwhelmed a 'debris fence' that consists of standard chain link.

Conclusions and Recommendations

The entirety of the Field Investigation area was affected by the fire with varying burn severity that will produce a high potential for mud and debris flows during the rainy season. Without vegetation on the slopes, sheet stormflow will become more easily channelized and erosive. The areas with severe burn in the slopes above the roadway, particularly areas with vegetation that burned below ground as seen with white ash, will likely experience the greatest amounts of material that will become mobilized as mud and debris. The lack of vegetative cover will also likely increase the potential for rockfall hazards in areas where over steepened slopes are directly adjacent to the roadway.

The K-Rail placed on September 4th will help protect the roadway from debris in the areas where it was placed. However, it should be noted that the K-Rail already placed, and the recommendations contained herein, may not be adequate to eliminate the debris and rockfall hazards to the roadway. As such, it is recommended that this section of roadway be monitored periodically and regularly by GEO and Street Services during the rainy season, particularly after significant storm events, for maintenance and the potential need for additional mitigation measures. In addition, there are numerous other areas that GEO recommends that further mitigative effort be initiated as soon as possible. These affected areas and recommendations for repairs, replacement, and new mitigation measures are presented in the attached Plates 1-6.

Due to the high speed of traffic in the area, it is recommended that K-Rail placement at the site, whether existing or recommended, be reviewed by LADOT and Street Services for any modifications as necessary to protect vehicular traffic. The K-Rail itself can pose a collision hazard to vehicles. To address this, it may mean the addition of K-Rail to eliminate gaps in the K-Rail, angling the ends of K-Rail rows into the slope, or placement of sand barrels at the ends of rows to limit this hazard.

It is recommended to replace all the burned timber lagging of the slough walls as indicated on the attached Plates, prior to the rainy season. If the timber lagging is replaced, the K-Rail at these locations can be moved to other areas as needed.

Several high burn intensity areas with existing culvert/retention basins may be undersized for potential mud/debris flows and may benefit from new or enlarged debris fences as indicated on the attached Plates.

Certain gulley's and culverts that intersect the roadway will benefit from the placement of K-Rail and new debris fences as indicated on the attached Plates. K-Rail placement at these locations should be considered temporary and will likely require anchoring to prevent them from moving during a debris flow event.

As recommended, the locations for new debris fences are on properties believed to be owned by the State of California (Caltrans.) As such, it is advisable to confer with Caltrans to determine the siting, ownership, and maintenance responsibilities for debris fences on these properties.

The guard rail support posts on the north side of the roadway will need to be replaced where they have completely burned out or have been sufficiently damaged that they no

longer adequately support the guard rail. It is estimated that approximately 550 posts must be replaced, and possibly more as determined by Street Services or LADOT.

Several locations are indicated on the attached Plates where it is recommended to install new slough walls. If new installation of slough walls at these locations cannot be initiated prior to this year's rainy season, it is recommended to place K-Rail along the entire lengths indicated.

Prior to the replacement of the timber lagging or the new installation of slough walls, it is recommended to remove existing debris in these areas to accommodate future rockfall and debris events.

Questions regarding this field investigation should be directed to Eric Noreen at (213) 847-0507.

cc: Edgar Duncan, Street Services
Ed Yu, LADOT
R. Gustavo Ortega, Caltrans

ATTACHMENTS:

- Plates 1 through 6

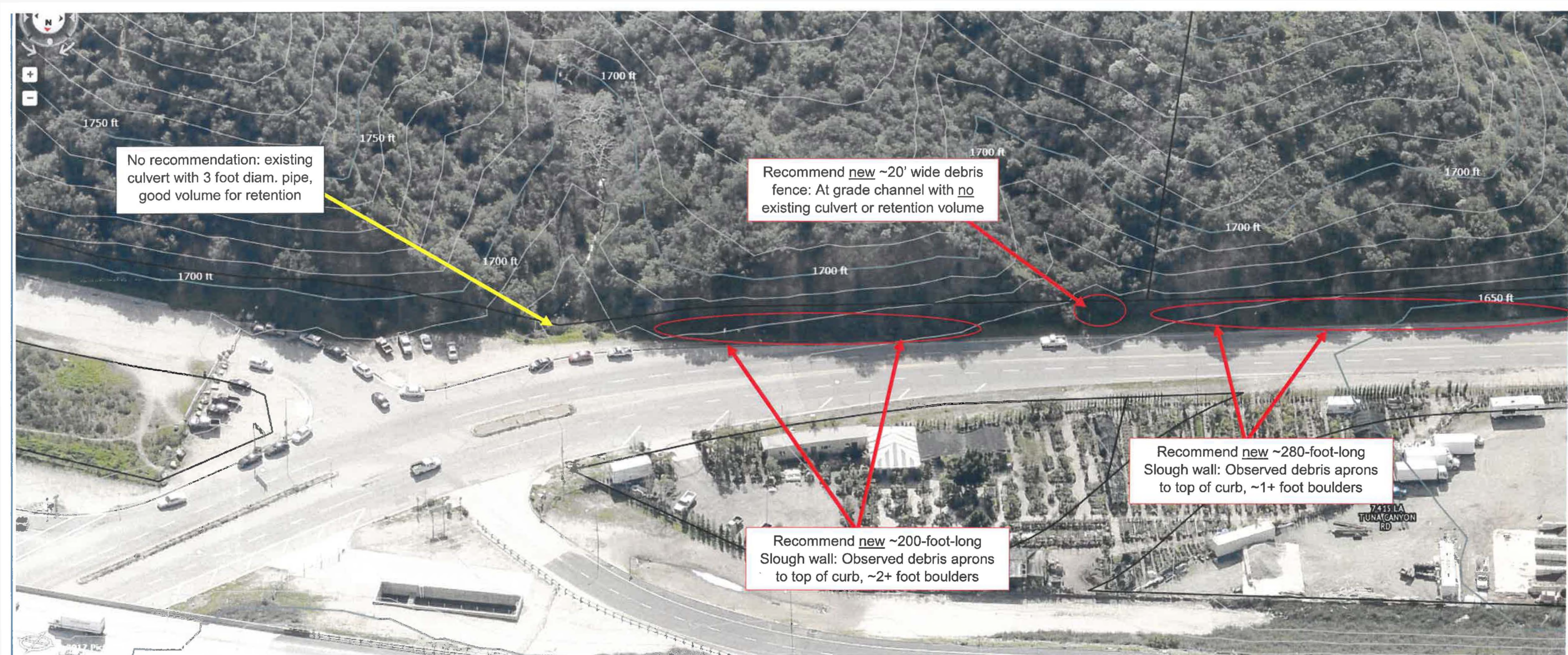


Plate 1: Looking south towards La Tuna Canyon Road adjacent to the 210 Freeway. Note the annotations regarding observations and recommendations. Oblique aerial image showing parcel boundaries in solid black lines (Pictometry). The following Plates are overlapped by approximately 60 feet. Areas with recommendations denoted in red, no action in yellow.

