4.1 AESTHETICS/VISUAL RESOURCES

This section provides a description of the existing visual and aesthetic resources within the study area and pertinent local, State, and Federal plans and policies regarding the protection of scenic resources. This section incorporates several technical studies prepared for the projects including: Visualization Studies prepared for Mount Signal Solar Farm 1 Project (MSSF1), Calexico Solar Farm 1 (CSF1), and Calexico Solar Farm 2 (CSF2) (Visualizations by Modative 2001a) and a Reflectivity Analysis prepared for MSSF1, CSF1, and CSF2 (Aztec 2011a and Visualization by Modative 2011). Effects on the existing visual character of the study area as a result of project-related aboveground facilities are considered and mitigation proposed based on the anticipated level of significance.

4.1.1 Environmental Setting

The study area is located in southern Imperial Valley, just north of the U.S./Mexico border, and is characterized as an agricultural landscape with generally level topography. Prominent visual features within the study area include numerous agricultural canals that supply water to the study area and agricultural related structures (e.g., silos). The Yuha Desert is generally located to the west of the study area and is comprised of upland desert landscape that transitions into the Coyote Mountains further west. Mount Signal rises out of the southern Yuha Desert, extending south of the U.S./Mexico border, and is a prominent visual feature in the landscape southwest of the project study area. The City of Calexico is located to the east of the project study area with the East Mesa sand dunes located further east. Areas to the north and south of the project study area are generally level and characterized by an agriculturally dominated landscape.

4.1.1.1 Regulatory Setting

This section identifies and summarizes Federal, State, and local laws, policies, and regulations that applicable to the projects.

Federal

There are no applicable Federal plans or policies that would apply to visual resources within the study area. However, as provided in Chapter 3, Project Description, the projects would interconnect with off-site transmission infrastructure to the west of the study area and located within the Bureau of Land Management's (BLM) Utility Corridor "N" within the Yuha Desert. Issues related to potential visual impacts from these off-site facilities are addressed in the Imperial Solar Energy Center South Final Environmental Impact Report/Environmental Assessment (EIR/EA), which is incorporated by reference into this EIR.

As explained in the Imperial Solar Energy Center South Final EIR/EA, federal plans and polices applicable to the portion of the Off-site Transmission Facilities (OTF) located within BLM land include the Federal Land Policy and Management Act of 1976 and the California Desert Conservation Area (CDCA) plan (refer to Solar Energy Center South Final EIR/EA Section 3.1, pages 3.1-1 through 3.1-6). The CDCA encompasses 25 million acres of land in Southern California that were designated by Congress in 1976 through the Federal Land Policy and Management Act. BLM administers approximately 10 million acres of the CDCA (Imperial County 2011). In the CDCA, visual resource management objectives in the multiple-use class guidelines provide the framework for determining appropriate levels of management, protection, and rehabilitation of BLM lands.

The OTF-BLM Lands and adjacent BLM Lands are located entirely within the Yuha Basin Area of Critical Environmental Concern (ACEC) of the CDCA Plan, while the proposed solar energy facility projects are outside and located to the east. More specifically, the OTF-BLM Lands are located within a Multiple-Use Class L (Limited Use) designated area within the CDCA. The Multiple-Use Class L (Limited Use) designation protects sensitive, natural, scenic, ecological, and cultural resource values. Public lands designated Class L are managed to provide generally lower-intensity, carefully controlled, multiple use of resources, while ensuring that sensitive values are not significantly diminished.

State

California Department of Transportation

The California Department of Transportation (Caltrans) manages the California Scenic Highway Program. The goal of the program is to preserve and protect scenic highway corridors from changes that would affect the aesthetic value of the land adjacent to the scenic corridor (Caltrans 2008). Interstate 8 (I-8) to the northwest of the study area is the nearest scenic route. The scenic route designation for I-8 ends at the junction of I-8 and State Route (SR) 98 near Coyote Wells. The study area is located more than 22 miles southeast of this scenic route.

Local

Imperial County General Plan

The Imperial County General Plan contains policies for the protection and conservation of scenic resources and open spaces within the County. These policies also provide guidance for the design of new development. The Conservation and Open Space Element of the General Plan provides specific goals and objectives for maintaining and protecting the aesthetic character of the region. Table 4.1-1 provides an analysis of the projects' consistency with Goal 7. Additionally, the Circulation and Scenic Highways Element of the General Plan (Imperial County, as amended through 2008) provides a means of protecting and enhancing scenic resources within highway corridors in Imperial County, consistent with Caltrans' State Scenic Highway Program.

TABLE 4.1-1. CONSISTENCY WITH APPLICABLE GENERAL PLAN CONSERVATION AND OPEN SPACE POLICIES

General Plan Policies	Consistency with General Plan	Analysis
Goal 7: The aesthetic character of the region shall be protected and enhanced to provide a pleasing environment for residential, commercial, recreational, and tourist activity.	Consistent	The projects would result in changes to the visual character of the study area, which is currently characterized as an agricultural landscape. As described in Section 4.1.1.2, the study area does not contain high levels of vividness or intactness and, therefore, the projects would not result in significant deterioration in the visual character of the study area. Additionally, project-related transmission facilities and associated towers would interconnect with existing transmission facilities, thereby limiting their overall footprint, which would limit their encroachment into background views of Mount Signal and the Peninsular Mountains. Additionally, these features would be in an east-west orientation and, therefore, would not distract from the overall unity of the viewshed facing west of Mount Signal and the Coyote Mountains.
Objective 7.1: Encourage the preservation and enhancement of the natural beauty of the desert and mountain landscape.	Consistent	The study area is located with an agricultural portion of the County and generally avoids both desert and mountain landscapes. This EIR incorporates by reference the findings of the EA being prepared by BLM for inter-related off-site transmission facilities that traverse through BLM's "N" Utility Corridor, as well as the Imperial Solar Energy Center South Final EIR/EA, which has determined the OTF within BLM lands to be consistent with this objective.

4.1.1.2 Existing Conditions

Visual Assessment and Visual Quality Criteria

The aesthetic quality of an area is determined through the variety and contrasts of the area's visual features, the character of those features, and the scope and scale of the scene. The aesthetic quality of an area depends on the relationship between its features and their importance in the overall view. Evaluating scenic resources requires a method that characterizes visual features, assesses their quality in relation to the visual character of the surrounding area, and identifies their importance to the individuals viewing them. This process is derived from established procedures for visual assessment developed by Federal agencies, and is commonly used for a variety of project types.

Both natural and created features in a landscape contribute to its visual quality. Landscape characteristics influencing visual quality include geologic, hydrologic, botanical, wildlife, recreation, and urban features. Several sets of criteria have been developed for defining and evaluating visual quality. The criteria developed by the Federal Highway Administration (FHA) in 1981, which is used in this analysis, include the concepts of vividness, intactness, and unity. According to these criteria, none of these is itself equivalent to visual quality; all three must be considered high to indicate high quality. These terms are defined as follows:

- "Vividness" is the visual power or memorability of landscape components as they combine in striking and distinctive visual patterns.
- "Intactness" is the visual integrity of the natural and human-built landscape and its freedom from encroaching elements.
- "Unity" is the visual coherence and compositional harmony of the landscape considered as a whole.

The analysis of visual resources for these projects uses a qualitative approach for characterizing and evaluating the visual resources within the study area that could be affected by the projects. Viewer sensitivity, also considered in relation to these criteria, is a function of several factors, including the following:

- Visibility of the landscape;
- Proximity of viewers to the visual resources;
- Frequency and duration of views;
- Number of viewers;
- Types of individuals and groups of viewers; and
- Viewers' expectations as influenced by their activity.

The viewer's distance from landscape elements plays an important role in the determination of an area's visual quality. Landscape elements are considered higher or lower in visual importance based on their proximity to the viewer, which contribute to a site's overall viewshed. Generally, the closer a resource is to the viewer, the more dominant, and therefore visually important, it is to the viewer. The U.S. Forest Service (USFS) separates landscapes into foreground, middleground, and background views. Although this should be considered on a case-by-case basis, in general, the foreground is characterized by clear details (within 0.25 or 0.5 mile from the viewer); the middleground is characterized by loss of clear texture within a landscape creating a uniform appearance (foreground to 3–5 miles in the distance); and the background extends from the middleground to the limit of human sight (USFS 1974). The USFS foreground, middleground, and background view approach is used for describing the relative quality of each of these landscapes.

Visual Character

The study area, as a whole, contains high levels of intactness and unity, but generally lacks landscape components that contribute to vivid and distinctive visual patterns. The visual character of the agricultural lands within the study area is of generally moderate quality and contributes to the unity and intactness of the larger Imperial Valley. To capture the existing visual quality for each of the components of the projects, views within the study area were photo-documented. Figure 4.1-1 illustrates the photo-documented view points. A more detailed description of the project facility sites along with the photograph for each vantage point are described below.

Mount Signal Solar Farm 1

The landscape in the vicinity of MSSF1 is characterized by level terrain, scattered agricultural residences and support structures, fencing, and irrigation canals and drain facilities (see Viewpoints A and B, Figure 4.1-2). Foreground views include unpaved roads, ruderal vegetation, utility poles, and irrigated farmland. Middleground views consist of open fields, isolated trees, and scattered structures. In the background, Mount Signal and the eastern foothills of the Peninsular Range, including the Coyote Mountains, are visible to the south and west. Perhaps the most significant landmark in the County is Mount Signal, located along the International Border on the eastern edge of the Yuha Desert, west of Calexico. This feature is visible from the entire Imperial Valley. No distinctive background views are present to the north and east. As described below, the vividness and intactness of the MSSF1 site is considered to be of low value. However, MSSF1 is considered to have high levels of unity with the surrounding landscape. The visual assessment criteria for MSSF1 are provided below.

- ***Vividness:*** The foreground is characterized by active agricultural operations with numerous open fields and related structures, which along with existing roadways; physically disrupt the distinctive views of the surrounding mountains in the background. No unique physical or geographic features add to the vividness of the MSSF1 site and, therefore, this area is considered to have low vividness.
- ***Intactness***: Existing agricultural structures, utility poles, irrigation canals, and roadways, including fencing and private access roads, act as encroachments in the fore- and middleground to the mountains visible in the background to the south and west of the site (Viewpoints A and B, Figure 4.1-2). The visual appearance of the existing structural elements does not contribute to any visual enhancements. The landscape is generally highly modified from its natural desert landscape. Because of these major encroachments, MSSF1 is considered to have low levels of intactness.
- ***Unity:*** As discussed above, the mountains in the background are divided from discernible encroachments. Although there are several encroachments within the landscape, they do not detract from the overall sense of unity; especially in western and southern vantages. The landscape surrounding MSSF1 is essentially comprised of agricultural land allowing for the MSSF1 site to contribute to moderate to high levels of visual unity.

