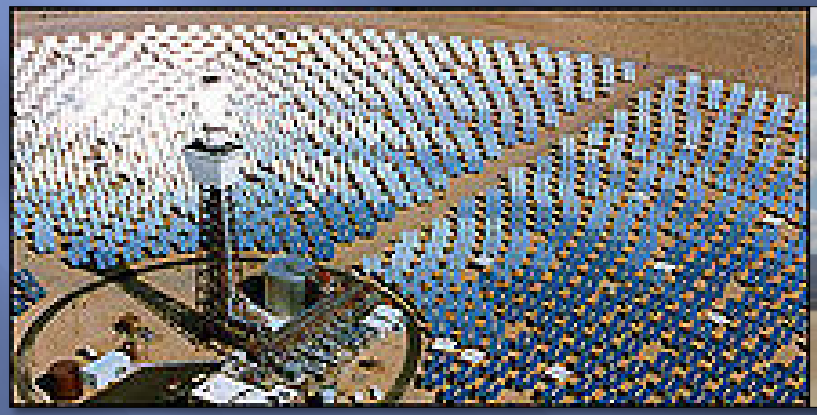
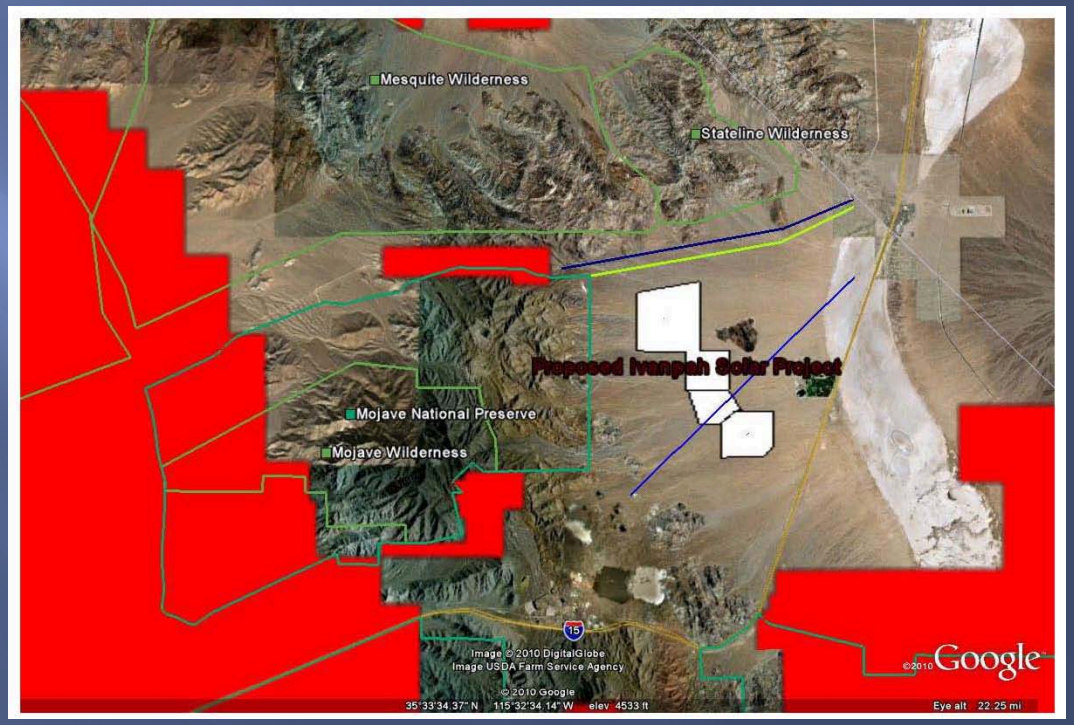
IVANPAH SOLAR ELECTRIC PROJECT

