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California Energy Commission
DOCKETED
11-AFC-3
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November 30, 2012

Siting Committee
Raoul Renaud, Hearing Officer
Eric Solorio, Project Manager
California Energy Commission
Docket No. 11-AFC-03
1516 9th Street
Sacramento, CA 95814

Re: Cogentrix Quail Brush Generation Project - Docket Number 11-AFC-03, Fire Behavior Analysis Report and Fire Protection Plan

Docket Clerk:

Pursuant to the provisions of Title 20, California Code of Regulations, and on behalf of Quail Brush Genco, LLC, a wholly owned subsidiary of Cogentrix Energy, LLC, Bingham McCutchen LLP hereby submits the Fire Behavior Analysis Report and Fire Protection Plan, dated November 26, 2012. The Quail Brush Generation Project is a 100 megawatt natural gas fired electric generation peaking facility to be located in the City of San Diego, California.

If you have any questions regarding this submittal, please contact Rick Neff at (704) 525-3800 or me at (415) 393-2572.

Sincerely yours,

Ella Foley Gannon

cc: Lori Ziebart, Cogentrix
John Collins, Cogentrix
Rick Neff, Cogentrix
Proof of Service List

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BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA

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1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION FOR THE
QUAIL BRUSH GENERATION PROJECT

DOCKET NO. 11-AFC-03
PROOF OF SERVICE
(Revised 11/19/2012)

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DECLARATION OF
SERVICE

I, Margaret Pavao, declare that on November 30, 2012, I served and filed copies of the attached Fire Behavior Analysis Report and Fire Protection Plan, dated November 26, 2012. This document is accompanied by the most recent Proof of Service list, located on the web page for this project at: http://www.energy.ca.gov/sitingcases/quailbrush/index.html.

The document has been sent to the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit or Chief Counsel, as appropriate, in the following manner:

(*Check all that Apply*)

For service to all other parties:

X Served electronically to all e-mail addresses on the Proof of Service list;

X Served by delivering on this date, either personally, or for mailing with the U.S. Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses marked *"hard copy required" or where no e-mail address is provided.

AND

For filing with the Docket Unit at the Energy Commission:

X by sending an electronic copy to the e-mail address below (preferred method); *OR*

___ by depositing an original and 12 paper copies in the mail with the U.S. Postal Service with first class postage thereon fully prepaid, as follows:

CALIFORNIA ENERGY COMMISSION – DOCKET UNIT
Attn: Docket No. 11-AFC-03
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.ca.gov

OR, if filing a Petition for Reconsideration of Decision or Order pursuant to Title 20, § 1720:

___ Served by delivering on this date one electronic copy by e-mail, and an original paper copy to the Chief Counsel at the following address, either personally, or for mailing with the U.S. Postal Service with first class postage thereon fully prepaid:

California Energy Commission
Michael J. Levy, Chief Counsel
1516 Ninth Street MS-14
Sacramento, CA 95814
michael.levy@energy.ca.gov

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

Margaret Pavao

Margaret Pavao

Fire Behavior Analysis Report and Fire Protection Plan Quail Brush Power Plant

Prepared for:
Cogentrix
9405 Arrowpoint Blvd.
Charlotte, NC 28273

Prepared for:
San Diego Fire-Rescue Department
Fire Prevention Bureau

Prepared By:

firesafe
::PLANNING SOLUTIONS

Table of Contents

QUAIL BRUSH POWER PLANT
FIRE BEHAVIOR ANALYSIS AND REPORT
San Diego, CA

Introduction

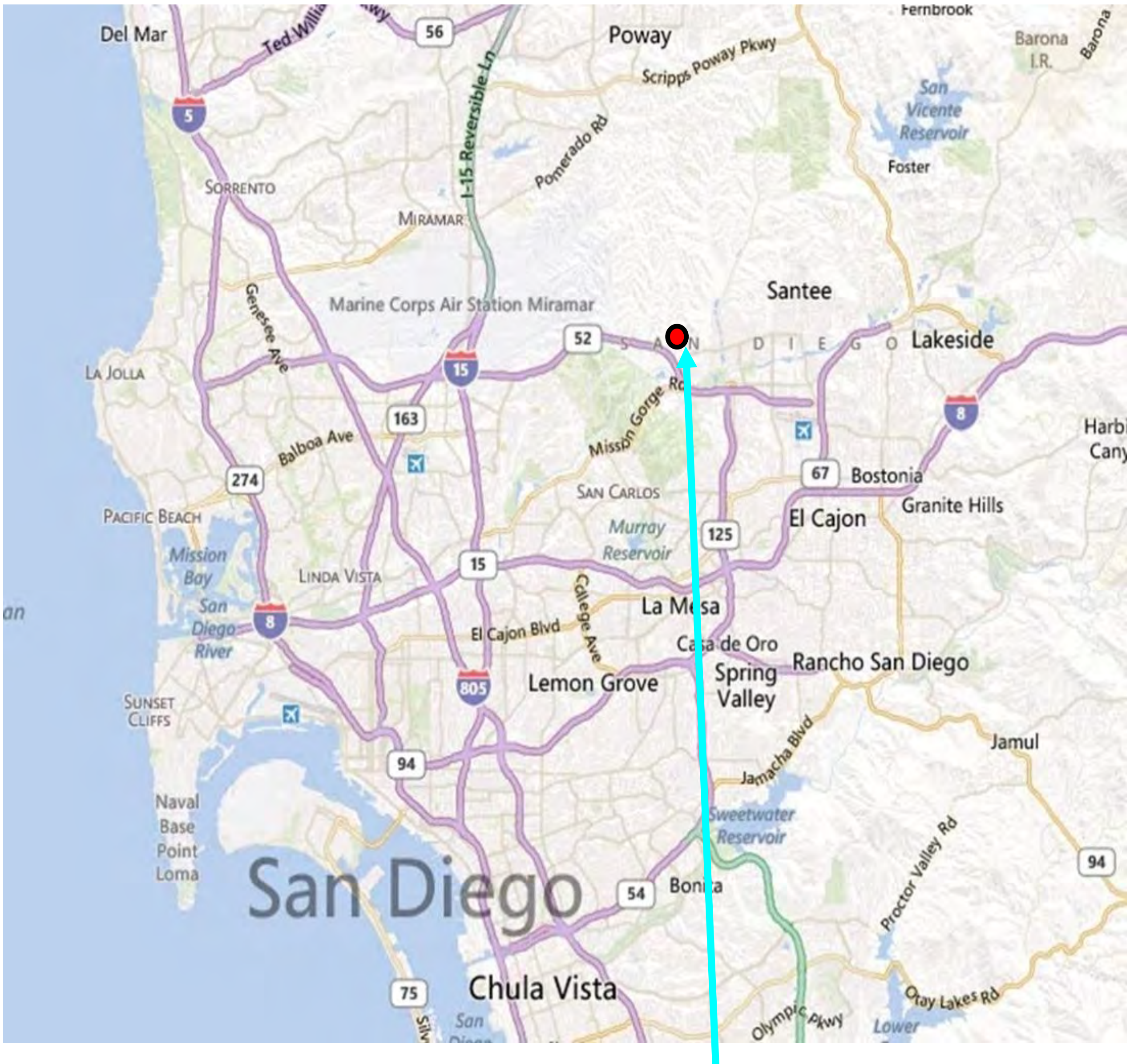
FireSafe Planning Solutions has been contracted to produce a Fire Behavior Analysis and Report for the Quail Brush Power Plant (hereafter referred to as the project) on the behalf of the project applicant and at the request of the San Diego Fire-Rescue Department (SDFRD). This plan includes the following components:

1. Fire Risk Analysis
2. Fuel Modification Plan (review and validation)
3. Response time analysis

Firesafe Planning Solutions (FPS) analyzed the Quail Brush Power Plant and its applicability of code requirements. Quail Brush Power Plant is a commercial development under the jurisdiction of the San Diego Fire-Rescue Department.

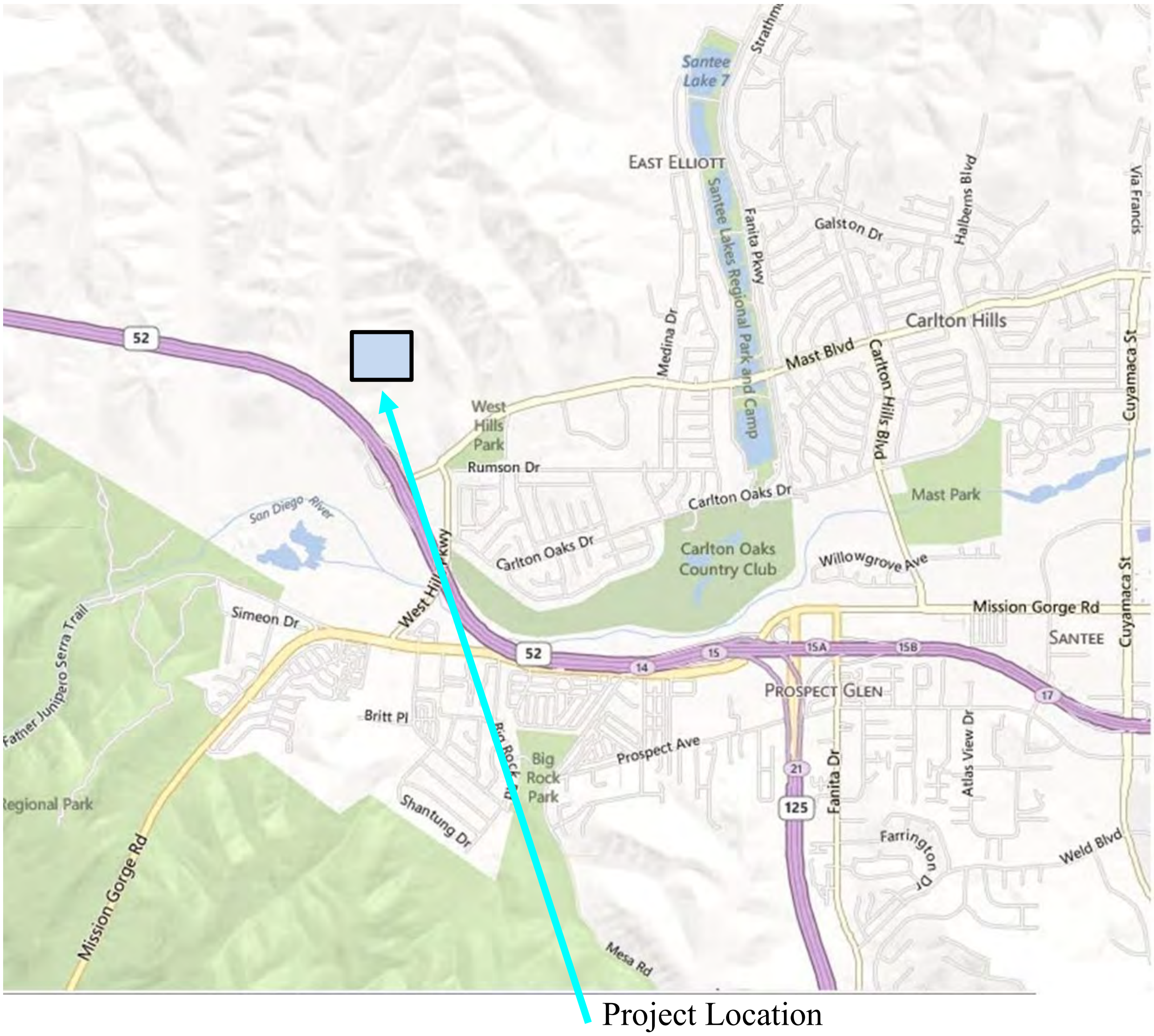
General Geographic Description

The proposed project consists of a 100-megawatt gas-fired intermediate/peaking plant; hereafter referred to as power plant site or site, and associated facilities, located in the City of San Diego, San Diego County, California. The Quail Brush Power Plant project is generally located north of Interstate 8 (I-8), east of Interstate 15 (I-15) and west of State Route 67 (SR-67) as shown below.

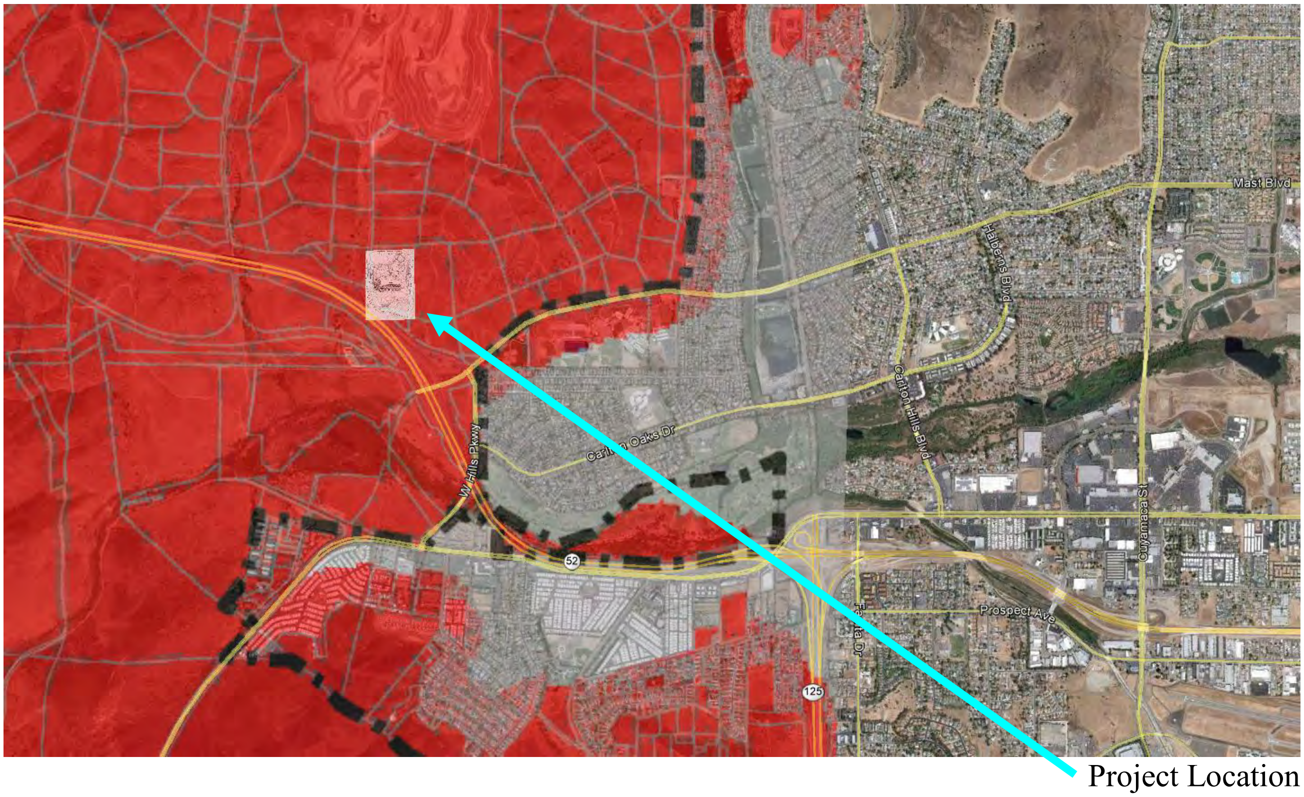


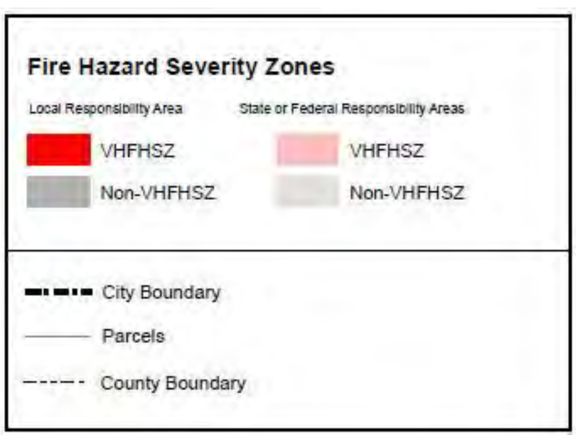
Project Location

The project is specifically located north of the San Clemente Canyon Freeway (SR-52), west of Medina Drive, north of Mast Boulevard, east of the Sycamore Landfill Road and adjacent to the Sycamore Canyon Landfill.



CAL FIRE Local Responsibility Area Very High Fire Hazard Severity Zone Map





As shown above, the project site is in the Local Responsibility Area (LRA) as identified by CAL FIRE per state law and is completely within Very High Fire Hazard Severity Zone of that map.

Fire Risk Assessment

Fire risk assessment is based on several factors. These include the fire history of the development area; the vegetation (fuel) that surrounds the project; the weather history for the general area and the specific site; the topography of the project site; and the placement of project structures relative to the factors listed above.