Mt Signal Solar Farm 1 (MSSF1) (1431 Acres)
Calexico Solar Farm 1, Phase A (CSF1(A)) (719 Acres)
Calexico Solar Farm 1, Phase B (CSF1(B)) (613 Acres)
Calexico Solar Farm 2, Phase A (CSF2(A)) (940 Acres)
Calexico Solar Farm 2, Phase B (CSF2(B)) (525 Acres)
Photo- Documented Viewpoints
National Border

George Rd
Rockwood Rd
Corda Rd
La Brucherie Rd
Willoughby Rd
Eady Rd
Kubler Rd
Weed Rd
New River
Cole Rd
Brockman Rd
Ferrell Rd
Weed Rd
Clark Rd
Cerson Wash
98
052-180-044
052-180-043
052-180-050
052-180-022
052-180-051
052-210-035
052-210-034
052-210-036
052-210-002
052-210-001
059-110-006
059-110-007
059-110-008
059-110-003
059-130-003
059-130-001
059-130-002
059-130-005
059-130-004
052-190-012
052-190-011
052-210-016
052-210-015
052-210-014
052-210-013
052-210-037
052-210-038
052-210-039
052-210-018
Hammer Rd
Anza Rd
Westside Main Canal
Pullliam Rd
Cook Rd
Mandrapa Rd
All American Canal
UNITED STATES OF AMERICA
MEXICO
A
B
C
D
E
F
G
H
Source: HDR ,2011
0 0.25 0.5 1 Miles
N W E S

G:\GIS Production\Projects\CntyImperial 8126\MSignalSolar 165940\Map Docs\mxd\PhotoViewpoints.mxd | Created by: dfitch | Last Updated: 11/1/2011

Photo-Documented Viewpoints within the Project Study Area

Figure 4.1-1

Imperial County | Mount Signal Solar Farm and Calexico I and II Solar Farms | EIR

HDR
ONE COMPANY | *Many Solutions*℠

Viewpoint A - Looking NW along Anza Road

Viewpoint B - Looking SE along State Route 98

Viewpoints A and B (MSSF1 Site)

FIGURE 4.1-2

Imperial County | Mount Signal Solar Farm and Calexico I and II Solar Farms | EIR

HDR ONE COMPANY | *Many Solutions*™

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Calexico Solar Farm 1(A)

Similar to MSSF1, the landscape in the vicinity of CSF1(A) is characterized by level terrain, scattered agricultural residences and support structures, fencing, and irrigation canals and drain facilities (see Viewpoints C and D, Figure 4.1-3). Foreground views include cultivated agricultural fields, utility poles, and ruderal vegetation along roadsides. Middleground views consist of open fields, isolated trees, and scattered agricultural structures. In the background, the Peninsular Mountains are visible to the south and west. As described below and similar to MSSF1, the vividness and intactness of the CSF1(A) site is considered to be of low value. However, the CSF1(A) site contributes to high levels of unity with the surrounding landscape. The visual assessment criteria for CSF1(A) are provided below.

- ***Vividness:*** The foreground is characterized by active agricultural operations with numerous cultivated agricultural fields and related structures, which along with existing roadways; physically disrupt the distinctive views of the surrounding mountains in the background. Drivers along SR 98 likely take interest in the mountains in the background, but pay minimal attention to features in the fore- and middleground. This area is considered to have low vividness.
- ***Intactness***: Similar to MSSF1, existing agricultural structures, utility poles, irrigation canals, and roadways, including fencing and private access roads, act as encroachments in the fore- and middleground to the mountains visible in the background to the west of the site (Viewpoints C and D, Figure 4.1-3). The visual appearance of the existing structural elements does not contribute to any visual enhancements. The landscape is generally highly modified from its natural desert landscape. Because of these major encroachments, the CSF1(A) site is considered to have low levels of intactness.
- ***Unity***: As discussed under MSSF1, the mountains in the background are divided from discernible encroachments. Although there are several encroachments within the landscape, they do not detract from the overall sense of unity; especially in western and southern vantages. The CSF1(A) site is essentially surrounded by agricultural land, thereby contributing to moderate to high levels of visual unity.

Calexico Solar Farm 1(B)

Similar to CSF1(A), the landscape in the vicinity of CSF1(B) is characterized by level terrain, isolated agricultural residences and support structures, major irrigation canals and drainage facilities (see Viewpoint D, Figure 4.1-3). Foreground views include cultivated agricultural fields, irrigation canals, and ruderal vegetation along roadsides. Middleground views consist of cultivated and fallow agricultural fields, isolated trees, and scattered agricultural structures. Background views are similar to that described for CSF1(A). As described below and similar to CSF1(A), the vividness and intactness of the CSF1(B) site is considered to be of low value. However, the CSF1(B) site contributes to high levels of unity with the surrounding landscape. The visual assessment criteria for this landscape area are provided below.

- ***Vividness:*** The foreground is characterized by cultivated and fallow agricultural fields and related structures, which along with existing roadways; physically disrupt the distinctive views of the surrounding mountains in the background. Drivers along Anza Road likely take interest in the mountains in the background, but pay minimal attention to features in the fore- and middleground. This area is considered to have low vividness.
- ***Intactness:*** Similar to CSF1(A), existing agricultural structures, utility poles, irrigation canals, and roadways, including fencing and private access roads, act as encroachments in the fore- and middleground to the mountains visible in the background to the west of the site (Viewpoint D, Figure 4.1-3). However, these encroachments do not obstruct views in the background. The visual appearance of the existing structural elements does not contribute to any visual enhancements. The landscape is generally highly modified from its natural desert landscape. Because of these major encroachments and similar to CSF1(A), the CSF1(B) site is considered to have low levels of intactness.

- ***Unity:*** As discussed under CSF1(A), the mountains in the background are divided from discernible encroachments. Although there are several encroachments within the landscape, they do not detract from the overall sense of unity; especially in western and southern vantages. The landscape surrounding CSF1(B) is essentially surrounded by agricultural land allowing for moderate to high levels of visual unity.

Calexico Solar Farm 2(A)

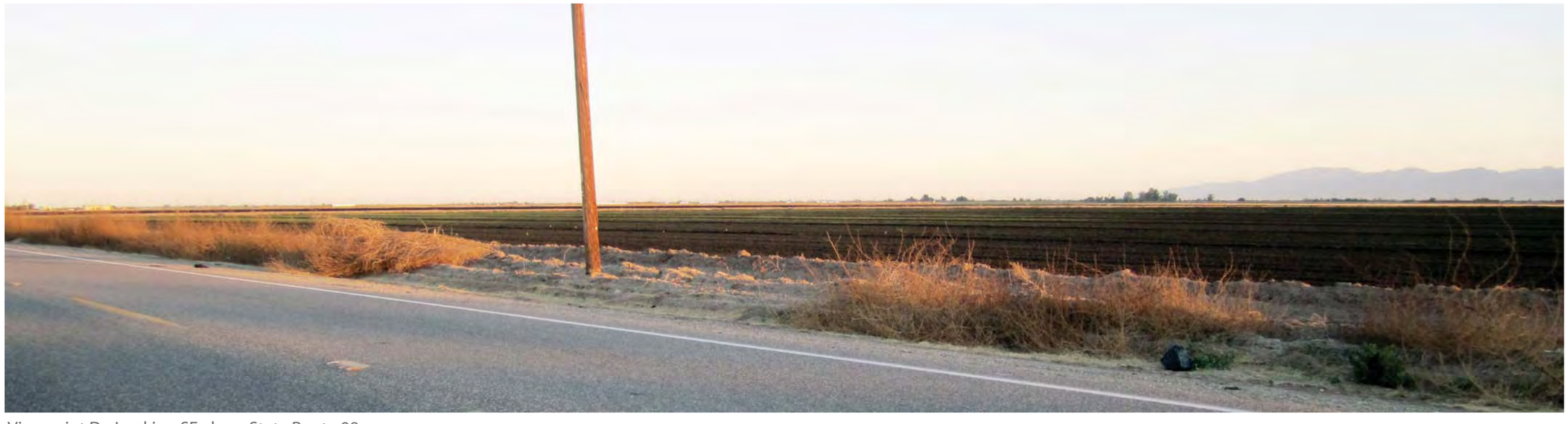
The landscape in the vicinity of CSF2(A) is characterized by level terrain, isolated agricultural residences and support structures, cultivated agricultural fields, above ground utilities, and scattered trees (see Viewpoints E and F, Figure 4.1-4). Foreground views include cultivated agricultural fields, irrigation canals, utility poles, and ruderal vegetation along roadsides. Middleground views consist of cultivated and fallow agricultural fields, scattered agricultural structures, and the Bowman Private Airstrip (see right corner of Viewpoint F, Figure 4.1-4). Background views to the west and southwest include the Peninsular Mountains and Mount Signal. Views to the east are generally unlimited with distinctive features visible. Based on these landscape characteristics, the vividness and intactness of the CSF2(A) site is considered to be of low value. However, similar to the other project sites, CSF2(A) contains high levels of unity with the surrounding landscape. The visual assessment criteria for CSF2(A) are provided below.

- ***Vividness:*** The foreground is characterized by cultivated and fallow agricultural fields and related structures, which along with existing roadways; physically disrupt the distinctive views of the surrounding mountains in the background. Westbound drivers along SR 98 likely take interest in the mountains in the background, but pay minimal attention to features in the fore- and middleground. This area is considered to have low vividness.
- ***Intactness:*** Existing agricultural structures, utility poles, irrigation canals, and roadways, including fencing and private access roads, and a private airstrip act as encroachments in the fore- and middleground to the mountains visible in the background to the south and west of the site (Viewpoints E and F, Figure 4.1-4). However, these encroachments do not obstruct views in the background. The visual appearance of existing structural elements do not contribute to any visual enhancements. The landscape is generally highly modified from its natural desert landscape. Because of these major encroachments, the CSF2(A) site is considered to have low levels of intactness.
- ***Unity:*** As discussed under CSF2(A), the mountains in the background are divided from discernible encroachments. Although there are several encroachments within the landscape, they do not detract from the overall sense of unity; especially in western and southern vantages. The landscape surrounding CSF2(A) is essentially surrounded by agricultural land allowing for moderate to high levels of visual unity.

Calexico Solar Farm 2(B)

Similar to the discussion for CSF2(A), the landscape in the vicinity of Calexico Solar Farm 2(B) (CSF2(B)) is characterized by level terrain, scattered agricultural residences and support structures, and above ground utilities (see Viewpoints G and H, Figure 4.1-5). Foreground views include cultivated and fallow agricultural fields, irrigation canals, utility poles, and ruderal vegetation along roadsides. Middleground views consist of cultivated and fallow agricultural fields, scattered agricultural structures, and above-ground utilities (see right corner of Viewpoint G, Figure 4.1-5). Similar to the rest of the study area, background views to the west and southwest include the Peninsular Mountains and Mount Signal. Views to the east are generally unlimited with distinctive features visible. Based on these landscape characteristics, the vividness and intactness of the CSF2(B) site is considered to be of low to moderate value. However, similar to the other project sites, CSF2(B) contains high levels of unity with the surrounding landscape. The visual assessment criteria for CSF2(B) are provided below.