VRM TRAINING COURSE 2010



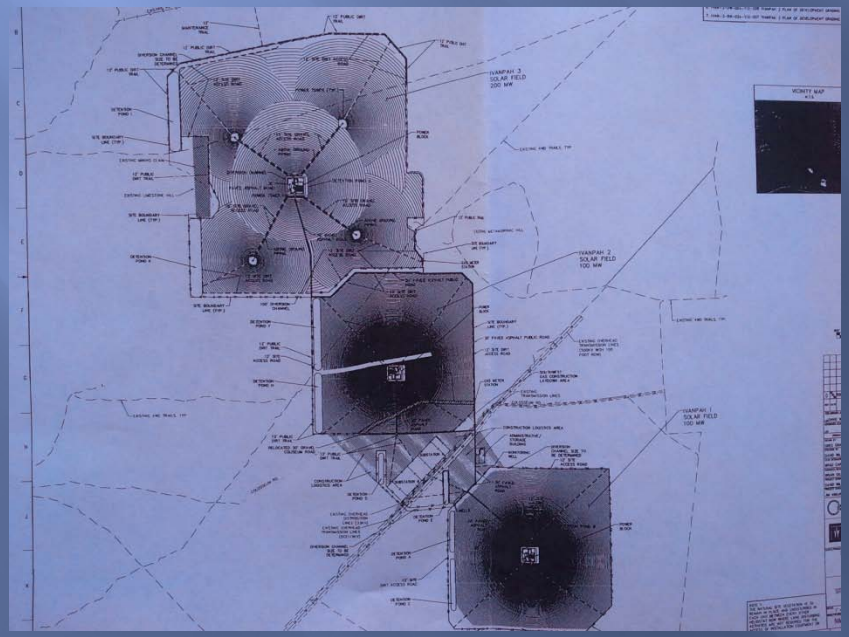
Project Description

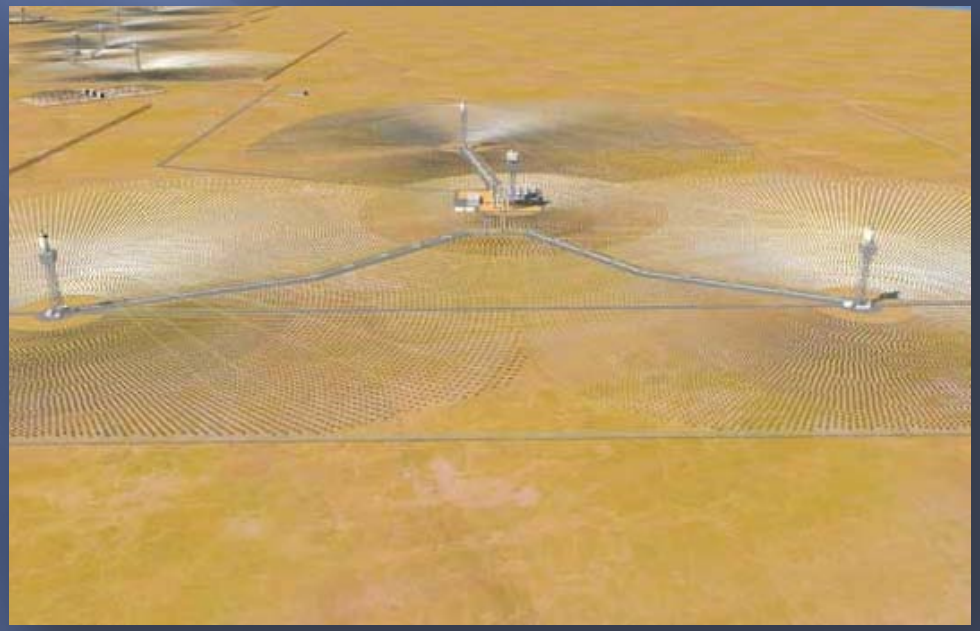
- Location:
  - Southern California's Mojave Desert in San Bernardino County
  - 4.5 miles southwest of Nevada community of Primm
  - West of Ivanpah Dry Lake (Special Recreation Emphasis Area)
  - Adjacent to Primm Valley Golf Resort
  - Adjacent to Mojave Desert Preserve
  - On BLM land
  - Adjacent to existing 500 KV transmission line



Project Description

- Three Solar Thermal Plants:
  - Phase One: 300 ft 100 MW Tower
  - Phase Two: 300 ft 100 MW Tower
  - Phase Three: 500 ft 200 MW Tower with four additional 300 ft towers





Project Description

- Existing Site Conditions/ Characteristic Landscape:
  - Mojave Desert of Basin and Range Physiographic Province
  - Existing RMP delineates area to be managed as VRM III
  - Predominantly creosote, fairly even and uniform
  - Generally enclosed landscape with predominantly horizontal lines, west of I-15 can appear fairly intact with slight cultural modifications
  - Sloping foothills with vertical form of mountain range behind