The fire behavior analysis in this report was completed to develop a performance based fire protection system from the modeling results (based on a worst case scenario) for this development. By using the worst-case scenario fire conditions, it is expected that any future fires will be equal to or less extreme than those modeled. FPS completed the fire hazard assessment and expected wildland fire behaviors in order to design a fuel modification and maintenance plan for the project site that will provide the necessary protection in the event of a wildland fire. These plans will be reviewed by the San Diego Fire-Rescue Department and approved prior to the start of this project.

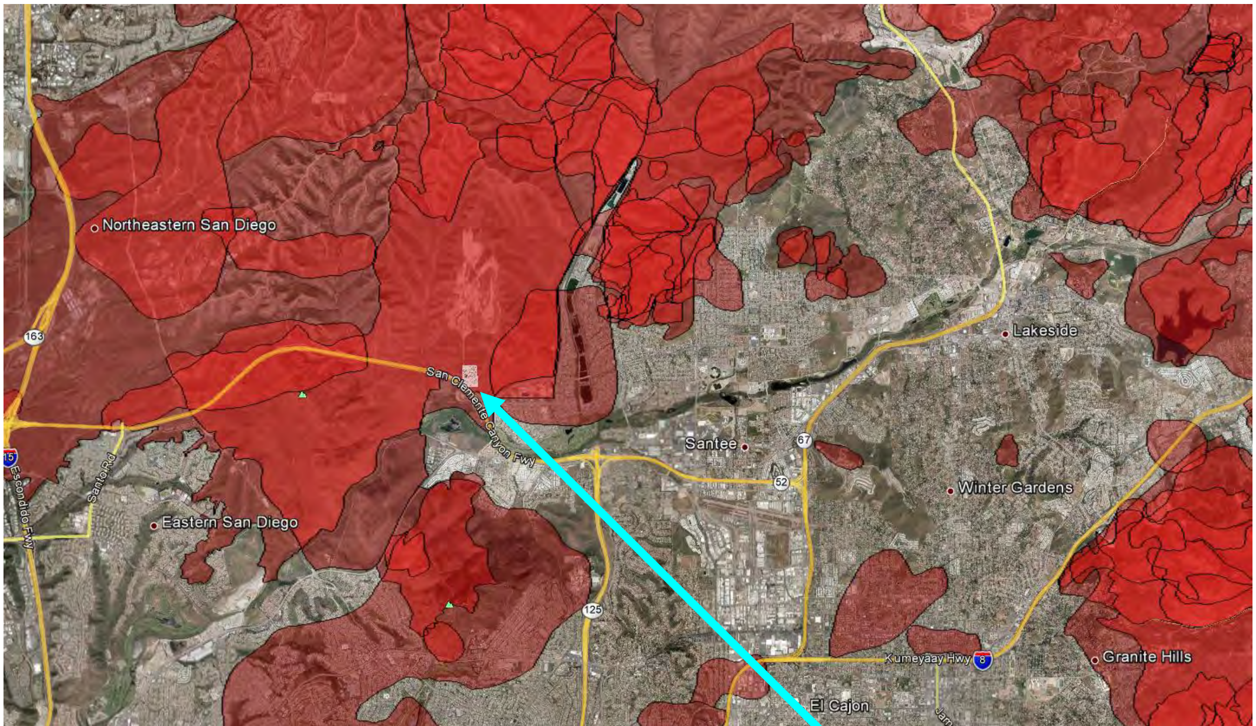
Computer projections simulate a fire burning within the native vegetative fuels directly outside the boundaries of the Fuel Modification Zones. The Fuel Modification Zones "1" and "2" remove undesirable plants and are replanted with an approved plant palette. These areas will act as a "buffer zone" for the fire as it moves into this area. When properly designed, installed and maintained, fire will not penetrate to the structure.

The modeling is completed in the wildland areas adjacent to the project. After the maximum flame length was determined, the effect of the thinning zone(s) is applied to calculate the maximum flame length at the juncture of the noncombustible zone (Zone 1). The Zone 1 depth is designed to have enough depth to insure that direct flame contact from the burning native plants does not impact the structure. The Zone 1 is the noncombustible buffer zone that keeps the structures safer. This is a systems approach that utilizes a mathematical model of fire behavior to develop a performance based plan to keep the impact of fire, heat and ember from damaging or destroying the properties they are designed to protect. These systems are designed to function without the need for direct fire protection efforts by the fire suppression crews at the time the fire front approaches the structures.

Fire History

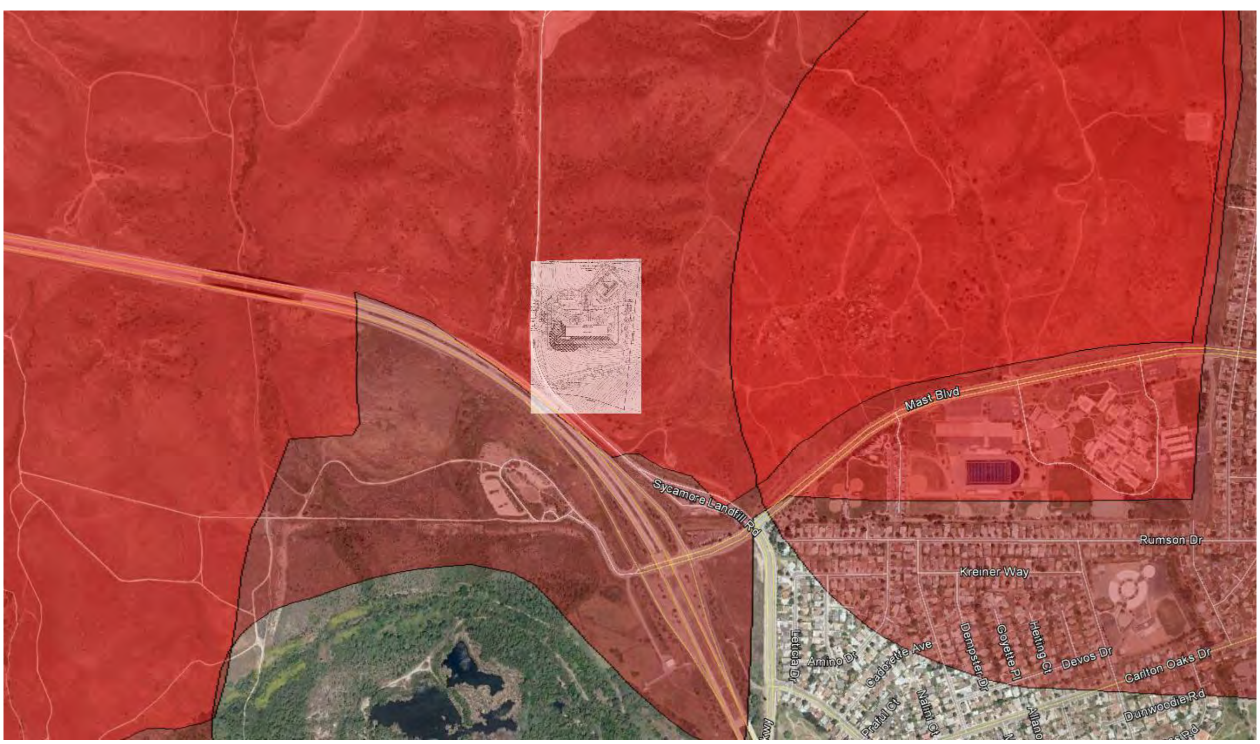
A review of the CalFire database (FRAP) is shown below. This database is compiled as a statewide spatial database of fire perimeters from BLM, NPS, and USFS fires 10 acres and greater in size and CAL FIRE fires 300 acres and greater in size. Collection criteria for CAL FIRE fires changed in 2002 to include timber fires greater than 10 acres, brush fires greater than 50 acres, grass fires greater than 300 acres, fires destroying three or more structures, and fires causing $300,000 or more damage. In 2008 collection criteria for CAL FIRE fires eliminated the monetary criterion and redefined the definition of structures.

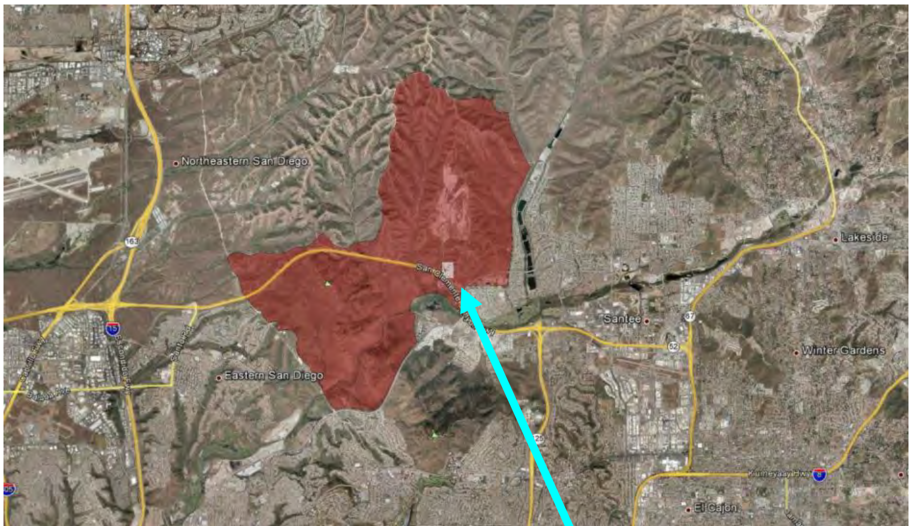
As shown on the following page, the project has had fire history in the time that fire perimeter data has been collected. It is also important to note that a historic "fire corridor" exists to the north of the project site. Many fires have burned in this area over the years. To the east of the project site and specifically to the northeast, few fires have occurred and only two fires have burned onto the project site in the period which records are available.



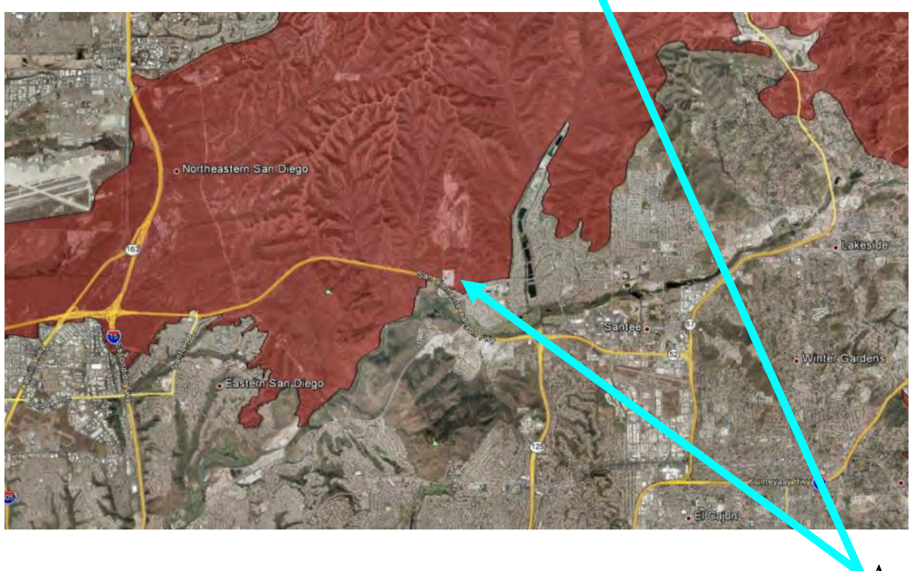
Approximate Project Site

An enlargement of the project area shows the two fire perimeters that entered the project site and the one fire to the east of the project site that threatened it. (project site shown in white rectangle)





June 15, 1981
7,310.5 acres
Assist #59



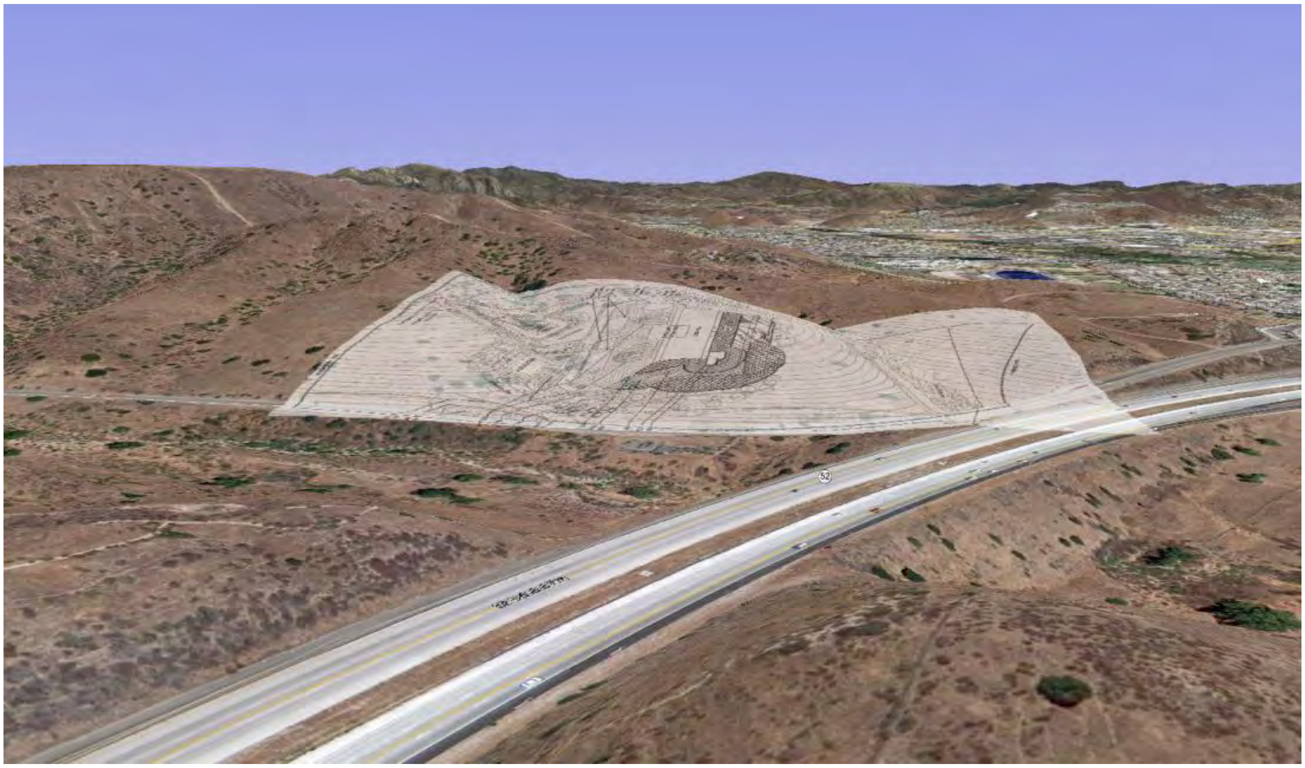
2003 Cedar Fire
October 25, 2003
280,284 acres

Approximate Project Site

The project site has had 2 very large fires one starting under fall offshore wind situation (October) and one from an onshore condition (June). The Assist #59, in 1981, burned 7,310 acre's starting on June 15, 1981. The Cedar fire burned 280,284 acres starting on October 25, 2003. The third fire (east of site) was in 1942 and burned 1,221 acres. No other information is available on this fire but the shape of the fire indicated that it had little to no wind affecting its progress (moved in all directions rather than one as it would if the wind was amplifying the rate of spread)

Topography

The project site will sit on the lower third of a west to southwest aspect. Below is an oblique view of the site and a Photographic Simulation of the site looking from the west (top) and southwest (bottom)

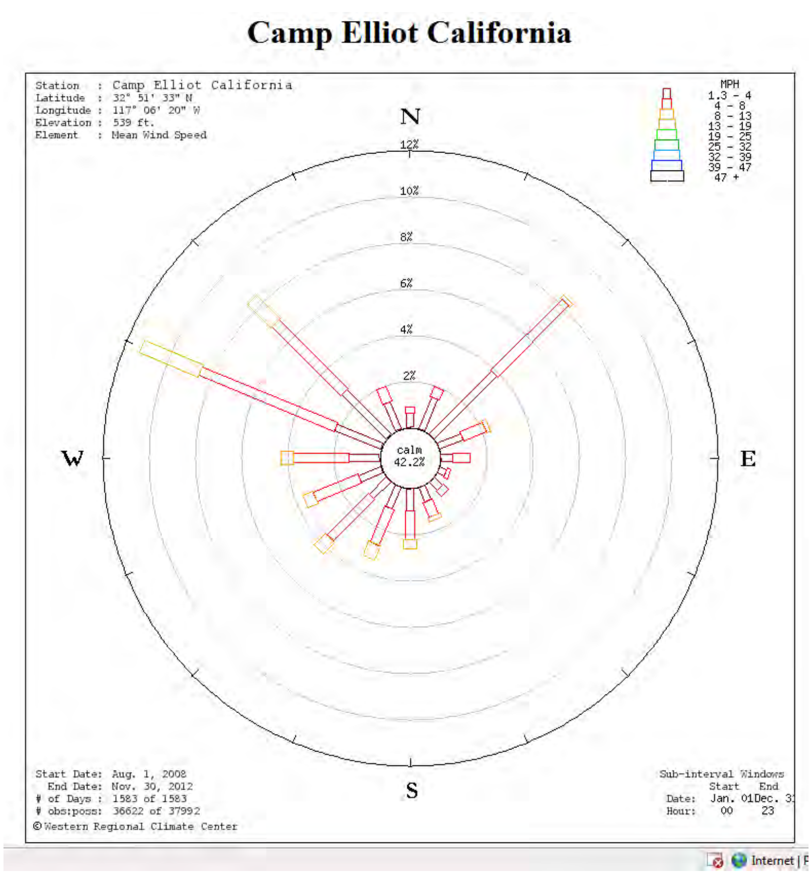


Small drainages exist on either side of the project site. The one to the south will be the one that has the access roadway for the project site.