Viewpoint C - Looking NW along Anza Road



Viewpoint D - Looking SE along State Route 98

Viewpoints C and D (CSF1(A) Site)

FIGURE 4.1-3

Viewpoint E - Looking NW along Hammers Road

Viewpoint F - Looking SE along Weed Road

Viewpoints E and F (CSF2(A) Site)

FIGURE 4.1-4

Viewpoint G - Looking SW along Ferrell Road

Viewpoint H - Looking NW along State Route 98

- ***Vividness:*** The foreground is characterized by cultivated and fallow agricultural fields and related structures, which along with existing roadways; physically disrupt the distinctive views of the surrounding mountains in the background. West bound drivers along SR 98 likely take interest in the mountains in the background, but pay minimal attention to features in the fore- and middleground. This area is considered to have low vividness.
- ***Intactness:*** Existing agricultural structures, utility poles, and roadways, including fencing and private access roads, act as encroachments in the fore- and middleground to the mountains visible in the background to the south and west of the site (Viewpoints G and H, Figure 4.1-5). However, these encroachments do not obstruct views in the background. The visual appearance of existing structural elements do not contribute to any visual enhancements. The landscape is generally highly modified from its natural desert landscape. Because of these major encroachments, the CSF2(B) site is considered to have low levels of intactness.
- ***Unity:*** The Peninsular Mountains and Mount Signal are visible in the background, but are divided from discernible encroachments. Although there are several encroachments within the landscape, they do not detract from the overall sense of unity; especially in western and southern vantages. The landscape surrounding CSF2(B) is essentially surrounded by agricultural land allowing for moderate to high levels of visual unity.

Off-site Transmission Facilities–Private

The description of existing conditions as provided for MSSF1 would also generally apply to the off-site transmission facilities proposed on private lands (OTF-Private). This corridor is characterized by low levels of vividness and intactness, but moderate to high levels of unity.

Off-site Transmission Facilities – BLM Lands

The landscape characterizing the utility corridor within Imperial Solar Energy Center South Project would be similar to that of the OTF-Private until crossing into the Yuha Desert. To the east of the Westside Main Canal, the landscape quickly transitions back to a desert landscape with Mount Signal dominating the landscape background to the south and the Coyote Hills to the west. These off-site transmission facilities would then interconnect with a proposed 230 kilovolt (kV) transmission line within BLM's existing "N" utility corridor. Views within the corridor are dominated by three sets of existing transmission lines and associated tower structures. Visual resources within the "N" utility corridor and BLM lands to the west of the Westside Main Canal are further described in the Imperial Solar Energy Center South Final EIR/EA, which is incorporated by reference into this EIR.

As described in the Imperial Solar Energy Center South Final EIR/EA, the portion of the OTF within BLM lands is located within an "Interim VRM Class III" area. The objective of this class is to "partially retain the existing character of the landscape." The level of change to the landscape can be moderate. Management activities may attract attention, but should not dominate the view of the casual observer. Any changes should repeat the basic elements found in the natural landscape–form, line, color, and texture." The BLM land is described as primarily vacant and undisturbed desert land; however, existing utilities, including several 500 kV and 230 kV transmission lines and towers traverse this area (refer to Imperial Solar Energy Center South Final EIR/EA Section 3.1, pages 3.1-4 through 3.1-6, and 3.1-9 through 3.1-14.)

The Juan Bautista de Anza National Historic Trail is located approximately seven miles west of the study area and within Yuha Basin Area of Critical Environmental Concern. Views from this trail have a potential to be identified as a scenic resource.

Viewer Sensitivity

Viewer sensitivity is based on the visibility of resources in the landscape, the proximity of viewers to the visual resource, the relative elevation of viewers to the visual resource, and the types and expectations of

individuals and viewer groups. The criteria for identifying the importance of views are related in part to the position of the viewer relative to the resource.

Travelers along SR 98 may be visually drawn toward development within Calexico to the east of the study area and the Peninsular Mountains and Mount Signal to the south and west. The visual landscape within the study area is dominated by agricultural uses, which provide open space viewing opportunities, but offer no distinctive visual features that would otherwise be appreciated by passing drivers. In this context, viewer sensitivity is considered to be low.

Visual sensitivity also depends on the number and type of viewers and the frequency and duration of views. Generally, visual sensitivity increases with an increase in total number of viewers, the frequency of viewing (e.g., daily or seasonally), and the duration of views (i.e., how long a scene is viewed). Also, visual sensitivity is higher for views seen by people who are driving for pleasure; people engaging in recreational activities such as hiking, biking, or camping; and homeowners. Sensitivity tends to be lower for views seen by people driving to and from work or as a part of their work (U.S. Forest Service 1995; Federal Highway Administration 1988; U.S. Soil Conservation Service 1978). Commuters and non-recreational travelers have generally fleeting views and tend to focus on commute traffic, not on surrounding scenery; therefore, they are generally considered to have low visual sensitivity. Residential viewers typically have extended viewing periods and are concerned about changes in the views from their homes; therefore, they are generally considered to have high visual sensitivity. Views from recreation trails and areas, scenic highways, and scenic overlooks are generally assessed as having high visual sensitivity.

The study area can be seen by two types of sensitive viewer groups: travelers on roadways and people residing and working within the study area. Travelers include both the drivers and passengers on the following routes:

- SR 98 (see Viewpoint B, Figure 4.1-2; Viewpoint D, Figure 4.1-3; and Viewpoint H, Figure 4.1-5);
- Anza Road (Viewpoint A, Figure 4.1-2; Viewpoint C, Figure 4.1-3);
- Ferrell Road (Viewpoint G, Figure 4.1-5);
- Weed Road (Viewpoint F, Figure 4.1-4);
- Brockman Road/SR 98 (Viewpoint D, Figure 4.1-3); and
- Hammers Road (Viewpoint E, Figure 4.1-4).

Sensitive viewer groups within the study area and unincorporated portions of Imperial County include:

- Residents (Viewpoint A, B, D, E, and F, Figure 3.11-1); and
- Employees and patrons at businesses (Viewpoint G, Figure 3.11-1).

Scenic Roadway Designation

SR 98 in the vicinity of the study area is not listed as officially designated or eligible for the scenic highway program (Caltrans 2010). As indicated in Section 4.1.1.1, I-8 is designated as a scenic route to the northwest of the study area. However, the segment of I-8 designated as scenic ends more than 20 miles to the northwest of the study area at the junction of I-8 and SR 98 near Coyote Wells.

Light and Glare

Existing sources of light and glare in the study area are primarily associated with scattered rural residences and agricultural support facilities. Sources of light in these areas include exterior and interior building lighting. Minimal sources of illuminated signs, streetlights, and signals are presented in the study area and are more focused to the east in the City of Calexico. Sources of glare in the study area include windows and reflective building materials such as metal roofs. Mobile sources of light and glare originate from vehicles, airplanes, and farm equipment. When light is not sufficiently screened and spills over into areas outside of a particular development area the effect is called “light trespassing.”

Due to the nature of the existing surrounding land uses, there is little light generated by surrounding uses. The majority of the light and glare that exists within the study area is a result of motor vehicles traveling on surrounding roadways. These roadways generate glare both during the night hours when cars travel with lights on, and during daytime hours because of the sun's reflection from cars and pavement surfaces.

4.1.2 Impacts and Mitigation Measures

This section presents the significance criteria used for considering project-related land used compatibility impacts and consistency with applicable planning documents, the methodology employed for the evaluation, and mitigation requirements, if necessary.

4.1.2.1 Thresholds of Significance

The thresholds for significance of impacts for the analysis are based on the environmental checklist in Appendix G of the State California Environmental Quality Act (CEQA) Guidelines. Consistent with the CEQA Guidelines and the professional judgment of the County's staff and environmental consultants, the projects would result in a significant impact on the environment if it would:

- Have a substantial adverse effect on a scenic vista;
- Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway;
- Substantially degrade the existing visual character or quality of the site and its surroundings; or
- Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

4.1.2.2 Methodology

This visual impact analysis is based on field observations conducted by HDR staff in June 2011, a visualization and reflectivity analysis prepared by Aztec 2010, Good Company 2011, and visualization by Modative 2011, for each of the projects' components, as well as a review of maps and aerial photographs for the study area. The analysis of the projects' impacts was based on evaluation of the changes to the existing visual resources that would result from project implementation. In making a determination of the extent and implications of the visual changes, consideration was given to:

- Specific changes in the visual composition, character, and valued qualities of the affected environment;
- The visual context of the affected environment;
- The extent to which the affected environment contained places or features that have been designated in plans and policies for protection or special consideration; and
- The numbers of viewers, their activities, and the extent to which these activities are related to the aesthetic qualities affected by the project-related changes.

It should be noted that an assessment of visual quality is a subjective matter, and reasonable people can disagree as to whether alteration in the visual character of the study area would be adverse or beneficial. For this analysis, a conservative approach was taken, and the potential for substantial change to the visual character of the study area is generally considered a significant impact.

4.1.2.3 Impact Analysis

IMPACT 4.1-1	Substantial Adverse Effect on a Scenic Vista. Implementation of the projects would not result in the degradation of the visual quality of a scenic vista.

MSSF1, CSF1(A), CSF1(B), CSF2(A), CSF2(B), OTF-Private

As stated in Section 4.1.1, the study area is located in the southern Imperial Valley, an agricultural landscape, and is not located within a scenic vista designated by the State or the County's General Plan (Imperial County, as amended through 2008). None of the viewpoints described in Section 4.1.1 of this EIR characterize the physical attributes necessary to qualify as a designated scenic vista. The proposed OTF-Private towers and associated transmission lines would be erected in an east-west orientation and, therefore, would not substantially disrupt the unity of the viewshed of Mount Signal and the Coyote Mountains to the west from the valley floor. Based on these factors, implementation of the projects would not have a substantial direct or indirect effect on a scenic vista and **no significant impact** would occur.

OTF-BLM Lands

The Juan Bautista de Anza National Historic Trail is located approximately 5 miles west of the OTF. Due to its substantial distance from the OTF corridor and flat topography, the OTF is not readily visible from this trail. Although transmission facilities could be visible along portions of the trail, the proposed transmission towers would be similar in use and scale as the existing towers and transmission facilities in the area and, therefore, would not substantially damage scenic resources from the Juan Bautista de Anza National Historic Trail. Any effect on views from the Historic Trail would be minimal, and for CEQA purposes would be considered **less than significant**.

Mitigation Measure(s)

No mitigation measures are required.

IMPACT 4.1-2	Substantial Adverse Effect on a Scenic Highway. Implementation of the projects would not result in substantial damage to scenic resources, including, but not limited to, trees, rock outcroppings, and ridgelines within a state scenic highway.