Process

Meet with project proponent

Evaluate existing site conditions

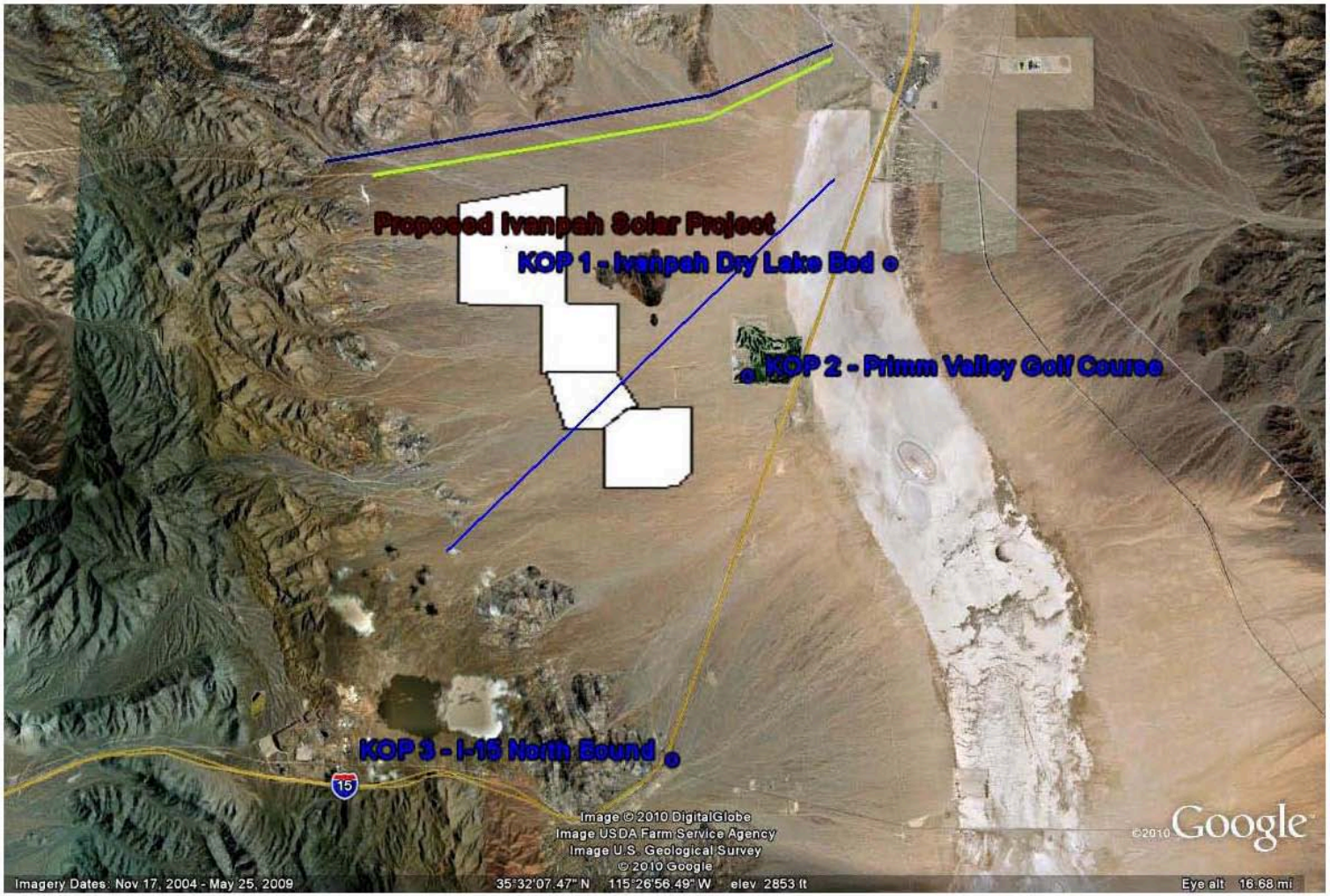
Establish Key Observation Points (KOPs)

- Three KOPs
  - Ivanpah Dry Lake Bed
  - Primm Valley Golf Resort
  - I-15 Northbound from Nipton Exit