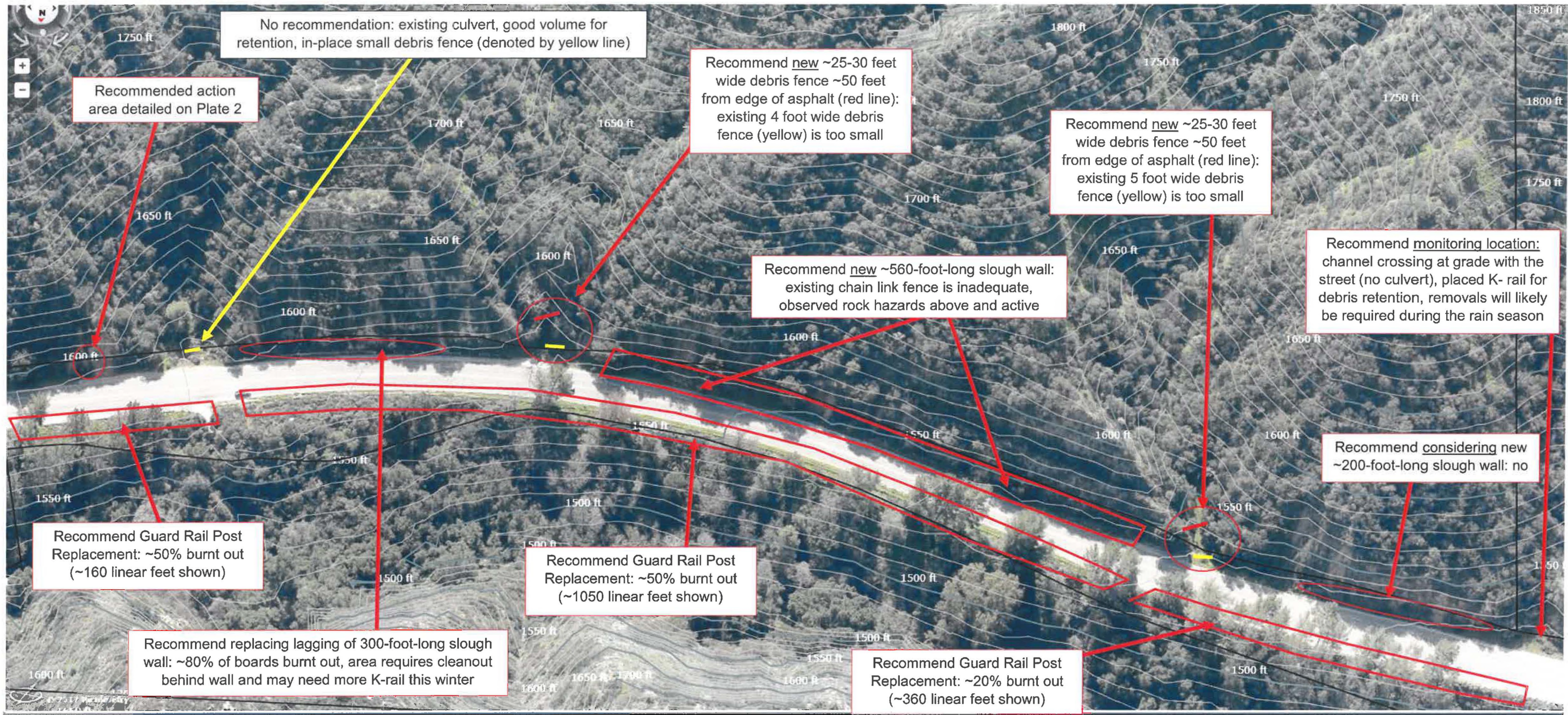


Plate 3: Looking south, ~500 feet west of 7415 La Tuna Canyon Road (on the left side of the photo.) Note the annotations regarding observations and recommendations. Oblique aerial image showing parcel boundaries in solid black lines (Pictometry). Areas with recommendations denoted in red, no action in yellow.

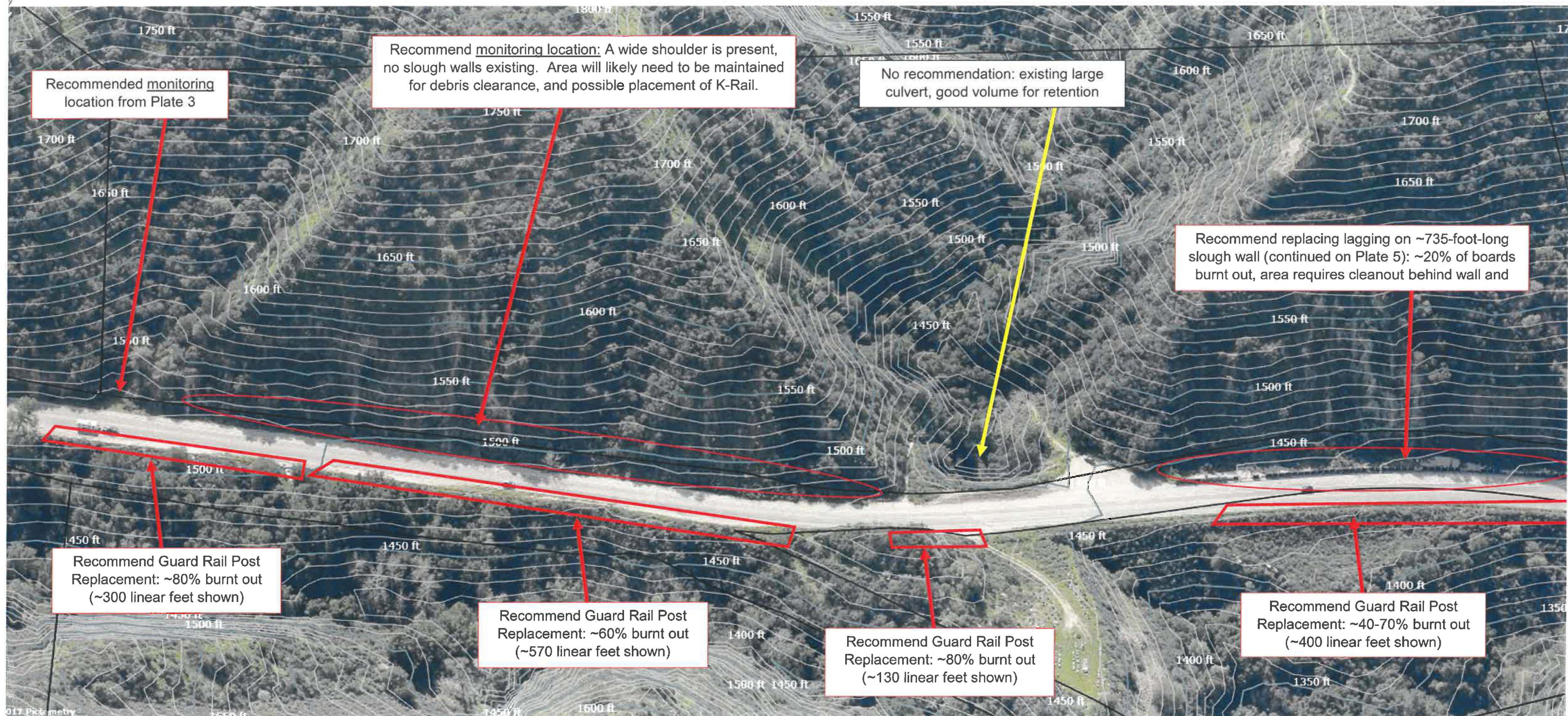


Plate 4: Looking south, ~2100 feet along the roadway west of 7415 La Tuna Canyon Road (on the left side of the photo.) Note the annotations regarding observations and recommendations. Oblique aerial image showing parcel boundaries in solid black lines (Pictometry). Areas with recommendations denoted in red, no action in yellow.