MSSF1, CSF1(A), CSF1(B), CSF2(A), CSF2(B), OTF-Private

The study area is located along the SR 98 corridor, which bisects the floor of the Imperial Valley, just north of the U. S. Mexico border. As provided in Section 4.1.1, portions of I-8 to the northwest of the study area are designated as scenic. However, these segments are located over 20 miles away and are not visible from the study area. Additionally, Mount Signal to the west obstructs views of the study area from upland portions of I-8 as it descends from the Peninsular Mountains. Based on these considerations, the projects would not result in damage to scenic resources, including trees, rock outcroppings, or historic buildings, including those listed as eligible for the Scenic Highway Program (Caltrans 2010).

OTF-BLM Lands

The Juan Bautista de Anza National Historic Trail is located approximately seven miles west of the projects; views from this trail have a potential to be identified as a scenic resource. However, due to its distance from the study area and level topography, the study area is not readily visible from this trail. Although the OTF could be visible from portions of the trail, the proposed transmission towers would be similar in use and scale as existing towers and transmission facilities in the area. The proposed projects' OTF facilities within BLM lands will be identical to those that were proposed and evaluated as part of the

Imperial Solar Energy Center South Final EIR/EA. No significant visual impact was identified associated with the transmission facilities located within BLM lands (see Imperial Solar Energy Center South Final EIR/EA Section 4.1, pages 4.1-13 and 4.1-14). Based on these considerations, the projects would not substantially damage scenic resources from the Juan Bautista de Anza National Historic Trail. Any effect of the projects on views from the Historic Trail would be minimal and, therefore, **less than significant**.

Mitigation Measure(s)

No mitigation measures are required.

IMPACT 4.1-3	Changes to Visual Character. Implementation of the projects could substantially degrade the existing visual character or quality of the study area and its surroundings.

The projects consist of two primary components: (1) the construction and operation of the solar energy facilities and support structures at the MSSF1, CSF1(A), CSF1(B), CSF2(A), and CSF2(B) site locations; and (2) the construction and operation of the OTF within and to the east of the study area. These projects' components would result in changes to the existing visual character of the study area, both in terms of the on-site features proposed under the projects and in the context of the study area's relationship within the surrounding agricultural landscape. Each of these frames of reference is considered under the associated headings below.

On-site Changes to Existing Visual Character

As described in Section 4.1.1, the study area is utilized for agricultural production and there are no distinctive visual resources. Construction of the projects would alter the existing visual character of the study area and its surroundings as a result of converting existing agricultural lands to a large-scale solar energy facility. The study area is essentially flat and, therefore, no substantial site grading and landform change would occur in conjunction with projects construction. A similar circumstance would occur during decommissioning activities upon site restoration in the future. Although the study area would be visually disrupted in the short-term during construction and decommissioning activities, these activities would not be more disruptive than existing agricultural operations. Because extensive grading is not required and these activities would be temporary, the visual character of the study area would not be substantially degraded in the short-term and related impacts would be **less than significant**.

As discussed in Chapter 3.0, the major generation equipment that would be installed in conjunction with the projects includes solar arrays, inverter modules and transformers, O&M buildings, electrical, substation(s), and an electrical distribution system. With the exception of the O&M facilities and solar arrays, these project features would generally remain below eight feet in height. The proposed O&M facilities could reach a maximum height of 25 feet while the solar arrays would extend up to 15 feet above the ground surface. As described in Chapter 3.0, each of projects' components within the study area would be enclosed by an 8-foot security fence. As illustrated in Figures 4.1-6 through 4.1-13, which provide visual simulations for post-project conditions at Viewpoints A, B, C, D, E, F, G and H, respectively, the proposed security fencing would partially screen views of the proposed solar facilities. In comparing post-project conditions in relation to existing conditions (see Figures 4.1-6 through 4.1-13), the proposed security fencing would also obscure views of adjacent open fields, scattered trees, and residences and, to a lesser extent, agricultural structures. As shown in Figures 4.1-6 through 4.1-13, taller structures, such as the electrical distribution and transmission lines and O&M facilities would remain visible above the security fencing. However, when considering these project features in the context of the low levels of vividness and intactness for the study area as documented in Section 3.1.1, these changes to the visual character of the study area are considered **less than significant**.

As described in Chapter 3.0, the solar panels would be arranged in 500-foot by 500-foot solar array grids that would be mounted to racks supported by driven piles, drilled and grouted piles, or ballasted piles. Depending on the type of solar panels selected, the racks would either be secured at a fixed-tilt position of 25 degrees from horizontal, facing in a southerly direction or, alternatively, a tracker mounted system

would be utilized. With the exception of access roads and O&M facilities, the solar grids would cover the entire study area. Figures 4.1-14, 4.1-15, and 4.1-16 provide an oblique post-project rendering for MSSF1, CSF1(A), and CSF2(B) and illustrate the associated conceptual solar array grid layout. As shown, the solar array grids would provide uniform coverage over the site(s) with the access roads and grid inverter model and transformer sites forming a rectangular grid layout that would be oriented in a north-south or east-west direction. This proposed layout would blend with and compliment the rectangular row cropping patterns present in adjacent agricultural fields. When considering the factors in the context of the low levels of vividness and intactness as documented within the study area, these project-related changes are considered **less than significant**.

Off-site Changes to Existing Visual Character

As provided in Section 4.1.1, although the study area contains low levels of vividness and intactness, the study area contributes moderate to high levels of unity within the existing agricultural landscape that characterizes the southern Imperial Valley. In this context, the open space areas offered within the study area contribute to background views of the Peninsular Mountains and Mount Signal from off-site vantages. As previously described, the project features would be erected across the study area, which could impede views of these natural topographical features. As shown in Figures 4.1-6, 4.1-9, 4.1-10, and 4.1-13 for Viewpoints A, D, E, and H, the project facilities would almost completely obscure views of the Peninsular Mountains to the northwest. In contrast and as shown in Figures 4.1-7, 4.1-8, 4.1-11, and 4.1-12 for Viewpoints B, C, F, and G, the project facilities would only result in a partial obstruction of background views to the west and southwest. Additionally, because OFT-Private would be constructed in an east-west orientation and the low height of the solar arrays (e.g. less than 15 feet), these facilities would not result in substantial disruptions to the unity of the viewshed of the mountains to the west. Given the low number of sensitive viewers within the study area including motorists, and the fact that these obstructions would be discontinuous depending on one's vantage point, project-related changes to background views and unity within the Imperial Valley would not be significant. Further, because the study area would be restored to agricultural uses in the future, long-term impacts to the visual character of the study area and adjacent areas would be **less than significant**.

In addition to the placement of solar arrays, the projects would include the placement of new O&M and electrical substation facilities, some of which could be placed in proximity to off-site residences located adjacent to the study area. These facilities typically have an industrial appearance. Under the current A-2, A-2-R, and A-3 zoning, landscaping for nonresidential development must conform to the landscaping requirements of the M-1 zone, which requires that a minimum of 10% of the developable lot be landscaped (County Ordinance 90302.03). Additionally, in instances where any interior property line abuts a residentially zoned lot, parcel or area, the M-2 zone requires that trees be planted at least every 25 feet in either individual planters or a maintained median planting area to provide sufficient screening. Based on these existing requirements, combined with proposed security fencing along the perimeter of the study area, visual impacts to adjacent lands are considered **less than significant**.

MSSF1

The impact discussion provided for the proposed projects as a whole would generally be applicable to the MSSF1 site location; however, the extent of visual-related impacts would occur at a reduced scale. Build-out of the MSSF1 site would entail the placement of solar array grids on approximately 1,431 acres along with supporting facilities. Figures 4.1-6 and 4.1-7 illustrate pre- and post-project conditions from the southern (Viewpoint A) and northern perimeters (Viewpoint B) of the MSSF1 site location. As shown under post-project conditions, the adjacent agricultural fields would no longer be visible. However, as discussed in Section 4.1.1, these agricultural fields and related encroachments provide minimal levels of vividness and intactness and, therefore, their obstruction is considered **less than significant**.

Existing

Proposed

Viewpoint A - Looking NW along Anza Road

Pre- and Post-Project Views at Viewpoint A (MSSF1 Site)

FIGURE 4.1-6

Existing

Proposed

Viewpoint B - Looking SE along State Route 98

Pre- and Post-Project Views at Viewpoint B (MSSF1 Site)

FIGURE 4.1-7

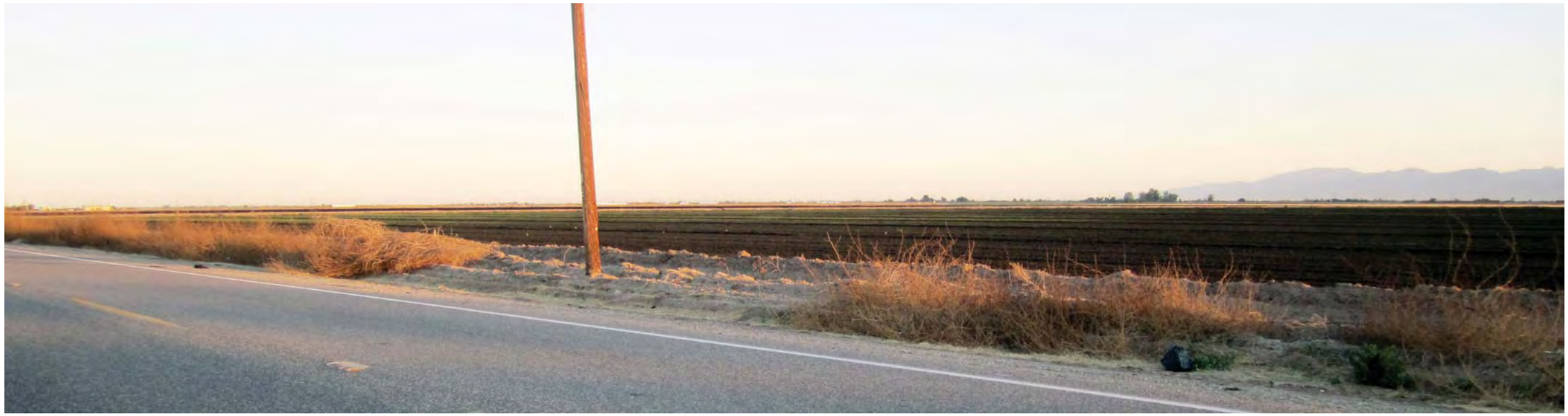
Existing

Proposed

Viewpoint C - Looking NW along Anza Road

Pre- and Post-Project Views at Viewpoint C (CSF1(A) Site)

FIGURE 4.1-8



Existing

Proposed

Viewpoint D - Looking SE along State Route 98

Pre- and Post-Project Views at Viewpoint D (CSF1(A) Site)