Viewed from the south, it is possible to see that the project site is at the bottom of Little Sycamore Canyon, where is joins with the San Diego River drainage east if the Mission Gorge.

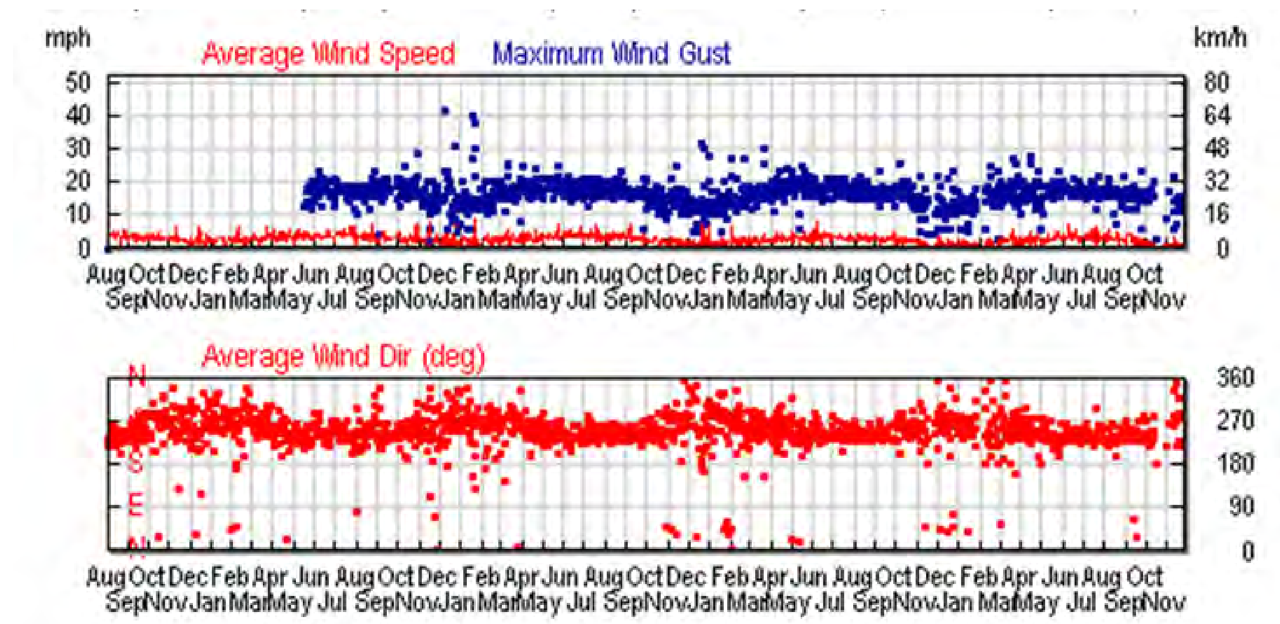
Wind Analysis

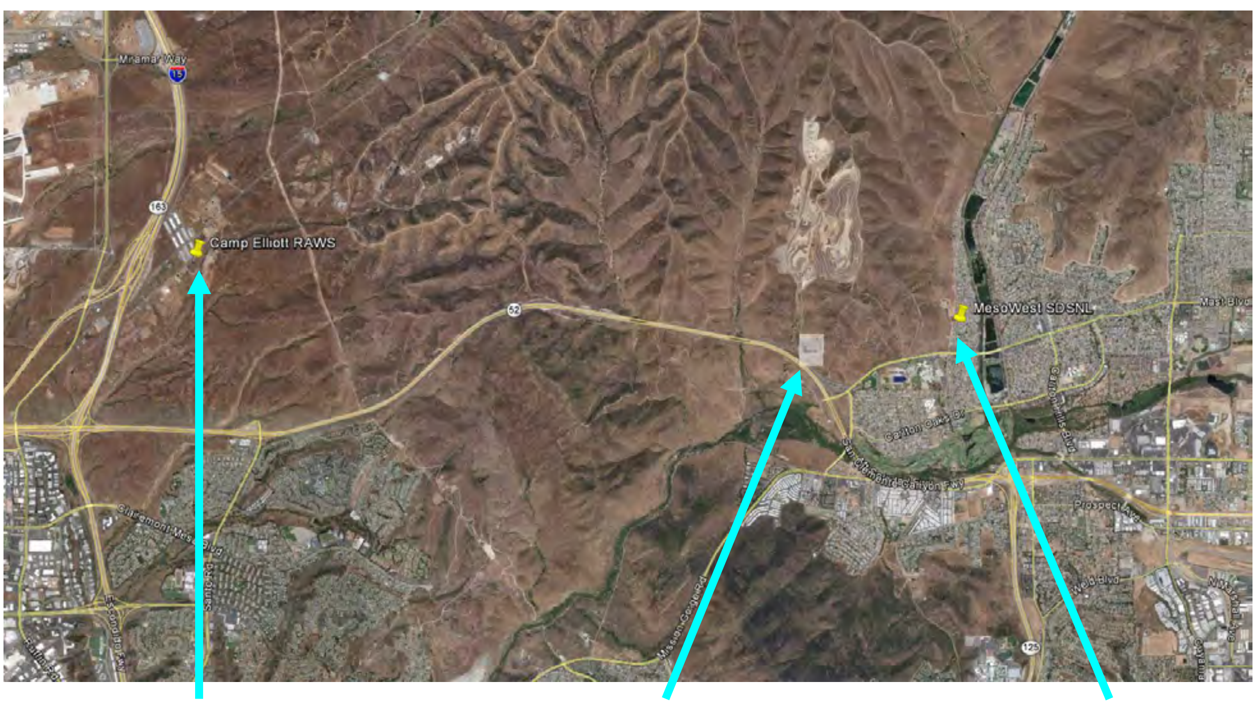
Remote Automated Weather Stations, (RAWS) are located adjacent to the project area were used to gather historical weather information. An analysis of the wind speed and direction can be seen in this wind rose on the below gathered from Camp Elliot to the west of the project site.



As shown, to the left, the two predominate winds are obvious. Most often the wind is WNW or NW and occasionally the wind will come from the NE (Santa Ana Condition). This RAWS is on the other side of the Mission Gorge from the project site and has slightly different readings than the site used to the east of the project at the Santee Recreation Lakes. While the overall trend is similar, the Santee site has a more westerly predominate wind rather than a WNW or NW at Camp Elliot. This is likely due the channeling effect of the winds to the east of the gorge and around the project site as opposed to the more open terrain of Camp Elliot.

The graphic below shows the wind speed and direction for the Santee Recreational Lakes RAWS site. Of note is the more westerly onshore wind as the predominate wind. For this reason, the west wind was modeled as the onshore event for the project site.





Camp Elliott RAWS Project Site Santee Lakes RAWS

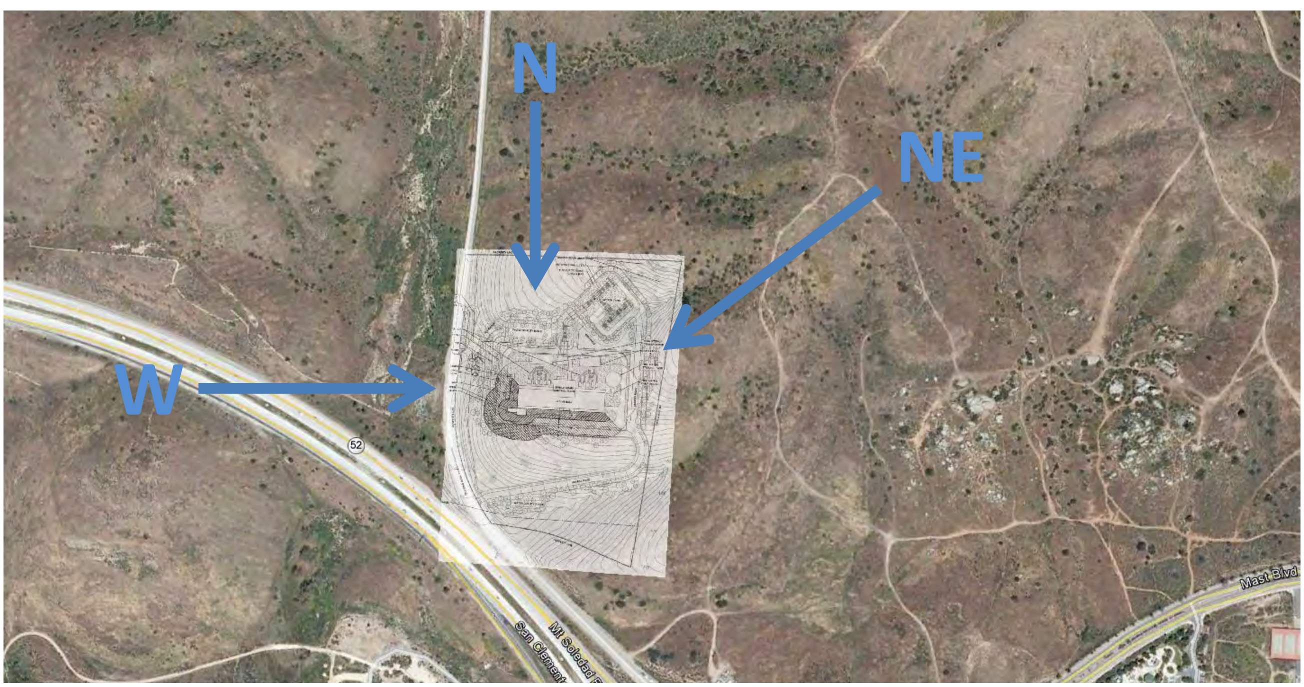
Wind modeling was accomplished using a program called Wind Ninja. This is the same program used by fire behavior specialist on actual wildland fires to estimate the wind speed and direction when making recommendations for fire tactics and strategy in the fire combat assignments for wildland fire suppression campaign.

WindNinja is a computer program that computes spatially varying wind fields for wildland fire application. It requires elevation data for the modeling area (in the form of an ASCII Raster DEM file, FARSITE landscape file, GeoTiff, or ERDAS Imagine file), a domain-mean initial wind speed and direction, and specification of the dominant vegetation in the area. A diurnal slope flow model can be optionally turned on or off. Outputs of the model are ASCII Raster grids of wind speed and direction (for use in spatial fire behavior models such as FARSITE and FlamMap), a GIS shapefile (for plotting wind vectors in GIS programs), and a .kmz file (for viewing in Google Earth). WindNinja is typically run on domain sizes up to 50 kilometers by 50 kilometers and at resolutions of around 100 meters.

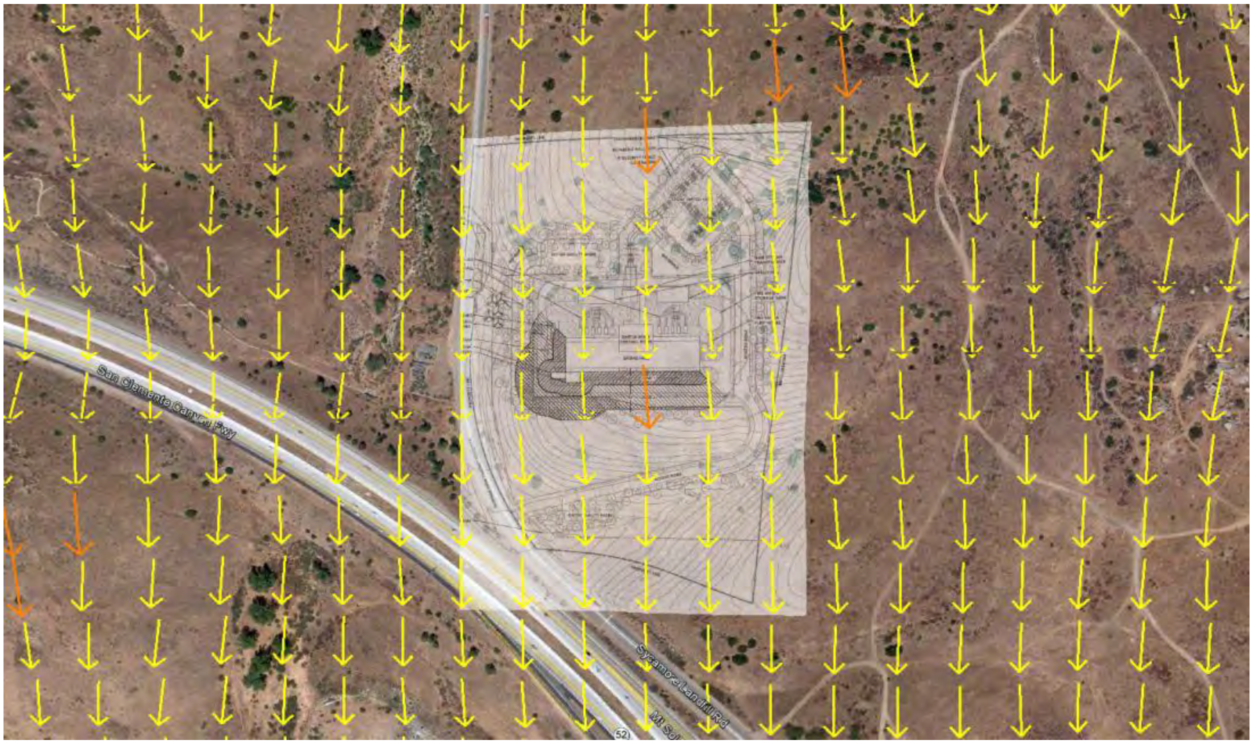
The results for the analysis conducted for this site were exported to KMZ files and placed over another KMZ of the project site for reference.

Three winds have been analyzed.

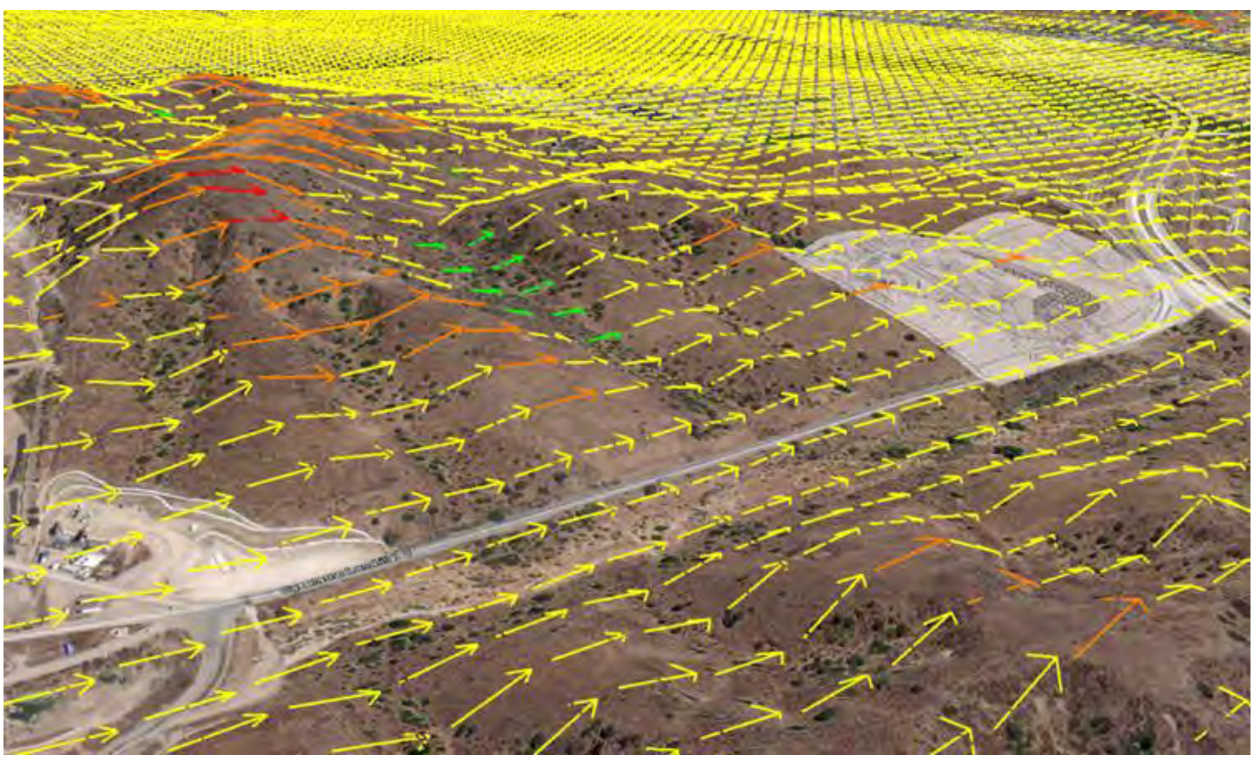
- First is a north wind which is the start of the Santa Ana wind event;
- Second is a northeast wind for a full Santa Ana wind
- And finally a west wind has been modeled for the predominate wind and onshore wind event that might occur at the end of a Santa Ana event.



