DOCKET
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California Energy Commission
Docket Unit
1516 Ninth Street
Sacramento, CA 95814-5512

Subject: **BSPP RESPONSE TO ALUC COMMENTS OF MARCH 22, 2010 ON ALUC APPLICATION AND SUBSEQUENT CORRESPONDENCE BY EMAIL ON APRIL 13, 2010**
BSPP RESPONSE TO ALUC COMMISSION COMMENTS FROM MAY 13, 2010 COMMISSION MEETING
DOCKET NO. (09-AFC-6)

Enclosed for filing with the California Energy Commission are 1) BSPP Response to ALUC Comments of March 22, 2010 and Subsequent Correspondence by Email on April 13, 2010, and 2) BSPP Response to ALUC Commission Comments from May 13, 2010 Commission Meeting for the Blythe Solar Power Project (09-AFC-6).

Sincerely,

Arrie Bachrach

Arrie Bachrach

BLYTHE SOLAR POWER PROJECT (09-AFC-6)
RESPONSE TO ALUC COMMENTS OF MARCH 22, 2010
ON ALUC APPLICATION AND SUBSEQUENT CORRESPONDENCE
BY EMAIL ON APRIL 13, 2010

Response Date: May 4, 2010

HEIGHT OF STRUCTURES

Comment 1:

> Confirm by map/figure that ACC-4 is located outside of the AIA boundaries. If it is within the AIA, then it is inconsistent with maximum height requirements.

Response:

The southeastern corner of the Air Cooled Condenser 4 (ACC-4) is approximately 135 feet outside of the boundary of the Airport Influence Area. Figure 1 presents a graphic showing Power Block 4, the location of ACC-4, and the 14,000 ft limit of the AIA. The Applicant commits that the ACC-4 and auxiliary cooling tower will remain outside the Airport Influence Area in the final project plan.

Comment 2:

> Identify the height and number of proposed transmission poles relative to AIA Zones.

Response:

See Table 1 for a listing of each pole, their height, and the Compatibility Zone in which each is located. Figure 2 provides a map of the locations of the power poles in the separate Compatibility Zones for the Blythe Airport. Based on ALUC comments, the Applicant is modifying the Gen-Tie line route to avoid crossing Compatibility Zone B1 and commits that the new route will both avoid Zone B1 and will have transmission poles no higher than 70 ft for that portion of the revised route that crosses Zone C. Graphics of the proposed route are not available but the Applicant commits to have submitted all new FAA notifications by the May 13 Commission Meeting and will have information on specific pole locations available at that time.

Comment 3:

> Update on FAA review of remaining transmission poles.

Response:

See Table 1 for a listing of each pole and its current FAA status as of 04/19/2010. Figure 3 presents a color coded map illustrating the status of each transmission line pole for which an FAA Form 7460 application has been submitted. AECOM contacted Ms. Karen McDonald of the FAA on April 14 to enquire as to the status of their review. Ms. McDonald stated that all seven review departments have finished their analyses and she is now compiling the review comments prior to issuing a determination. She cannot commit to a completion date for her review and issuance of the determinations. She did say that regulations may dictate that some of the cases will require public notice prior to final determination.

As part of the evolving design of the project plan, the Applicant is proposing to relocate that portion of the transmission line that is south of Interstate 10 and to avoid Compatibility Zone B1. The existing transmission line route and the proposed modification of that power line route are given in Figure 4. New FAA Forms 7460 will be submitted for those power poles requiring new FAA review because of the new alignment of the transmission line.

On April 19, the FAA provided a determination of no hazard to air navigation for Pole PB2.3-3. This pole is located within the BSPP project boundary, well away from the Blythe Airport, and is associated with Power Block 2. A copy of this determination is attached.

Comment 4:

> At the April 8 meeting, the Commission Chairman advised that he would not be inclined to support aboveground transmission lines crossing through Zones B1 and C directly westerly of the east-west runway at Blythe Airport, especially since the approach from the east is already constrained by aboveground lines just east of the Zone A boundary.

Response:

The FAA has issued a determination letter of No Hazard to Aviation for Pole 26 which is proposed to be located in Compatibility Zone B1, almost exactly along the extended centerline of Runway 26 (See attachment 1). It is puzzling that the FAA has concluded that a 90 ft transmission pole on the extended centerline of Runway 26 does not constitute a hazard to air navigation while the ALUC indicates that they may consider such a pole a non-recommended use in Zone B1.

The published pattern altitude for the Blythe Airport is 800 ft, approximately the same height as the McCoy Mountains to the west of extended Runway 26. Aircraft departing on Runway 26 will need to gain altitude to clear the McCoy Mountains if they continue straight west after take-off. Aircraft approaching Runway 26 from the east, if they abort their landing, would also need to gain altitude to clear the McCoy Mountains if they had a straight out departure. Because the McCoy Mountains are less than a mile from the proposed transmission line route, pilots will already be ascending as they pass over the transmission line if they maintain a heading to the west.

As noted above, the Applicant is proposing to reroute the transmission line to avoid crossing Compatibility Zone B1. Figure 5 presents the elevation profile for the newly proposed Gen-Tie route that avoids Compatibility Zone B1. Note that the figure is oriented with west to the top of the figure.

There is limited room to move the transmission line further to the west to avoid crossing all of Zone C due to rising terrain to the west of the current proposed location. Such a path would put the transmission line in or near the McCoy Mountains at a much higher base elevation than at the proposed locations of the poles. The higher base elevation with poles extending higher still would in itself potentially pose a greater hazard to aviation than that posed by the proposed pole locations in Zones B1 and C. The previously proposed Gen-Tie route is located approximately 4,400 feet west of the future end of Runway 26 at an elevation of 502 feet for pole 26, to be located approximately on the extended centerline of the runway. Figure 6 presents an east-west profile of terrain elevations extending west from the end of Runway 26. The terrain rises gradually, then steeply to approximately 780 feet elevation at 10,000 feet west of the runway, the extent of compatibility zone C.

Figure 7 presents a series of north-south elevation profiles spaced approximately 2,000 feet apart west of the end of Runway 26. Each successive profile west is higher than the proceeding profile. Only at the 12,000 profile does the terrain fall on the far side of the McCoy Mountains. Figure 8 presents a map showing the locations of the east-west profile and the north-south profiles. The Transmission line would have to be located to the west of the McCoy Mountains for it to not pass over zone C. However, the routing for such a transmission corridor would be problematic since it would have to cross over the McCoy Mountains to allow the poles to the west of the runway to be on the far side of the mountain.

The Applicant fails to see the hazard associated with 90 ft transmission poles in Zones C and B1, given the distance of the transmission line poles from the end of Runway 26 and their nearness to the McCoy Mountains and the fact that the FAA has already determined that Pole 26 does not constitute a hazard to air navigation. However, in response to ALUC concerns, the Applicant is modifying the proposed transmission line route within the B1 zones to address ALUC comments. The proposed routing will not pass through Zone B1 and will comply with requested height limitations in Zone C.

The cost of burying a 230KV transmission line in dry desert sands is prohibitively expensive (on the order of $10 million or more). In addition, heat transfer issues associated with the dissipation of heat from the power line into the surrounding dry sands would seriously reduce the amount of power able to be transmitted along the underground segment of the transmission line during the hottest days of the summer, precisely the time of the peak summer load on the California power grid.

RADIO FREQUENCY INTERFERENCE

Comment 5:

> Detail how BSPP is comparable to the Palmdale Hybrid Power Project (PHPP) (i.e. total project acres, total MW, location related to distance from airport and to flight paths)

Response:

The Palmdale Hybrid Power Project (PHPP) is located immediately adjacent to the north side of the departure end of Runway 25 at the Palmdale Regional Airport/Air Force Plant 42. The PHPP plant site shares a boundary with Plant 42. The PHPP is located on a 337 acre site and is composed of two natural gas fired combustion turbine generators (CTGs), two heat recovery steam generators (HRSGs), and one steam turbine generator (STG), and a 250 acre solar thermal mirror array with parabolic trough mirrors. The power rating of the solar thermal mirror array is a nominal 50 MW. The overall power rating of the PHPP is 570 MW. Figure 9 presents a map showing the location of the PHPP project and Plant 42. At a nominal 1,000 MW, the BSPP is considerably larger than the solar field for the PHPP, but the BSPP mirrors are much farther away from the Blythe Airport and its traffic patterns (approximately 8,200 ft from Runway 35) compared to the distance from the PHPP project to the Plant 42 runways and traffic patterns (approximately 1,500 ft from Runway 25).

Comment 6:

> What are the communications and navigation signal utilized by the Blythe Airport?

Response:

Blythe airport (KBLH) has one navigational aid. It is a VORTAC (very high frequency omni directional range) transmitter at 117.40MHz. Pilot to ground communications at Blythe Airport are as follows:

CTAF/UNICOM	122.8 MHz
WX ASOS	120.175 MHz
APCH/DEP	128.15 and 285.60 MHz (provided by Los Angeles ARTCC)
Blythe VORTAC	117.40 MHz, 14E
Parker VORTAC	117.98 MHz, 15E

As discussed below, radio interference at around 117 MHz from BSPP power lines will be very weak and any potential radio interference around this frequency is not expected to significantly hamper air-ground communications at the Blythe Airport.

Comment 7:

> What would be the most likely maximum impact scenario involving line voltage, distance from the line to the receiving device, orientation of the antenna, signal level, line configuration and weather conditions and the level of interference created?

Response:

There will be no impact from the radio noise produced by the proposed facility on the VORTAC navigational aid at the Blythe airport.

There are two sources of radio noise from the proposed facility: corona from the conductors and gap noise from the hardware. Corona noise is typically a foul (rain) weather phenomenon that results from the breakdown of air at the surface of the conductor due to the stress on the electric field on air molecules. One of the key measures of that stress is the electric field gradient on the surface of the conductor. This gradient is in-turn directly affected by the impressed line to ground voltage conductor and the diameter of the conductor (as well as bundling of the conductor). The proposed facility will have a line to ground voltage of approximately 130kV and a conductor with a diameter of 1.762 inches. There is one conductor, and hence no bundling. This conductor is larger than typical for a 230kV facility as it is needed to carry a fairly large power flow over a short distance; one of the side benefits of this selection is improved corona performance. These configuration details results in a very low conductor surface gradient (9kV/cm), significantly below typical corona inception level of 17.5kV/cm. Further at a frequency of 117MHz corona noise is not productive even at higher surface gradient.

Unlike interference to AM radio (which is broadcasting between 0.520 MHz–1.610 MHz), which one might experience while passing under a 230kV transmission line in a car, at 117MHz power line radio noise corona is very weak (less than 4dBμV/m) even directly under this facility. Radio interference from gap noise typically occurs in fair, dry weather from the transmission line hardware (e.g. insulators). The sources of this noise are surface imperfections on the hardware and dust (or other solid air pollution). This facility will be constructed with polymer insulators and other hardware for high pollution areas. This will emulate to the greatest extent possible the surface tracking that would occur and reduce the levels of radio noise; which is negligible at 230kV in any case. This will increase the reliability of the circuit under the condition of dryness with sand and other airborne particulates.

The Blythe VORTAC (like all VORs) is used to locate the airport during mid-flight and is not an instrument landing device (there are none at Blythe). The pertinent factor for its successful use is that signal to noise ratio at the aircraft is high enough to allow the on-board instrument to decode the signal and provide bearings for mid-fight location and identification of nearby airports with similar VORs. VOR use is appropriate above 500ft. At that distance radio noise from the facility (which has been shown to very low in any case) is nearly immeasurable (calculated to be less than 0.5dBμV/m). Therefore the facility will not impact the use of VOR at the Blythe airport.

Comment 8:

What are the "acceptable levels" for electric field generation and what are typical impacts at certain distance at that level?

Response:

The electric field profile for this facility was provided in the Application for Certification (AFC), Table 5.14-9. The maximum field level is indicated as 1.85 kV/m at a distance of 75 ft from the centerline of the transmission structure. This result assumes an expected lowest clearance of the conductor to ground of 28 ft. The impacts are evaluated based on the electric shock that could occur from induction of current by the transmission line's electric field on metallic objects (e.g. trucks) at those locations and the reaction of people who might come in contact with those objects under those circumstances. Using these parameters, the current induced on a vehicle the size of a large semi-truck is less than 0.05 milliamps which is imperceptible to people. Beyond consideration of induced current and its effects there are no objective standards to evaluate the electric field and the State of California has not set a regulatory limit for electric and magnetic field levels. There are no human health effects based standards in place as the foundation for them as not been established. However the levels of fields expected from this facility are remarkably below most high voltage power lines in use today and are certainly typical for all 230kV line in-service.

REFLECTIVITY/GLARE

Comment 9:

Detail how BSPP is comparable to the Victorville (VV2) project (i.e. total project acres, total MW, location related to distance from airport and to flight paths, orientation of panels)

Response:

The Victorville II Project (VV2) is very similar in design to the PHPP and is located immediately adjacent to the north and east of the departure end of Runway 35 at the Southern California Logistic Airport (SCLA). The VV2 plant site shares a boundary with the SCLA. The VV2 plant is proposed for a 275 acre site and is composed of two natural gas fired combustion turbine generators (CTGs), two heat recovery steam generators (HRSGs), and one steam turbine generator (STG), and a 250 acre solar thermal mirror array with parabolic trough mirrors. The power rating of the solar thermal mirror array is a nominal 50 MW. The overall power rating of the VV2 project is 570 MW. Figure 10 presents a map showing the location of the VV2 project and the SCLA. At a nominal 1,000 MW, the BSPP is considerably larger than the solar field for VV2, but it is farther away from the Blythe Airport and its traffic patterns (approximately 8,200 ft from Runway 35) compared to the distance from the VV2 project to the SCLA runways and traffic patterns (approximately 5,000 ft from the departure end of Runway 35).

Comment 10:

How are the over-flights conducted for the VV2 analysis comparable to the BSPP proposal related to flight path?

Response:

As background, the production of glare from the mirror array, or in more accurate terminology, specular reflection, is not due to direct reflection of the sun by the parabolic mirror but is due to three sources of light of much lower intensity:

- The reflection of incoming sunlight from a small linear area along the front of the Heat Conducting Element (HCE) that is normal (perpendicular) to the sun and intercepts and reflects a small portion of the incoming sunlight.
- Direct reflection of light from metal components of the parabolic mirror array such as connectors along the HCE tube and structural elements.
- Light that is first refracted and scattered by the glass tube of the HCE that then strikes the mirror and is subsequently reflected outwards in a columnar beam, but at a greatly reduced intensity.