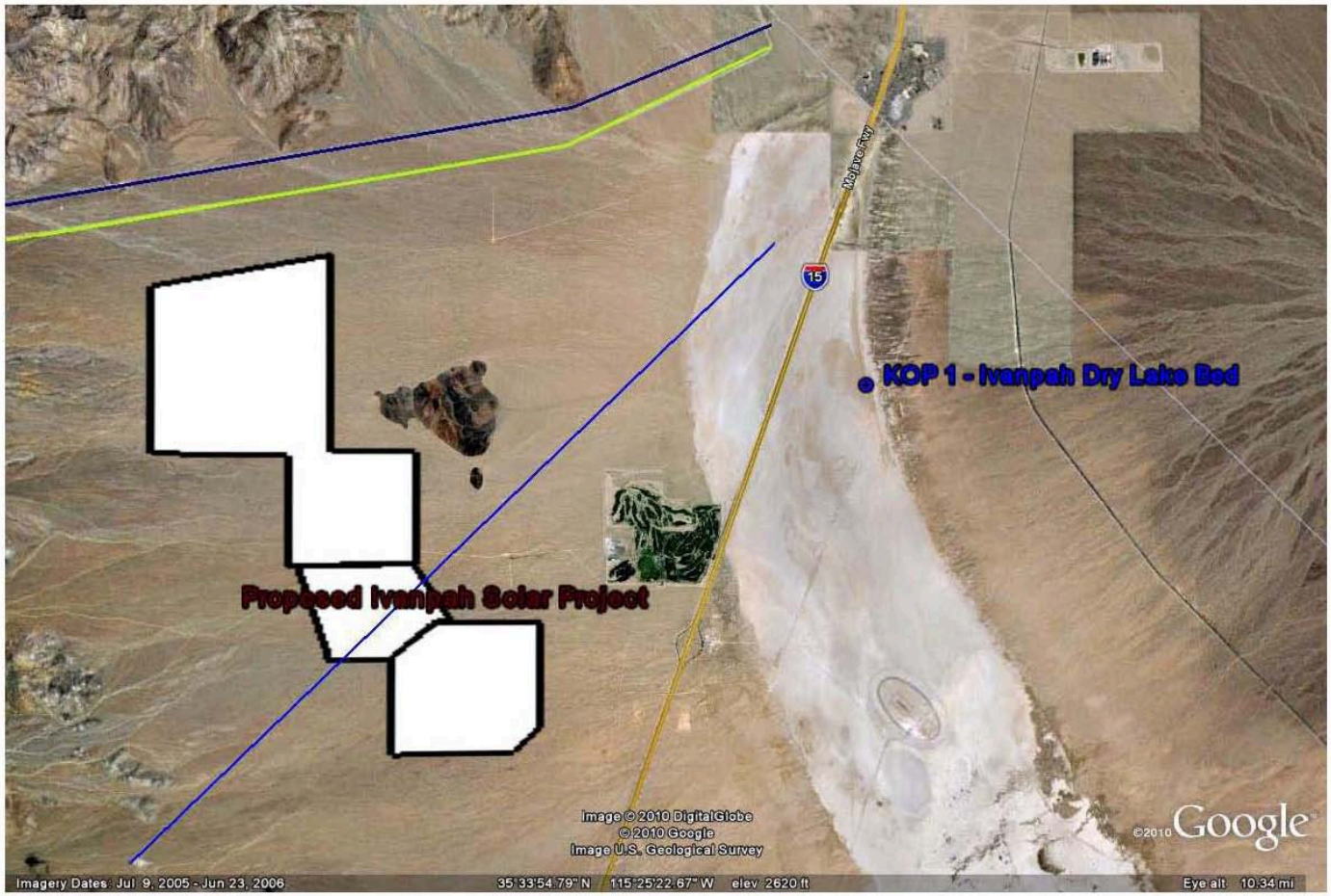
Complete contrast rating forms from KOPs

Project recommendations /mitigation

Key Observation Points



Key Observation Point No. 1



Key Observation Point No. 1–
Existing Condition

Key Observation Point No. 1–
Proposed Condition

Key Observation Point No. 1

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(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date: OCT 7, 2010

District: NEEDLES FO

Resource Area:

Activity (program): SOLAR

SECTION A. PROJECT INFORMATION

1. Project Name: IVANPAH SOLAR PROJECT

2. Key Observation Point: IVANPAH DRY LAKE SRMA

3. VRM Class: III

4. Location: Township _____ Range _____ Section _____

5. Location Sketch

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	ROUNDED AND TRIANGULAR FOR OF BG MOUNTAINS; LOW ROUNDED TRIANGULAR FEATURES IN THE MG; MODERATELY UNIFORM LY SLOPING FROM VALLEY IN FOOTHILLS	NONE IN FG; LOW, NO DISTINCT FORM; REGULAR; DARK STIPPLING IN MG/BG	VERTICAL, ANGULAR FORMS FROM T-LINE;
LINE	PREDOMINANTLY HORIZONTAL LINES; BROKEN, JAGGED LINES FROM MOUNTAIN SILHOUETTE; STRONG LINE CAUSED BY 1-5& TRANSMISSION LINES; UNIFORM, DIRECTIONAL LINES FROM PIPELINE AND 2 TRACKS	NO DISTINCT LINE	DIRECTIONAL, UNIFORM FROM I-15;
COLOR	TANS AND GRAYS; PIPELINE AND ROADS LIGHTER TAN	LIGHT/MEDIUM OLIVE	INDISTINCT GRAY FROM LATTICE STRUCTURES
TEXTURE	SMOOTH BG WITH SOME COURSE FEATURES; COURSE IN BG FROM MOUNTAINS	FINE	FINE, SMOOTH