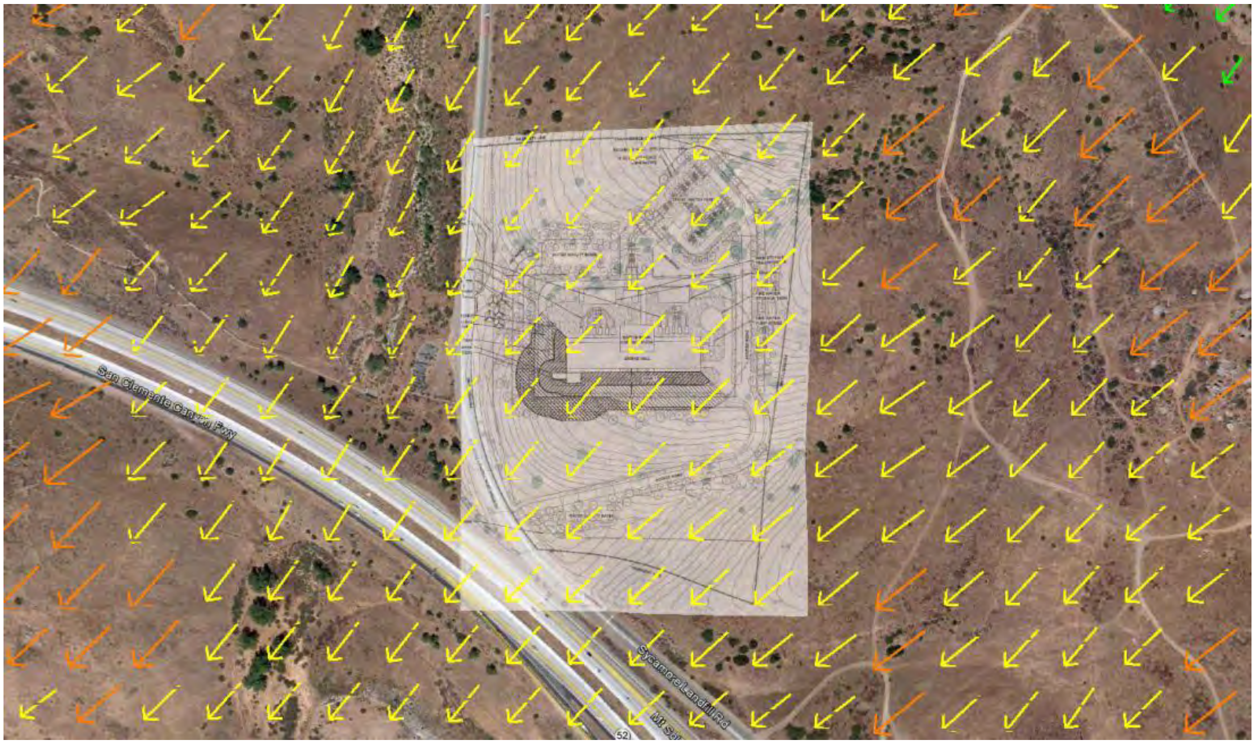
The north wind event runs directly down Little Sycamore Canyon.



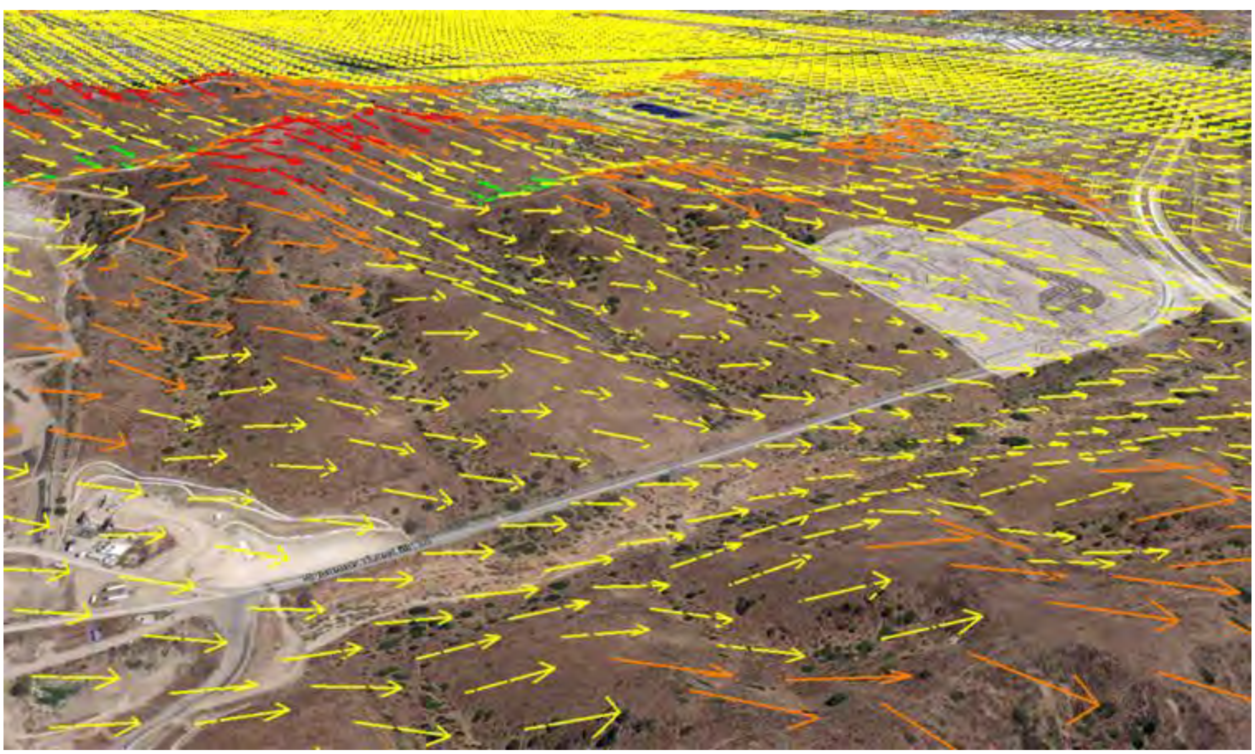
Ridge top acceleration is shown in orange and red on the graphics above (plan view) and below in an oblique view. Minor acceleration occurs north of the project site in its ungraded configuration.



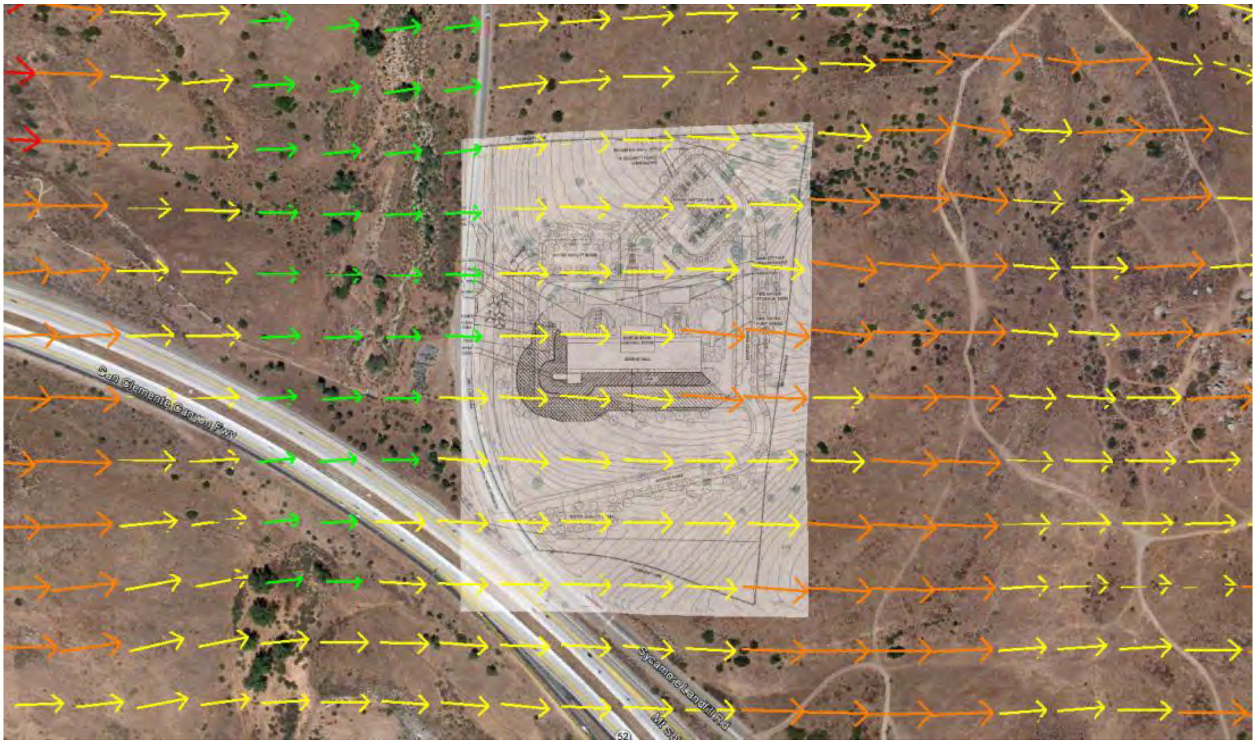
The northeast wind event shifts the ridge top acceleration to the east aspect of the project site.



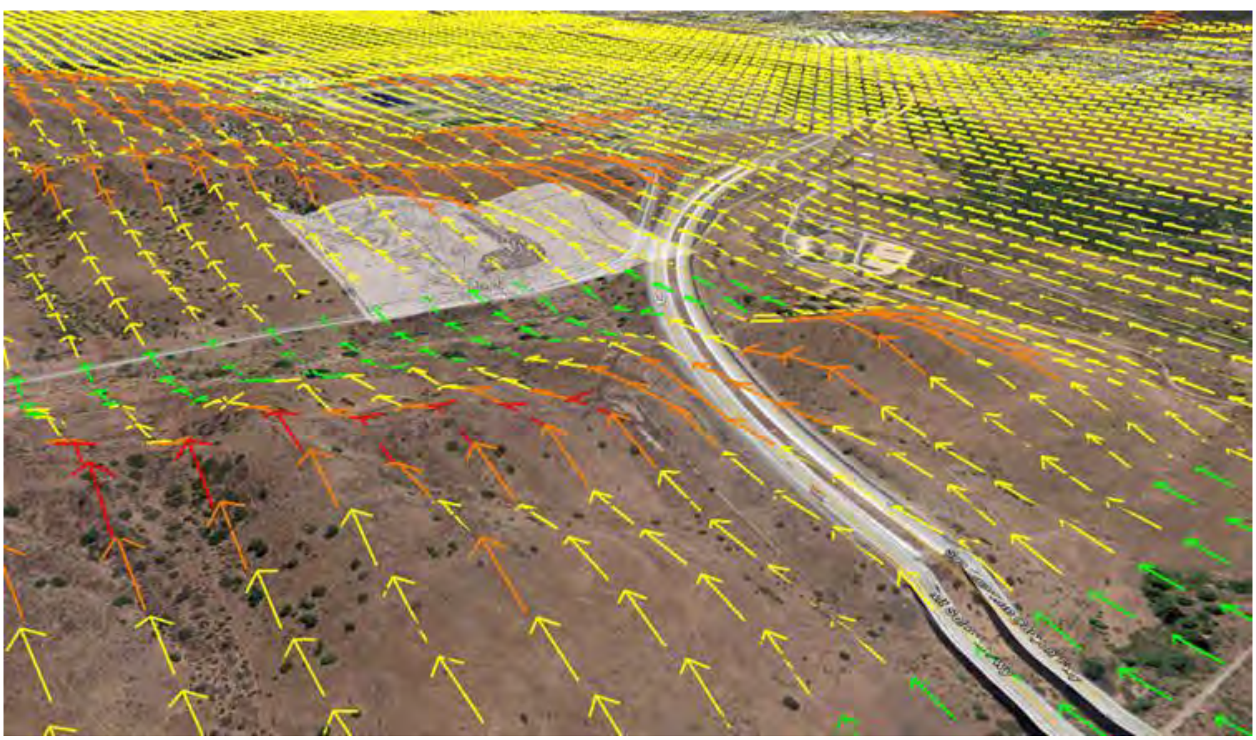
With the Santa Ana wind condition, all ridge top acceleration occurs offsite of the proposed project.



The west wind runs perpendicular to Little Sycamore Canyon and this creates ridge top acceleration on either side of the project site but wind sheltering (green arrows) below the project site



The oblique view below shows the acceleration as the wind leave the project site and the slowing of the wind as it approaches the site from the bottom of the drainage.



The data shows that the Quail Brush Power Plant area is prone to strong north-easterly wind events in the fall that result in large fires. The wind rose from the Camp Elliot RAWS shows the strongest winds. This weather station is on an exposed ridge approximately 3 miles from the project. The normal sea breeze wind direction can be seen as west (onshore) 6-12 mph and offshore 6-9 mph. It indicates that the strongest winds blow in excess of 40 mph from the Northeast. During these periods, fuel moistures are typically at their lowest point for the year for both living and dead fuels because of the persistent summer drought of the Mediterranean climate. Coincidentally, offshore winds can blow from the north-north east during these low fuel moisture periods. The combination of steep canyon topography, dry fuels and strong winds are ideal for massive fire runs.

Wind Ninja models the local winds above the friction caused by landforms and vegetation. As the wind nears the surface of the earth, the wind is channeled and follows the terrain. This is especially true with the Santa Ana type winds which tend to be very terrain-following. In the area of project site, the winds would flow almost directly down the adjacent drainage to the east and the fire would follow this drainage accordingly.

As shown on the graphics on the previous page and below, the North wind aligns with the major drainage that the project is in and several other drainages in the areas. The northeast and west wind impact the project down slope and upslope alignments respectively. The overall wind modeling shows that the project site will be relatively unaffected from wind acceleration and wind channeling. In fact, due to its position on the hillside and at the bottom of the Little Sycamore Canyon drainage, winds at the project site location will be relatively stable and similar to those winds in the flat area to the south and east.

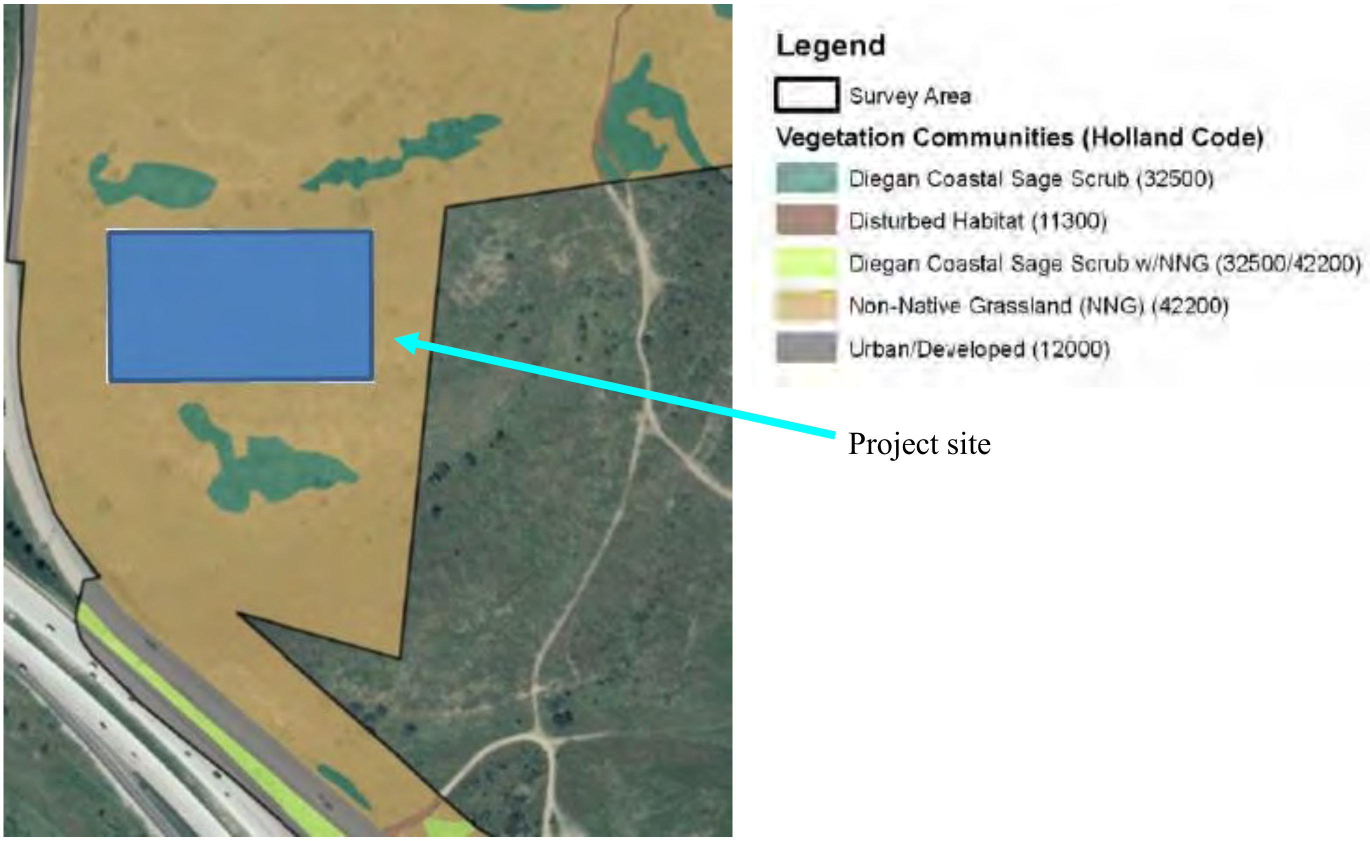
Fuels Discussion

According to the project biology report, the biological survey area is located within a previously burned area that is naturally re-vegetating to its previous state. Although there is still evidence of burned vegetation, the vegetation has nearly recovered and vegetative cover is close to pre-burn conditions based on historic aerial photos. The majority of the power plant site contains a dense stand of non-native grasslands (California annual grassland series) with a single patch of remnant Diegan coastal sage scrub habitat (California buckwheat-white sage series). There are also several ecotones, which are areas with overlapping vegetation communities. The most common species observed is deer weed (Lotus scoparius). Isolated individual plants scattered within the patch of deer weed include California buckwheat (Eriogonum fasciculatum) and white sage (Salvia apiana).