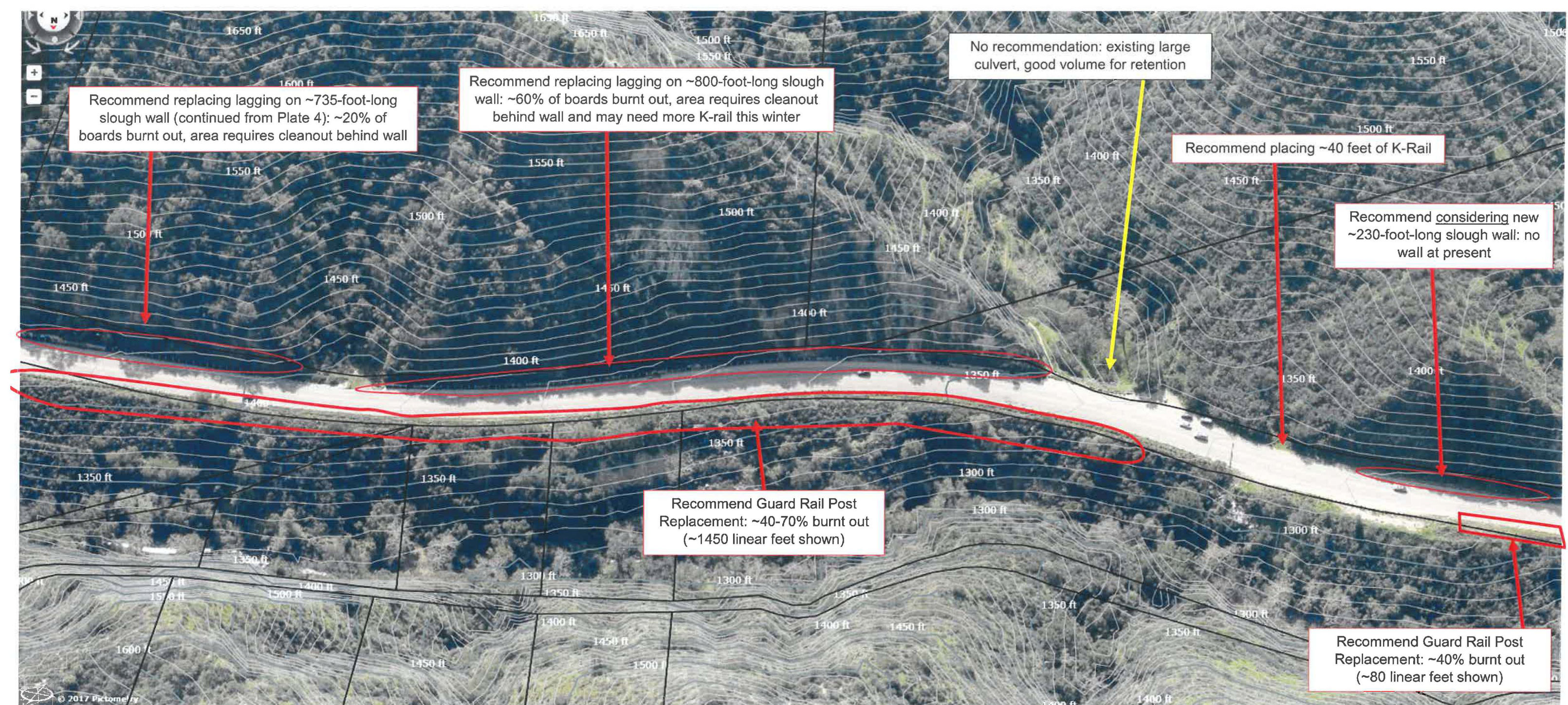


Plate 5: Looking south, ~3800 feet along the roadway west of 7415 La Tuna Canyon Road (on the left side of the photo.) Note the annotations regarding observations and recommendations. Oblique aerial image showing parcel boundaries in solid black lines (Pictometry). Areas with recommendations denoted in red, no action in yellow.

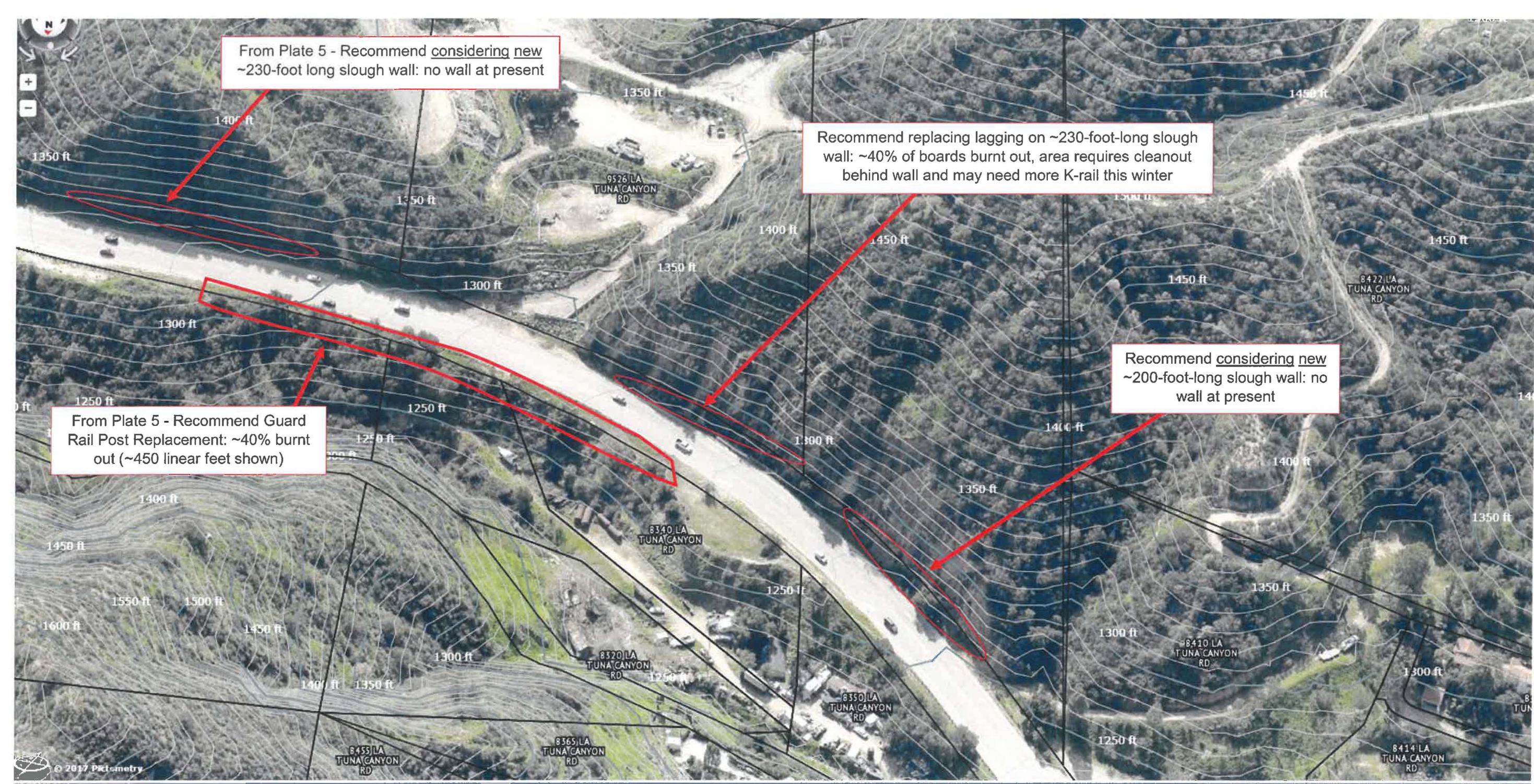


Plate 6: Looking south, ~5300 feet west of 7415 La Tuna Canyon Road (on the left side of the photo.) Note the annotations regarding observations and recommendations. Oblique aerial image showing parcel boundaries in solid black lines (Pictometry). Areas with recommendations denoted in red, no action in yellow.