FIGURE 4.1-9

Existing

Proposed

Viewpoint E - Looking NW along Hammers Road

Pre- and Post-Project Views at Viewpoint E (CSF2(A) Site)

FIGURE 4.1-10

Existing

Proposed

Viewpoint F - Looking SE along Weed Road

Pre- and Post-Project Views at Viewpoints F (CSF2(A) Site)

FIGURE 4.1-11

Existing

Proposed

Viewpoint G - Looking SW along Ferrell Road

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Pre- and Post-Project Views at Viewpoint G (CSF2(B) Site)

FIGURE 4.1-12

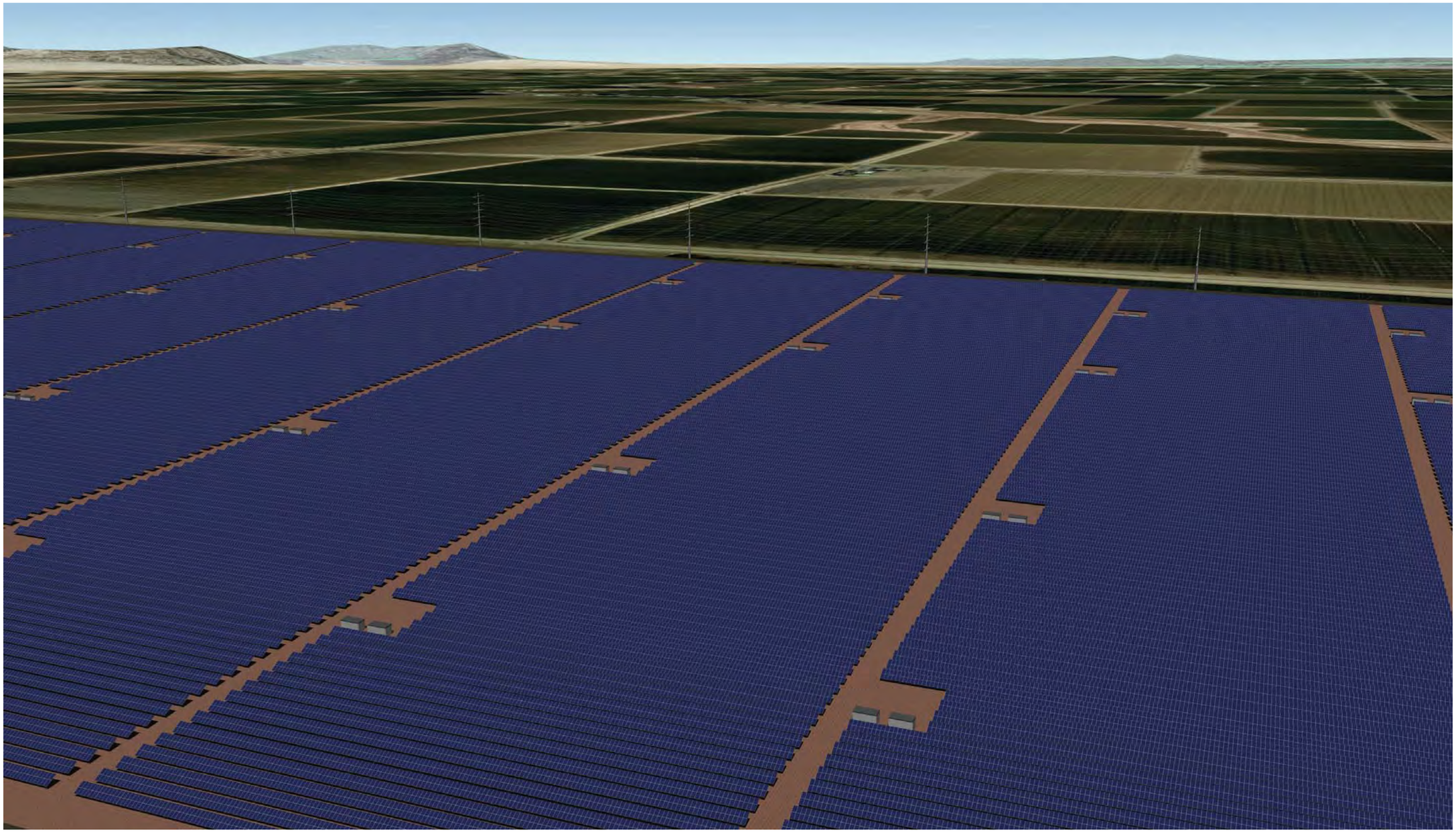
Existing

Proposed

Viewpoint H - Looking NW along State Route 98

Pre- and Post-Project Views at Viewpoint H (CSF2(B) Site)

FIGURE 4.1-13



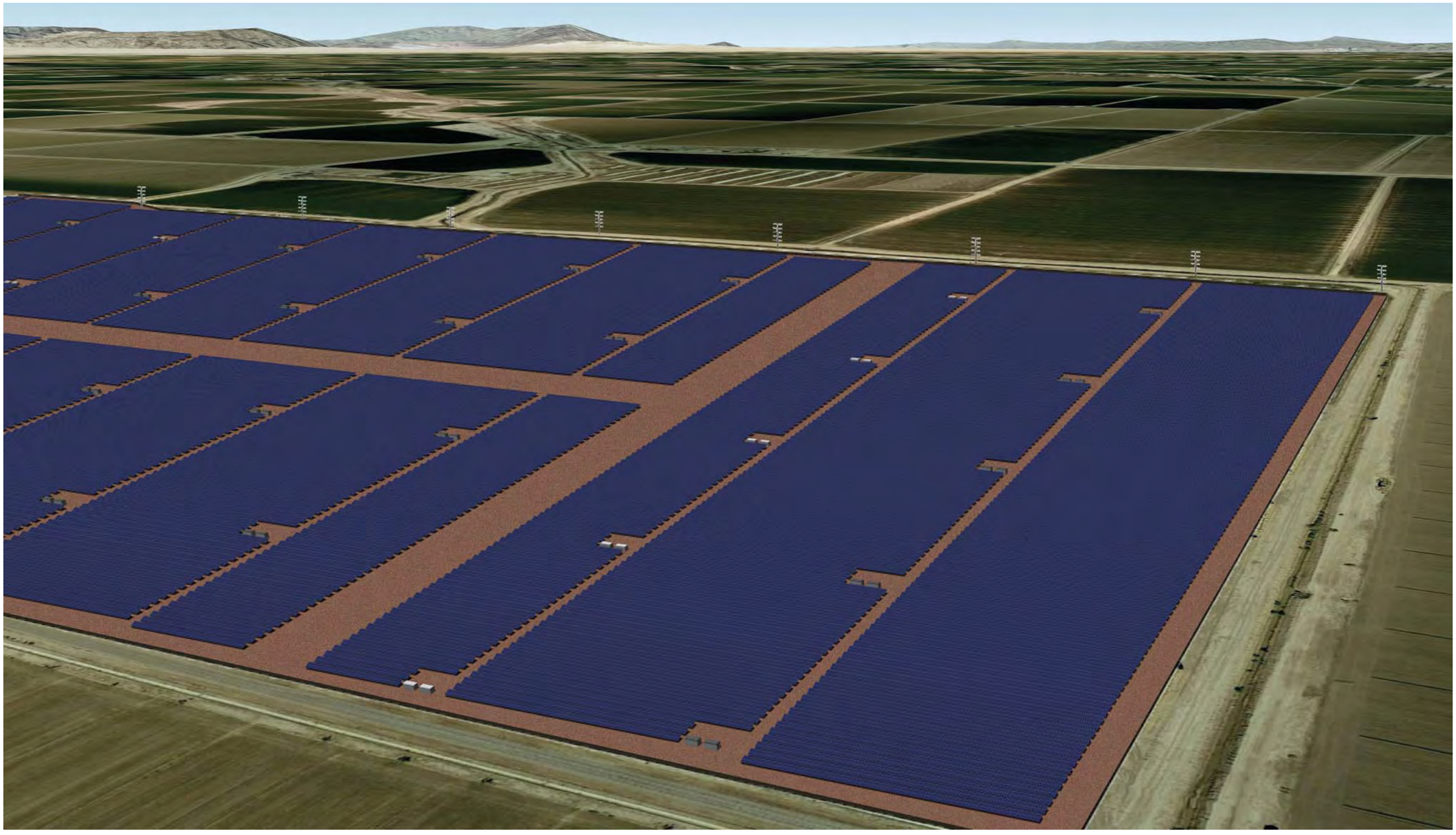
Proposed

Looking North - North West

Oblique Post-Project Rendering for MSSF1

FIGURE 4.1-14

HDR ONE COMPANY | *Many Solutions*℠



Proposed

Looking North - North West

Oblique Post-Project Rendering for CSF1

FIGURE 4.1-15

Imperial County | Mount Signal Solar Farm and Calexico I and II Solar Farms | EIR

HDR ONE COMPANY | *Many Solutions*℠

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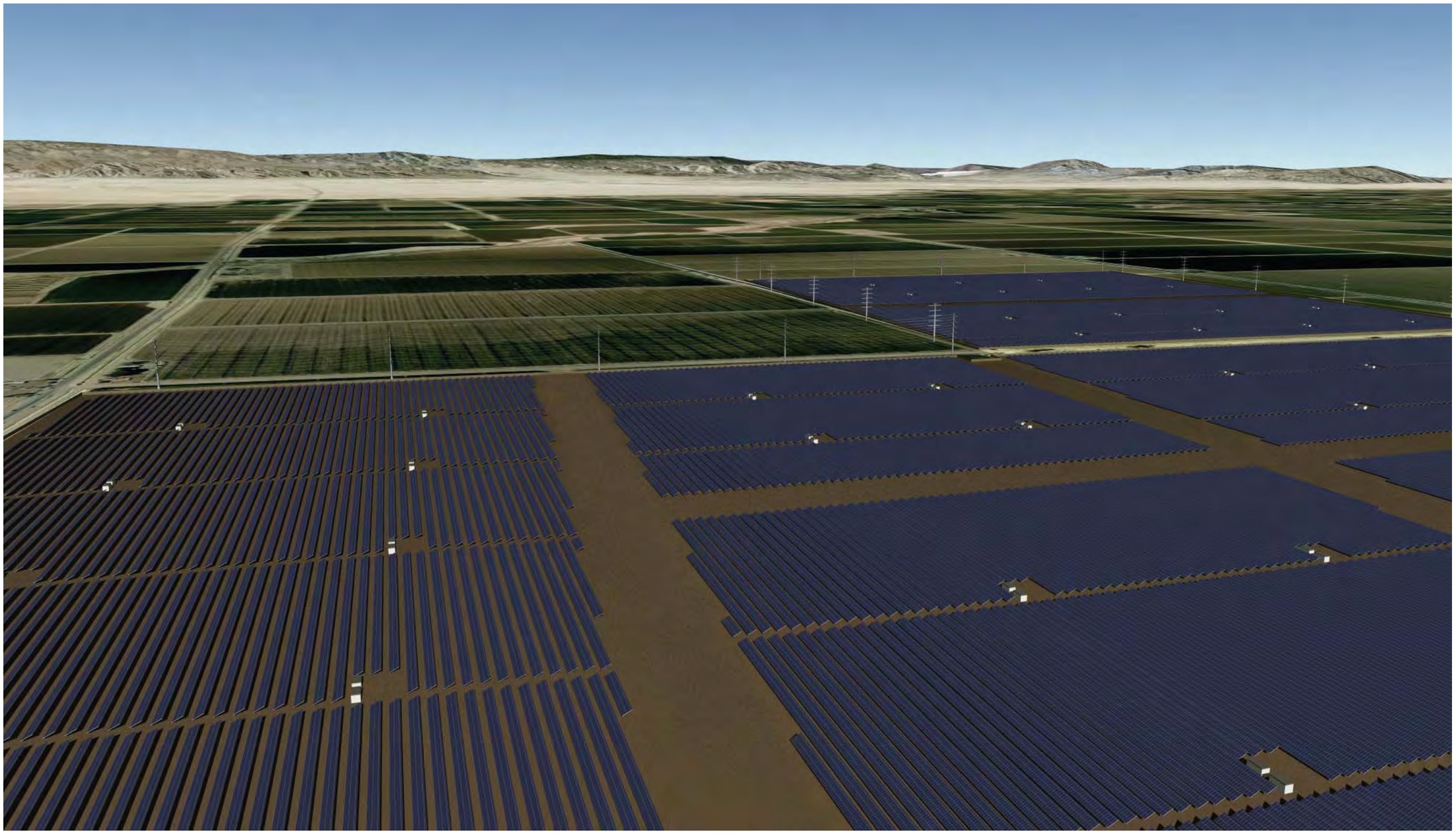