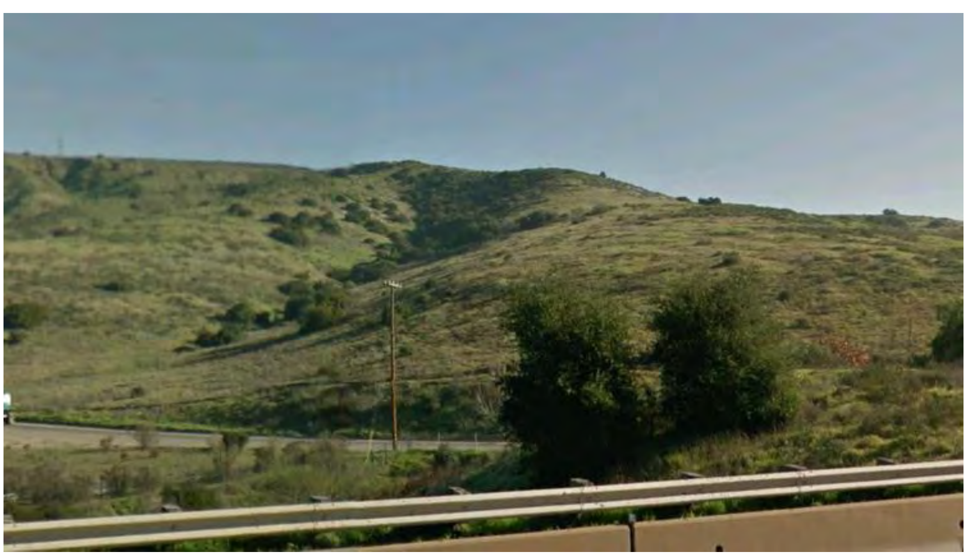
The specific fuel models used for the fire behavior analysis are shown below.

Fuel Model	
gs2	Moderate load, dry climate grass-shrub (D) (122)
sh2	Moderate load, dry climate shrub (S) (142)
SCAL18	Sage / Buckwheat

The graphic below shows the arrangement of the wildland fuels adjacent to the project site. Current vegetation is mostly non-native grasslands with small pockets of Diegan Coastal Sage Scrub.



Shown below is a late spring time picture of the site when the seasonal grasses are just beginning to dry and cure. (Picture shown is from the freeway looking at the site from the southwest)



The area around the project site tends to have greater fuel loading on the north aspects. As shown below in an aerial of the areas to the west of the project site, north aspects are darker and have much more year round vegetation rather than seasonal grasses. In the graphic below, the black arrow indicates the direction of north. Those hillsides which face to the north are the northern aspects. This is important as it relates to the site in that the historic fire corridors discussed earlier at burning in these areas with the heavier northern aspect vegetation and do not generally continue to burn when the vegetation is sparser as it is at the project site.

Project site

Given the site assessment, the worst case wildland fuels are moderate load grasses and shrubs. The SCAL18 fuel model was used for the small pockets of Diegan Coastal Sage Scrub. While they do not have enough biomass today to produce flame lengths in the model, over time, this configuration could possibly occur under extreme circumstances.

Weather History

In addition to the wind inputs for the site, assumptions need to be made for temperature, fuel moisture and precipitation. A review of the RAWS sites shows that the maximum temperature for the areas was 110 degrees. The lowest relative humidity was 5% and that the site has periods of heavy rain. Temperature fluctuations are normal within the seasons and tend to hit their maximums in the fall with the Santa Ana wind conditions (but are also possible in the summer). Freezing and frost kill are not an issue for this area.

History for MSDSNL

Santee Lakes CA US SGXWFO, Santee, CA — Current Conditions — Add Station Status

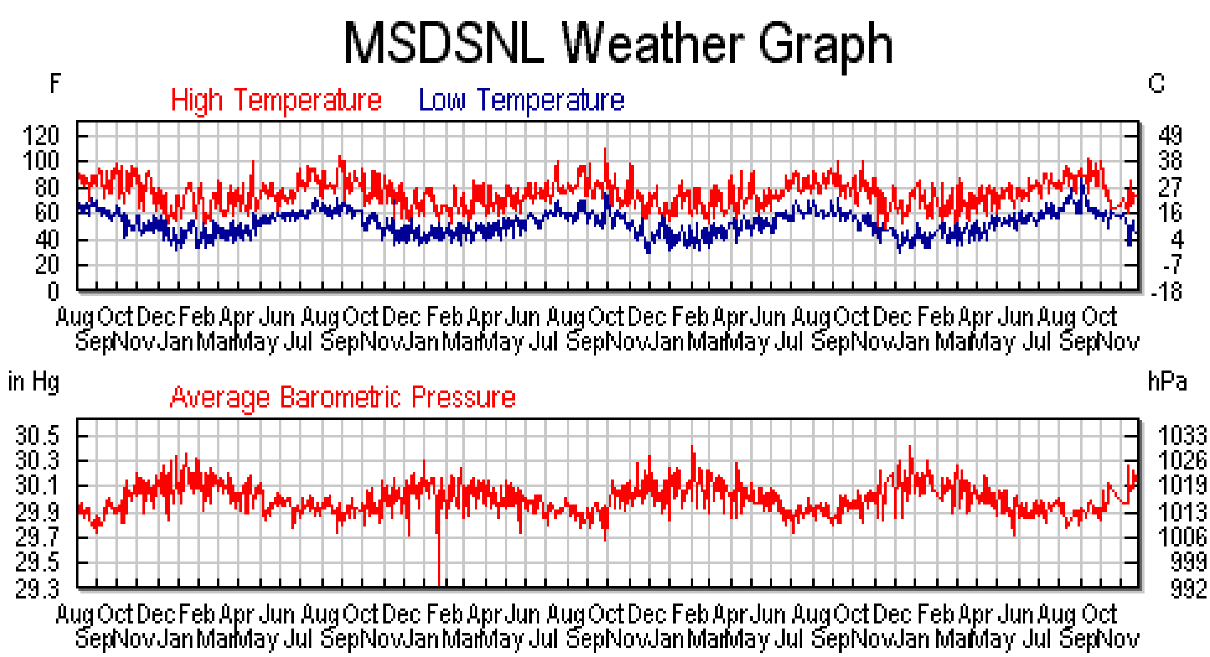
The data provider for this station: MesoWest

Daily Summary for August 1, 2008 - November 23, 2012

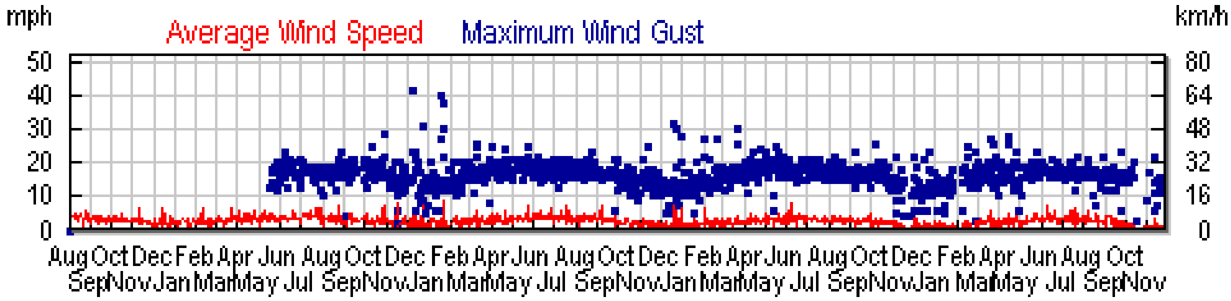
August 1 2008 - TO - November 23 2012 Go

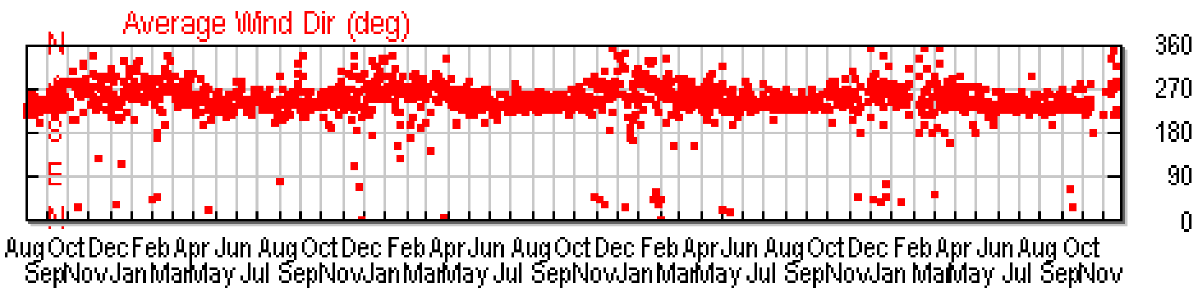
Daily | Weekly | Monthly | Yearly | **Custom**

	High:	Low:	Average:
Temperature:	**110.0** °F	**29.0** °F	**62.4** °F
Dew Point:	**74.0** °F	**-99.9** °F	**50.0** °F
Humidity:	100.0%	5.0%	68.6%
Wind Speed:	**26.0**mph from the SW	-	**2.7**mph
Wind Gust:	**42.0**mph from the SSE	-	-
Wind:	-	-	WSW
Pressure:	**30.50**in	**29.20**in	-
Precipitation:	**69.16**in		



The wind graphs below clearly show the predominate wind (270 degree – west) and the fall northeast wind events (Santa Ana winds) which generally correlate to the larger wind gusts (these are also produced by winter storms).





Theses weather factors will be used in the fire behavior model.

Fire Behavior Analysis

The BEHAVE, Fire Behavior Prediction and Fuel Modeling System is the most popular and accurate method for predicting wildland fire behavior. The BEHAVE fire behavior computer modeling system is utilized by wildland fire experts nationwide. Because the model was designed to predict the spread of a fire, the fire model describes the fire behavior only within the flaming front. The primary driving force in the fire behavior calculations is the dead fuel less than ¼" in diameter; these are the fine fuels that carry the fire. Fuels larger than ¼" contribute to fire intensity, but not necessarily to fire spread.

The BEHAVE fire model describes a wildfire spreading through surface fuels, which are the burnable materials within 6' of the ground and contiguous to the ground. This type of modeling demonstrates the best fire defense analysis for the Quail Brush Power Plant developments. The Modeling shows that the measurable fuels are further away than the most extreme flame lengths that would be produced. Using the modeling results, the Fuel Modification Plan was validated to ensure there are no direct interface areas in which a fire in the wildland will have an impact on the future structures. All future structures are protected with a Fuel Modification Zones 1 and 2 for a total distance of 100 feet.

Worst case National Fire Behavior Prediction System fuel models have been used for analysis; specifically fuel models GS2, SH2, and SCAL18. Worst case fire weather was used as well.

- One hour dead fuel moistures were calculated at 3%, ten hour at 4% and 100 hour at 5%.
- Live Herbaceous fuels were calculated at 30%. Live woody fuels at 50%.
- Temperatures were assumed to be in the low 110 degree range.
- Winds are calculated out of the NE at 45 mph (20 foot wind speed) and the W at 30 mph.
- A wind adjustment factor of .5 was used.
- Fire was modeled running in all directions with the wind on the southwest aspect.

Full details for each model run are available in the appendixes. Version 5.05 of the BEHAVE modeling program was used for this analysis. Fire activity on the site has removed a large amount of the older vegetation. Historical documents and pictures have been used to model the expected vegetation on the site.

Modeling scenarios have been completed for a NE wind and a W wind. Results show that flame lengths of up to 33.6 feet are possible in the SCAL fuel (very limited areas). The flame lengths for the grass shrub mix are about 19 feet and 15 feet for the shrubs without the grasses. It should be noted that these are the extreme head of the fire in a worst case fire burning in "equilibrium" from a continuous fuel bed. These outputs are not possible for small pocket of vegetation or without the ability of the fire to self-propagate using its own heat to preheat the fuels ahead of it.

It should also be noted that moving only 15 degrees off of the head of the fire will drop the flame length significantly (about 33%) to 22 feet for the SCAL18, 11 feet for the grass shrub mix and 9 feet for shrub model alone. Another 15 degrees and the flame lengths fall off to 14, 7 and 6 feet respectively. This is important in that all of the worst case inputs must align to produce the highest impact and removing or mitigating on a small part of the scenario reduces the impacts greatly. Similar reductions are seen in the fireline intensity and other aspects of the modeling outputs (See appendix for full outputs on both model runs).

Fire Acceleration

Fire acceleration is defined as the rate of increase in spread rate/fire line intensity from a given source. It is also defined as the rate of increase in spread rate from the current rate to an equilibrium spread rate under constant environmental conditions. Fire acceleration measures the amount of time required for a fire spread rate to achieve the theoretical steady state spread rate given: 1) its existing spread rate, and 2) constant environmental conditions. Fire acceleration is fuel dependent but independent of fire behavior. The incorporation of acceleration means that fire spread rates will not immediately adjust to the equilibrium spread rates when conditions change.

The rate of fire acceleration is dependent on a rate factor. The default rate for acceleration to 90% of equilibrium rates is 20 minutes from a point source fire. Line source fires are known to accelerate much faster (Johansen 1987) than point source fires. Although the equilibrium spread rate is dependent on fuel conditions, the buildup or acceleration rate has been found to be fuel independent for a variety of fuel types (excelsior, pine needles, and conifer understories).

A single acceleration rate may not be accurate for all fuel types (McAlpine and Wakimoto 1991), especially between very different fuel types. Fire in grass fuels is expected to accelerate more rapidly than in slash fuels, but there is little data to guide these settings. Acceleration is presumed to be independent of the fire behavior or eventual spread rate.

Fire acceleration is important because the flame lengths that are being discussed from the modeling in the Behave program assume that the fire has reached a self-sustaining equilibrium state. In the smaller areas of the project site and where fire could establish itself within an area that is perpendicular to the wind, the fire will not reach this point before it runs out of fuel. This is the rationale for the distances for the defensible spaces from interior fuel beds which are not directly connected to exterior fuel beds. In these instances, the fire must spot into the fuel bed, build to a steady burning state and then continue to a state of equilibrium. When the amount of fuel is simply not available within the interface area, to complete this process, mitigations have been adjusted to the actual risk on hand for these areas. This is particularly an issue in the area between Sycamore Landfill Road and the project site given the divided nature of the landscape in this area with the roadways and freeway to the west and southwest of the project site.

In summary, the BEHAVE analysis shows that flame lengths (in the direction of the project) from the NE wind shall have more of an impact than the W wind but neither is significant. The adjoining open space does have native wildland chaparrals, which are mostly coastal sage scrub type fuels and very sparse or in small pockets. The major wildland fuel is a grass/shrub mixture that will produce, at worst case, a flame length of 18.6 feet but is more likely to be less than ten feet. The biomass of the wildland fuel in this area are not sufficient to create flame length or fireline intensities great enough to overcome the 35 foot Zone 1 area that will have no vegetation in it. The Zone 2 vegetation will be significantly reduced over the native and will provide no means for a wildfire in the native vegetation to be communicated to the project site structures by radiant or convected heat or by direct impingement. The real issue, established by the modeling and the real life experience in many recent fires, is the ember intrusion. Modeling shows the potential for downwind embers up to several miles from the wildland. This is why the entire project will need to comply with the requirements set forth for ember intrusion protection.