Specular reflection must obey the Law of Reflection, derived from Snell's Law, in which the incoming and outgoing light rays form the same angle of incidence from the normal to the reflecting surface. The mirror arrays at all solar trough power plants are aligned north-south to allow east-west tracking of the sun. The normals for any given HCE tube are therefore east and west of the solar array, and therefore reflections can only occur to the east and west. See Attachment 1 for a simple set of graphics that illustrate the geometry of the optics of a solar mirror array and the potential reflections that may occur from the array, including the geometry for a pilot landing on Runway 17.

The orientations of the mirror arrays at the BSPP, the VV2 project, and the Harper Lake project are all north-south, to allow an east-west tracking of the sun. The overflight of the Harper Lake solar array[1] for which pictures were submitted with the ALUC Application occurred in the morning as the flight path was east of the Harper Lake solar array. The approach simulation documented by the pilot was for an approach in the afternoon to Runway 17 at the SCLA with the solar array to the east of the extended runway. This would be equivalent to a morning approach to Runway 17 at the Blythe Airport since the mirror arrays at the BSPP are to the west of the Blythe Airport.

Runway 17/35 at the Blythe Airport is the runway with the greatest potential to be affected by glare. As Runway 17/35 is to the east of the BSPP solar arrays, you could only experience glare when operating from this runway when you were looking west with the sun to your back. Consequently, pilots at the Blythe Airport would potentially experience glare when departing to the north on Runway 35 in the morning, or when landing to the south on Runway 17 in the morning. Obviously, these operations would not be likely to occur in close proximity.

To be observed by a ground level observer, the sun's rays must be low on the horizon. Consequently, the only time specular reflection can occur from the BSPP mirror array and be visible by a ground level observer is in the early morning or late afternoon, the observer is to the east or west of the mirror, the sun is to the back of the observer and slightly over the observer's shoulder, and the observer is looking at the point where a perpendicular line from the observer to the HCE intersects the HCE. This means that a

[1] Note: In the BSPP Application to the ALUC, the solar mirror facility for which overflight photographs were provided was referenced as the Kramer Junction solar project but was actually the Harper Lake solar project.

pilot on the ground at the Blythe Airport will not be able to observe any glare since no location on the airport will be perpendicular to the HCE tubing. In addition, the facility will have 30 ft tall wind fencing on the east and west sides of the facility which are taller than the mirror arrays and will effectively limit observation of glare by a ground level observer to the east or west of the facility.

For a properly situated ground level observer, the only time glare would be visible is in the first few hours after sunrise, or before sunset, when the sun is low on the horizon. The McCoy Mountains are to the west of the BSPP and will prevent low angle of incidence sunlight from striking the BSPP mirrors in the late afternoon hours. The general public (other than hikers in the McCoy Mountains) will only be exposed to the potential specular reflections in the morning when located to the east of the mirror arrays. After the sun rises in the sky during the morning and the mirrors begin tracking the sun, Snell's Law will not allow a ground level observer to observe the reflection. And to reiterate, the reflection (glare) is specular reflection from the HCE tube, not reflection of the sun from the parabolic mirror.

The only geometry that allows for pilots to observe potential flashes of light from the BSPP solar array will be when the pilot is east or west of the solar array and in an approximate direct line from the sun and the solar array. In addition, the intensity of the glare, or specular reflection, is subject to inverse square attenuation with distance from the glare source. The farther the pilot is from the solar array, the weaker the glare becomes by the square of the distance. Beyond a certain distance that will depend on a number of factors including time of day, pilot altitude, clarity of the air, and cloudiness, among other factors), the glare will be so dissipated as to blend into and contribute to the general glow from the linear HCEs. As was documented in the project Application for Certification submitted to the California Energy Commissions (CEC), including observations by a CEC staff member (James Adams), from a distance, the solar array looks like a body of water and there is no indication of point sources of glare.

Pilots would potentially be able to observe glare from the solar arrays when east or west of the BSPP, as discussed above. Since the McCoy Mountains are to the west of the BSPP, aircraft are likely to be several miles from the BSPP solar arrays if they are to the west of the airport. Because of this distance, the drop-off in intensity of any potential glare will be significant due the inverse square attenuation and there is unlikely to be any significant glare that would potentially be hazardous. This leaves only aircraft operating from or near Runway 17/35 that would potentially be affected by glare.

Table 2 below presents an analysis of the projected Year 2020 flight operations at the Blythe Airport, as contained in the Riverside County Airport Land Use Compatibility Plan. From Table 2, there will be an estimated average of 68 flight operations per day for Runway 17/35 in year 2020, of which 88% would be daytime operations. Assuming that the daytime flights are spread evenly over a 12-hour day, this results in approximately five aircraft operations involving Runway 17/35 in any given daytime hour. Given that these operations will tend to follow a set pattern on either arrival or departure, the pattern height and approach glide slope could be used to define the solar geometry (i.e., time of day) at which glare could possibly be observed. Such a geometry of sun-flight profile is unlikely to persist for more than a single hour. Thus, a very small number of pilots could potentially expose themselves to glare at the airport on any given day, and the times and locations of exposure could easily be computed by the geometry of the pattern height, glide slope, day of year, and sun angle (time of day), and noted as a NOTAM. It is less likely that a pilot would be subject to glare from the solar field than what a pilot would experience from non-solar field reflective surfaces such as a building window in the vicinity of the airport and from windshields, mirrors, and flat surfaces of vehicles traveling along Interstate 10.

Table 2. Projected Daily Operations in 2020 at Blythe Municipal Airport by Runway and Aircraft Type

	Piston Engine	Turboprop	Business Jets	Totals
Runway 8	7.4	0.2	0.2	8
Runway 26	73.9	3.6	4.1	82
Runway 17	44.4	0.5	0.2	45
Runway 35	22.2	0.5	0.2	23
Helicopters				2
Totals	148	5	5	159
Source: Riverside County Airport Land Use Compatibility Plan, October 2004. Volume 3. Blythe Municipal Airport.				

THERMAL PLUMES

Comment 11:

> Based on what data is the CEC "not concerned with [the small auxiliary two-cell wet cooling towers] being a potential hazard to aviation? Is any data available for these similar to the dry cooling towers on temperature rise and upward velocity? How often, how long, and what time of day are these to be used?

Response:

The CEC is not concerned about potential aviation hazards produced by the BSPP auxiliary cooling towers as demonstrated by the fact that the auxiliary cooling towers were not even mentioned in the Traffic and Transportation section of the Staff Assessment for the BSPP.

The small auxiliary cooling tower for each BSPP power block provides cooling for equipment not directly a part of the steam cycle. These auxiliary cooling towers are much smaller in all aspects than the steam cycle cooling towers proposed for the PHPP and VV2 facilities and that which exists at the Blythe Energy Project. The specifications for the auxiliary cooling tower and the proposed PHPP cooling tower are given below in Table 3. Each BSPP auxiliary cooling tower will be designed to operate 24 hours per day, 8,760 hours per year. However, the load on the cooling tower will be lower at night than during the day.

The entire auxiliary cooling tower of two cells is roughly equivalent to one of the ten cells in a steam cycle cooling tower for a 570 MW power plant such as PHPP (or VV2) that rejects 440 MW of thermal energy to the atmosphere through the wet cooling tower. The temperature of the exhaust air from the auxiliary cooling tower would be comparable to that for the steam cycle cooling tower since both plumes would essentially be saturated with water upon release and the temperature would be determined by the ambient temperature and relative humidity.

One of the BSPP auxiliary cooling towers has a water circulating rate of approximately 6,000 gallons per minute (gpm). By comparison, the steam cycle cooling towers proposed for the PHPP and VV2 projects each have a water circulation rate of 130,000 gpm, a factor over 20 times larger, while the airflow through the tower is a factor of eight times larger for the PHPP and VV2 towers. As turbulence produced by a cooling tower is a function of both the air flow rate and the heat rejection (a function of the water circulation rate), the potential for turbulence and visible plumes above the auxiliary cooling tower is much less than that for the much larger PHPP (or BEP) steam cycle cooling tower.

Table 3. Comparison of BSPP Auxiliary Cooling Tower with the PHPP Steam Cycle Cooling Tower

Parameter	Units	BSEP Auxiliary Cooling Tower	PHPP Steam Cycle Cooling Tower	Ratio PHPP to BSPP Value
Number of Cells	-	2	10	5
Daily Operation	hours	24	24	1.0
Annual Operation	hours	8,760	8,760	1.0
Water Circulation Rate	gpm	6,034	130,000	21.5
Air Flow Rate (per cell for PHPP)	cfm	180,500	1,528,000	8.5
Fan Diameter	ft	12	28	2.3
Fan Exit Velocity	m/s	8.2	12.6	1.5
Tower Footprint	sq ft	1,320	34,200	26
Tower Height	ft	32	62	1.9

There is a potential for the plume from the ACC-4 to drift into the Airport Compatibility Zone. Figure 11 presents the location of the Project, the compatibility zone, and a wind rose. A wind rose is a meteorological diagram that graphically displays the frequency of occurrence of the distribution of wind speed and wind direction at a measurement location. In the wind rose, the individual barbs represent the wind blowing from a given direction, with the length proportional to the frequency of wind flow from that direction. For example, in Figure 11, the wind barb at the top of the figure represents the frequency of time the wind blows from the north to the south. Since the length of the wind barb extends to the 6% circle, the frequency of winds blowing from the north at the Blythe Airport is 6%. Encoded on the wind barb by color are the relative frequencies of winds of various speeds for that given direction.

Approximately 20% of the time, the wind as measured at the Blythe airport (2002-2004) could cause any plume from ACC-4 to advect to the south and southeast over the AIA. For the remaining approximately 80% of the time, the ACC plume will either rise vertically due to calm winds or will advect in a general northward direction away from the AIA. Please note that the blue, red, and green colors on the wind rose in Figure 11 represent occurrences of wind speeds 7 knots and greater. At these speeds, wind shear across any ACC plume will tend to rapidly dissipate the plume and will reduce or eliminate any potential for turbulence in the plume to affect aircraft operations. Consequently, the frequency of occurrence of ACC plumes that could advect into the AIA and potentially pose a hazard to aviation is well less than 20%. The most problematic time for potential turbulence from the ACCS will be during periods of calm winds, which generally occur at night and in the early morning hours.

PROVISION OF OPEN SPACE WITHIN ZONE D

Comment 12:

> Clarify the project footprint area and area left as open space (free of most structures and other major obstacles such as walls, large trees or poles greater than 4 inches in diameter measured 4 feet above the ground, and overhead wires) for the project area located within Zone D.

Response:

Figure 12 presents a map showing the Airport Influence Area for Blythe Airport and the Right of Way and Area of Disturbance for the BSPP. Approximately 555 acres of the BSPP project area are located within Compatibility Zone D. Within Zone D, mirrors will be located on approximately 31.6 acres, or 5.6% of the total project area within Zone D. In addition to the small 31.6 acre footprint of the mirror arrays in Zone D, there will be small footprints for approximately three power poles.

CUMULATIVE IMPACTS OF ADDITIONAL HAZARDS TO FLIGHT.

Comment 13:

> Due to the amount of existing and proposed solar facilities located within the vicinity of the Blythe Municipal airport, does this project propose additional hazards to flight which considered individually may be insignificant, but cumulatively may be considered significant?

Response:

The Air Cooled Condensers (ACCs) at the BSPP are well outside of the flight pattern for the Blythe Airport and are not expected to produce a hazard to aviation. The four ACCs are 120 ft high with base elevations of approximately 580 ft, 530 ft, 470 ft, and 400 ft Mean Sea Level (MSL), compared to the base elevation of the Blythe Airport at approximately 400 ft MSL. The pattern altitude for the airport is approximately 1,200 ft MSL. Consequently, aircraft in the terminal area will be approximately 620 feet or higher above any given ACC if the aircraft are at pattern altitude and are highly unlikely to experience any significant flight hazards associated with the ACCs. In addition, the impacts of any potential turbulence associated with an individual ACC will be limited to the immediate airspace above the units and will therefore not contribute to any cumulative impact. The ACCs are spaced more than a mile apart and therefore are unlikely to produce a cumulative impact between individual ACCs.

The glare, or specular reflection, from the mirror arrays is highly localized due to the geometry of the optics that creates the glare. To be observed, the observer must be on a straight line between the sun and this line must be on a perpendicular (normal) to the HCE tubes. This limits the potential locations where glare can be observed to the east of the mirror arrays in the morning and the west of the mirror arrays in the afternoon. The intensity of any glare generated will fall off as the square of the distance, and thus, is localized near an individual mirror array. As noted in the pictures of the Harper Lake solar facility overflight submitted with the ALUC application, only a portion of a solar array diffuse glow is visible from a given pilot observation point, and the portion of the array where glow is observable will move as the aircraft moves. Because of the geometry of the optics involved, it is highly unlikely that multiple solar fields would all present the same view of glare to a pilot at a given location, and even if such perfect alignment would occur, the intensity of the distant solar array would have fallen such that it would appear as only the diffuse glow noted in the overflight photographs. And as discussed above in the response for Glare, on average, approximately five aircraft operations per day in Year 2020 would likely be in a position to observe potential glare from the solar array while operating from Runway 17/35.

The proposed U.S. Solar power plant would not employ parabolic mirrors but rather arrays of photovoltaic cells. The optical properties of such cells are completely different from those for a parabolic mirror and have not been addressed as part of the analysis for the BSPP. However, photovoltaic panels are designed to absorb, rather than reflect, sunlight, and so any reflections from solar panels is expected to be small. In addition, as with all light sources, the intensity of any such glare or reflections from a photovoltaic array would fall off as the square of the distance from the observer. As the U.S. Solar project is proposed for several miles from the BSPP, it is unlikely that there would be a significant cumulative interaction with the BSPP, given the distance between the two proposed projects and the low reflectivity of photovoltaic panels.

The most probable cumulative impact of construction of the BSPP is that it would add one more facility to the vicinity of the airport for which pilots would need to observe and avoid objects at their discretion.

