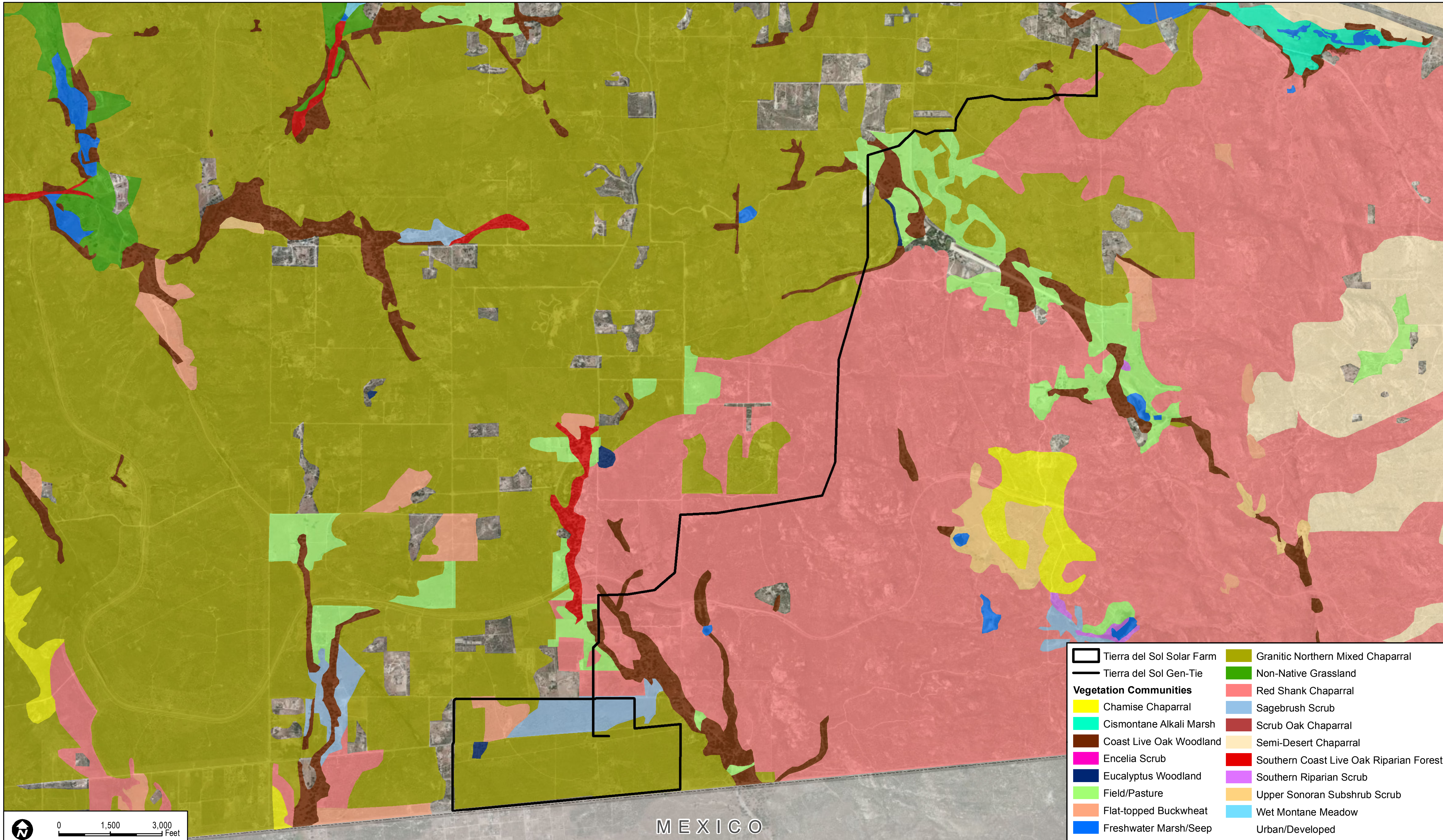


DUDEK

7123

SOURCE: SanGIS 2011; AECOM 2013; Soitec 2013; Bing Maps

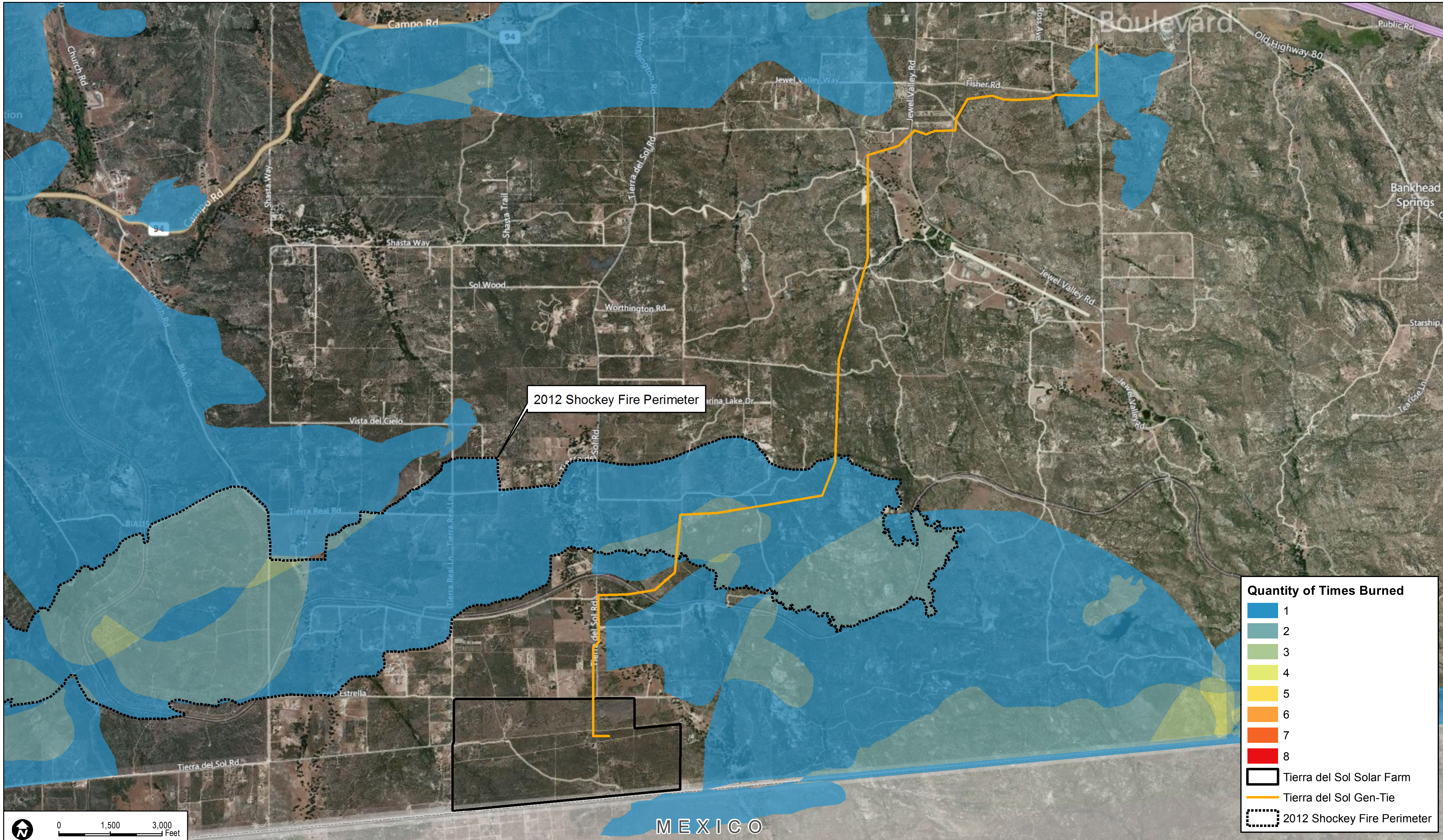
APPENDIX C

Site Vegetation Map

FIRE PROTECTION PLAN - TIERRA DEL SOL SOLAR FARM

APPENDIX D

Fire History Exhibit



DUDEK

7123

SOURCE: SanGIS 2011; AECOM 2013; Soitec 2013; USGS 2012; Bing Maps

APPENDIX D

Fire History Map

FIRE PROTECTION PLAN - TIERRA DEL SOL SOLAR FARM

APPENDIX E

BehavePlus Fire Behavior Analysis

APPENDIX E
BehavePlus Fire Behavior Analysis

BEHAVEPLUS FIRE BEHAVIOR MODELING

Fire behavior modeling includes a high level of analysis and information detail to arrive at reasonably accurate representations of how wildfire would move through available fuels on a given site. Fire behavior calculations are based on site-specific fuel characteristics supported by fire science research that analyzes heat transfer related to specific fire behavior. To objectively predict flame lengths, spread rates, and fireline intensities, the BehavePlus 5.0.2 fire behavior modeling system was applied using predominant fuel characteristics, slope percentages, and extreme weather variables for the site.

Predicting wildland fire behavior is not an exact science. As such, the movement of a fire will likely never be fully predictable, especially considering the variations in weather and the limits of weather forecasting. Nevertheless, practiced and experienced judgment, coupled with a validated fire behavior modeling system, results in useful and accurate fire prevention planning information.