BehavePlus 5.0.5 Fri, Nov 23, 2012 at 18:54:38 Page 1

Inputs: SURFACE

Description		Quail Brush Power Plant NE 45mph

Fuel/Vegetation, Surface/Understory

Fuel Model		gs2, sh2, SCAL18

Fuel Moisture

1-h Moisture	%	3
10-h Moisture	%	4
100-h Moisture	%	5
Live Herbaceous Moisture	%	30
Live Woody Moisture	%	50

Weather

20-ft Wind Speed	mi/h	45
Wind Adjustment Factor		.5
Wind Direction (from north)	deg	45

Terrain

Slope Steepness	%	100
Aspect	deg	225

Fire

Spread Direction (from north)	deg	0, 15, 30, 45, 60, 75, 90, 105, 120,

Run Option Notes

Maximum reliable effective wind speed limit IS imposed [SURFACE].

Calculations are for the specified spread directions [SURFACE].

Fireline intensity, flame length, and spread distance are always for the direction of the spread calculations [SURFACE].

Wind and spread directions are degrees clockwise from north [SURFACE].

Wind direction is the direction from which the wind is blowing [SURFACE].

For the modeling, the following fuel models have been used.

Discrete Variable Codes Used
Quail Brush Power Plant NE 45mph

Fuel Model

gs2	Moderate load, dry climate grass-shrub (D) (122)
sh2	Moderate load, dry climate shrub (S) (142)
SCAL18	Sage / Buckwheat

Quail Brush Power Plant NE 45mph

Flame Length (ft)

Spread Dir deg	Fuel Model gs2	sh2	SCAL18
0	2.1	1.7	4.6
15	2.0	1.7	4.4
30	1.9	1.6	4.3
45	1.9	1.6	4.3
60	1.9	1.6	4.3
75	2.0	1.7	4.4
90	2.1	1.7	4.6
105	2.2	1.8	4.9
120	2.4	2.0	5.3
135	2.6	2.2	5.9
150	3.0	2.5	6.7
165	3.6	3.0	8.0
180	4.6	3.8	10.1
195	6.4	5.3	13.9
210	10.7	8.8	22.1
225	18.6	14.9	33.6
240	10.7	8.8	22.1
255	6.4	5.3	13.9
270	4.6	3.8	10.1
285	3.6	3.0	8.0
300	3.0	2.5	6.7
315	2.6	2.2	5.9
330	2.4	2.0	5.3
345	2.2	1.8	4.9
360	2.1	1.7	4.6

open a worksheet

Quail Brush Power Plant NE 45mph

Fireline Intensity (Btu/ft/s)

Spread Dir deg	Fuel Model gs2	sh2	SCAL18
0	28	18	157
15	25	17	144
30	24	16	137
45	24	16	135
60	24	16	137
75	25	17	144
90	28	18	157
105	31	21	179
120	37	25	212
135	47	31	266
150	63	42	356
165	92	62	521
180	154	103	862
195	319	212	1734
210	976	638	4768
225	3257	2021	11816
240	976	638	4768
255	319	212	1734
270	154	103	862
285	92	62	521
300	63	42	356
315	47	31	266
330	37	25	212
345	31	21	179
360	28	18	157

Fuel Modification Plan Validation

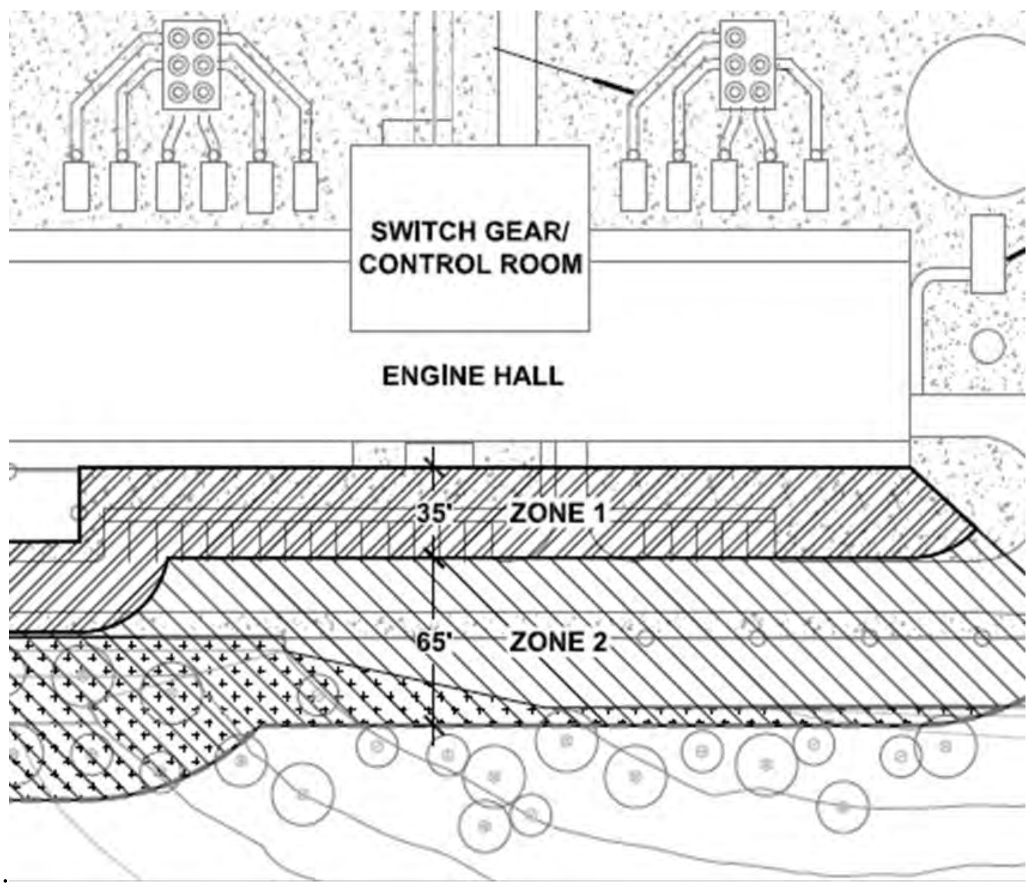
The Fuel Modification Plan for Quail Brush Power Plant consist of two (2) different zones, a minimum of a 35' Zone 1 and a 65' Zone 2. The Fuel Modification shall be no less than 100'.

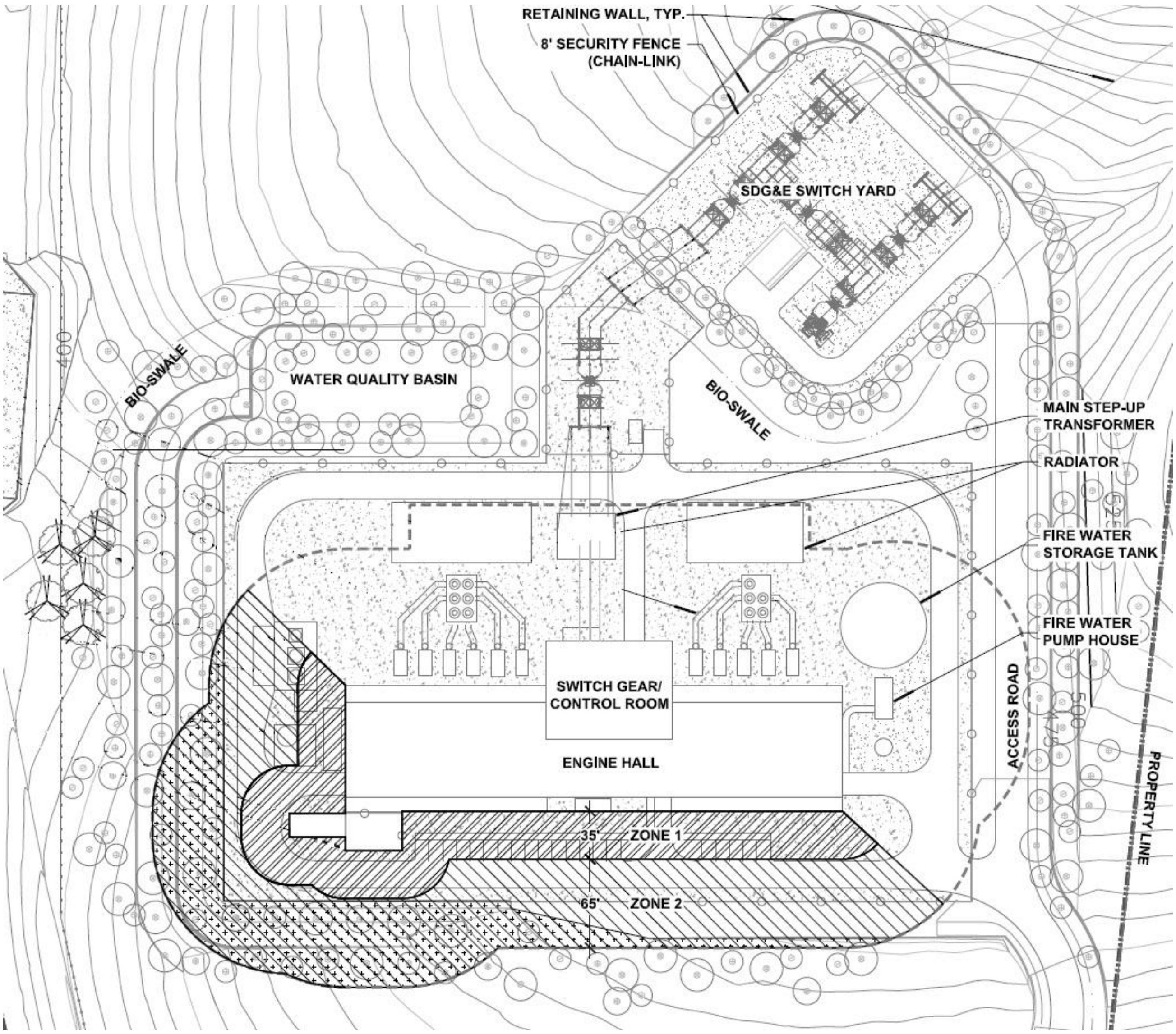
Zone 1 - Setback Zone

The purpose of the setback zone is to provide a defensible space for fire suppression forces and to protect structures from radiant heat and convective heat. No combustible construct. This zone is to be located on a level graded area at the top or base of slope and shall be between Zone 2 and the structure. No planting will be allowed in the Zone 1.

Zone 2 – Thinning Zone

This section is the thinning zone where specific native vegetation will be removed along with all of the downed and dead materials and fire resistive native plants will be used to replace them. Remaining vegetation will be spaced in a manner that does not provide for large pockets of fuel or create a path of travel for fire from the pristine vegetation to the Zone 1 in a manner that will impede the function of that zone. The thinning zone will also attempt to dramatically reduce the production of embers from the fuels within this zone by removing not only dead materials on the ground but also those within the remaining vegetation within the zone.





Why will this fuel modification zone work as designed?

Three physical processes are responsible for heat transfer to objects during wildland fires:

1) The aforementioned embers or mass transfer,

2) Radiant heat which travels by electromagnetic waves in straight lines from flames; and

3) Convection which due to strong buoyancy (directly proportional to temperature differential) *mostly* is released upward, even in wind driven situations, some estimates place the value of 4/5 of the total heat release on a wildland fire.

With radiant heat being the most effective heat transfer mechanism after mass transfer, we can look at how wildland firefighters estimate safe zone size as an analog of the heat impact on structures. In Butler and Cohen's paper "Firefighter Safety Zones: A Theoretical Model Based on Radiative

Heating" in the International Journal of Wildland Fire 8(2) 73 – 77, a model of a single firefighter surrounded by a flame body of uniform height and depth is used to estimate the injury threshold of the firefighter. What analog of fire behavior is used to estimate the heat incident on the firefighter? It is flame length. Safety gear worn by firefighters is also designed with these criteria in mind.

Heat energy that impacts objects around a wildland fire is a product of the amount of fuel that is ignited (heat per unit area or BTU/Sq. ft.), the time it stays ignited (residence time) and the number of square feet of fuels that are on fire at one time. Heat per unit area in BTU/Sq. Ft. is only a property of the fuel bed characteristics and its fuel moisture content. It says nothing about wind, the driving force of all fires.

The bulk of the radiant heat energy is at the head where the flaming zone depth is the greatest. But since the residence time of these light fuels is short, the depth of the flaming zone is small due to the short burnout time. Most of the energy is released in a few seconds.

The amount of radiant heat energy released at the head is directly proportional to the depth of the flaming Zone 1 and the heat output of the fuel type in BTU/Ft. Sq. If many square feet of fuel are on fire together, flame length is large, the heat output is high. The heat output of the flames is measured in BTU/FT/Second (Byram's Fireline intensity). This is determined largely by wind speed and slope. Byram's intensity is directly proportional to flame length.

And according to a paper by Cohen and others on structure ignition, flames at the head fire have virtually no significance when they are more than 33' away, which they are in the case of the project site. And the short burnout time of these riparian fuels will prevent any ignition due to the short residence time.

Given all of these factors and the modeling results, the fuel modification plan, as designed, will protect the project site from a wildland fire.

Additional Fire Protection Features

Water Supply/Built in Fire Protection

The project site will have onsite water storage for the required fire flow and domestic/process needs. The project site will have 600,000 gallon fire water storage tank and appropriately sized fire pump to insure uninterrupted water service for the duration of a wildland fire's impact from the flaming front and for several hours after this event. Fire hydrants will be provided in accordance with the San Diego Fire-Rescue Departments criteria for hydrant placement. The Engine Hall will also be protected with automatic fire sprinklers (NFPA 13 standard)

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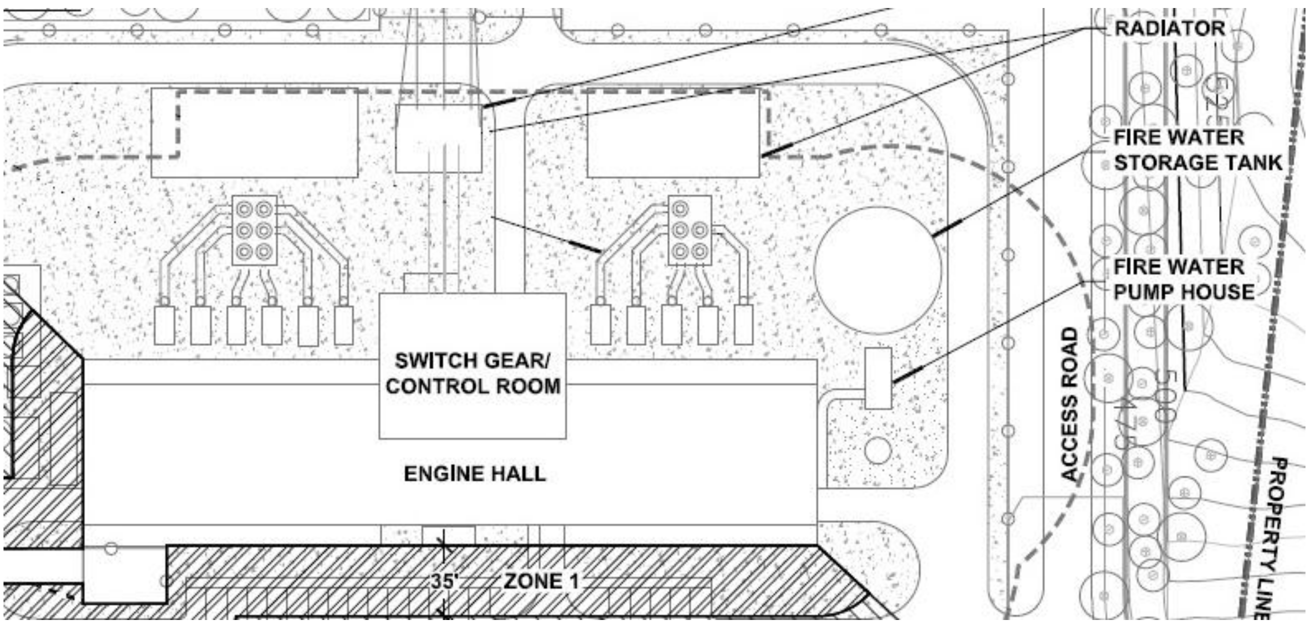


The project site will adhere to structural requirements for new buildings located in the Very High Fire Hazard Severity Zone specified under Chapter 7A of the 2007 California Building Code for structures.