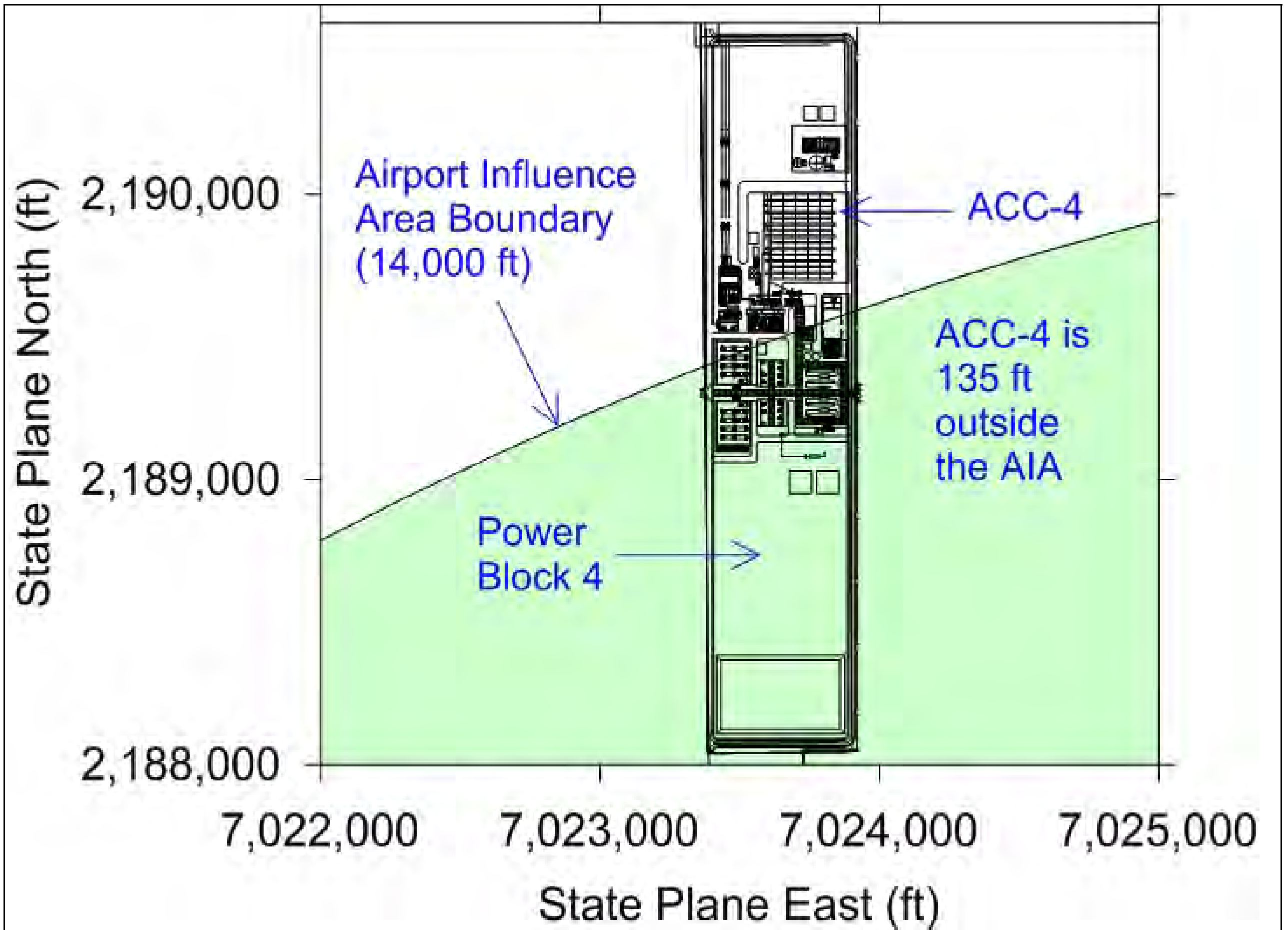


Figure 1. Location of ACC-4 Outside of the Blythe Airport Influence Area.

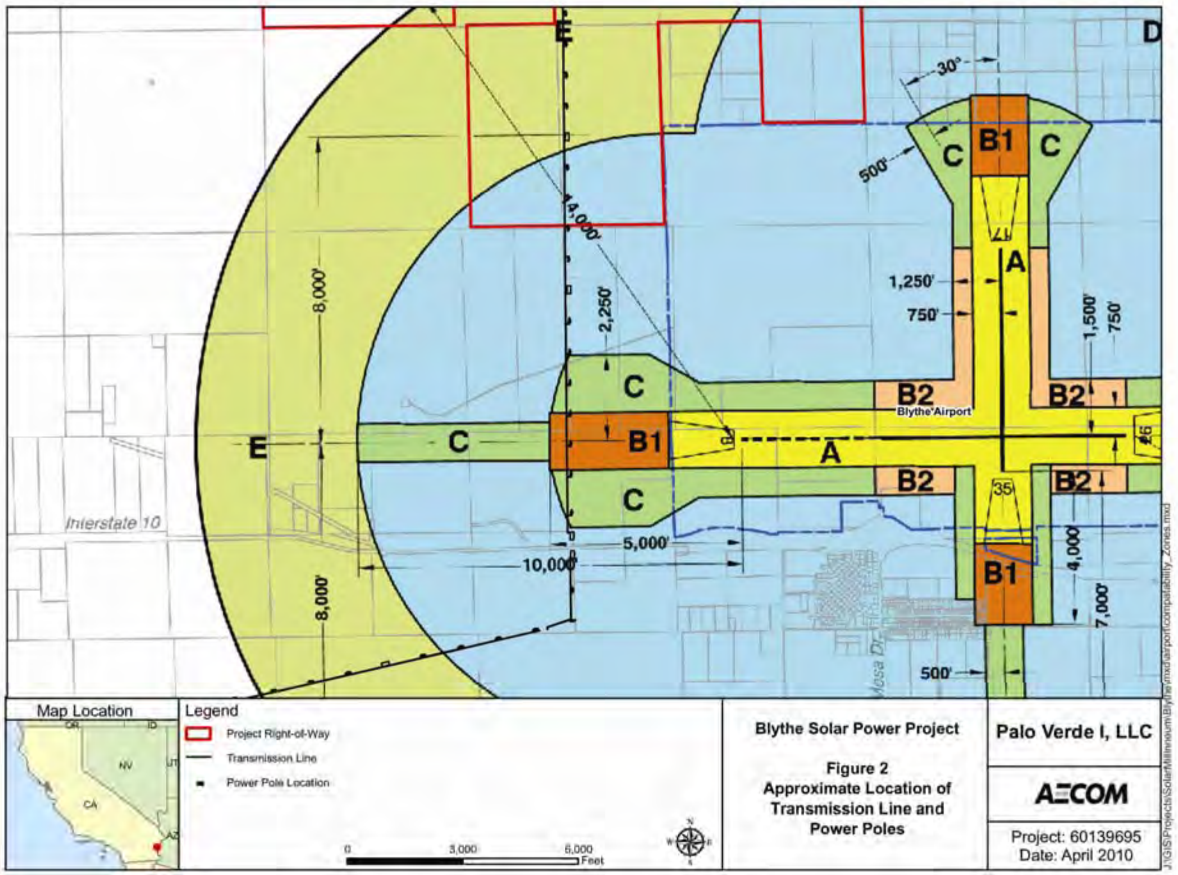


Figure 2. Map Showing the Original Locations of Power Poles within the Airport Influence Area and the Compatibility Zones Filed with FAA in November 2009.

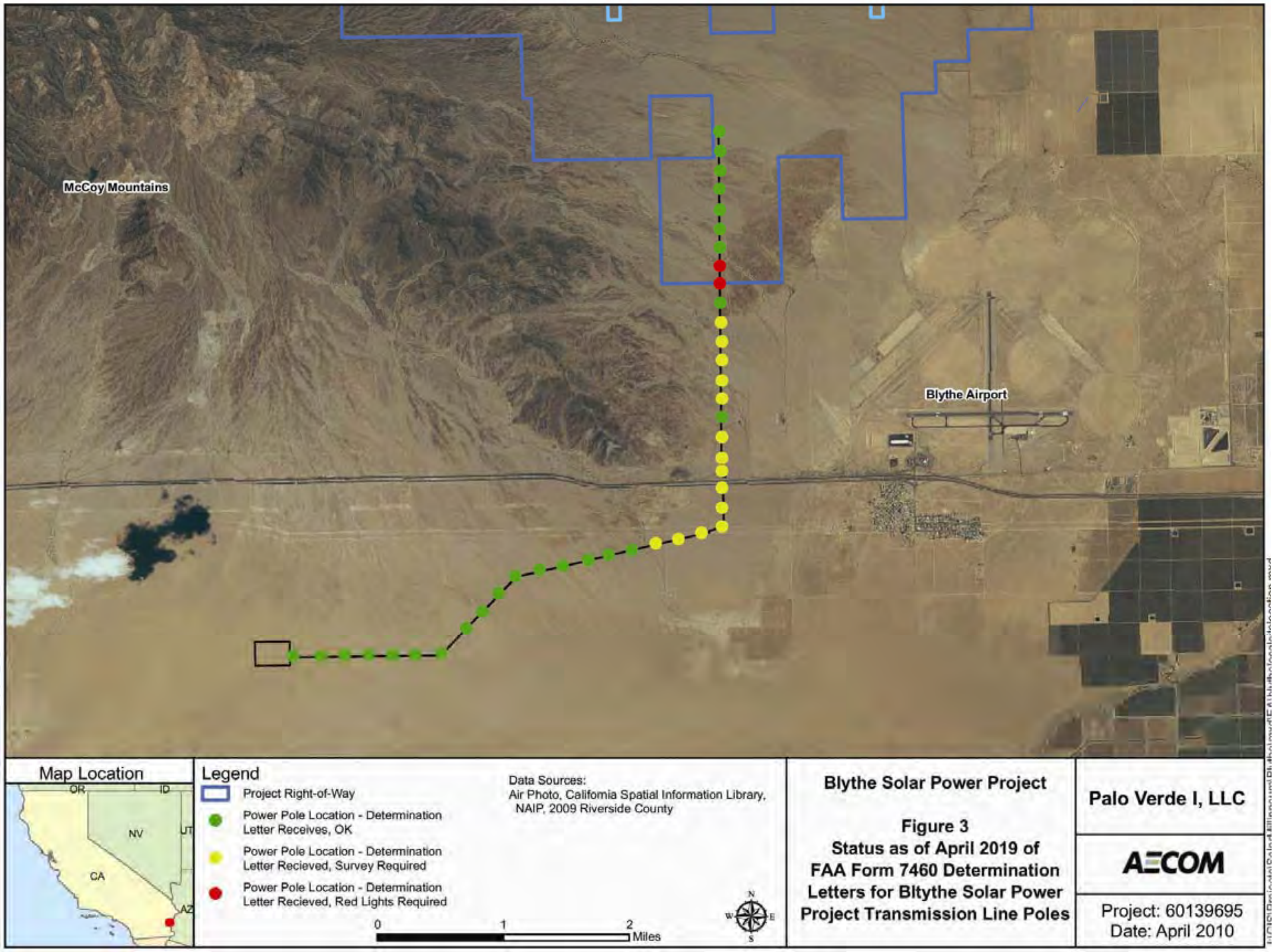


Figure 3. Map Showing the Status of FAA Form 7460 Applications to the FAA.