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

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9/28/17

Date: September 27, 2017
GEO File No. #17-205
C.D. Nos. 2 & 7

SUMMARY OF FIELD INVESTIGATION

Locations: Debris Fences in the Verdugo Mountains; near 9360 N. Elben Ave., 9361 N. Elben Ave., 9277 W. Elben Pl., Wildwood Fire Rd., and 8520 N. Springford Dr.
Thomas Guide Pages: 503-D6, 503-E6, 503-F7, and 533-C1
Requested By Mike Miranda (Los Angeles County Department of Public Works)
In Attendance: Daniel Orris (Geotechnical Engineering Group)
Date of Investigation: September 19 and 21, 2017

DESCRIPTION AND REMARKS

At the request of the Los Angeles County Department of Public Works (County), the Geotechnical Engineering Group (GEO) has completed a field investigation to assess the condition of 6 debris fences located near the subject properties. The debris fences are in close proximity to or within the burn limits of the La Tuna Canyon Fire, which occurred over the Labor Day Weekend. The 6 debris fences were constructed in the early 1980's to prevent debris flow from damaging public and private property downstream of the structures. This field investigation has been prepared to summarize the observations made and to provide preliminary recommendations relative to the identified problems. A subsurface investigation was not performed as part of this study.

Summary of Observations

As illustrated in Figure 1, debris fences are situated near the northern terminus of Elben Avenue, near the eastern terminus of Elben Place, along Wildwood Fire Road, or near the northeast terminus of Springford Drive in the Verdugo Mountains of Los Angeles (Figure 1). For purposes of discussion, the debris fences have been identified as DF-1 through DF-6 herein. According to Navigate LA, DF-3 through DF-6 were constructed on private property, and DF-1 and DF-2 were constructed across both private property and the public right-of-way (Figures 2 through 5). Permission to access DF-5 and DF-6 was requested by GEO but not allowed by the private property owner. The condition of DF-5 and DF-6, following the wildfire, was verbally reported to GEO by the property owner, and those statements are included herein.

The debris fences were constructed near the base of the Verdugo Mountains and span the mouth of major drainages. Upstream of the debris fences, the mountainous areas are moderately to steeply sloping and, where unburned, are covered by a moderate to thick growth of brush and grasses. As a result of the fire, the mountains were stripped of a majority of the vegetation, but not completely denuded. According to Dibblee (T.W., Jr.,

1991, Geologic Map of the Sunland and Burbank (North ½) Quadrangles, Los Angeles County, California, Dibblee Geological Foundation Map #DF-32, scale 1:24,000) the mountains are underlain by Mesozoic-age quartz diorite bedrock. Although not mapped by Dibblee, the mountains are mantled by substantial volumes of non-cohesive and highly erodible slopewash materials.

As shown by the attached Photos, the debris fences are constructed of concrete-embedded steel railroad rails and creosote-treated timber planks that are 11 to 12-inches tall and range from 2 to 2.75-inches in thickness. The planks are vertically spaced approximately 2 to 3 inches apart to allow runoff to pass through the fences as debris accumulates behind them (Photo 1). DF-1, DF-2, and DF-4 have removable “gates” in the central portion of the structures that range from 12 to 20 feet in width. The gates for DF-1 and DF-2 are detached, resulting in an open debris fence condition (Figure 2 and Photo 2). The gates are leaning on the slopes downstream and upstream of DF-1 and DF-2, respectively. The field measured dimensions and depth of debris accumulation behind DF-1 through DF-4 are included in Table 1 below. The dimensions provided for DF-5 and DF-6 below were determined using Navigate LA.

Table 1 – Debris Fence Details

| Debris Fence Identification | Length (feet) | Height (feet) | Max depth of debris accumulation behind fence (feet) |
|------------------------------------|----------------------|----------------------|---|
| DF-1 | 60' | 12' | 3' |
| DF-2 | 70' | 14' | Varies; 1 - 1.5' |
| DF-3 | 225' | 15' | 0 – 1' (locally) |
| DF-4 | 70' | 14' | 2' |
| DF-5 | 80' | 14' | Not observed |
| DF-6 | 100' | 15' | Not observed |

Runoff that flows through the debris fences is directed to a variety of downstream improvements. Downstream of DF-1, DF-2 and DF-4 are Portland cement concrete (PCC) access roads that are lined by PCC curbs, and facilitate both vehicular access and direct runoff toward the storm drain system (Figure 4 and Photo 3). Directly downstream of DF-3 is a 9-foot wide PCC drainage ditch that trends parallel to the fence. The drainage ditch flows toward a 25-foot wide drainage channel that directs runoff away from the fence in a southwesterly direction (Figure 3 and Photo 5).

Some of the debris fences are in disrepair or have suffered damage as a result of the fire. DF-1 has cracked or broken timber planks and is missing timber planks along the upper portions of the fence. The timber planks on DF-1 suffered localized light charring as a result of the fire, and light to moderate charring of the timber planks on the 20-foot wide gate section (Photo 3). DF-2 was observed in good condition with no fire damage and only a few cracked planks (Photo 2). DF-3 was observed in fair to good condition with fire damage limited to light charring of approximately 40 linear feet of timber planks near the eastern side of the fence (Photo 4). A 15-foot wide section of DF-3 was missing two planks near the top of the fence (Photo 4). Additionally, two relatively large wood piles were observed near the western edge of DF-3 on the upstream side, and the 9-foot wide PCC drainage ditch on the downstream side of the fence was partially filled with sediment (Photo 4 and 5). DF-4 was observed in good condition and undamaged by the fire (Photo

1). The condition of DF-5 and DF-6 was not observed by GEO however were reported by the property owner to have "faired ok" during and after the fire.

Conclusions and Recommendations

Field observations by GEO indicate the debris fences, where observed, are in fair to good condition with localized mild to moderate charring of timber planks as a result of the fire. Some disrepair was observed including some cracked or missing timber planks, two of the center gates are removed, and accumulations of debris were observed upstream of the fences, and in the downstream drainages devices.

As a result of the fire, the large drainages and steep mountainous terrain upstream of the fences have the potential to shed substantial volumes of runoff and debris during periods of heavy rainfall. Accordingly, repair measures to ensure the debris fences are in proper operating condition, prior to the upcoming wet winter months, is warranted.

GEO performed a review of available records related to the debris fences and has concluded that the structures, which are located mostly on private property, and locally within the City of Los Angeles right-of-way, are not City-owned infrastructure. During the investigation, the County communicated to GEO their intent to voluntarily repair the fences and remove debris accumulations as necessary. The County did however request the City's assistance in obtaining right-of-entry and maintenance agreements from the pertinent property owners. GEO recommends the Bureau of Engineering Real Estate Division coordinate with and assist the County in obtaining the necessary agreements.