To be used effectively, the basic assumptions and limitations of BehavePlus must be understood.

- First, it must be realized that the fire model describes fire behavior only in the flaming front. The primary driving force in the predictive calculations is dead fuels less than one-quarter inch in diameter. These are the fine fuels that carry fire. Fuels greater than one inch have little effect while fuels greater than three inches have no effect on fire behavior.
- Second, the model bases calculations and descriptions on a wildfire spreading through surface fuels that are within six feet of the ground and contiguous to the ground. Surface fuels are often classified as grass, brush, litter, or slash.
- Third, the software assumes that weather and topography are uniform. However, because wildfires almost always burn under non-uniform conditions, length of projection period and choice of fuel model must be carefully considered to obtain useful predictions.
- Fourth, the BehavePlus fire behavior computer modeling system was not intended for determining sufficient fuel modification zone widths. However, it does provide the average length of the flames, which is a key element for determining "defensible space" distances for minimizing structure ignition.

Although BehavePlus has some limitations, it can still provide valuable fire behavior predictions which can be used as a tool in the decision-making process. In order to make reliable estimates of fire behavior, one must understand the relationship of fuels to the fire environment and be able to recognize the variations in these fuels. Natural fuels are made up of the various components of vegetation, both live and dead, that occur on a site. The type and quantity will depend upon the soil, climate, geographic features, and the fire history of the site. The major fuel groups of grass, shrub, trees, and slash are defined by their constituent types and quantities of litter and duff layers, dead woody material, grasses and forbs, shrubs, regeneration, and trees. Fire behavior can be predicted largely by analyzing the characteristics of these fuels. Fire behavior is affected by seven principal fuel characteristics: fuel loading, size and shape, compactness, horizontal continuity, vertical arrangement, moisture content, and chemical properties.

The seven fuel characteristics help define the 13 standard fire behavior fuel models (Anderson 1982) and the more recent custom fuel models developed for southern California (Weise and Regelbrugge 1997). According to the model classifications, fuel models used in BehavePlus have been classified into four groups, based upon fuel loading (tons/acre), fuel height, and surface to volume ratio. Observation of the fuels in the field (on site) determines which fuel models should be applied in BehavePlus. The following describes the distribution of fuel models among general vegetation types for the standard 13 fuel models and the custom southern California fuel models:

- Grasses Fuel Models 1 through 3
- Brush Fuel Models 4 through 7, SCAL 14 through 18
- Timber Fuel Models 8 through 10
- Logging Slash Fuel Models 11 through 13