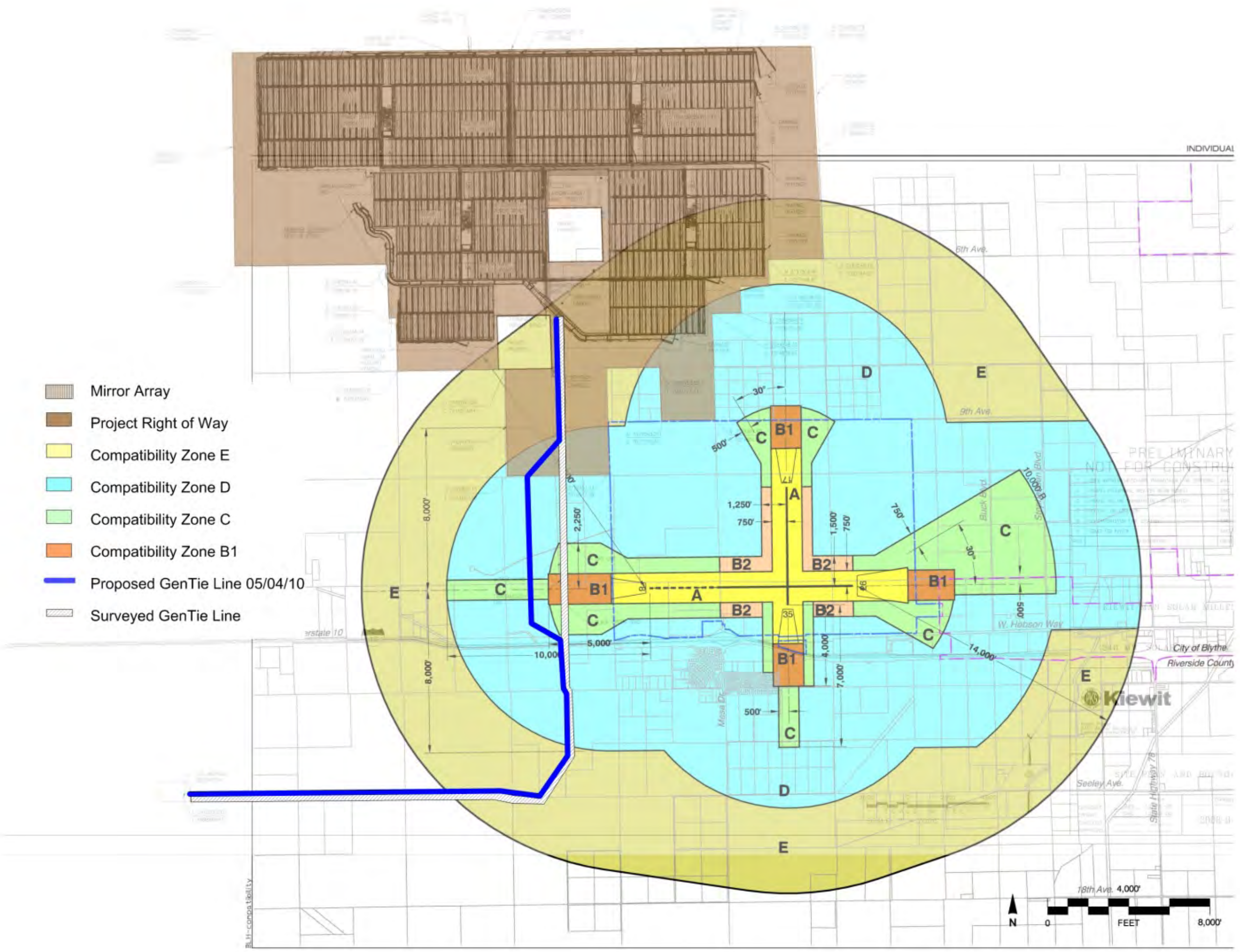
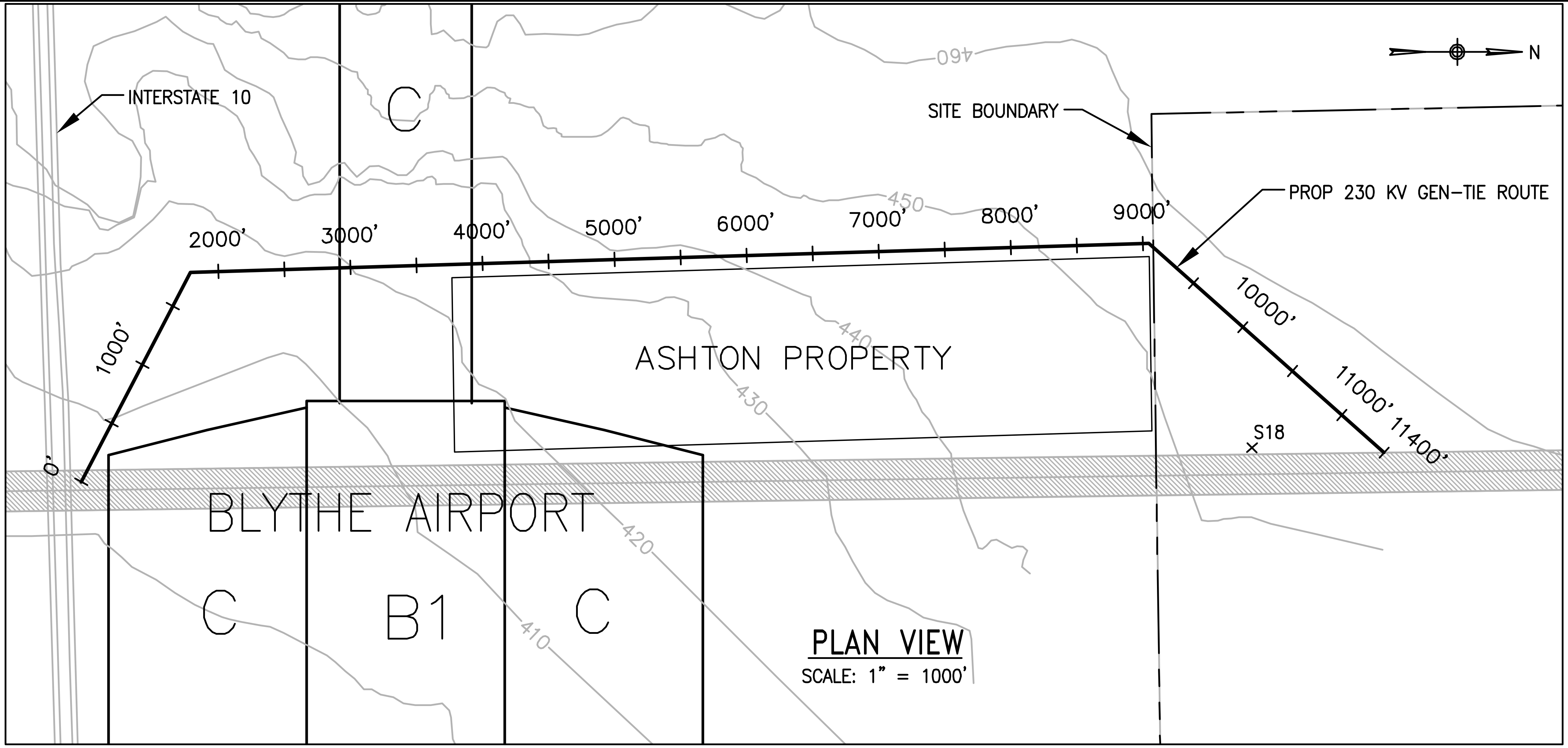
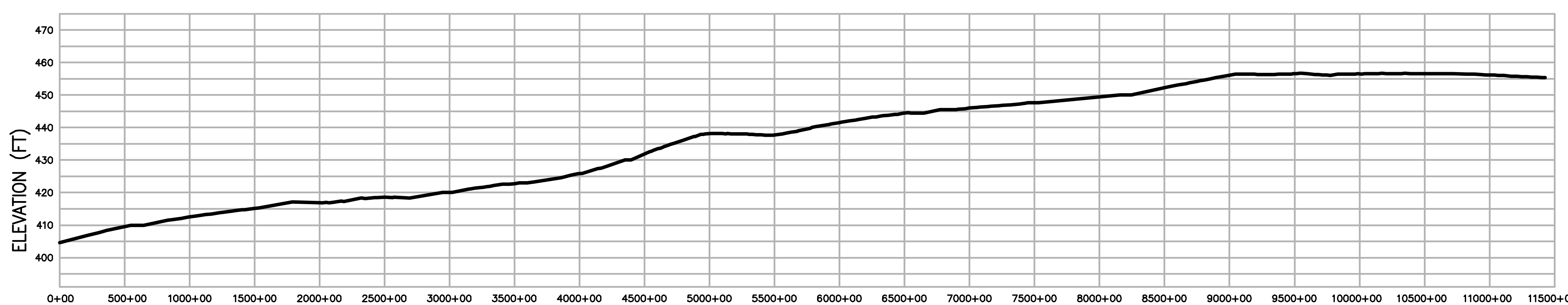


Figure 4. Submitted and Proposed New Transmission Line Corridor and Open Space within Compatibility Zone D

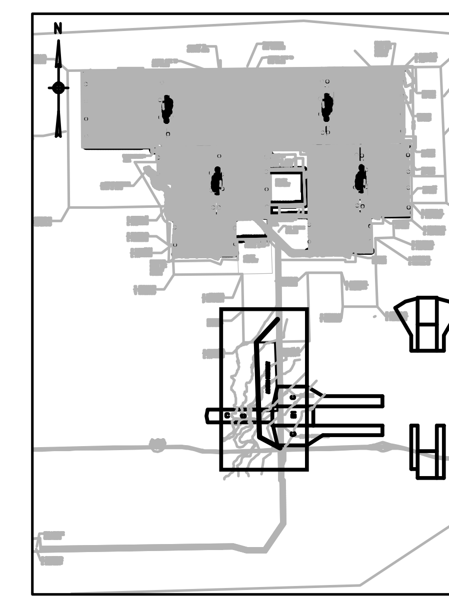
NOTES:
POLE LOCATIONS TO BE DETERMINED.



PLAN VIEW
SCALE: 1" = 1000'



TERRAIN PROFILE
SCALE: HORIZ: 1" = 1000'
VERT: 1" = 40'



KEY PLAN
N.T.S.

Figure 5. Revised Gen-Tie Line Route, 05/04/10

NO.	DATE	REVISION	BY CHK	APP.	APP.	D'BASE UPDATE	NOTES

DESCRIPTION | COST ACCOUNT
WORK COVERED BY THIS DRAWING CHARGED TO COST ACCOUNT ABOVE

CONSTRUCTION APPROVAL

APPROVAL	DATE	SCALE: AS SHOWN	DATE
		DESIGNED BY	04/30/10
		DRAWN BY	
		CHECKED BY	
		APPROVED BY	
		APPROVED BY	

INFORMATION CONFIDENTIAL: ALL PLANS, DRAWINGS, SPECIFICATIONS AND/OR INFORMATION FURNISHED HEREWITH ARE AND SHALL REMAIN THE PROPERTY OF EARTH TECH AND SHALL BE HELD CONFIDENTIAL AND SHALL NOT BE USED FOR ANY PURPOSE NOT PROVIDED FOR IN AGREEMENTS WITH EARTH TECH.

PROFESSIONAL SEAL

AECOM
AECOM
2101 WEBSTER STREET
SUITE 1000
OAKLAND, CALIFORNIA 94612

BLYTHE SOLAR POWER PROJECT
REVISED 230 KV GEN-TIE ROUTE: OPTION 1

JOB NO. | DWG NO. SK-1 | REVISION R-1

Figure 6 Elevation Profile, East to West

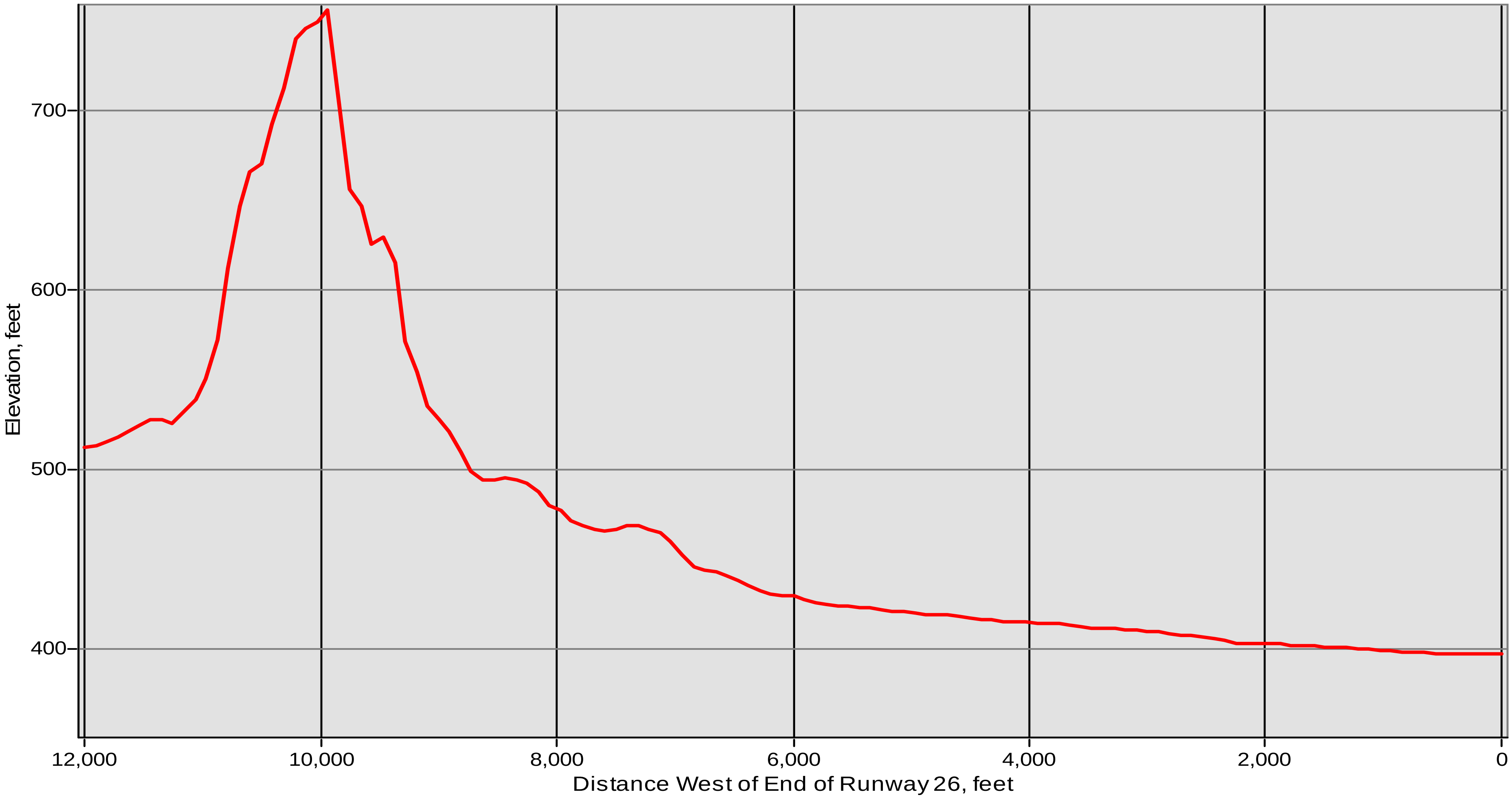
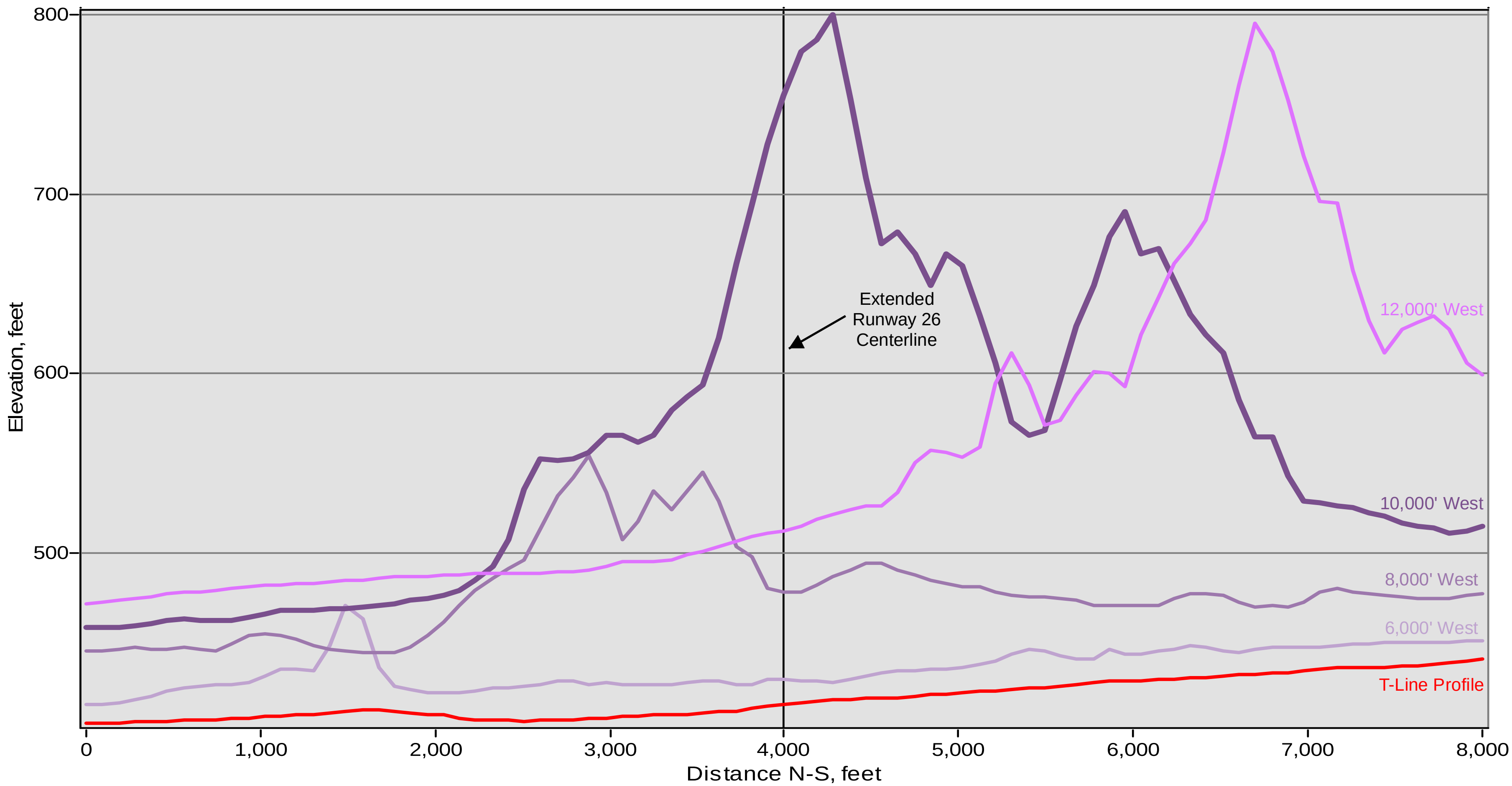
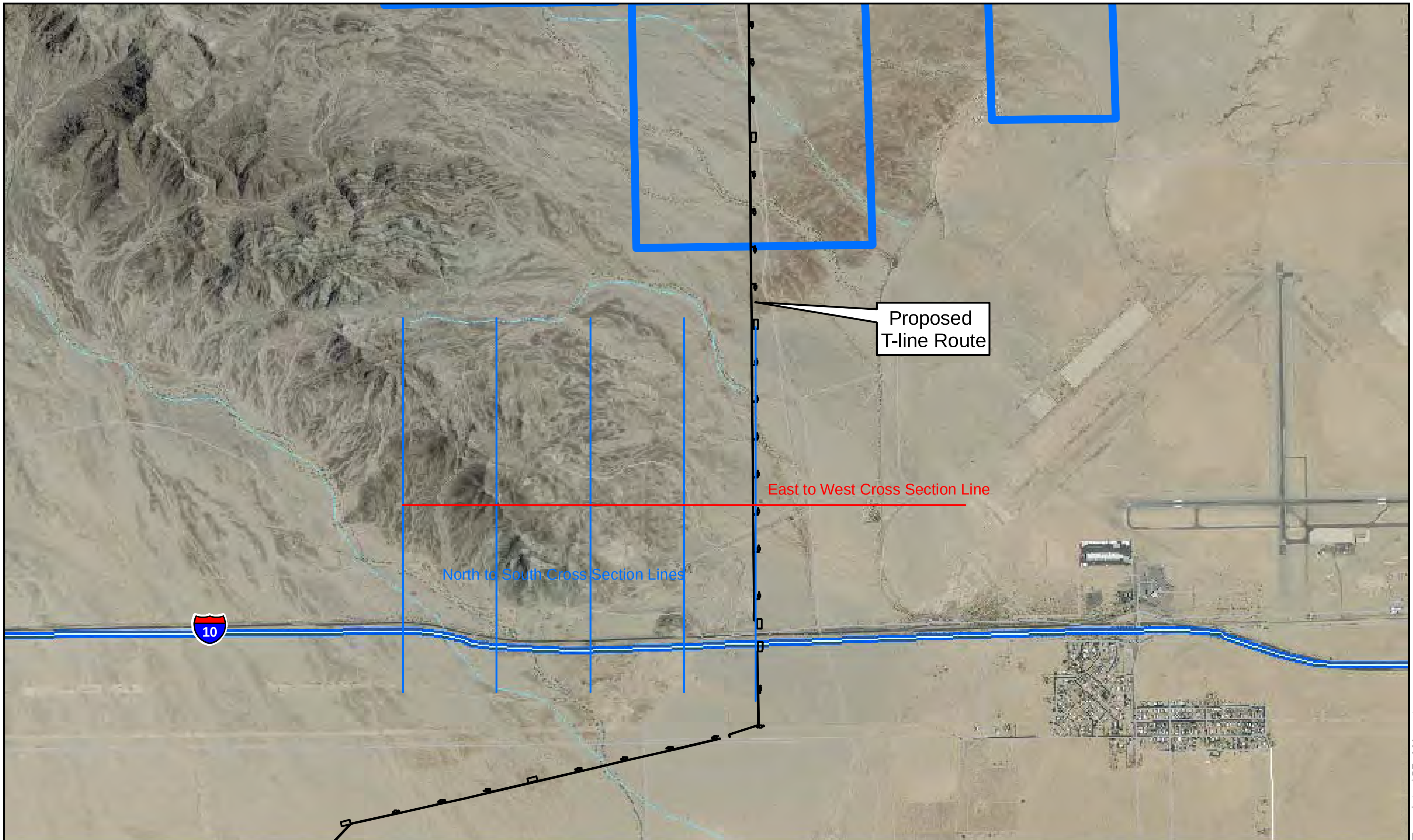