In accordance with the site Wildland Emergency Action Plan, employees will be trained for power plant evacuation. It is not anticipated that the plant staff will join in any area suppression efforts. However, they may conduct localized suppression efforts within the power plant area under certain conditions and consistent with the emergency response procedures, such as during system shutdown and lockout, prior to evacuation. An employee shelter-in-place response procedure may be developed in conjunction with the San Diego Fire-Rescue Department. A shelter–in-place Class 3 safe room (or as otherwise required by the AHJ) may be designed in accordance with OSHA and San Diego Fire-Rescue Department requirements.

Evacuation routes will be posted throughout the facility. All employees will be trained in site emergency evacuation route procedures as part of the comprehensive training program. Safe assembly areas will be clearly shown on evacuation route placards posted throughout the facility. All employees will be trained

Fire/EMS Services

According to the current timeline, construction of the power generating facility, from site preparation and grading to commercial operation, would take approximately 18 months. If approved, construction would begin March 2013 and conclude June 2014.

Construction would generally occur between 7 a.m. and 7 p.m. During the peak construction months 11 and 12, the construction workforce would total about 268 individuals. Peak truck traffic (40 per day) would occur during months 1 and 2 when excavation efforts are underway. The truck trips are assumed to be spread out equally throughout the construction period. These trips are only the trips for the project site and do not include the trips related to the construction of the transmission line and gas line (as they are off-site). The number of workers per day would range from 29 in month 1 to 268 in month 11. Overall, there will be at least 100 workers during construction from months 5 through month 14.

Once construction was completed, the project would employ approximately 11 full-time workers resulting in approximately 22 daily trips. There would be 10 technicians 7 days a week working 12 hour shifts and 1 plant manager present 5 days a week. Truck trips during operation would be very limited.

The San Diego Fire-Rescue Department has indicated that it will be able to provide the Quail Brush facility with fire protection and emergency medical services during both construction and operation of the facility with its current level of personnel and material assets. However, emergency response times to this location will not meet the City's adopted response time goals of7.5 minutes for a single unit and 10.5 minutes for a multiple unit response.

The San Diego Fire-Rescue Department has indicated that it has automatic-aid agreements with other response agencies which may provide units to this location; however, the response of the agencies below cannot be assured now or in the future. The current automatic aid agreement with the City of Santee is on a month-to-month basis and could end at any time. At this time, the project area is not covered by the Santee agreement. The Santee and Heartland units and response times are estimated by San Diego Fire and Rescue as follows:

HE5 - 9.8 minutes
HE4 - 12.8 minutes
HE7 - 13.4 minutes
HEB4 - 12.8 minutes

San Diego Fire-Rescue Department has provided unit and response times are as follows:

E34 - 14.6 minutes
E39 - 15.2 minutes
T28 - 17.7 minutes
B7 - 20.0 minutes

As shown on the graphic below and in the appendix at the end of the site images, the project site has four San Diego City fire stations and two Santee City fire stations within 10 miles of the project.

Project Site

Resources are as follows:

Santee Fire Station 5
Located at 9130 Carlton Oaks Drive which is 1.86 miles from the project entrance.

- Ladder Truck with cross staffed Brush Engine and ALS ambulance

Santee Fire Station 4
Located at 8950 Cottonwood Avenue, which is 4.10 miles from the project entrance.

- Type 1 engine and cross staffed Rescue and ALS ambulance

San Diego City Fire Station 34
Located at 6565 Cowles Mountain Blvd., which is 5.83 miles from the project entrance.

- Engine 34
- Brush 34

San Diego City Fire Station 31
Located at 6002 Camino Rico, which is 6.62 miles from the project entrance.

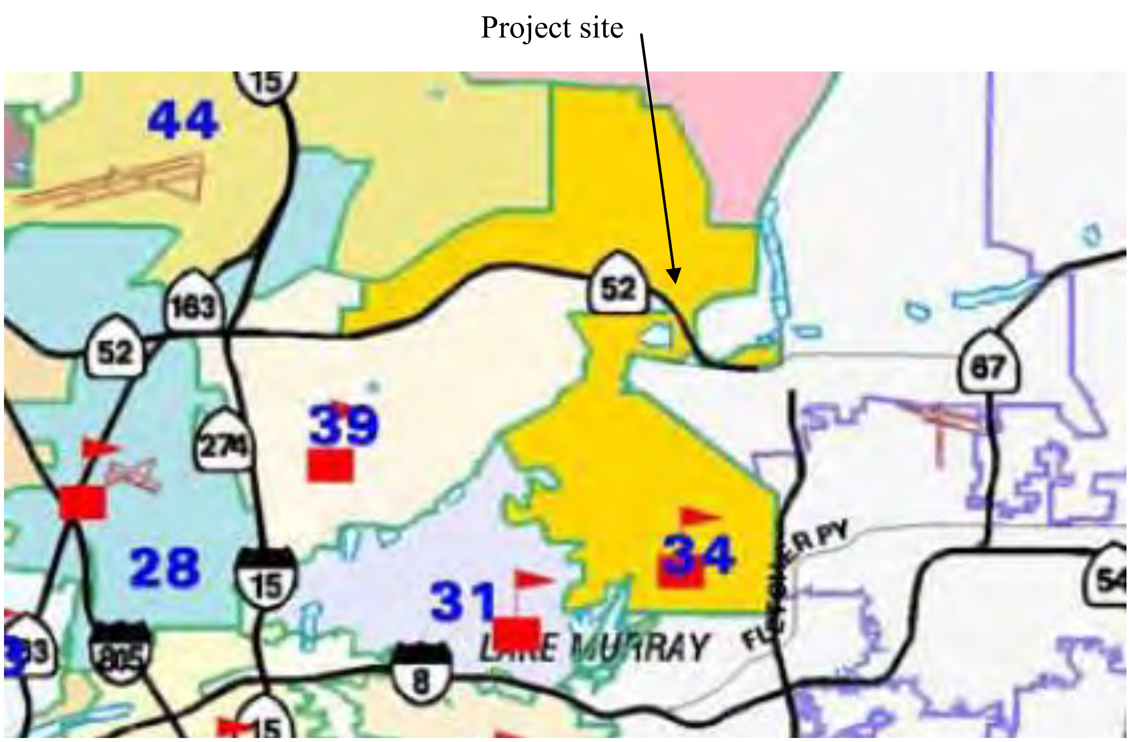
- Engine 31
- Medic 31

San Diego City Fire Station 39
Located at 4949 La Cuenta Drive, which is 6.90 miles from the project entrance.

- Engine 39
- Medic 39

San Diego City Fire Station 28
Located at 3880 Kearny Villa Road, which is 9.53 miles from the project entrance.

- Engine 28
- Truck 28
- Water Tender 28
- Foam 28
- Crash 28



The map above shows the first due areas for the San Diego City units.

A review of the call history for the four power generation facilities located in the San Diego Fire-Rescue Department jurisdiction (Larkspur, CalPeak, Cabrillo, and Miramar) from Jan 2009 to present shows are very low call generation.

The summary for the 4 plants includes:

5 false alarms
1 off-site vehicle fire
5 medical aid responses
And the Sept 8, 2012 fire at the Miramar Station

On average, the existing site produced one call per site per year. Additionally, when viewed from a risk standpoint, using the CFAI accreditation criteria, as reported by San Diego City Fire to the Commission, the project site will be classified as Low.

San Diego City Fire Response Standards

There are seven response categories for the San Diego Fire-Rescue Department: Fire, Levels 1 and 2, and Medical, Levels 0-1-2-3-4. The following non-fire incidents are included within these categories.

1) EMS
2) Hazardous Materials
3) Technical Rescue
4) Disasters

A Level 1 Fire represents a higher priority than a Level 2. For example, a Level 1 would include a residential fire and a rubbish fire would be a Level 2. Both levels, however, require the first responding engine company to arrive at the scene of an emergency

The emergency medical services response standard is delineated on the Table below. A Level 1 medical emergency requires the first responders to arrive at scene within eight minutes 90% of the time.

EMS RESPONSE LEVEL

LEVEL	RESOURCE	RESPONSE	DEFINITION
1	ALS –First responder + ALS ambulance	CODE 3: ≤ 8 min+ CODE 3: ≤ 12 min	EMERGENCY (potential risk to life)
2	ALS ambulance	CODE 3: ≤ 12 min	URGENT (risk to short or long term health, but no life-threat)
3	ALS ambulance	NO CODE: ≤ 20 min	NON-URGENT (little immediate health risk)
4	Ambulance (ALS OR BLS)	BEST EFFORT ≤ 30 min	UNSCHEDULED, NONEMERGENCY

Mitigation Measures

The applicant is proposing a health and safety program for both project construction and operation to mitigate hazards and comply with applicable regulations; safety training programs would also be provided to construction and operations personnel. The Emergency Action Program/Plan proposed by the applicant would be part of the construction and operation health and safety plan and would describe escape procedures, rescue and medical procedures, alarm and communication systems, and response procedures for very hazardous materials. The Construction and Operation Health and Safety Program are contained in written documents and would be kept at specific locations within the facility.

As part of the comprehensive training program, all employees will be trained in basic first-aid and medical treatment. First-aid and medical treatment of serious injuries and/or conditions will be coordinated with the first responders.

Training Program Elements:

- General requirements
- Fire hazard inventory, including ignition sources and mitigation
- Housekeeping and proper materials storage
- Employee alarm\communication system
- Portable fire extinguishers
- Fixed firefighting equipment
- Fire control and containment
- Flammable and combustible liquid storage
- Use of flammable and combustible liquids
- Dispensing and disposal of flammable liquids
- Training requirements
- Reporting and notification procedures for emergency; contacts, including offsite and local authorities
- Alarm and communication systems
- Emergency response equipment
- Emergency personnel (response team) responsibilities and notification roster
- Site assembly and emergency evacuation route procedures
- First Aid/Medical Treatment
- Additional requirements such a Lock out/Tag Out procedures

The fire resistive construction, on-site water supply, fuel modification zones, internal safeguards and training program all work together to make the project site safe from most risks and self-sufficient in the event of an emergency until the arrival of the first responders from the appropriate agency.

Overall Risk Reduction Analysis

The overall risk of the project site has been successfully reduced through the use of a multifaceted risk prevention and risk management process that includes the following features:

- Facility features
    - All structures are protect with automatic fire sprinklers
    - Performance based fuel modification system (including no vegetation within 35 feet of any structure)
    - Chapter 7A Construction (wildland interface requirements)
    - Onsite water supply of 600,000 gallon with independent fire pumps
    - Shelter-in-Place facilities in event that evacuation is not possible
    - Physical barriers such as the 10' fire wall on the west side of the plant

- Staff training and Capabilities
    - Emergency Action Plans
    - Evacuation procedures and routes
    - Staff First Aid/CPR/AED training
    - Site personnel are trained for confined space and respirator usage
    - Site fire prevention and first response teams for incipient fires and medical call
    - Onsite medical emergency transportation options

- Reduced service demand
    - Very low probability of fire/EMS service needs from SDFRD
    - Onsite medical staff to provide BLS level care within a few minutes
    - Safety procedures such as Lock out/ Tag out systems that decrease occupational hazards and prevent accidents
    - A healthy workforce (no elderly or infirmed) on site with a limited number of personnel on site (normally only 11 personnel on the site)

- Proximity of available resources
    - Onsite response personnel are on duty within the plant at all times and can provided initial care and actions to prevent the escalation of an emergency in the early phases when actions can be taken without extreme risk to the personnel or the need for specialized equipment. This includes fire suppression with portable fire extinguishers, compartmentalization of the hazard by closing barriers, reenergizing

equipment or shutting down processes as well as initiating actions such as CPR or first aid when needed.

- Within 10 miles of the site SDFRD has four fire stations housing four engine companies, a truck company, two paramedic units and various support equipment.
  - Both of the San Diego paramedic units are within seven miles and much of the travel route in on major streets or freeway. Assuming a 12 response standard (one minute of dispatch time, one minute of turnout time and ten minutes of driving time) the paramedic units need only average a speed of 42 mph to achieve the adopted standard.
- If available for response, the City of Santee has an additional engine two paramedic units that is within two miles of the project site and well within the SDFRD standards. This area is not currently covered in the month-to-month automatic aid agreement. Basic life support (site personnel) and ALS level (SDFRD resources) care will be provided to the project site even without a response from Santee City Fire Department resources.

The factors delineated above will meet or will be "above and beyond" the intent of the Laws, Ordinances. Regulations and Standards (**LORS**). Needed to mitigate fire/EMS needs and support the facility's projected very low service requirements.

Fire Behavior Analysis and Report Summary

In summary, the site, when operational will have personnel assigned who are trained in confined space, use of respirators, qualified in CPR and will have some ability to start basic emergency medical care of an injured worker or visitor. The site is designed to be fire safe for risk both internal and external including a wildland fire from the adjacent open space. The site will not generate an increase in workload for the local emergency responders that will have any impact on existing services or resource deployment. If available, Fire/EMS resources from the closest location can be at the project site quickly and would have the ability to provide all services needed. In the event that the closest resources are not available, the Fire/EMS delivery system has considerable depth with more than enough resources within 10 miles of the project site to insure that resources needed to combat a fire or render aid will be available when needed without the need for new or additional fire stations or other resources.

This Fire Behavior Analysis and Fire Protection Plan report is submitted as one component in a series of fire protection documents designed to insure that the project is constructed in a manner that make it safe for the residents and the city as a whole. We unconditionally recommend approval of this Fire Behavior Analysis and Fire Protection Plan Report to assist in building safer project.

Appendix A – Fire Modeling Results

BehavePlus 5.0.5

Quail Brush Power Plant NE 45mph

Fri, Nov 23, 2012 at 18:54:38

Input Worksheet

Inputs: SURFACE

Input Variables		Units	Input Value(s)
Fuel/Vegetation, Surface/Understory			
	Fuel Model		gs2, sh2, SCAL18
Fuel Moisture			
	1-h Moisture	%	3
	10-h Moisture	%	4
	100-h Moisture	%	5
	Live Herbaceous Moisture	%	30
	Live Woody Moisture	%	50
Weather			
	20-ft Wind Speed	mi/h	45
	Wind Adjustment Factor		0.5
	Wind Direction (from north)	deg	45
Terrain			
	Slope Steepness	%	100
	Aspect	deg	225
Fire			
	Spread Direction (from north)	deg	0, 15, 30, 45, 60, 75, 90, 105, 120, 135, 150, 165, 180, 195, 210, 225, 240, 255, 270, 285, 300, 315, 330, 345, 360

Run Option Notes

Maximum reliable effective wind speed limit IS imposed [SURFACE].

Calculations are for the specified spread directions [SURFACE].

Fireline intensity, flame length, and spread distance are always for the direction of the spread calculations [SURFACE].

Wind and spread directions are degrees clockwise from north [SURFACE].

Wind direction is the direction from which the wind is blowing [SURFACE].

Results for: Surface Rate of Spread (ch/h)

Spread Dir deg	Fuel Model		
	gs2	sh2	SCAL18
0	2.6	0.7	2.1
15	2.4	0.6	1.9
30	2.3	0.6	1.8
45	2.2	0.6	1.8
60	2.3	0.6	1.8
75	2.4	0.6	1.9
90	2.6	0.7	2.1
105	3	0.8	2.4
120	3.5	0.9	2.8
135	4.5	1.2	3.6
150	6	1.5	4.8
165	8.8	2.3	6.9
180	14.7	3.8	11.5
195	30.4	7.8	23.1
210	92.9	23.5	63.6
225	310.1	74.4	157.6
240	92.9	23.5	63.6
255	30.4	7.8	23.1
270	14.7	3.8	11.5
285	8.8	2.3	6.9
300	6	1.5	4.8
315	4.5	1.2	3.6
330	3.5	0.9	2.8
345	3	0.8	2.4
360	2.6	0.7	2.1

Results for: Fireline Intensity (Btu/ft/s)

Spread Dir deg	Fuel Model		
	gs2	sh2	SCAL18
0	28	18	157
15	25	17	144
30	24	16	137
45	24	16	135
60	24	16	137
75	25	17	144
90	28	18	157
105	31	21	179
120	37	25	212
135	47	31	266
150	63	42	356
165	92	62	521
180	154	103	862
195	319	212	1734
210	976	638	4768
225	3257	2021	11816
240	976	638	4768
255	319	212	1734
270	154	103	862
285	92	62	521
300	63	42	356
315	47	31	266
330	37	25	212
345	31	21	179
360	28	18	157

Results for: Flame Length (ft)

Spread Dir deg	Fuel Model		
	gs2	sh2	SCAL18
0	2.1	1.7	4.6
15	2	1.7	4.4
30	1.9	1.6	4.3
45	1.9	1.6	4.3
60	1.9	1.6	4.3
75	2	1.7	4.4
90	2.1	1.7	4.6
105	2.2	1.8	4.9
120	2.4	2	5.3
135	2.6	2.2	5.9
150	3	2.5	6.7
165	3.6	3	8
180	4.6	3.8	10.1
195	6.4	5.3	13.9
210	10.7	8.8	22.1
225	18.6	14.9	33.6
240	10.7	8.8	22.1
255	6.4	5.3	13.9
270	4.6	3.8	10.1
285	3.6	3	8
300	3	2.5	6.7
315	2.6	2.2	5.9
330	2.4	2	5.3
345	2.2	1.8	4.9
360	2.1	1.7	4.6

Results for: Flame Residence Time (min)

Spread Dir deg	Fuel Model		
	gs2	sh2	SCAL18
0	0.21	0.23	0.49
15	0.21	0.23	0.49
30	0.21	0.23	0.49
45	0.21	0.23	0.49
60	0.21	0.23	0.49
75	0.21	0.23	0.49
90	0.21	0.23	0.49
105	0.21	0.23	0.49
120	0.21	0.23	0.49
135	0.21	0.23	0.49
150	0.21	0.23	0.49
165	0.21	0.23	0.49
180	0.21	0.23	0.49
195	0.21	0.23	0.49
210	0.21	0.23	0.49
225	0.21	0.23	0.49
240	0.21	0.23	0.49
255	0.21	0.23	0.49
270	0.21	0.23	0.49
285	0.21	0.23	0.49
300	0.21	0.23	0.49
315	0.21	0.23	0.49
330	0.21	0.23	0.49
345	0.21	0.23	0.49
360	0.21	0.23	0.49

BehavePlus 5.0.5

Quail Brush Power Plant SW 30mph

Fri, Nov 23, 2012 at 20:29:27

Input Worksheet

Inputs: SURFACE

Input Variables		Units	Input Value(s)
Fuel/Vegetation, Surface/Understory			
	Fuel Model		gs2, sh2
Fuel Moisture			
	1-h Moisture	%	3
	10-h Moisture	%	4
	100-h Moisture	%	5
	Live Herbaceous Moisture	%	30
	Live Woody Moisture	%	50
Weather			
	20-ft Wind Speed	mi/h	30
	Wind Adjustment Factor		0.5
	Wind Direction (from north)	deg	225
Terrain			
	Slope Steepness	%	100
	Aspect	deg	225
Fire			
	Spread Direction (from north)	deg	0, 15, 30, 45, 60, 75, 90, 105, 120, 135, 150, 165, 180, 195, 210, 225, 240, 255, 270, 285, 300, 315, 330, 345, 360

Run Option Notes

Maximum reliable effective wind speed limit IS imposed [SURFACE].