In addition, the aforementioned fuel characteristics were utilized in the recent development of 40 new fire behavior fuel models (Scott and Burgan 2005) developed for use in BehavePlus modeling efforts. These new models attempt to improve the accuracy of the standard 13 fuel models outside of severe fire season conditions, and to allow for the simulation of fuel treatment prescriptions. The following describes the distribution of fuel models among general vegetation types for the new 40 fuel models:

- Non-Burnable Models NB1, NB2, NB3, NB8, NB9
- Grass Models GR1 through GR9
- Grass-shrub Models GS1 through GS4
- Shrub Models SH1 through SH9
- Timber-understory Models TU1 through TU5
- Timber litter Models TL1 through TL9
- Slash blowdown Models SB1 through SB4

BEHAVEPLUS FIRE BEHAVIOR MODELING INPUTS

Vegetation/Fuels

To support the fire behavior modeling efforts conducted for this Fire Protection Plan, a fuel model was identified for the site to represent its dominant chaparral vegetative cover. While other vegetation types are located on site, chaparral fuels represent the most significant wildfire threat for the proposed project. The chaparral cover on site was classified as a Fuel Model SH7.

Weather

Fire behavior modeling conducted in support of this FPP utilized the guidelines and standards presented by the County of San Diego, Department of Planning and Land Use[1]. These guidelines identify acceptable fire weather inputs for extreme fire conditions during summer months and Santa Ana fire weather patterns. The County analyzed and processed fire weather from Remote Automated Weather Stations (RAWS) between April 15 to December 31 in order to represent the general limits of the fire season. Data provided by the County's analysis included temperature, relative humidity, and sustained wind speed and is categorized by weather zone, including Maritime, Coastal, Transitional, Interior, and Desert.

To evaluate potential fire behavior for the project site, Dudek utilized the BehavePlus (v. 5.0.2) fire behavior modeling software package to determine fuel moisture values and expected fire behavior for the site. The temperature, relative humidity, and wind speed data for the Interior[2] weather zone were utilized for this FPP based on the project location. Reference fuel moistures were calculated in BehavePlus and were based on site-specific topographic data inputs. Fire behavior for the site was calculated using worst-case fuels, topography, and weather and included an assessment of potential fire burning uphill (5% slope) in chaparral fuel beds (Fuel Model SH7) with Santa Ana (24 mph) and Peak (56 mph) sustained wind speeds. Table 1 summarizes the fuel moisture calculations utilized for this FPP.

Table 1
BehavePlus Fine Dead Fuel Moisture Calculation

Variable	Value
Dry Bulb Temperature	90 -109 deg. F
Relative Humidity	5 - 9 %
Reference Fuel Moisture	1 %
Month	Feb Mar Apr Aug Sep Oct

1 County of San Diego Report Format and Content Requirements – Wildland Fire and Fire Protection (August 31, 2010). On-line at http://www.sdcounty.ca.gov/dplu/docs/Fire-Report-Format.pdf
2 http://mappingsandiego.com/viewMap.html

Table 1
BehavePlus Fine Dead Fuel Moisture Calculation

Variable	Value
Time of Day	16:00 - 17:59
Elevation Difference	Level (within 1,000 ft.)
Slope	0 - 30%
Aspect	East
Fuel Shading	Exposed (< 50% shading)
Fuel Moisture Correction	2 %
Fine Dead Fuel Moisture	3 %

Topography

The topography of the site is discussed in greater detail in the FPP. Slope is a measure of angle in degrees from horizontal and can be presented in units of degrees or percent. Slope is important in fire behavior analysis as it affects the exposure of fuel beds. Additionally, fire burning uphill spreads faster than those burning on flat terrain or down hill as uphill vegetation is pre-heated and dried in advance of the flaming front, resulting in faster ignition rates. Slope values for this site were measured from site topographic maps and are presented in units of percent.