Figure 7 Elevation Profiles West of Extended Runway 26 Centerline





Map Location

Legend

1 inch = 3,000 feet
0
3,000
6,000
Feet

N
W
E
S

BSPP

Figure 8
Cross Section Location Map

Source:

AECOM

Project: #
Date: April 2010

Y:\Projects\Solar_Millennium\Figure_Templates\85x11L.mxt

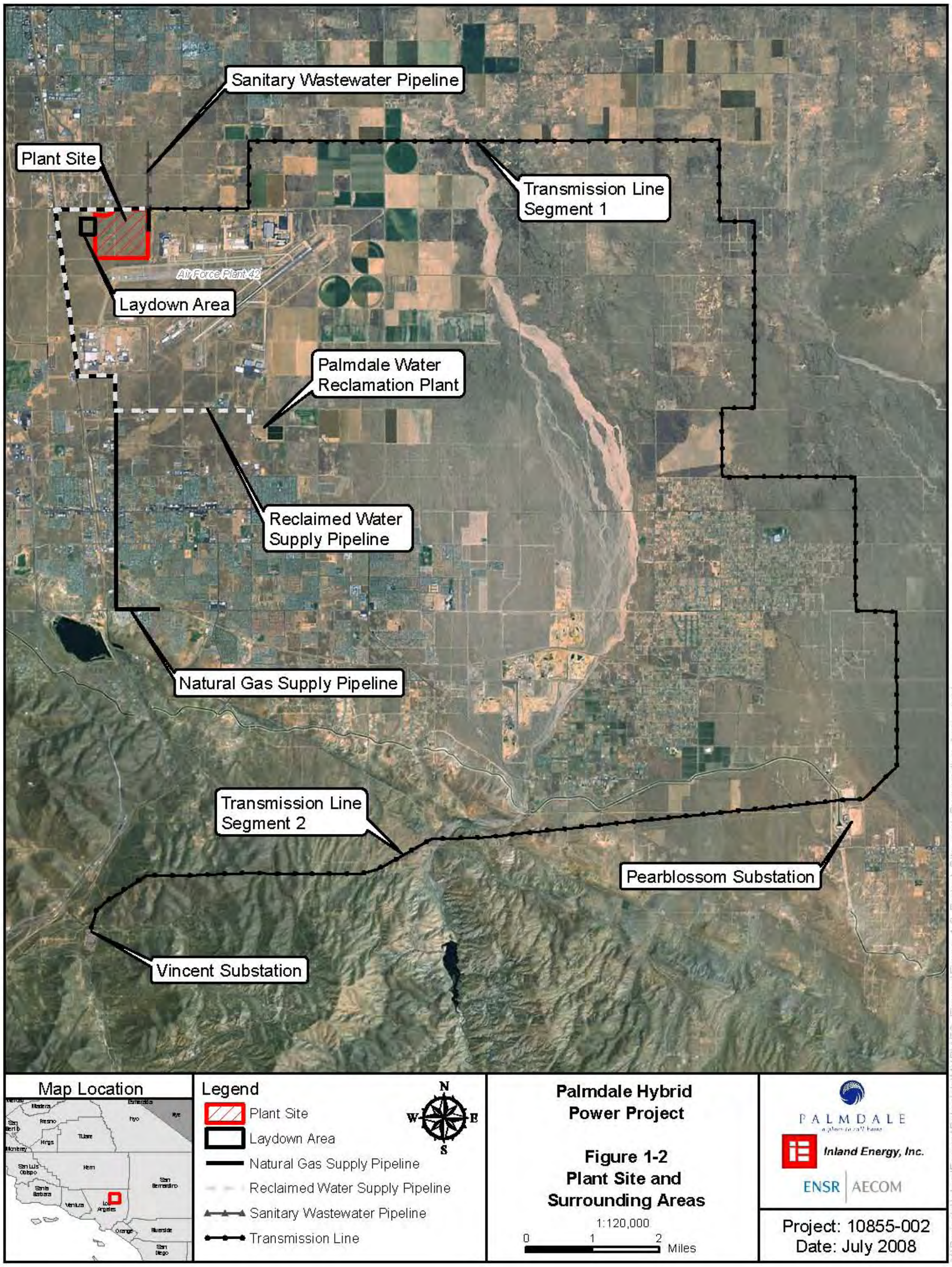


Figure 9. Location of the Palmdale Hybrid Power Plant with respect to Air Force Plant 42

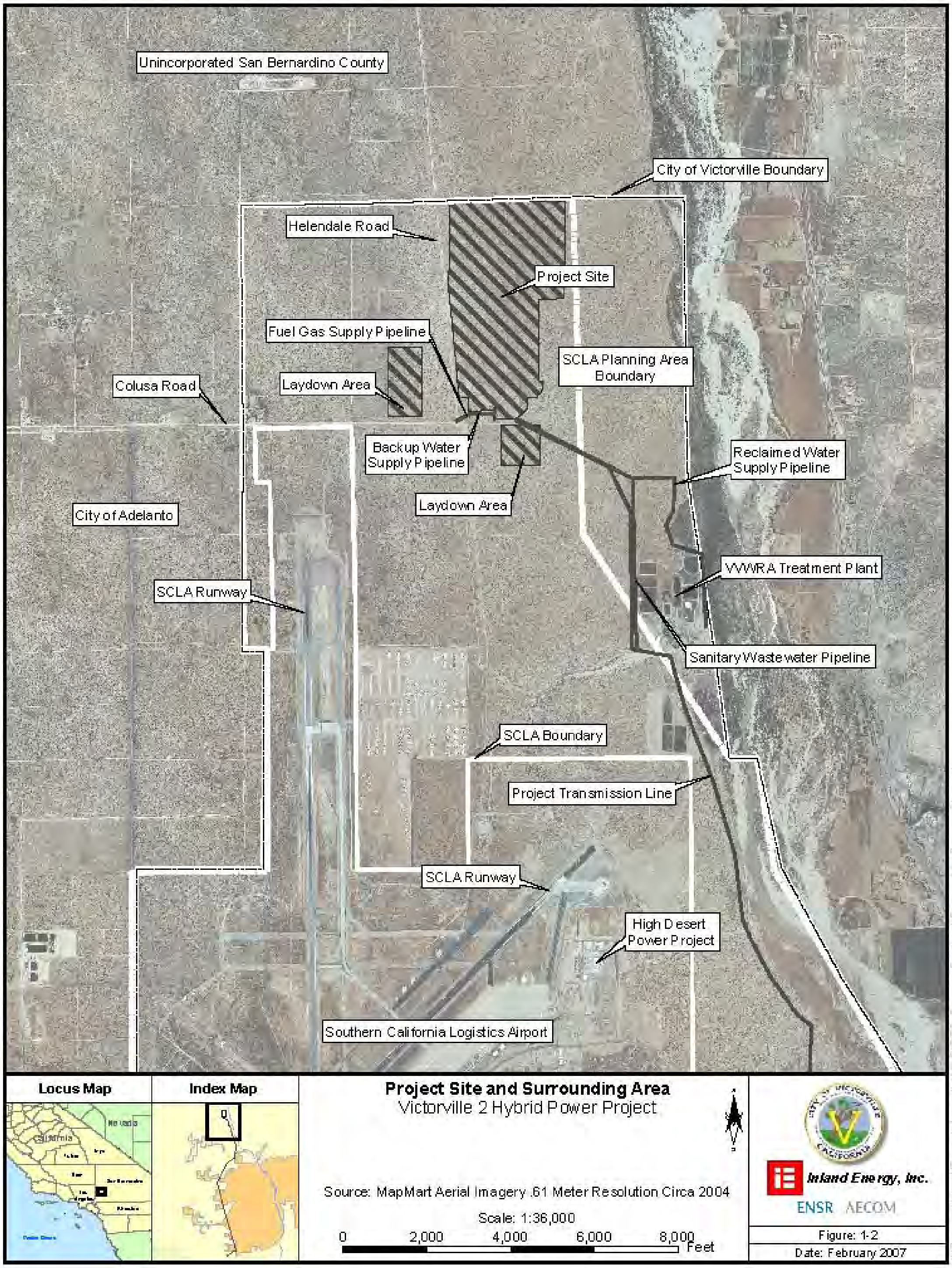


Figure 10. Location of the Victorville 2 Project Site with respect to the Southern California Logistics Airport