Proposed

Looking West

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Oblique Post-Project Rendering for CSF2

FIGURE 4.1-16

In the context of the MSSF1 site's relationship with the surrounding agricultural landscape, development of the MSSF1 site would result in partial and, in limited instances, complete obstructions of background views of the Peninsular Mountains and Mount Signal (see Figure 4.1-6, Viewpoint A and Figure 4.1-7, Viewpoint B). These obstructions would be substantially less than those associated with the projects as a whole. However, given the low number of sensitive viewers within the study area and the fact that these obstructions would be discontinuous depending on one's vantage point, project-related changes to background views and associated unity would not be significant. Further, because the MSSF1 site would be restored to agricultural uses in the future, long-term impacts to the visual character of the study area would be **less than significant**.

CSF1(A)

The impact discussion provided for the proposed projects as a whole would generally be applicable to the CSF1(A) site location; however, the extent of visual-related impacts would occur at a reduced scale. Build-out of the CSF1(A) site would entail the placement of solar array grids on approximately 719 acres along with supporting facilities. Figures 4.1-8 and 4.1-9 illustrate pre- and post-project conditions from the southern (Viewpoint C) and northern perimeters (Viewpoint D) of the CSF1(A) site location. As shown under post-project conditions, the adjacent agricultural fields would no longer be visible. However, as discussed in Section 4.1.1, these agricultural fields and related encroachments provide minimal levels of vividness and intactness and, therefore, their obstruction is considered **less than significant**.

In the context of the CSF1(A) site's relationship with the surrounding agricultural landscape, the development of the CSF1(A) site would result in partial and, in limited instances, complete obstructions of background views of the Peninsular Mountains and Mount Signal (see Figures 4.1-8, Viewpoint C and 4.1-9, Viewpoint D). However, these obstructions would be substantially less than those associated with the entire projects. Given the low number of sensitive viewers within the study area and the fact that these obstructions would be discontinuous depending on one's vantage point, project-related changes to background views and associated unity would not be significant. Further, given the CSF1(A) site would be restored to agricultural uses in the future, long-term impacts to the visual character of the study area would be **less than significant**.

CSF1(B)

The impact discussion provided for CSF1(A) would generally be applicable to the CSF1(B) site location; however, the extent of visual-related impacts would occur at a reduced scale. Build-out of the CSF1(B) site would entail the placement of solar array grids on approximately 613 acres along with supporting facilities. As discussed in Section 4.1.1, these agricultural fields and related encroachments provide minimal levels of vividness and intactness and, therefore, their obstruction is considered **less than significant**.

In the context of the CSF1(B) site's relationship with the surrounding agricultural landscape, the CSF1(B) site is immediately north of the U. S./Mexico border and a mile south of SR 98. Because of the limited number of sensitive viewers in the vicinity of CSF1(B), project-related changes to background views and associated unity would not be significant. Further, given the CSF1(B) site would be restored to agricultural uses in the future, long-term impacts to the visual character of the study area would be **less than significant**.

CSF2(A)

The impact discussion provided for the proposed projects as a whole would generally be applicable to the CSF2(A) site location; however, the extent of visual-related impacts would occur at a reduced scale. Build-out of the CSF2(A) site would entail the placement of solar array grids on approximately 940 acres along with supporting facilities. Figures 4.1-10 and 4.1-11 illustrate pre- and post-project conditions from the eastern (Viewpoint E) and western perimeters (Viewpoint F) of the CSF2(A) site location. As shown under post-project conditions, the adjacent agricultural fields would no longer be visible. However, as

discussed in Section 4.1.1, these agricultural fields and related encroachments provide minimal levels of vividness and intactness and, therefore, their obstruction is considered **less than significant**.

In the context of the CSF2(A) site's relationship with the surrounding agricultural landscape, the CSF2(A) site location is in the closest proximity to the City of Calexico. Due to the distance of the Peninsular Mountains from the CSF2(A) site, the placement of the solar arrays and related facilities would result in complete obstructions of background views to the west (see Figure 4.1-10, Viewpoint E). However, these obstructions would be substantially less than those associated with the entire projects. Given the low number of sensitive viewers within the study area and the fact that these obstructions would be discontinuous depending on one's vantage point, project-related changes to background views and associated unity would not be significant. Further, given the CSF2(A) site would be restored to agricultural uses in the future, long-term impacts to the visual character of the study area would be **less than significant**.

CSF2(B)

The impact discussion provided for MSSF1 would generally be applicable to the CSF2(B) site location; however, the extent of visual-related impacts would occur at a reduced scale. Build-out of the CSF2(B) site would entail the placement of solar array grids on approximately 525 acres along with supporting facilities. As discussed in Section 4.1.1, these agricultural fields and related encroachments provide minimal levels of vividness and intactness and, therefore, their obstruction is considered **less than significant**.

In the context of the CSF2(B) site's relationship with the surrounding agricultural landscape, the development of the CSF2(B) site would result in partial and, in limited instances, complete obstructions of background views of the Peninsular Mountains and Mount Signal (see Figure 4.1-12, Viewpoint G and Figure 4.1-13, Viewpoint H). However, these obstructions would be substantially less than those associated with the projects. Given the low number of sensitive viewers within the study area and the fact that these obstructions would be discontinuous depending on one's vantage point, project-related changes to background views and associated unity would not be significant. Further, given the CSF2(B) site would be restored to agricultural uses in the future, long-term impacts to the visual character of the study area would be **less than significant**.

OTF–Private

As provided in Chapter 3, OTF-Private would bisect the study area in an east-west orientation prior to interconnecting with off-site facilities approved for the Solar Energy Center South Project (see Figures 3.0-2 and 3.0-13). The OTF support structures would consist of steel monopole towers spaced approximately 900 to 1,110 feet apart. Figure 3.0-14 in Chapter 3 provides a representative example of this type of transmission tower. Figure 4.1-7, Viewpoint B; Figure 4.1-8, Viewpoint C; and Figure 4.1-10, Viewpoint F provides a visual simulation of the OTF on private lands.

In order to facilitate the interconnection of the OTF with adjacent transmission facilities, the transmission towers would need to be the same height as the existing towers, which is 140 feet. The projects propose the use of transmission towers at 140 feet in height, which would exceed the limit of 120 feet within the A-2, A-2-R, and A-3 zones. This would require the approval of a variance application by the County Planning Commission and Board of Supervisors. As part of the approval process for a variance, the County is required to make findings pursuant to Title 9 Division 2, Section 90202.08 of the Imperial County Land Use Ordinance. This issue is considered further from a land use and plan consistency perspective in Section 4.10. From a visual impact perspective, a 20-foot differential from what is allowed under the existing zoning for the transmission towers is considered minor. Further, in considering the low levels of vividness and intactness within the study area, the placement of these facilities would not result in significant deterioration of the existing visual character. Due to the east-west orientation of the OTF, impacts to the unity of the study area and associated background views of the Peninsular Mountains would be minimal and, therefore, **less than significant**.

OTF BLM Lands

The OTF support structures proposed on BLM lands would consist of steel lattice towers spaced approximately 900 to 1,110 feet apart (see Figure 4.1-17). Three types of towers could be used for the OTF on BLM Lands, which may include suspension, deflection, and dead end towers. Suspension, deflection, and dead-end towers are typically about 140 feet in height. Representative examples of these types of towers are illustrated in Figure 3.0-15 (Typical Suspension Tower), 3.0-16 (Typical Deflection Suspension Tower), and 3.0-17 (Typical Dead End Tower). Figure 4.1-17 provides a visual simulation of the OTF with BLM Lands.

As discussed in Chapter 3.0, the solar facilities would require the construction of OTF on private lands to facilitate interconnection with OTF on BLM Lands via facilities approved for the Imperial Solar Energy Center South Project. The OTF on BLM Lands would be constructed within BLM's "N" Utility Corridor. The EIR/EA prepared for the Imperial Solar Energy Center South Project also included the construction of new transmission facilities within the "N" Utility Corridor and therefore, is incorporated by reference into this EIR. As provided in the previously prepared EIR/EA, visual impacts were determined to be less than significant since these facilities would not be expanded outside the designated "N" Utility Corridor. In addition, the materials used for the new towers and transmission lines would be similar and consistent with the color, texture, and materials utilized for existing transmission towers and lines within the "N" Utility Corridor (see Imperial Solar Energy Center South Final EIR/EA, Section 4.1). Based on these considerations, resulting impacts to the visual character of BLM Lands would be **less than significant**.

Mitigation Measure(s)

No mitigation measures are required.

IMPACT 4.1-4	New Sources of Nighttime Lighting and Glare. The projects would create new source of light and glare, which could adversely affect day or nighttime views in the study area.

MSSF1, CSF1(A), CSF1(B), CSF2(B), OTF-Private, OTF-BLM Lands

As described in Chapter 3.0, the projects would include new sources of nighttime lighting. In addition, given the nature of the projects (e.g., solar facilities), this discussion also considers potential glare-related impacts generated by the proposed solar arrays. This discussion considers each issue under the associated headings below.