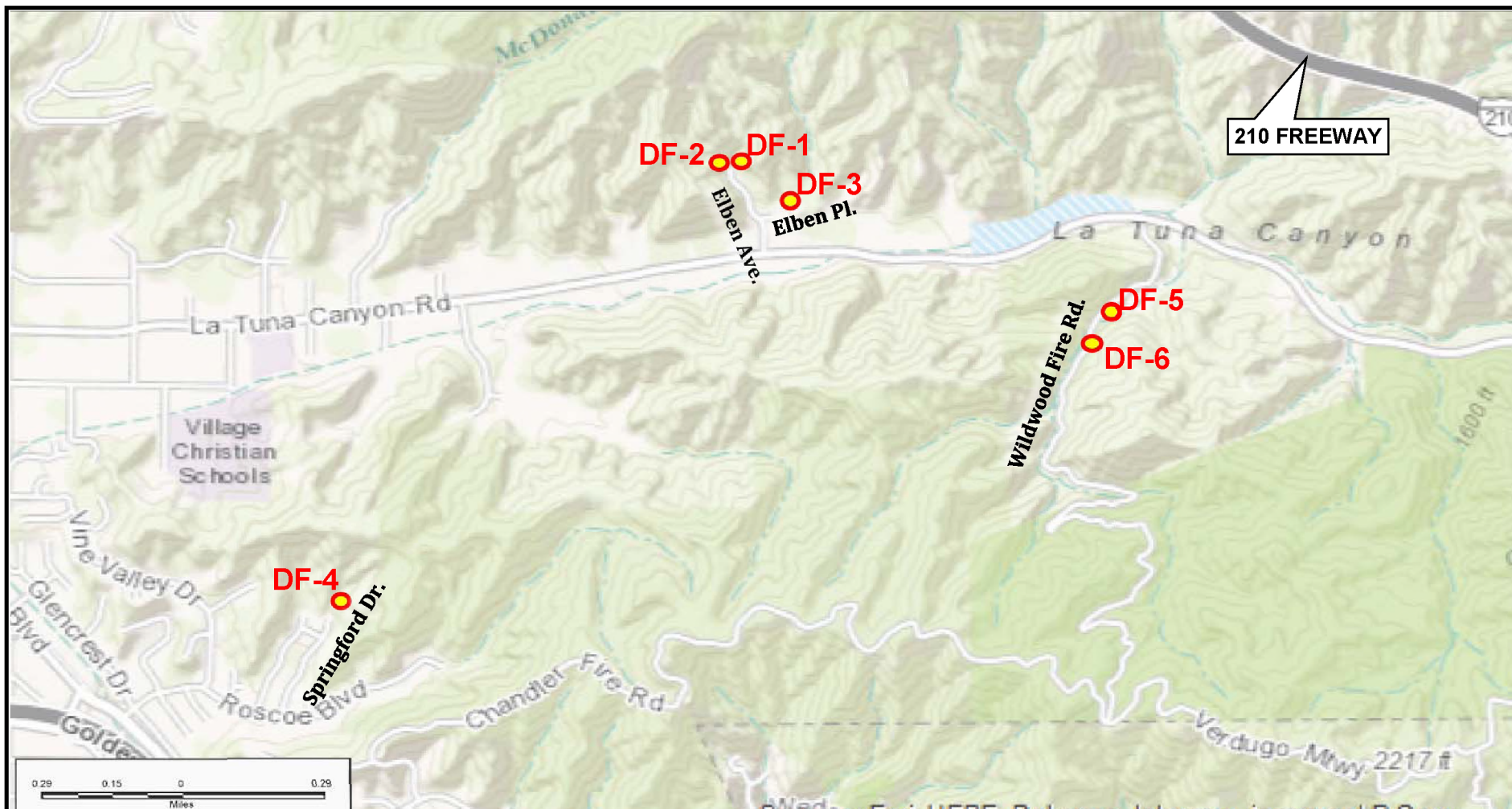
Questions regarding this field investigation should be directed to Daniel Orris at (213) 847-0488.

cc: Uri (Uriel) Jimenez, Bureau of Engineering Real Estate Division, Mail Stop 515
Patricia Wood, Los Angeles County Department of Public Works
File Copy

ATTACHMENTS:

- Figure 1: Vicinity Map
- Figures 2 through 5: Site Location Map - A, - B, - C, and - D
- Photos 1 through 5

Figures 1 Through 5



LEGEND



Approximate location of debris fence



VICINITY MAP

DEBRIS FENCES IN THE VERDUGO MOUNTAINS

BUREAU OF ENGINEERING
GEOTECHNICAL ENGINEERING GROUP (GEO)
GEO FILE NO.: 17-205
DATE: SEPTEMBER 27, 2017

FIGURE No. 1



LEGEND

— Property Line

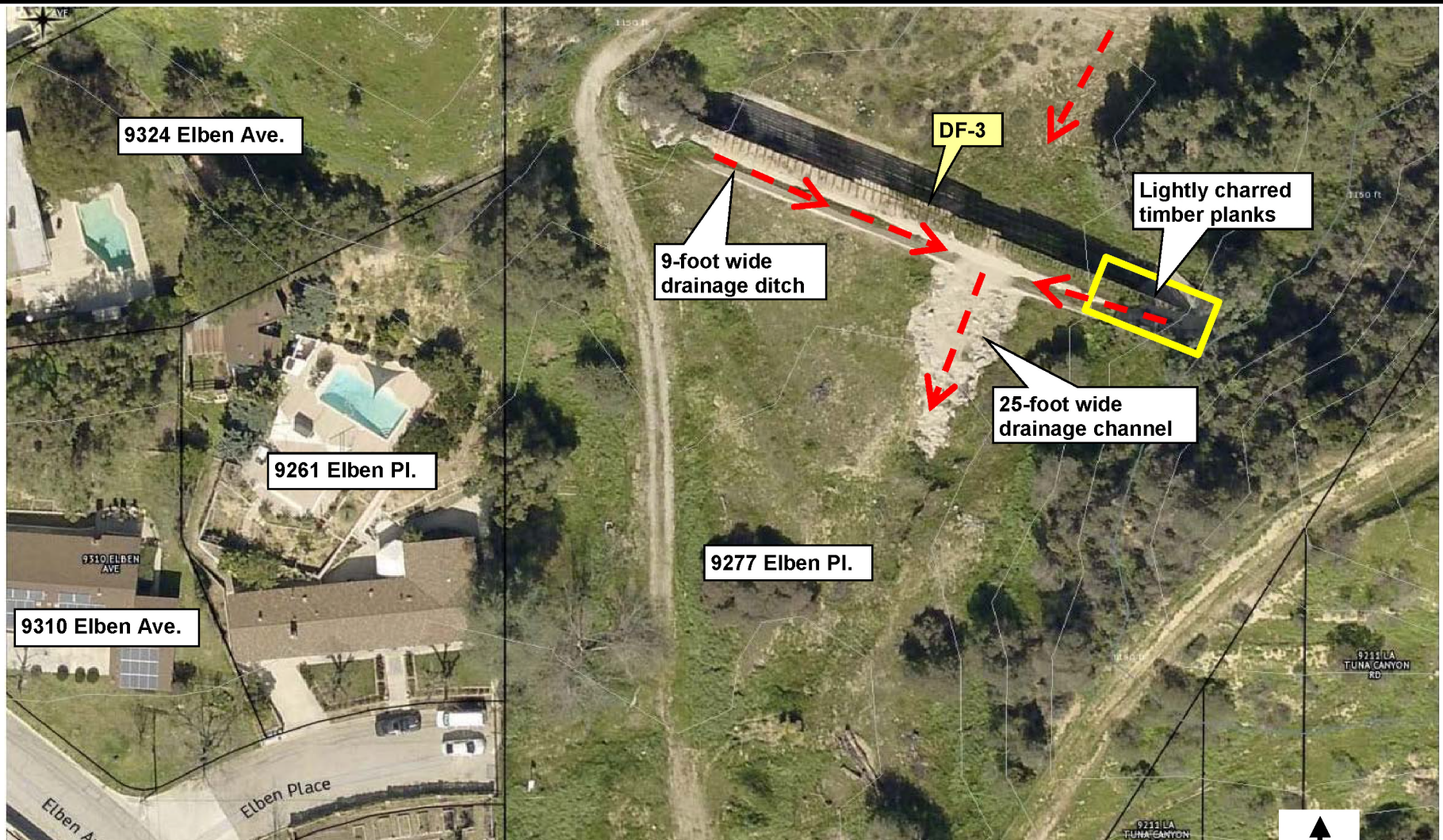


SITE LOCATION MAP - A

DEBRIS FENCES IN THE VERDUGO MOUNTAINS

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GEOTECHNICAL ENGINEERING GROUP (GEO)
GEO FILE NO.: 17-205
DATE: SEPTEMBER 27, 2017