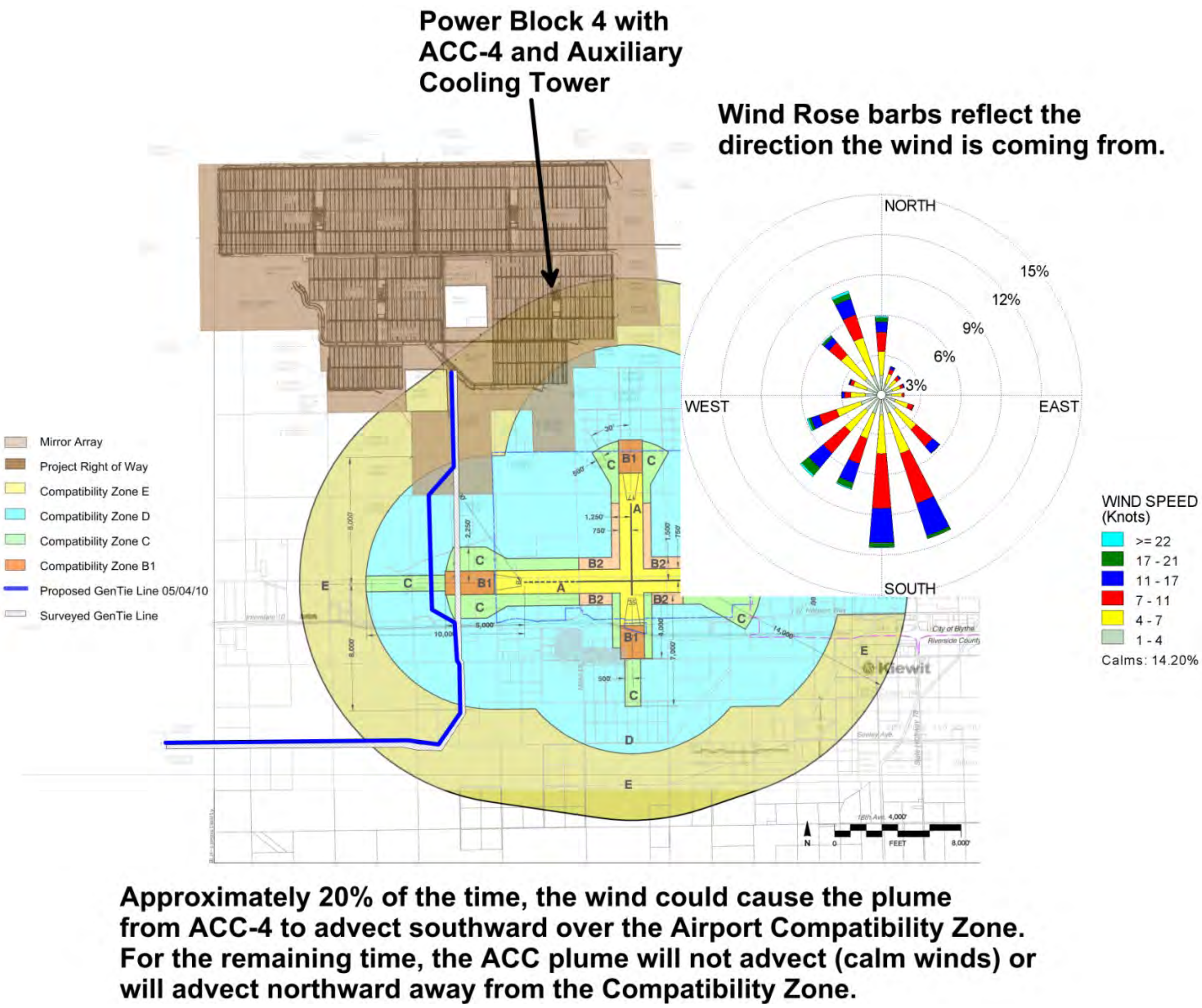


Figure 11. Power Block 4, Airport Compatibility Zone, and Wind Rose for Blythe Airport

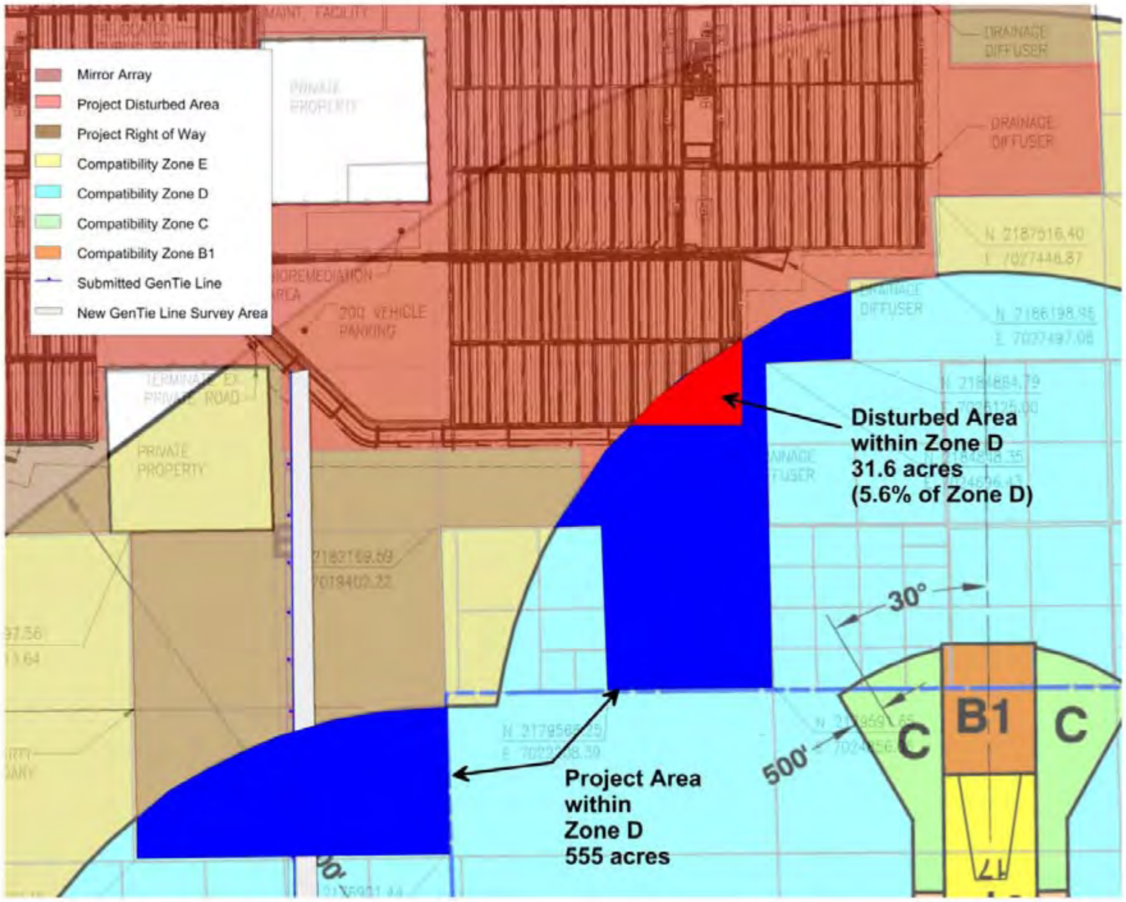


Figure 12. Mirror Array Disturbed Area in Compatibility Zone D and Total Project Area in Zone D

Table 1. Status of FAA Form 7460 Power Pole Applications and ALUC Compatibility Zone Designation as of 19 April 2010

Pole	Height (ft)	ALUC Compatibility Zone	FAA Determination Letter Status
Pole 1	145	-	Determination of No Hazard
Pole 2	145	-	Determination of No Hazard
Pole 3	145	-	Determination of No Hazard
Pole 4	145	-	Determination of No Hazard
Pole 5	145	E	Determination of No Hazard
Pole 6	145	E	Determination of No Hazard
Pole 7	145	E	Determination of No Hazard
Pole 8	145	E	Determination of No Hazard
Pole 9	145	E	Determination of No Hazard
Pole 10	145	E	Determination of No Hazard
Pole 11	145	E	Determination of No Hazard
Pole 12	145	E	Determination of No Hazard
Pole 13	145	E	Determination of No Hazard
Pole 14	145	E	Determination of No Hazard
Pole 15	90	E	Determination of No Hazard
Pole 16	90	E	Determination of No Hazard
Pole 17	90	D	Determination of No Hazard
Pole 18	90	D	Determination Received, Red Lights Required
Pole 19	90	D	Determination Received, Red Lights Required
Pole 20	90	D	Determination of No Hazard
Pole 21	90	D	Add Letter Received, Survey Required
Pole 22	90	D	Add Letter Received, Survey Required
Pole 23	90	C	Add Letter Received, Survey Required
Pole 24	90	C	Add Letter Received, Survey Required
Pole 25	90	B1	Add Letter Received, Survey Required
Pole 26	90	B1	Determination of No Hazard
Pole 27	90	B1	Add Letter Received, Survey Required
Pole 28	90	C	Add Letter Received, Survey Required
Pole 29	90	D	Add Letter Received, Survey Required
Pole 30	90	D	Add Letter Received, Survey Required
Pole 31	145	D	Add Letter Received, Survey Required
Pole 32	145	D	Add Letter Received, Survey Required

Table 1. Status of FAA Form 7460 Power Pole Applications and ALUC Compatibility Zone Designation as of 19 April 2010

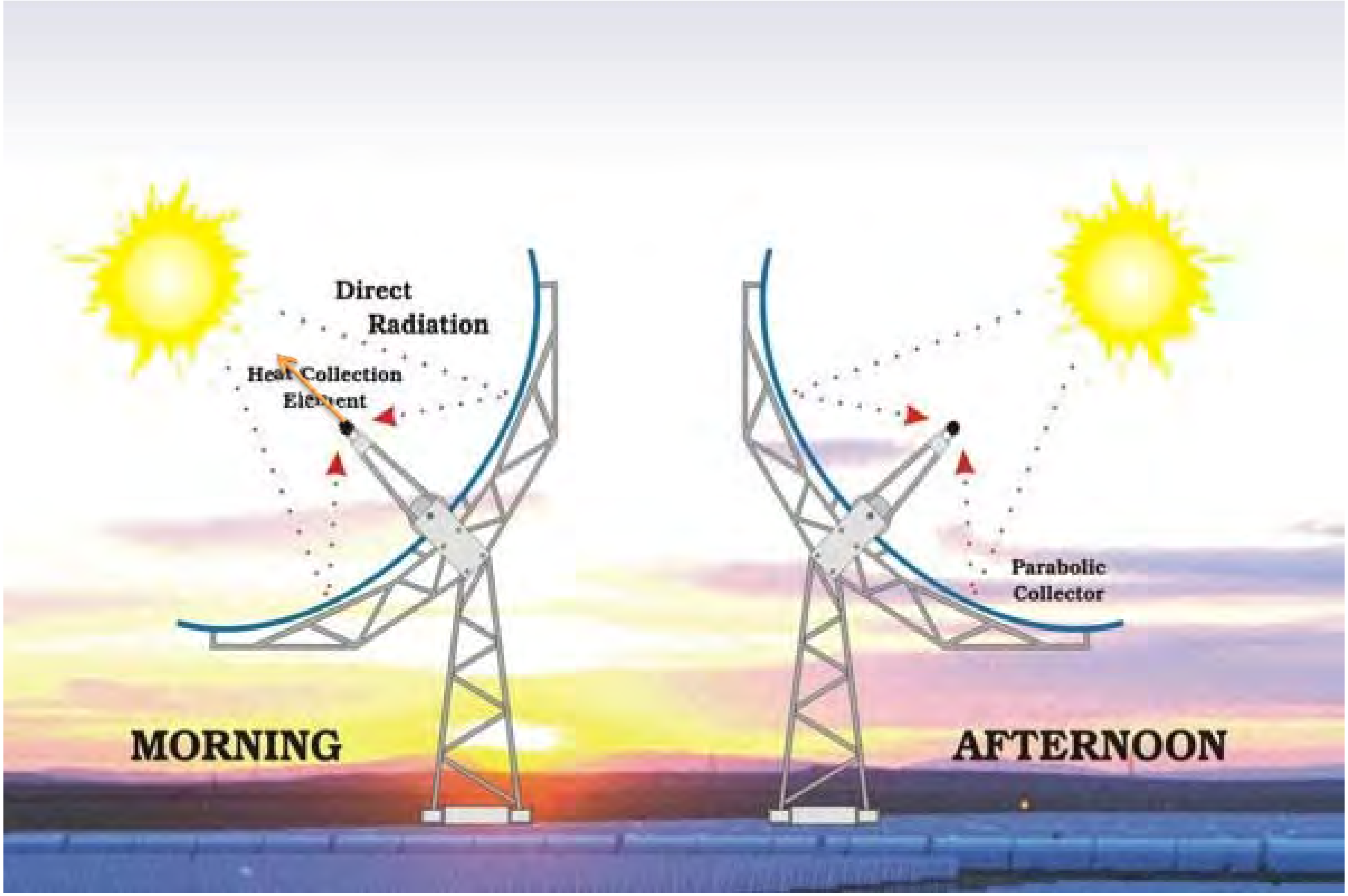
Pole	Height (ft)	ALUC Compatibility Zone	FAA Determination Letter Status
Pole 33 [A]	145	D	Add Letter Received, Survey Required
Pole 34 [A]	145	D	Add Letter Received, Survey Required
Pole 35 [A]	145	D	Add Letter Received, Survey Required
Pole 36 [A]	145	E	Determination of No Hazard
Pole 37 [A]	145	E	Determination of No Hazard
Pole 38 [A]	145	E	Determination of No Hazard
Pole 39 [A]	145	E	Determination of No Hazard
Pole 40 [A]	145	E	Determination of No Hazard
Pole 41 [A]	145	E	Determination of No Hazard
Pole 42 [A]	145	E	Determination of No Hazard
Pole 43 [A]	145	E	Determination of No Hazard
Pole 44 [A]	145	-	Determination of No Hazard
Pole 45	145	-	Determination of No Hazard
Pole 46	145	-	Determination of No Hazard
Pole 47	145	-	Determination of No Hazard
Pole 48	145	-	Determination of No Hazard
Pole 49	145	-	Determination of No Hazard
Pole 50	145	-	Determination of No Hazard
Pole 51	145	-	Determination of No Hazard
Pole 2.3-3	145	-	Determination of No Hazard

[A] Transmission Line Route is being revised south of Interstate 10. These poles will require resubmittal of FAA Form 7460. Additional poles may also require resubmittal of FAA Form 7460 depending on the land survey just completed and the ultimate placement of individual poles.