Nighttime Lighting

The study area is currently used for agricultural production and, for this reason, is not an existing source of light or glare. Sources of nighttime lighting associated with the projects would be minimal and limited to the O&M facilities and the electrical transmission towers for the purpose of alerting aircraft flying in and out of Calexico Airport, as well as crop dusting activities. As provided in Chapter 3, project-related lighting would be designed to provide the minimum illumination needed to achieve safety and security objectives. Additionally and consistent with County Ordinance 90301.02(K), development standards for commercial and industrial zones, project lighting would be directed downward and shielded to focus illumination on the projects and away from adjacent properties. Based on these considerations, the projects are not anticipated to create a new source of substantial light which would adversely affect nighttime views in the study area and the impact is considered **less than significant**.

Glare

The projects would involve the installation of photovoltaic modules (PV), which convert sunlight directly into electricity and, by their shear nature, are non-reflective. A typical PV panel with a single layer of anti-

reflective coating reflects less than 10% of the sunlight that comes into contact with the panel (Good Company 2011). By way of comparison agriculture vegetation reflects between 18% and 25% of solar radiation; while galvanized steel (used in industrial roofs) is between 40% and 90% (Good Company 2011). As described in Chapter 3.0, the projects would generally avoid the use of materials such as fiberglass, aluminum or vinyl/plastic siding, galvanized products, and brightly painted steel roofs, which have the potential to create on- and off-site glare impacts.

One measure of reflectivity is albedo—the ratio of solar radiation across the visible and invisible light spectrum reflected by a surface. Albedo varies between 0, a surface that reflects no light, and 1, a mirror-like surface that reflects all incoming light. Solar panels with a single anti-reflective coating have a reflectivity of approximately 0.10.3 (Good Company 2011). By comparison, sand has an albedo between 0.15 and 0.45 and agricultural vegetation has an albedo between 0.18 and 0.25. Based on these levels of reflectivity, the PV panels are anticipated to have a lower reflectivity than the prevailing ground cover within the study area (agricultural crops) (Good Company 2011).

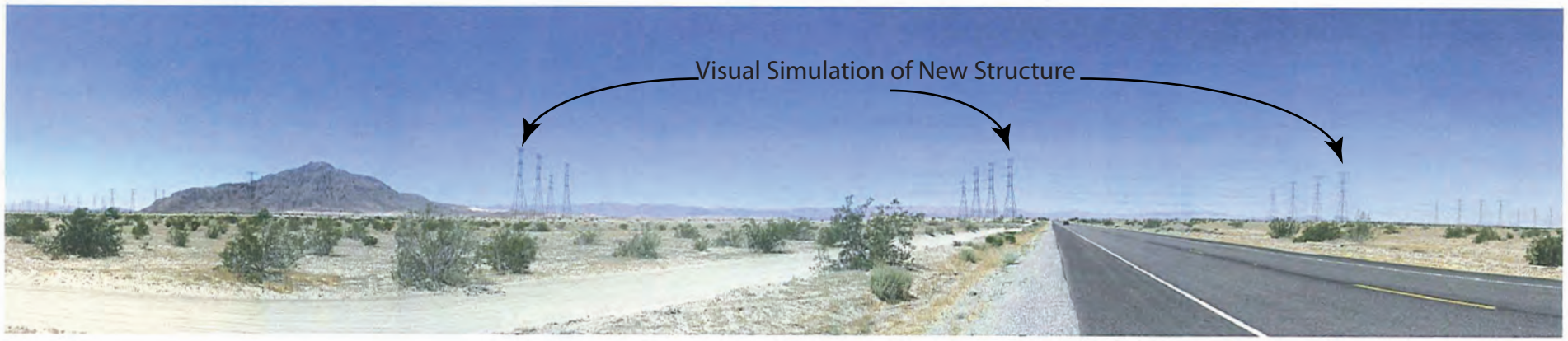
To maximize electricity production in a fixed tilt system, panels are typically oriented toward the south and face the sun, resulting in angles of reflection above nearby buildings and ground-traffic. Likewise, with a tracker mounting system and integration of high precision tracking technology installations, light reflected from the solar modules is retro-reflected into the direction of the sun during typical operations. Thus, perception of glare on the ground or close to the ground is largely impossible under regular operation. Only in cases when the tracking mechanism is in malfunction (e.g., due to a loss of power), the glass surfaces may reflect sunlight to locations on or close to the ground. However, this would only occur if the malfunction were to happen during direct irradiance (radiant emittance) and if the corresponding sun angle reflects off the tracker position, thereby producing a glare spot at a given location. Due to the movement of the sun and assuming a fixed position of the tracker during a malfunction, such a glare spot would move quickly from the given position so that the glare would not be perceivable during a longer period of time. Further, given the study area's distance from the Calexico Airport, with exception of CSF2(A), the projects would not use materials that would reflect significant levels of glare or glint[1] upwards in a manner that could affect flight operations. Based on these considerations, the impact is considered **less than significant**.

CSF2(A)

The impact discussion provided for the proposed projects as a whole in relation to potential nighttime lighting and glare impacts would also generally apply to CSF2(A). However, CSF2(A) which is situated closer to nearby development along the western fringe of Calexico, contains a private airfield, and is located adjacent to the Airport Land Use Compatibility Plan (ALUCP) area for Calexico International Airport, which is delineated by Hammers Road. The existing structures closest to the CSF2(A) are a cluster of buildings, approximately 30 feet south from the southwestern corner of the site. At this distance and assuming a fixed-tilt system, the height of direct reflection or glint is 36 feet above the ground surface (Good Company 2011). Additionally, there is a residential neighborhood on the western edge of Mexicali, Mexico, approximately 0.45 miles due south, where the elevation of direct glare would be over 0.5 miles (or 2,832 feet) high (Good Company 2011). This roughly corresponds with the height of an 188-story building (Good Company 2011). With a fixed-tilt system, at a distance of 20 feet from the solar panels, the height of reflection is already at 24 feet. At 30 feet from the solar panels, the height of the reflection is at 35.8 feet or higher (depending on the time of year). Based on these expected angles of reflection, adjacent land uses and vehicle traffic along local roadways would be unaffected and, therefore, **no significant impact** would occur.

[1] Glint, also referred to as specular reflection, is produced by direct reflection of the sun beam in the surface of the PV solar panel. Glint is highly directional, since its origin is purely reflective. In contrast, glare is not directional and is the reflection of diffuse irradiance, which is significantly less intense than glint.

Existing setting from SR-98 looking southwest towards the Off-site Transmission Facilities located within BLM Land (Utility Corridor "N")



Visual Panoramic Simulation

Source: BRG Consulting, Inc., 2010

Visual Simulation of Proposed Off-site Transmission Facility within BLM Utility Corridor "N"

FIGURE 4.1-17

Glare and Glint Effects to Calexico Airport (Fixed-Tilt Systems)

The CSF2(A) site location is located adjacent and to the west of Zone B2 of the ALUCP for Calexico International Airport. As a result, the solar facilities constructed in conjunction with CSF2(A) would be installed within the flight plane as depicted in Figure 4.1-18. A plane, in the context of this section, is referred to as the hypothetical vertical rectangular two dimensional surface areas connecting the airplane to the ground assuming a straight line approaching path. This plane is used to calculate the angle of reflection from certain stationary light sources (i.e., the sun) onto mobile sources (i.e., airplanes) to determine glint (Aztec 2010). To assess potential impacts to flight operations, Aztec completed a series of mathematical equations to determine the relative reflectivity. Based on Aztec's results, there would be several days in the year and, at certain hours, where a reflected beam vector would be contained within the flight plane as depicted in Figure 4.1-18. However, it is important to note that any relevant glint would occur only if the elevation angle of the reflected beam is coincident with the flight approaching angle, in either east or west directions (Aztec 2011).

As provided in Figure 4.1-19, a reflected beam would be contained in the flight plane at 7:30 AM (after sunrise) and at 3:45 PM (before sunset) with the reflected beam directed upwards at an angle of 23.9 degrees and 34.6 degrees, respectively. Based on these results, the reflection held at 7:30 AM would affect airplanes landing at Calexico International Airport from the west, while the reflection held at 3:45 PM would affect airplanes landing or launching from east. In both cases, a long-term glint exposure would only occur if the airplanes were landing at the same particular angles (i.e., 23.9 degrees and 34.6 degrees, respectively) (Aztec 2011). However, it should be noted that normal landing angles are within the range of 3 degrees and 6 degrees, so on a typical day, no risk of prolonged exposure to glint would be possible (Aztec 2011).

Nevertheless, there remains a few days in the year where there is an eventual risk of glint from the PV modules to landing airplanes. These particular days are 72 to 75 (2nd week of March - morning time) and 80 to 83 (3rd week of March - evening time) (Aztec 2011). Because of yearly symmetry, the same occurs in mid-October. Interference with the landing path occurs at around 7:37 AM, when the sun azimuth is -84° and elevation only 3°. Therefore, airplanes reaching Calexico International Airport runway from the west would have the sun disc just in front of them. However, this glint effect is considered negligible when compared to direct sun light exposure, as in this case. Similarly, planes landing or launching from the east at day 82, for example, would be facing the sun disc at sunset, and again the risk of glint would be negligible when compared to the light intensity of direct sun (Aztec 2011). However, given that CSF2(A) would produce new glint impacts in addition to direct sunlight at these times, these effects could result in a **significant impact** to airport operations.

Glare and Glint Effects to Calexico Airport (Tracker Mounting Systems)

Similar to the procedure applied to fixed-tilt systems, Aztec used a similar method for moving reflecting surfaces to assess effects from a tracker mounting system. As provided in Figure 4.1-19, the reflected beam using this type of solar array configuration would be contained in the flight plane at 8:45 AM and 3:00 PM. However, in both cases the beam elevation angle is well over 40°, so there is minimal risk for glint. In applying the same calculation for a complete year and, as shown in Figure 4.1-19, whenever the reflected beam is contained in the flight plane, its elevation angle is very far from the usual approaching or launching angles to the airport (Aztec 2011). For this reason, there is negligible risk of glint impacts using a tracker mounting system since the eventual reflected beam would have a high elevation angle (that is, pointing upwards), so no interference with approaching or launching airplanes from Calexico Airport would occur (Aztec 2011).

The same conclusions can be extended to other tracking technologies, including single inclined axis or double axis trackers (Aztec 2011). With these devices, the tracking efficiency is higher than with horizontal axis trackers, therefore the incident angle is even lower, and the reflected beam would be directed at the sun disk more closely. Risk for glint when landing or launching might theoretically occur only at low sun elevation angles (i.e., sunrise or sunset); however, during these particular hours the

backtracking technology modifies the tracking algorithm to avoid mutual shading thus re-orientating the reflected beams upwards, far from the flight path. Based on these considerations, the impact would be **less than significant**.

Mitigation Measure(s)

The following mitigation measure is required for CSF2(A). No mitigation is required for CSF1(A), CSF1(B), CSF2(B), OTF-Private, and OTF-BLM.