FIGURE No. 2



LEGEND

- Property Line
- Indicates direction of stormwater flow



SITE LOCATION MAP - B

DEBRIS FENCES IN THE VERDUGO MOUNTAINS

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GEOTECHNICAL ENGINEERING GROUP (GEO)
GEO FILE NO.: 17-205
DATE: SEPTEMBER 27, 2017

FIGURE No. 3



LEGEND

— Property Line

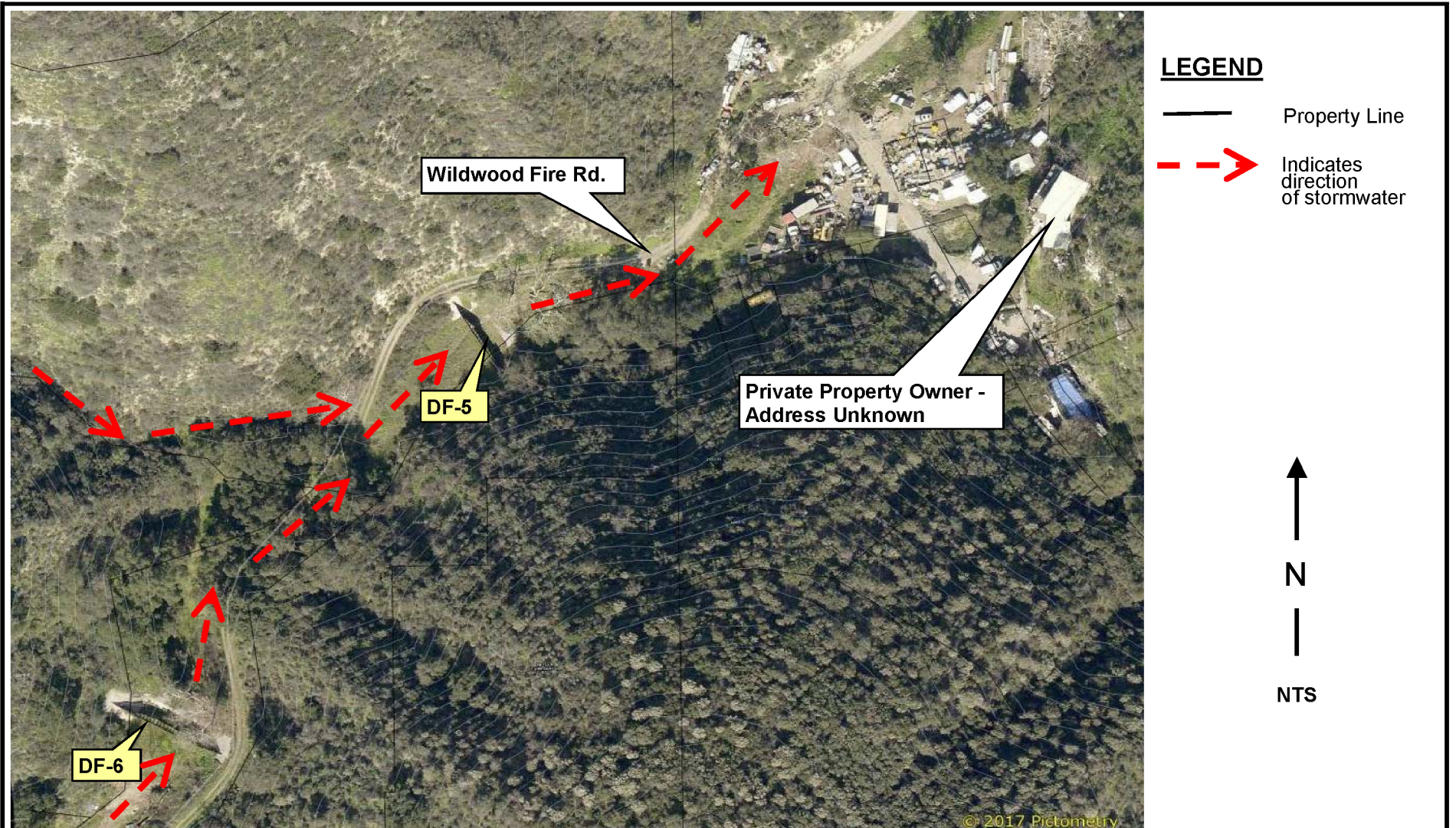


SITE LOCATION MAP - C

DEBRIS FENCES IN THE VERDUGO MOUNTAINS

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GEO FILE NO.: 17-205
DATE: SEPTEMBER 27, 2017