Attachment 1

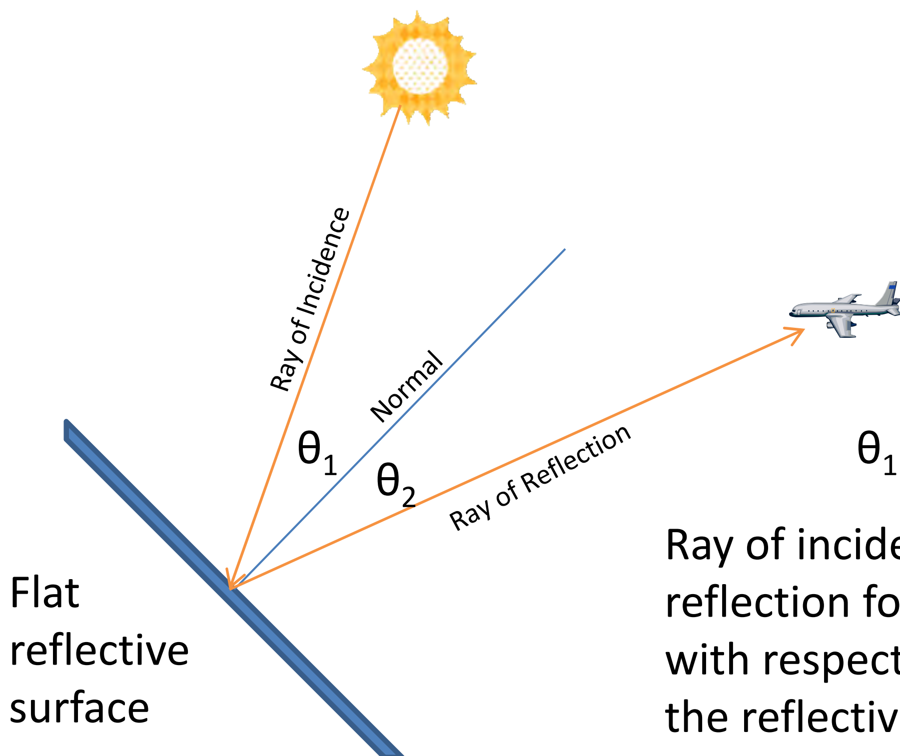
Schematic Diagrams of Parabolic Mirror Optics Geometry and Example Photographs

Solar Trough Mirror



Note: Rays from the sun are parallel and not as reflected in this cartoon

Snell's Law (Law of Reflection)

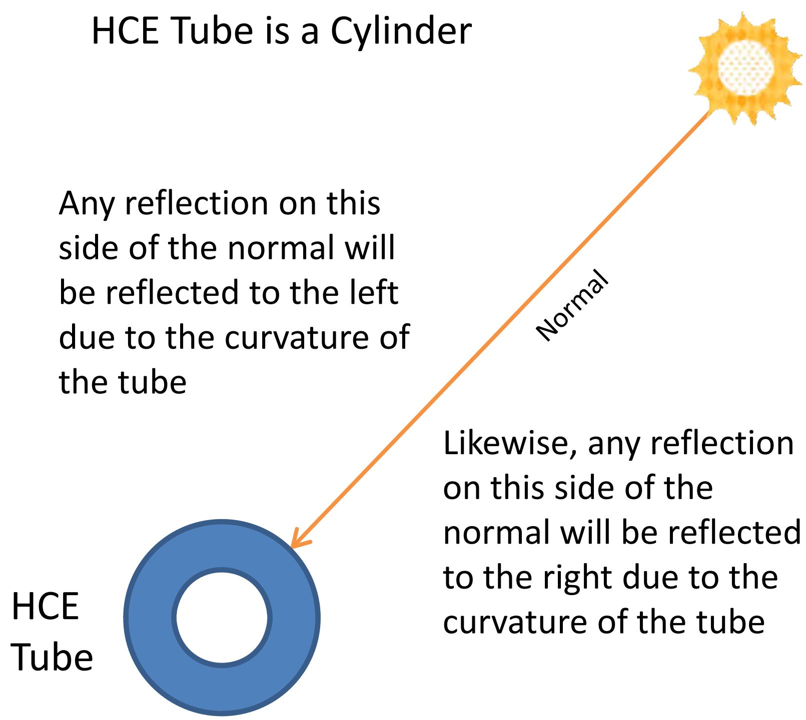


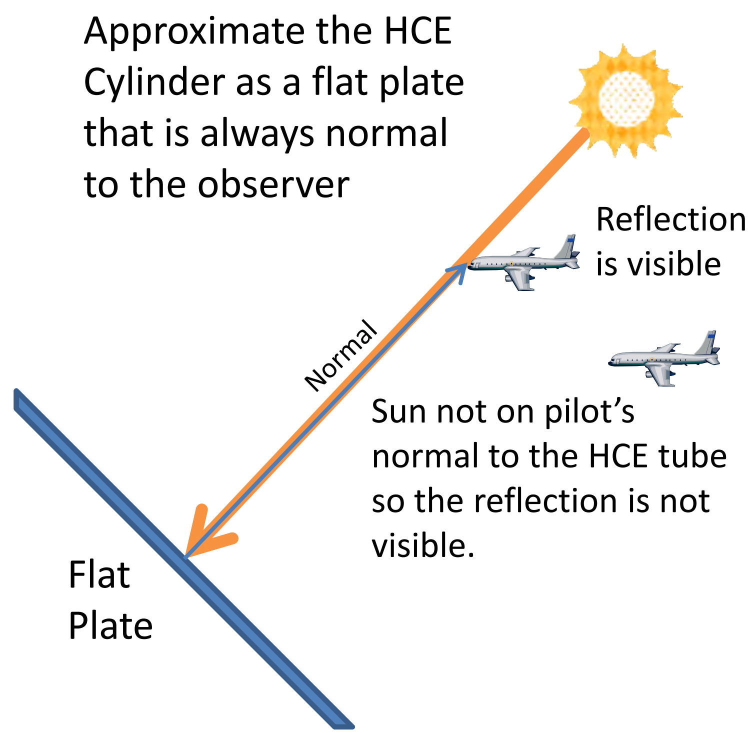
$\theta_1 = \theta_2$

Ray of incidence and ray of reflection form the same angle with respect to the normal of the reflective surface and are in the same plane

AECOM

Simplify the Geometry to a flat plate that is always normal to the observer





The strongest reflection that an observer can see is from the point normal to the cylinder with respect to the observer

The pilot will experience the strongest reflection only when the HCE tube, the pilot, and the sun are all in a direct line.

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The reflection occurs only from a single point on the HCE tube normal to the observer

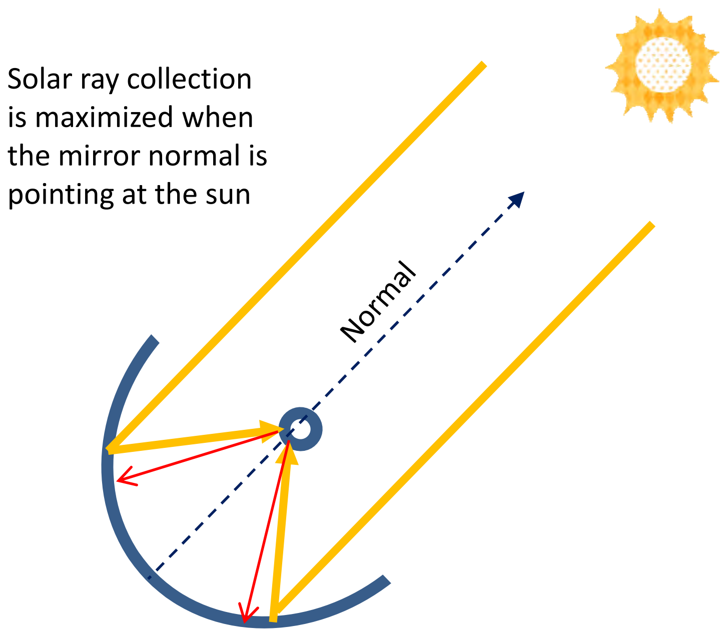
Kramer Junction solar power plant, looking east, 04/25/2009, 8:44 AM, Nikon D200, 1/80, f 32.0.
View not representative of BSPP as BSPP will have a 30-ft wind fence on the eastern and western side of the facility that prevent such ground level views of glare.

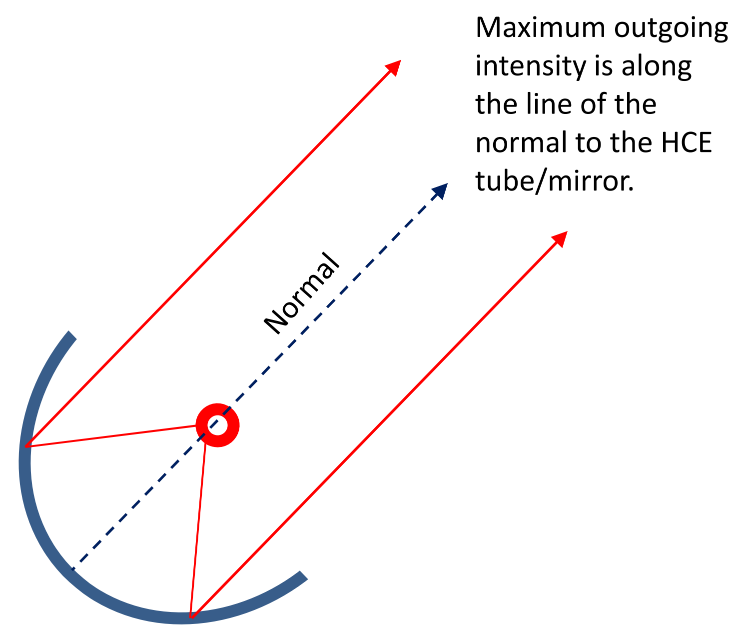
AECOM

The HCE tube is a minor source of light

In this photograph, the mirrors are pointed vertically. The most intense reflection is from a joint connector on the normal to the observer. Reflections off the individual joints in the HCE tube are visible. Note the limited extent of glow and lack of reflection from the operating HCE tube visible on either side of the normal.

The HCE tube can act as a weak source of light that is reflected in the parabolic mirror producing "glow"





Parallel suns rays strike the parabolic mirror and are reflected to the HCE tube at the mirror line of focus. Most light striking the HCE tube is absorbed by the heat transfer fluid in the HCE. However, a small portion of the incident light is reflected, scattered, or refracted by the HCE tube downward towards the mirror.

The HCE tube becomes a weak light source whose light is reflected by the mirror outward in a columnar beam. This is the source of glow from the mirror. The intensity of the reflected light is greatest on the line normal to the HCE tube. Thus, the mirror must be pointed at the observer to observe the strongest glow or reflection.

AECOM

Solar Mirror Array "Glow"

Only a portion of the solar array glows due to the geometric constraints for observing light from a parabolic mirror.

Note the cooling tower plume shadow indicating the sun is directly behind the observer.

The speckle on the edges of the bright array are from individual troughs separated by non-visible background.

Harper Junction solar array, September 24, 2007 at approximately 10:15 looking west-northwest. Solar elevation angle is ~ 50° above the horizon.

AECOM

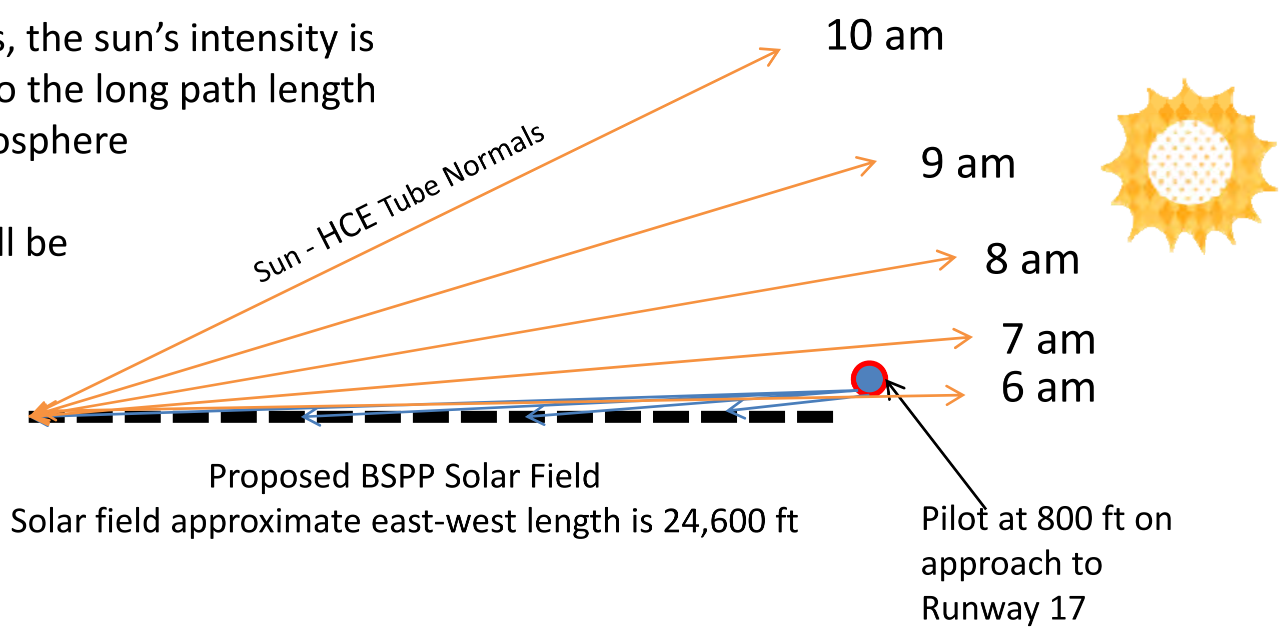
Geometry of Pilot Approaching Runway 17 at 800 ft Pattern Altitude

For a pilot at 800 ft, the view angle to the solar field is less than approximately 5-10 degrees

The sun is at or below 10 degrees elevation only within the first few hours of sunrise

At low sun angles, the sun's intensity is attenuated due to the long path length through the atmosphere

Any reflection will be of attenuated sunlight



Time of Potential Visible Glare for Pilot Approaching Runway 17 at 800 ft Pattern Altitude