Calculations are for the specified spread directions [SURFACE].

Fireline intensity, flame length, and spread distance are always for the direction of the spread calculations [SURFACE].

Wind and spread directions are degrees clockwise from north [SURFACE].
Wind direction is the direction from which the wind is blowing [SURFACE].

Results for: Surface Rate of Spread (ch/h)

Spread Dir deg	Fuel Model	
	gs2	sh2
0	14.9	3.8
15	30.6	7.8
30	90.7	23.6
45	275.4	75.3
60	90.7	23.6
75	30.6	7.8
90	14.9	3.8
105	8.9	2.3
120	6.1	1.5
135	4.5	1.1
150	3.6	0.9
165	3	0.8
180	2.7	0.7
195	2.4	0.6
210	2.3	0.6
225	2.3	0.6
240	2.3	0.6
255	2.4	0.6
270	2.7	0.7
285	3	0.8
300	3.6	0.9
315	4.5	1.1
330	6.1	1.5
345	8.9	2.3
360	14.9	3.8

Results for: Fireline Intensity (Btu/ft/s)

Spread Dir deg	Fuel Model gs2	Fuel Model sh2
0	156	103
15	321	212
30	953	639
45	2893	2044
60	953	639
75	321	212
90	156	103
105	94	62
120	64	42
135	48	31
150	38	25
165	32	21
180	28	18
195	26	17
210	24	16
225	24	16
240	24	16
255	26	17
270	28	18
285	32	21
300	38	25
315	48	31
330	64	42
345	94	62
360	156	103

Results for: Flame Length (ft)

Spread Dir deg	Fuel Model	
	gs2	sh2
0	4.6	3.8
15	6.4	5.3
30	10.6	8.8
45	17.6	15
60	10.6	8.8
75	6.4	5.3
90	4.6	3.8
105	3.6	3
120	3	2.5
135	2.7	2.2
150	2.4	2
165	2.2	1.8
180	2.1	1.7
195	2	1.6
210	2	1.6
225	1.9	1.6
240	2	1.6
255	2	1.6
270	2.1	1.7
285	2.2	1.8
300	2.4	2
315	2.7	2.2
330	3	2.5
345	3.6	3
360	4.6	3.8

Results for: Flame Residence Time (min)

Spread Dir deg	Fuel Model gs2	sh2
0	0.21	0.23
15	0.21	0.23
30	0.21	0.23
45	0.21	0.23
60	0.21	0.23
75	0.21	0.23
90	0.21	0.23
105	0.21	0.23
120	0.21	0.23
135	0.21	0.23
150	0.21	0.23
165	0.21	0.23
180	0.21	0.23
195	0.21	0.23
210	0.21	0.23
225	0.21	0.23
240	0.21	0.23
255	0.21	0.23
270	0.21	0.23
285	0.21	0.23
300	0.21	0.23
315	0.21	0.23
330	0.21	0.23
345	0.21	0.23
360	0.21	0.23

Appendix B - Site Images

Below are the site image locations and directions from the images taken from the biological report on this project site. The next six images are from that report and captions are the ones from that report. Additional images follow that have been taken of the site as it appears in its current condition.

Photograph 1:Looking northeast from the southern portion of the project site. The photograph is representative of the non-native grassland habitat onsite. The eastern edge of the plant site is located at the edge of the large shrubs in the background.

Photograph 2: Looking southeast at the southern portion of the plant site from the northern portion of the project site. The top of the ridge line in the background is the plant site southern boundary.

Photograph 3:Looking north along the proposed Gent Tie route at the northern extent of the plant site. This photo depicts the typical upland swale associated with the eastern portion of the project survey area. The vegetation at the bottom of the swale is western ragweed.

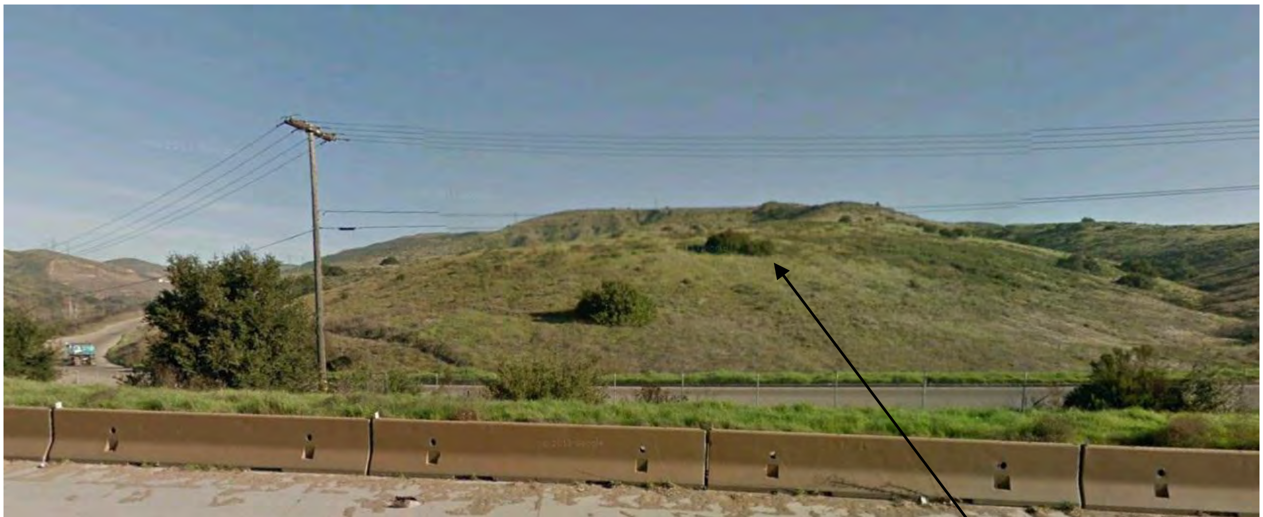
Photograph 4: Looking southeast at the northern extent of the Gen Tie portion of the project. The Sycamore Landfill Road is in the background. Sycamore Canyon Creek is in the foreground.

Photograph 5: Looking southwest at the proposed project site. State Route 52 is in the background. The proposed plant site will be constructed within the non-native grassland area adjacent to the Sycamore Landfill Road.

Photograph 6: Looking southeast at the ridge line just east of the Gen Tie Route. The saddle area of the ridge line contains a patch of native grasslands. Residential development is located further to the east, beyond the project survey area.

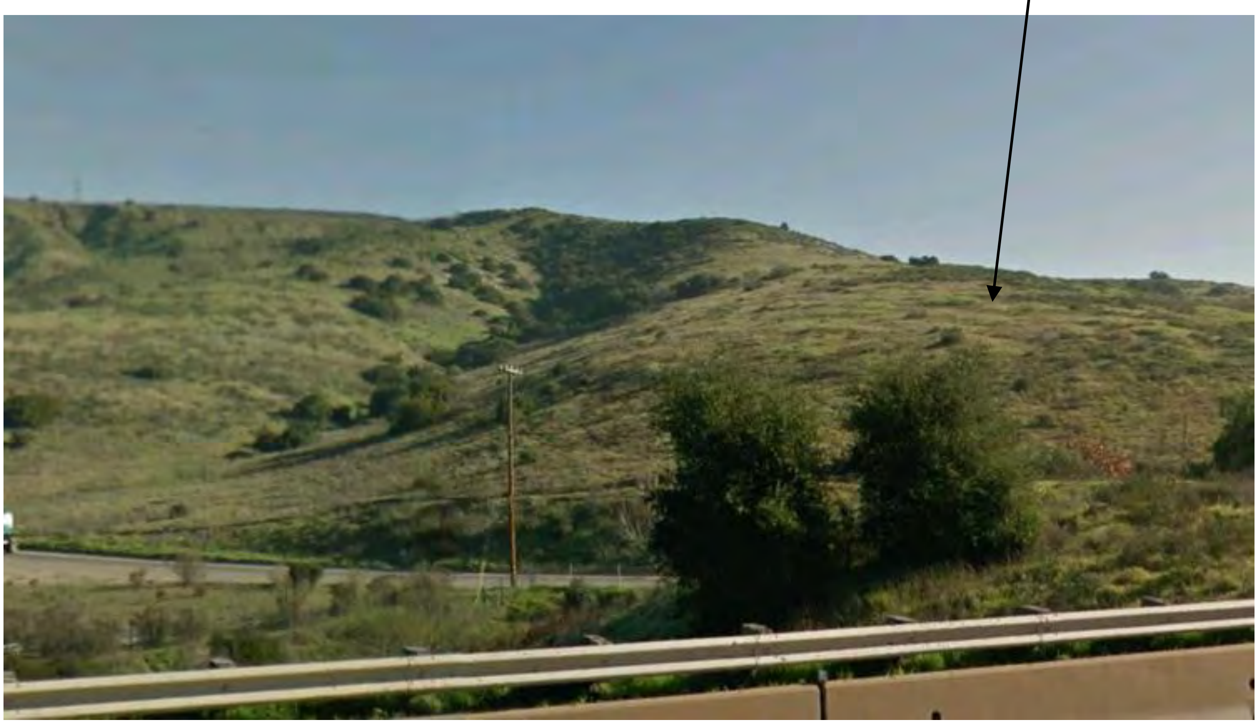
These additional site photos from the late spring when seasonal grasses are beginning to cure.

Below is the small drainage to the south of the site.



Project Site

Below is the drainage to the north of the site.

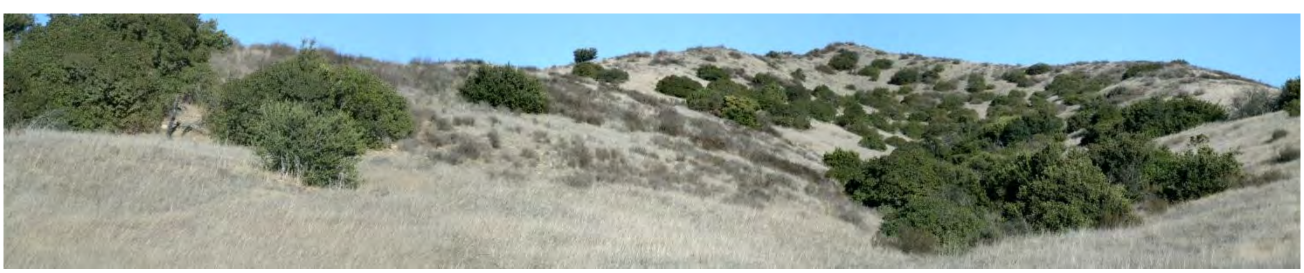


Finally late fall photos of the same area show the fully cured seasonal grasses and the remaining shrubs which are now in a "stressed" condition. These photos were taken in late November of 2012.

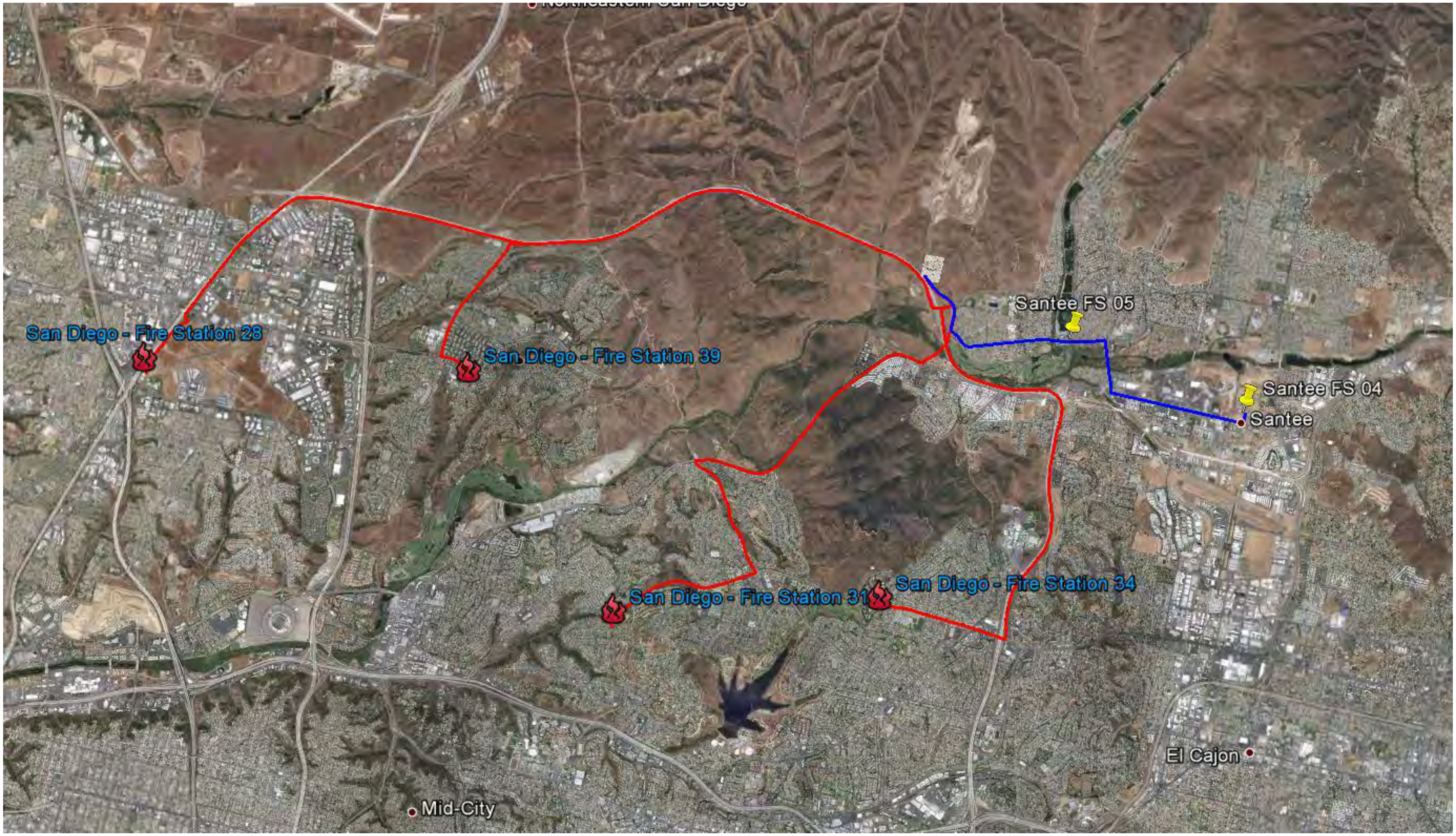
Below is the small drainage to the south of the site.

Same area different view.

Below is the drainage to the north of the site.



The only area adjacent to the power plant (Engine Hall) which will have any accumulation of shrubs in the small drainage to the north of the site as shown above and below (same area). This is the sh2 or potential SCAL18 area. Project Site



Response routes in red are for San Diego City fire stations and those in blue are for Santee City fire stations.