FIGURE No. 4



SITE LOCATION MAP - D

DEBRIS FENCES IN THE VERDUGO MOUNTAINS

BUREAU OF ENGINEERING
GEOTECHNICAL ENGINEERING GROUP (GEO)
GEO FILE NO.: 17-205
DATE: SEPTEMBER 27, 2017

FIGURE No. 5

Photos 1 Through 5

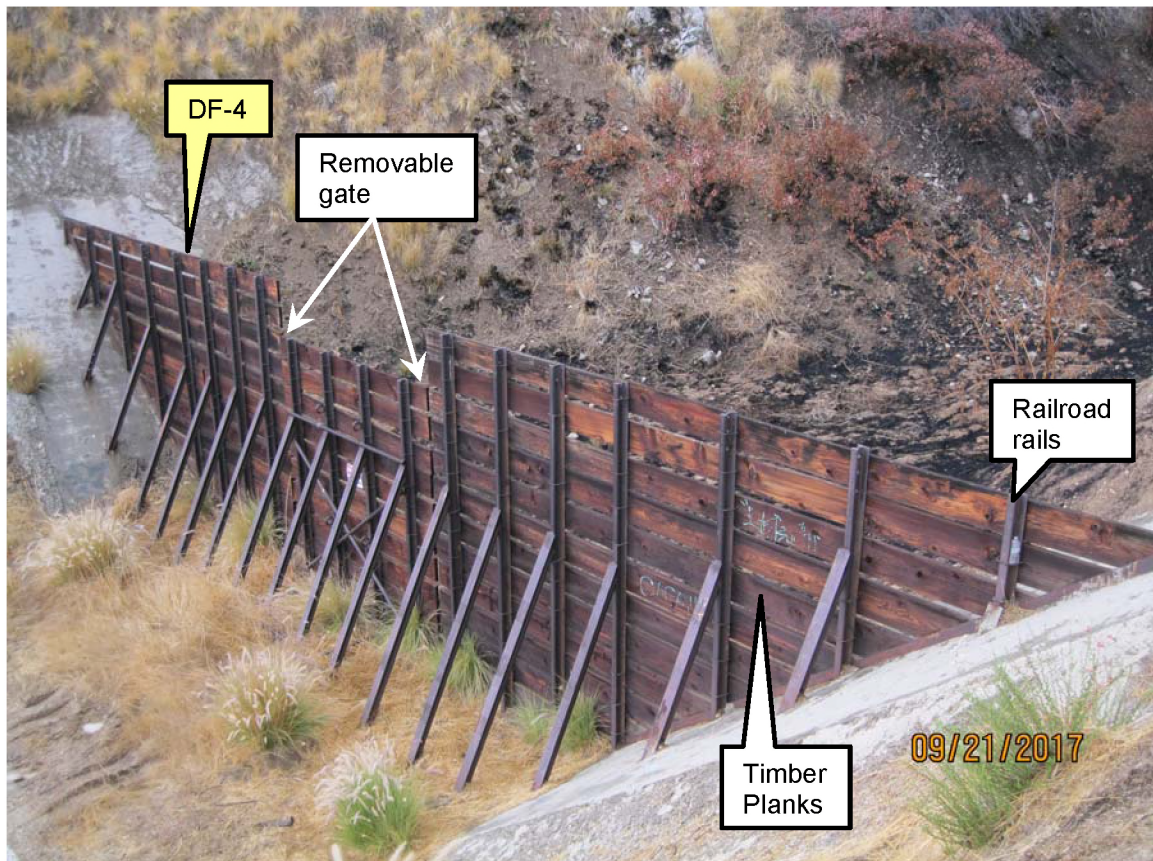


Photo 1: Standing downstream and looking toward DF-4 and the typical debris fence construction consisting of concrete-embedded steel railroad rails and creosote-treated timber planks. Note the vertical spacing between the planks, and the removable gate in the center of the fence.

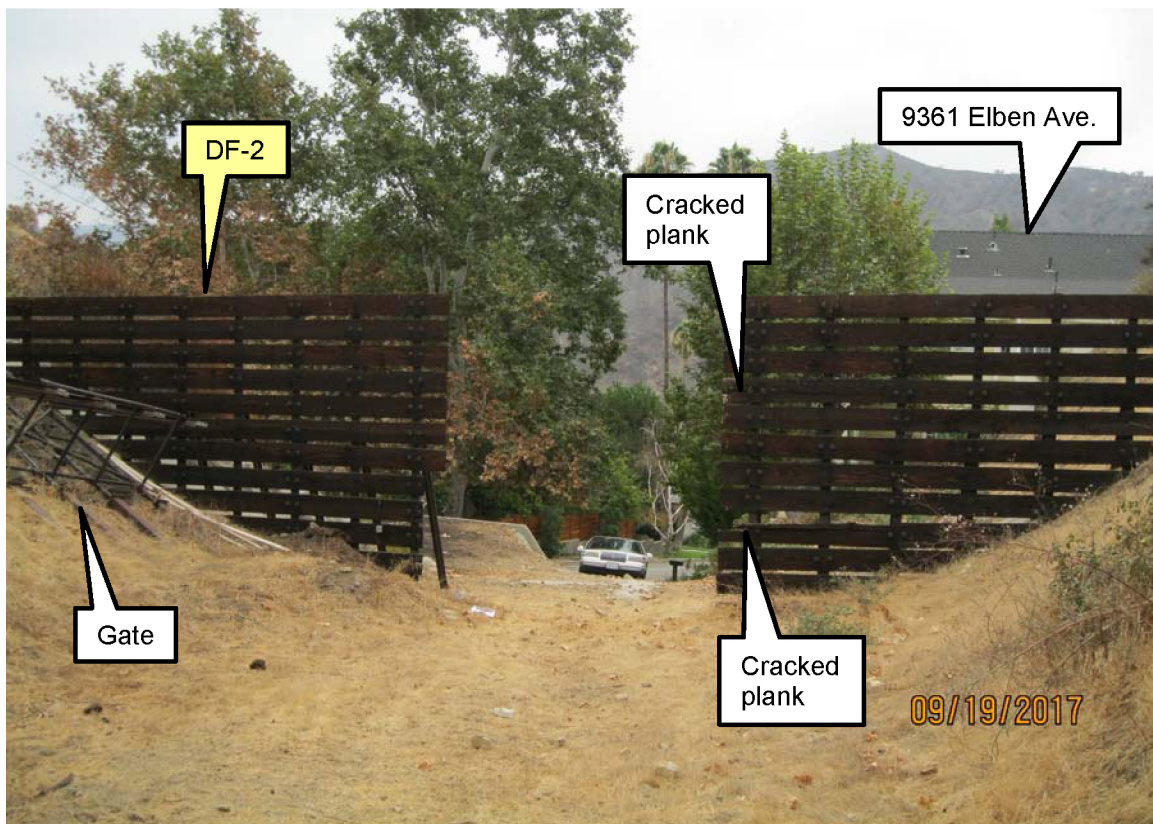


Photo 2: Standing upstream and looking toward DF-2 which is currently open. Note the gate leaning on the slope upstream of the fence. DF-2 was observed in good condition, with no fire damage and only a few cracked planks.

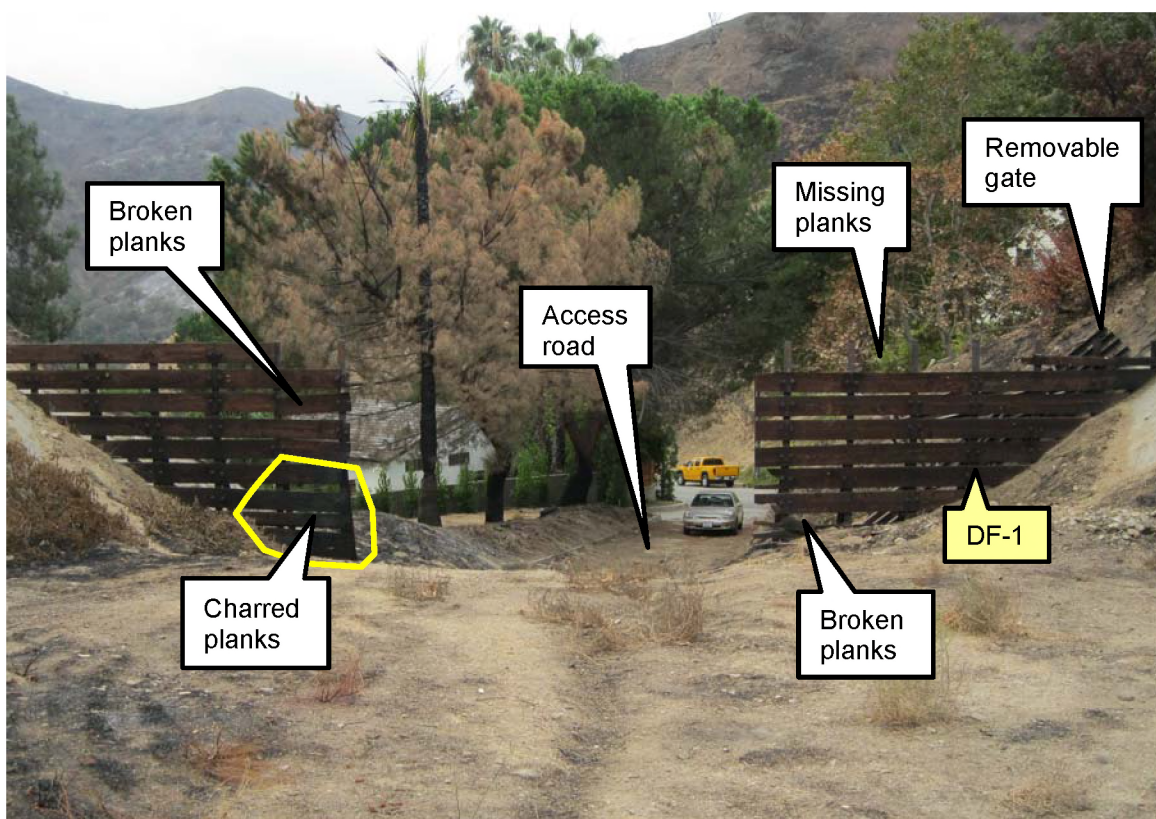


Photo 3: Standing upstream and looking toward DF-1 and the PCC access road downstream. Note the area where the planks are lightly charred, and the areas where planks are broken or missing. Also note the gate which is leaning on the slope, downstream of the fence.