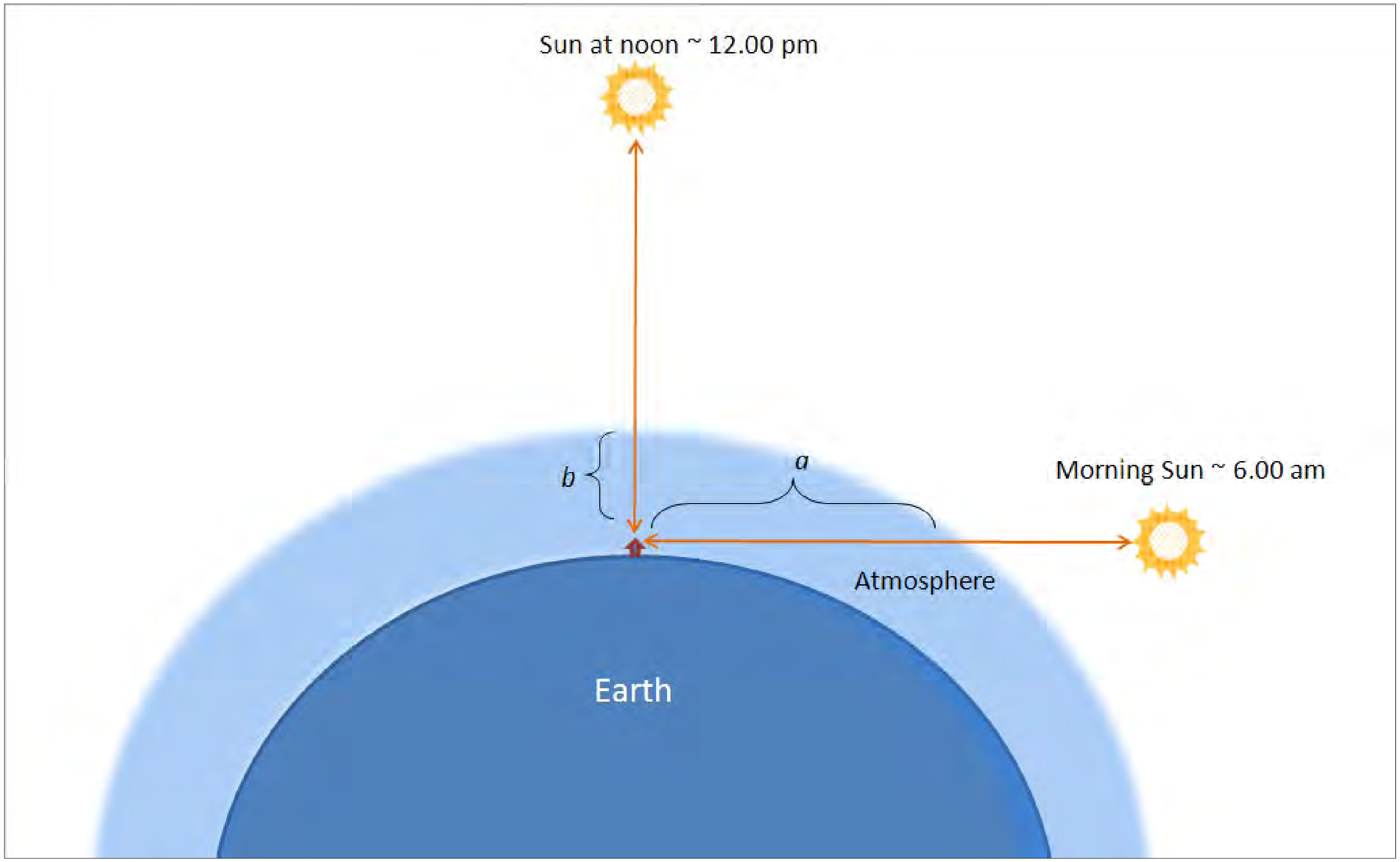
Pilot Horizontal Distance from Array (ft)	Pilot View Angle of Array (Downward from Horizontal)	Time For Sun at Same Elevation Angle[1]	
		Dec 20 (PST)	Jun 20 (PDT)
24,600	1.9	6:50	5:40
15,000	3.1	7:00	5:50
10,000	4.6	7:10	6:00
5,000	9.1	7:40	6:20
1,000	38	Not possible[2]	8:50

[1] Time to the nearest 10 minutes
[2]Maximum solar elevation angle approximately 33 degrees at noon.

There is a period of approximately one hour per day in the early morning during which glare could be visible by a pilot approach Runway 17. There is a lower probability of seeing the glare from the nearest mirror (1,000 ft horizontal distance) due to optical geometric constraints. There will be more opportunity for the proper geometry from mirrors in the middle of the solar field, and hence higher probability of glare.

AECOM

Sunlight is Attenuated in Early Morning Hours Due to Long Path Length through Atmosphere



AECOM

Federal Aviation Administration
Air Traffic Airspace Branch, ASW-520
2601 Meacham Blvd.
Fort Worth, TX 76137-0520

Aeronautical Study No.
2009-AWP-6289-OE

Issued Date: 04/19/2010

Ray Dracker
Solar Millennium
1625 Shattuck Ave
Suite 270
Berkeley, CA 94709

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Transmission Line BSPP Pole #PB2.3-3
Location:	Blythe, CA
Latitude:	33-40-25.38N NAD 83
Longitude:	114-44-56.73W
Heights:	145 feet above ground level (AGL)
	630 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be completed and returned to this office any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part I)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part II)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking and/or lighting are accomplished on a voluntary basis, we recommend it be installed and maintained in accordance with FAA Advisory circular 70/7460-1 K Change 2.

Any height exceeding 145 feet above ground level (630 feet above mean sea level), will result in a substantial adverse effect and would warrant a Determination of Hazard to Air Navigation.

This determination expires on 10/19/2011 unless:

(a) extended, revised or terminated by the issuing office.
(b) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE POSTMARKED OR DELIVERED TO THIS OFFICE AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE.

This determination is based, in part, on the foregoing description which includes specific coordinates , heights, frequency(ies) and power . Any changes in coordinates , heights, and frequencies or use of greater power will void this determination. Any future construction or alteration , including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact our office at (310) 725-6557. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2009-AWP-6289-OE.

Signature Control No: 670580-124953478 (DNE)

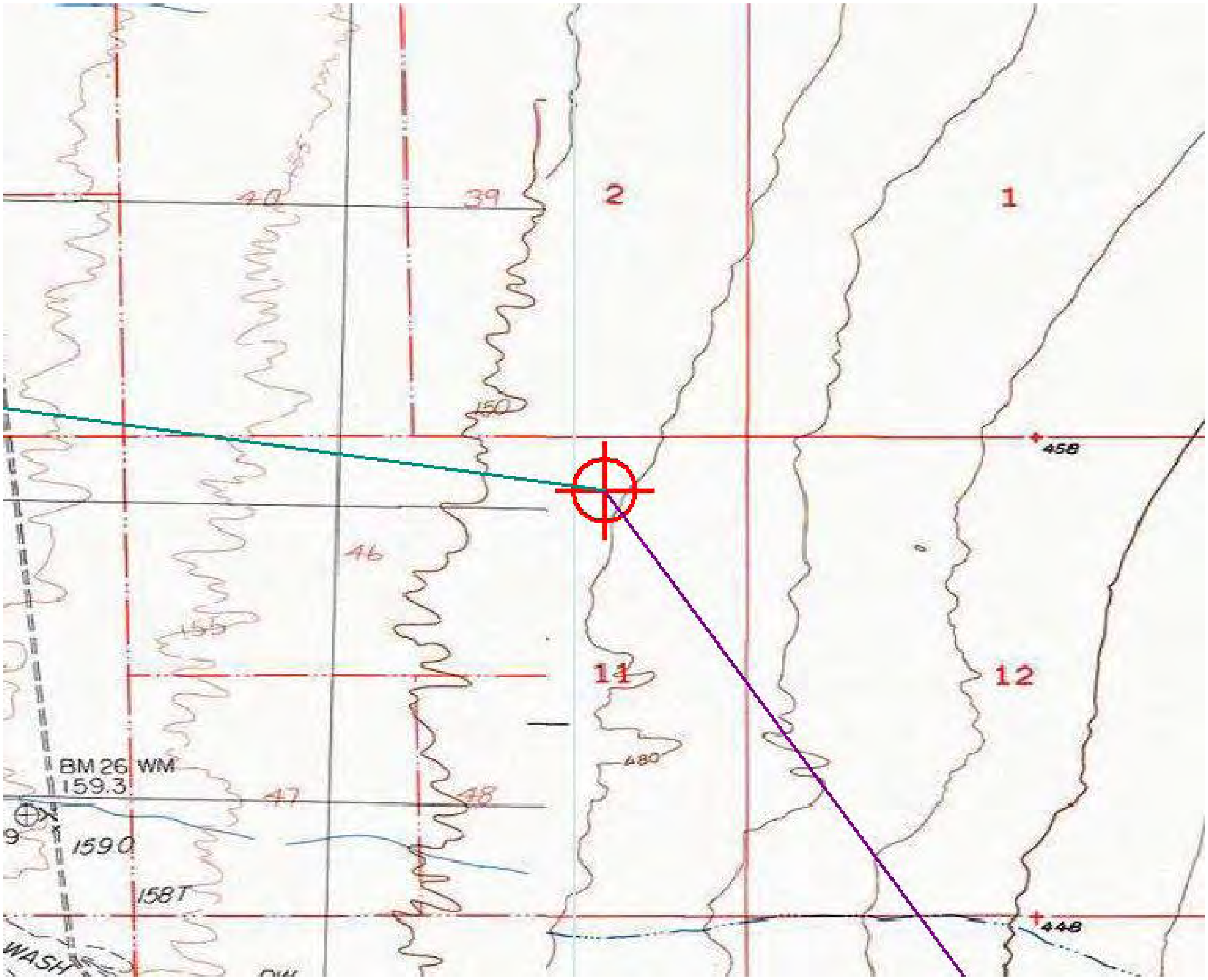
Karen McDonald
Specialist

Attachment(s)
Case Description
Map(s)

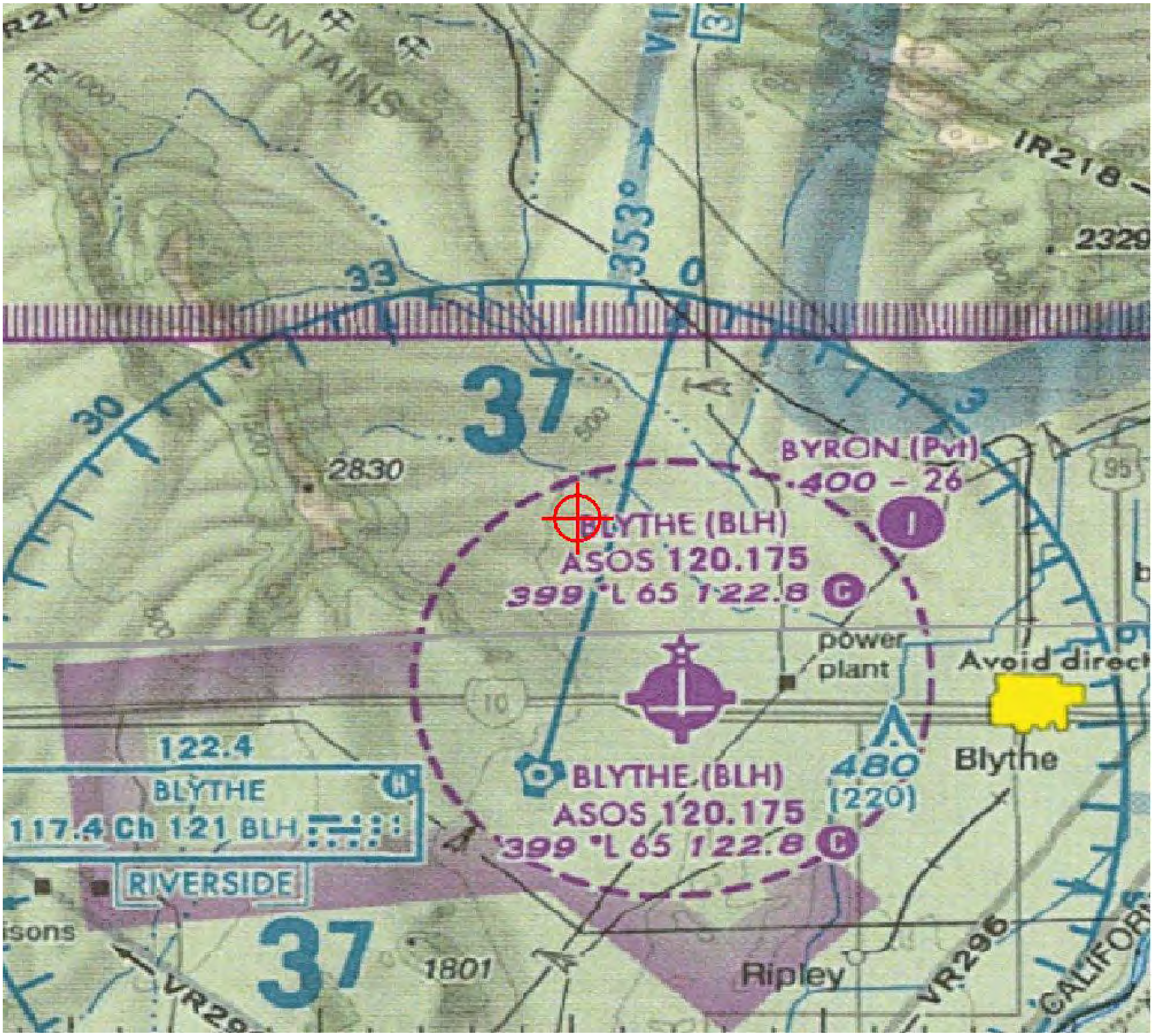
Case Description for ASN 2009-AWP-6289-OE

3 phase 500 kV line to deliver solar-generated electrical power to the SCE grid. Pole heights of 145? and 90?; spacing nominally 1000 feet and 800 feet, respectively. Also filed with CEC and BLM.

Verified Map for ASN 2009-AWP-6289-OE



Sectional Map for ASN 2009-AWP-6289-OE



STATE OF CALIFORNIA
ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION

In the Matter of: **APPLICATION FOR CERTIFICATION** **for the *BLYTHE SOLAR POWER PROJECT***	**Docket No. 09-AFC-6** **PROOF OF SERVICE** ***(Revised 1/26/2010)***

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<u>DECLARATION OF SERVICE</u>

I, Carl Lindner, declare that on,June 16, 2010, I served and filed copies of the attached:

BSPP; RESPONSE TO ALUC COMMENTS OF MARCH 22, 2010 ON ALUC APPLICATION AND SUBSEQUENT CORRESPONDENCE BY EMAIL ON APRIL 13, 2010

BSPP; RESPONSE TO ALUC COMMISSION COMMENTS FROM MAY 13, 2010 COMMISSION MEETING

The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at:

[http://www.energy.ca.gov/sitingcases/solar_millennium_blythe].

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, in the following manner:

(C*heck all that Apply*)

For service to all other parties:

___X__ sent electronically to all email addresses on the Proof of Service list;

______ by personal delivery or by overnight delivery service or depositing in the United States mail at <u>Camarillo, California</u> with postage or fees thereon fully prepaid and addressed as provided on the Proof of Service list above to those addresses **NOT** marked "email preferred."

AND

For filing with the Energy Commission:

__X_ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (preferred method);

OR

_____ depositing in the mail an original and 12 paper copies, along with 13 CDs, as follows:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 09-AFC-6
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512

docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct.

Carl E. Lindner