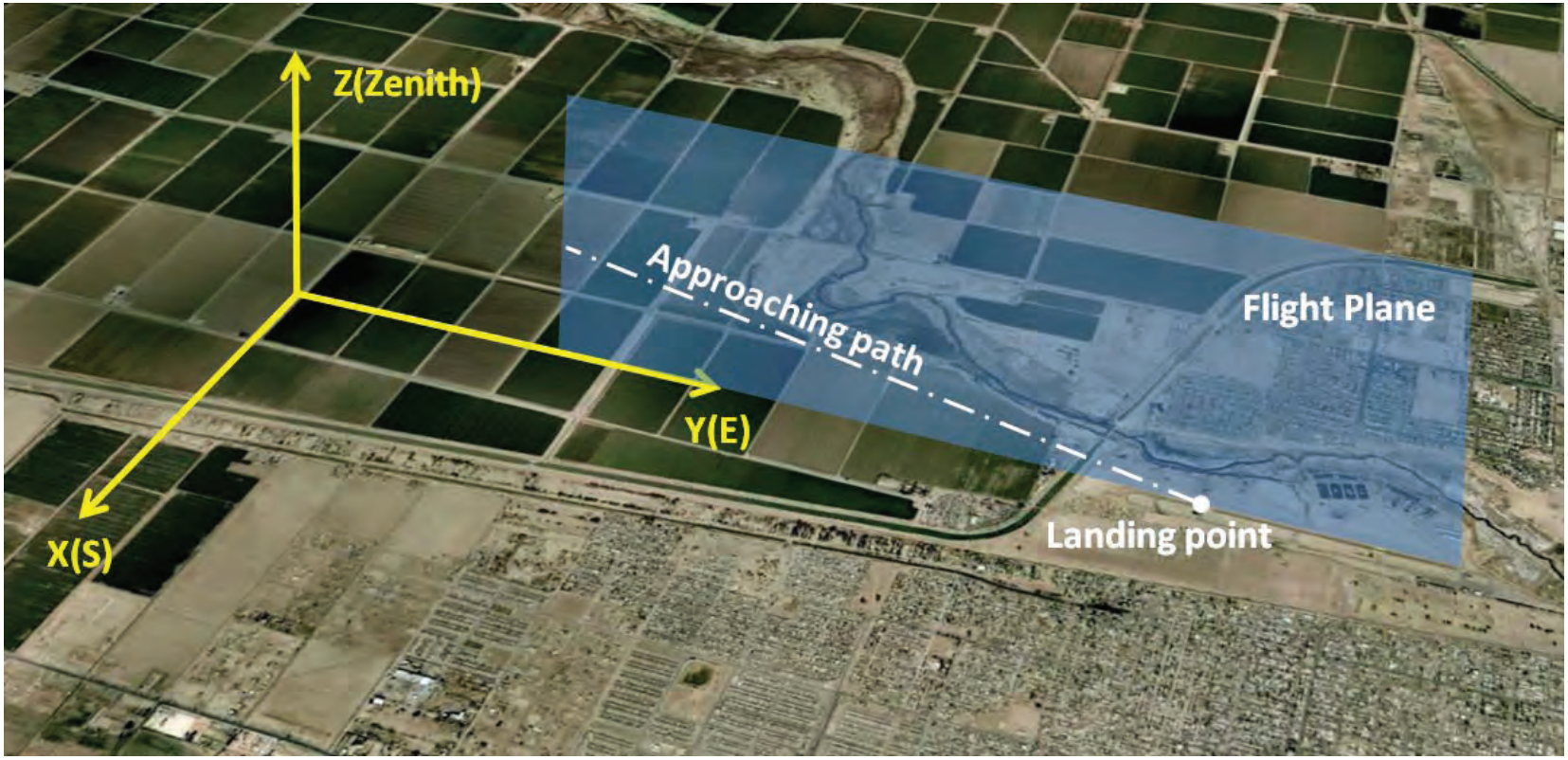
4.1-4 Coordinate Final Design Plans for CSF2(A) with Imperial County Airport Land Use Commission (ALUC) to Minimize Glare and Glint Effects on Airport Operations. The project applicant shall coordinate the final design of CSF2(A) with the Imperial County ALUC to ensure that glare and glint effects from the proposed solar arrays are minimized to the maximum extent practical. The project applicant shall incorporate design recommendations prescribed by the ALUC for CSF2(A), including the use of tracker mounting systems as opposed to fixed-tilt systems. To ensure that recommendations are integrated into the final design plans for CSF2(A), Imperial County shall coordinate the final design plans for CSF2(A) with the ALUC prior to final approval.

Significance After Mitigation

Implementation of Mitigation Measure 4.1-4 would reduce potentially significant impacts to airport operations at Calexico International Airport associated with glare and glint to a less than significant level through coordination with the ALUC and preparation and implementation of design features to minimize adverse impacts to airport takeoff and landing operations.

4.1.3 Residual Impacts

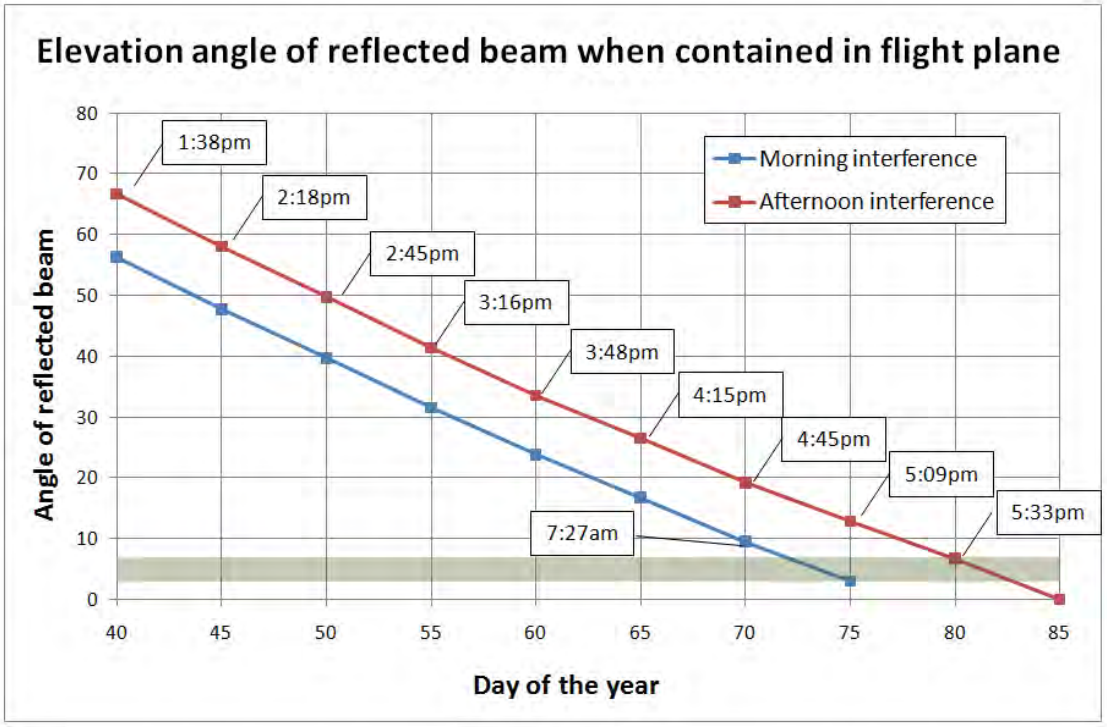
Implementation of the mitigation measure contained in this section would reduce potential glare and glint impacts to airport operations at Calexico International Airport to a less than significant level. Impacts related to substantial alteration of a scenic vista and damage to designated scenic corridor would be less than significant and no additional mitigation measures are required. Changes to visual character of the study area would be less than significant and would be transitioned back to agricultural uses in the future following site decommissioning and restoration. Based on these conclusions, implementation of the projects would not result in residual significant unmitigable impacts to the visual character of the study area or add substantial amounts of light and glare.

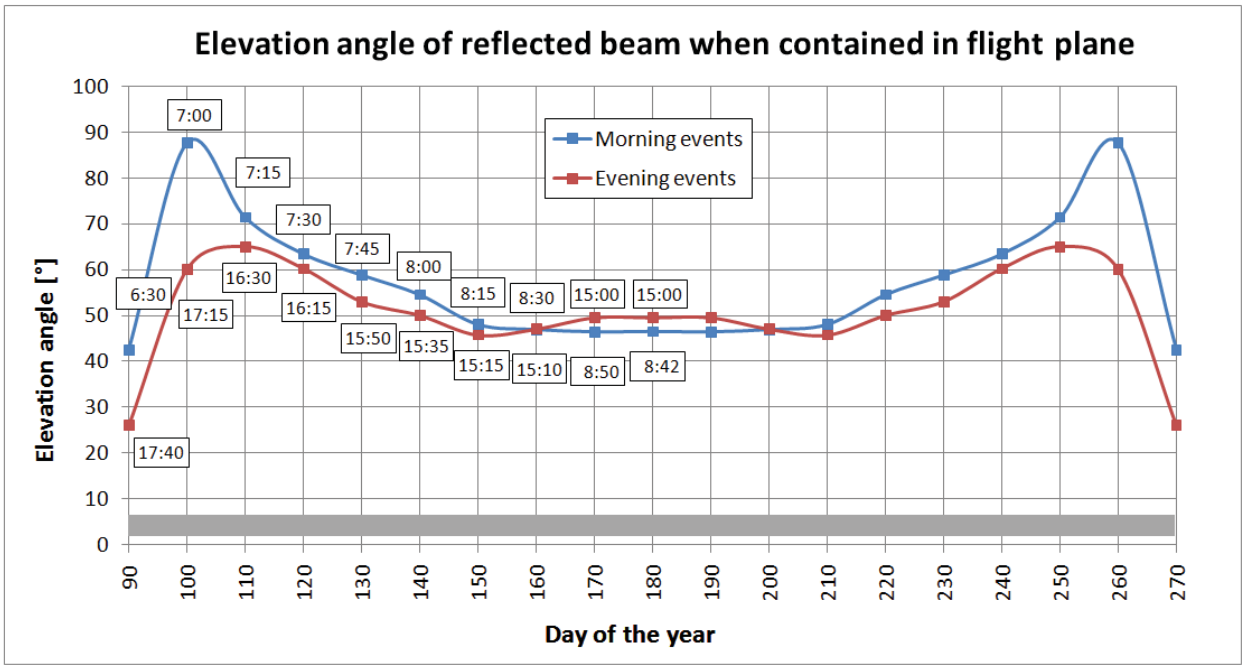


Source: Aztec, 2011

Flight Path for Calexico Airport

FIGURE 4.1-18





Source: 8-minute energy, 2011(a)

Elevation Angle of Reflected Beam When Contained in Flight Plain

FIGURE 4.1-19