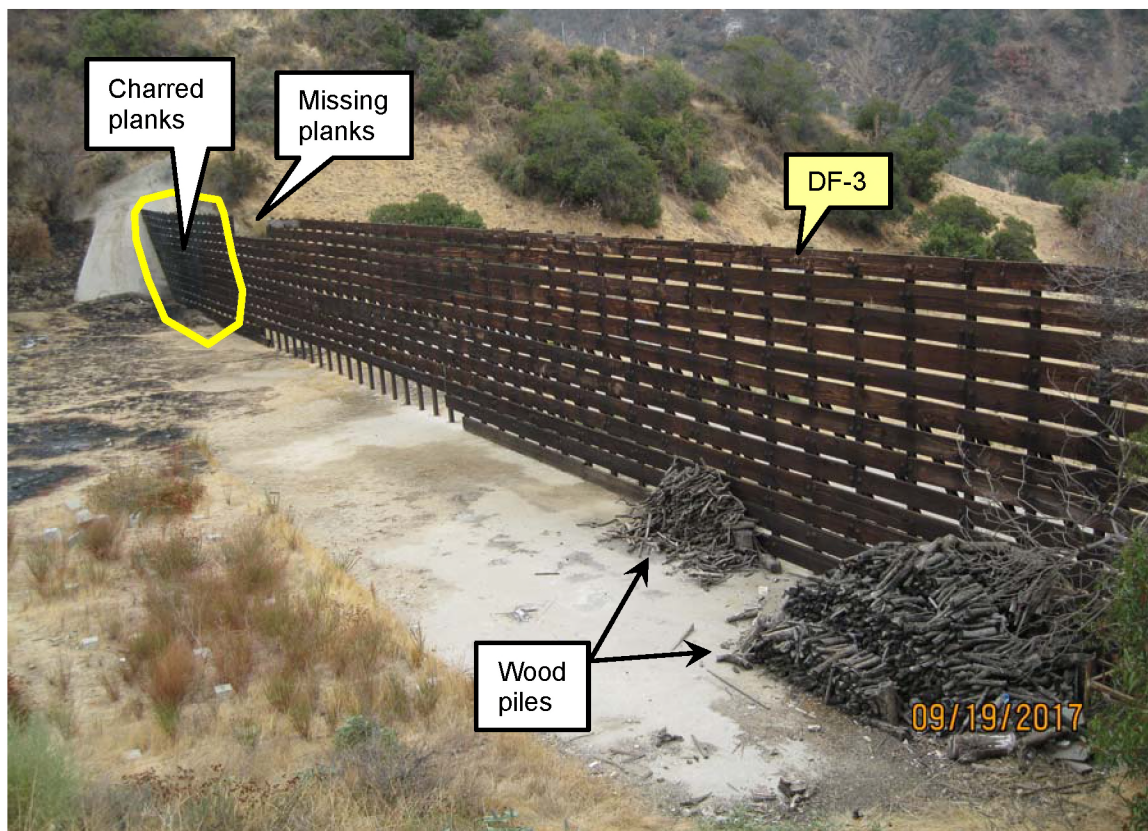


Photo 4: Standing upstream and looking toward DF-3. Note the location of the lightly charred timber planks, the wood piles, and the missing planks near the top of the fence.

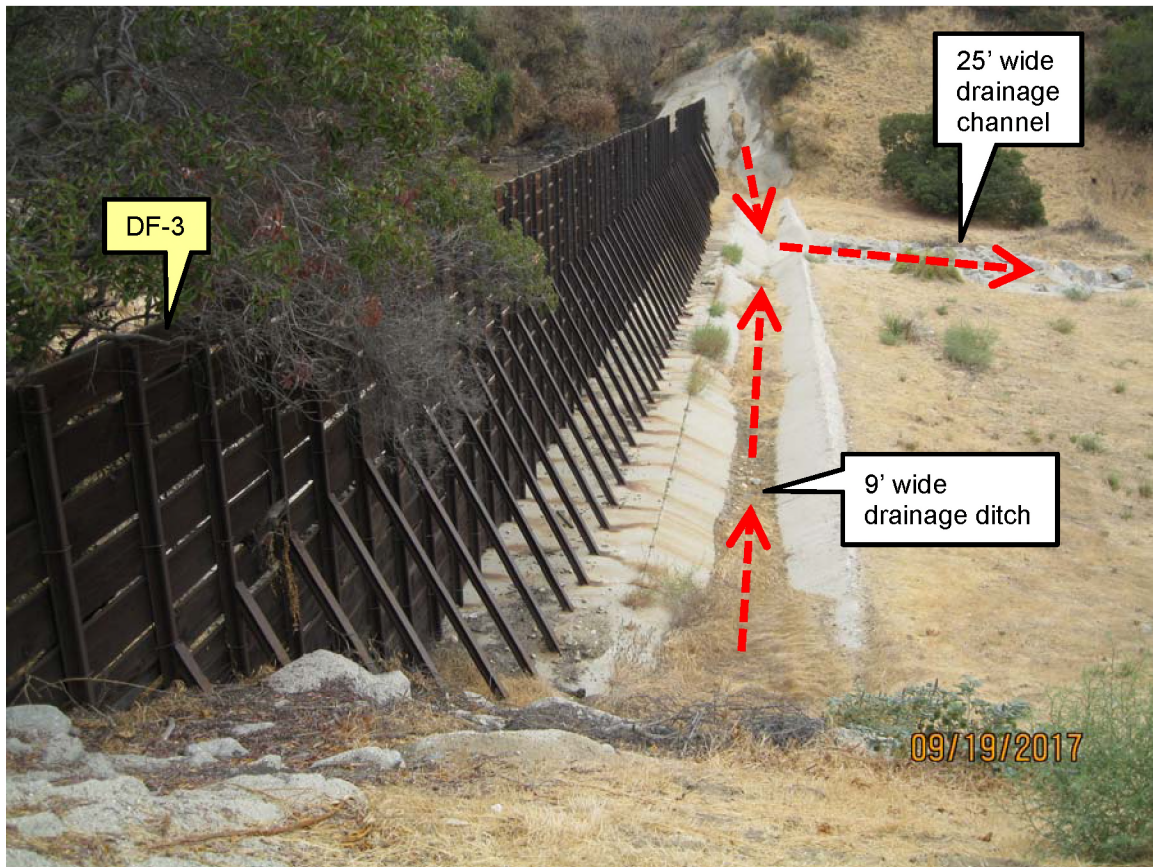


Photo 5: Standing downstream and looking toward DF-3 and the 9-foot wide PCC drainage ditch that is partially filled with sediment. Also note the 25-foot wide drainage channel. The red arrows indicate direction of stormwater flow.