The modeling location was an area in the central portion of the site representing the maximum slope (5%) and aligned with anticipated Santa Ana winds (an approximately east-west alignment). This site was selected based on the strong likelihood of fire approaching from the east during a Santa Ana wind-driven fire event. The fire behavior modeling input variables for the solar farm and gen-tie transmission line are presented in Table 2. Locations for each modeling run are presented graphically in Figure 3 of the FPP.

Table 2
BehavePlus Fire Behavior Modeling Inputs

Variables	Solar Farm Values	Gen-Tie Line Values
Fuel Model	SH7	SH5
1h Moisture	3%	3%
10h Moisture	4%	4%
100h Moisture	5%	5%
Live Herbaceous Moisture	30%	30%
Live Woody Moisture	60%	60%
20-foot Wind Speed (upslope)	24, 56*	24, 56*
Wind Adjustment Factor	0.5	0.5
Slope Steepness	5%	10%

*includes Santa Ana (24 mph) and peak (56 mph) sustained wind speeds

BEHAVEPLUS FIRE BEHAVIOR MODELING RESULTS

Three fire behavior variables were selected as outputs from the BehavePlus analysis conducted for the project site, and include flame length (feet), rate of spread (mph), and fireline intensity (BTU/feet/second). The aforementioned fire behavior variables are an important component in understanding fire risk and fire agency response capabilities. Flame length, the length of the flame of a spreading surface fire within the flaming front, is measured from midway in the active flaming combustion zone to the average tip of the flames (Andrews, Bevins, and Seli 2004). It is a somewhat subjective and non-scientific measure of fire behavior, is extremely important to fireline personnel in evaluating fireline intensity and is worth considering as an important fire variable (Rothermel 1983). Fireline intensity is a measure of heat output from the flaming front, and also affects the potential for a surface fire to transition to a crown fire. Fire spread rate represents the speed at which the fire progresses through surface fuels and is another important variable in initial attack and fire suppression efforts. The information in Table 3 presents an interpretation of these fire behavior variables as related to fire suppression efforts. The results of fire behavior modeling efforts are presented in Tables 4 and 5, as well as in Table 3 of the FPP. Additionally, identification of modeling run locations is presented graphically in Figure 3 of the FPP.

Table 3
Fire Suppression Interpretation

Flame Length (ft)	Fireline Intensity (Btu/ft/s)	Interpretations
Under 4 feet	Under 100 BTU/ft/s	Fires can generally be attacked at the head or flanks by persons using hand tools. Hand line should hold the fire.
4 to 8 feet	100-500 BTU/ft/s	Fires are too intense for direct attack on the head by persons using hand tools. Hand line cannot be relied on to hold the fire. Equipment such as dozers, pumpers, and retardant aircraft can be effective.
8 to 11 feet	500-1000 BTU/ft/s	Fires may present serious control problems -- torching out, crowning, and spotting. Control efforts at the fire head will probably be ineffective.
Over 11 feet	Over 1000 BTU/ft/s	Crowning, spotting, and major fire runs are probable. Control efforts at head of fire are ineffective.

Table 4
BehavePlus Fire Behavior Modeling Results for Solar Farm

Fire Behavior Variable	Santa Ana (24 mph Winds)	Peak (56 mph Winds)
Flame Length (feet)	27.4	43.1
Fireline Intensity (Btu/ft/s)	7,565	20,302
Surface Rate of Spread (mph)	2.0	5.4

Table 5
BehavePlus Fire Behavior Modeling Results for Gen-tie Line

Fire Behavior Variable	Santa Ana (24 mph Winds)	Peak (56 mph Winds)
Flame Length (feet)	40.0	52.3
Fireline Intensity (Btu/ft/s)	17,809	30,871
Surface Rate of Spread (mph)	4.8	8.3

APPENDIX F

Fire Facility Availability Form

COUNTY OF SAN DIEGO
DEPARTMENT OF PLANNING AND LAND USE: Zoning
PROJECT FACILITY AVAILABILITY FORM, Fire

Please type or use pen

Tierra del Sol Solar Farm LLC. — 858-638-0995
Owner's Name — Phone

16650 Via Esprillo
Owner's Mailing Address — Street

San Diego — CA
City — State — Zip

ORG______
ACCT______
ACT______
TASK______
DATE______ AMT $______

DISTRICT CASHIER'S USE ONLY

F

SECTION 1. PROJECT DESCRIPTION — TO BE COMPLETED BY APPLICANT

A.
- [ ] Major Subdivision (TM)
- [ ] Minor Subdivision (TPM)
- [ ] Boundary Adjustment
- [x] Rezone (Reclassification) from Remove A to Designator zone.
- [x] Major Use Permit (MUP), purpose: 60 MW Solar Farm
- [ ] Time Extension...Case No.______
- [ ] Expired Map...Case No.______
- [ ] Other______
- [ ] Specific Plan or Specific Plan Amendment
- [ ] Certificate of Compliance:______

B.
- [ ] Residential . . . . Total number of dwelling units______
- [ ] Commercial . . . . Gross floor area______
- [ ] Industrial . . . . . Gross floor area______
- [x] Other . . . . Gross floor area NA 420 Acres Development

C. Total Project acreage 420 Total lots 1 Smallest proposed lot NA

Assessor's Parcel Number(s)
(Add extra if necessary)

658-120-03-00	658-090-31-00
658-090-55-00	658-120-02-00
658-090-54-00	

Thomas Bros. Page ______ Grid ______

Tierra del Sol Road Boulevard
Project address — Street

Mountain Empire, Boulevard — 91905
Community Planning Area/Subregion — Zip

OWNER/APPLICANT A[...]E ALL CONDITIONS REQUIRED BY THE DISTRICT.

Applicant's Signature: [signature] Attorney-In-Fact, Tierra del Sol Solar Farm LLC Date: 10-21-14

Address: 16650 Via Esprillo San Diego, CA Phone: 858-638-0995

(On completion of above, present to the district that provides fire protection to complete Section 2 and 3 below.)

SECTION 2: FACILITY AVAILABILITY — TO BE COMPLETED BY DISTRICT

District name San Diego County Fire Authority

Indicate the location and distance of the primary fire station that will serve the proposed project 39912 Ribbonwood Rd., 5.9 miles

A.
- [x] Project is in the District and eligible for service.
- [ ] Project is not in the District but is within its Sphere of Influence boundary, owner must apply for annexation.
- [ ] Project is not in the District and not within its Sphere of Influence boundary.
- [ ] Project is not located entirely within the District and a potential boundary issue exists with the ______ District.

B.
- [x] Based on the capacity and capability of the District's existing and planned facilities, fire protection facilities are currently adequate or will be adequate to serve the proposed project. The expected emergency travel time to the proposed project is 10.65 minutes. Facilities will be adequate with a developer agreement as similar funding mech.
- [ ] Fire protection facilities are not expected to be adequate to serve the proposed development within the next five years.

C.
- [ ] District conditions are attached. Number of sheets attached ______
- [x] District will submit conditions at a later date. As per the FPP.

SECTION 3. FUELBREAK REQUIREMENTS

Note: The fuelbreak requirements prescribed by the fire district for the proposed project do not authorize any clearing prior to project approval by the Department of Planning and Land Use.

- [x] Within the proposed project 30-50 feet of clearing will be required around all structures.
- [ ] The proposed project is located in a hazardous wildland fire area, and additional fuelbreak requirements may apply.

Environmental mitigation requirements should be coordinated with the fire district to ensure that these requirements will not pose fire hazards.

This Project Facility Availability Form is valid until final discretionary action is taken pursuant to the application for the proposed project or until it is withdrawn, unless a shorter expiration date is otherwise noted.

[signature] — JAMES PINE, DFM — 858.495.5434 — 10/23/2014
Authorized signature — *Print name and title* — *Phone* — *Date*

On completion of Section 2 and 3 by the District, applicant is to submit this form with application to:
Zoning Counter, Department of Planning and Land Use, 5201 Ruffin Road, Suite B, San Diego, CA 92123

APPENDIX G

Fire Safety Site Plan