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	NO DISTINCT LANDFORM	RECTILINEAR EDGE CREATED BY PROJECT FOOTPRINT	CYLINDRICAL TOWERS; DISTINCT SALT DOME; CIRCULAR ORIENTATION OF ARRAYS;
LINE	RADIAL LINES OF DISTURBANCE	DIAGONAL LINES CREATED BY ACCESS ROAD; BOLD LINES CREATED BY PROJECT FOOTPRINT	STRONG RADIAL LINES OF ARRAYS; LARGE VERTICAL LINES OF TOWERS
COLOR	LIGHT TANS AND GREYS OF BASE MATERIAL	EXPOSED TAN SOILS FROM ACCESS ROAD AND FOOTPRINT DEVELOPMENT	METALLIC CASING OF TOWERS; ILLUMINOUS GLARE OF SALT DOME; DARK REFLECTIONS OF ARRAYS
TEXTURE	SMOOTH BASE MATERIAL	SMOOTH (REMOVED VEGETATION)	SMOOTH

SECTION D. CONTRAST RATING X SHORT TERM ☐ LONG TERM

1. DEGREE OF CONTRAST

ELEMENTS	FEATURES: LANDWATER BODY (1) Strong	Moderate	Weak	None	VEGETATION (2) Strong	Moderate	Weak	None	STRUCTURES (3) Strong	Moderate	Weak	None
Form			X		X				X			
Line	X				X				X			
Color		X			X				X			

2. Does project design meet visual resource management objectives? ☐ Yes X No (Explain on reverse side)

3. Additional mitigating measures recommended? X Yes ☐ No (Explain on reverse side)

Evaluator's Names: D. GILBERT, M. SCHWARTZ, R. DONIGAN, J. SAUNDERS, B. KELLEHER, M. TANAKA-SANDERS

Date: OCT 7, 2010

	Texture			X			X						X	

SECTION D. (Continued)

RADIAL LINES OF ARRAY ORIENTATION WOULD CREATE STRONG CONTRASTS IN LINE

RECTILINEAR FORM OF PROJECT FOOTPRINT, AND LINES ASSOCIATED WITH ACCESS ROAD AND FOOTPRINT DEVELOPMENT WOULD CREATE STRONG CONTRASTS IN FORM AND LINE. VEGETATION REMOVAL DURING PAD GRADING WOULD CREATE STRONG COLOR CONTRASTS WITH THE SURROUNDING CHARACTERISTIC VEGETATION.

THE INTRODUCTION OF LARGE CYLINDRICAL TOWERS, VERTICAL LINES, AND THE CIRCULAR ORIENTATION OF ARRAYS WOULD CREATE STRONG CONTRASTS IN FORM AND LINE.

COLOR ASSOCIATED WITH TOWERS, REFLECTION OF THE ARRAYS, AND THE GLARE OF THE SALT DOME WOULD CREATE STRONG COLOR CONTRASTS.

Additional Mitigating Measures (See item 3)

APPLY PAINT TO THE METALLIC TOWER CASING TO MATCH THE BACKGROUND DESERT COLORS, APPLY TEXTURE CONCRETE PEDESTAL

APPLICATION OF ADVANCE COLOR TREATMENT SOIL STABILIZER (WITH PIGMENT) TO THE DISTURBED SOILS RESULTING FROM FOOTPRINT DEVELOPMENT

STRATEGIC LANDSCAPE PLANTINGS AT GOLF COURSE ON AFFECTED HOLES TO SCREEN VIEWS OF TOWERS

INSTALLATION OF AUDIO VISUAL WARNING SYSTEM (AVWS) TO MINIMIZE NIGHTTIME LIGHTING EFFECTS RESULTING FROM FAA REQUIRED NIGHTTIME LIGHTING

REDUCE VEGETATION DISTURBANCE AROUND DEVELOPMENT PADS

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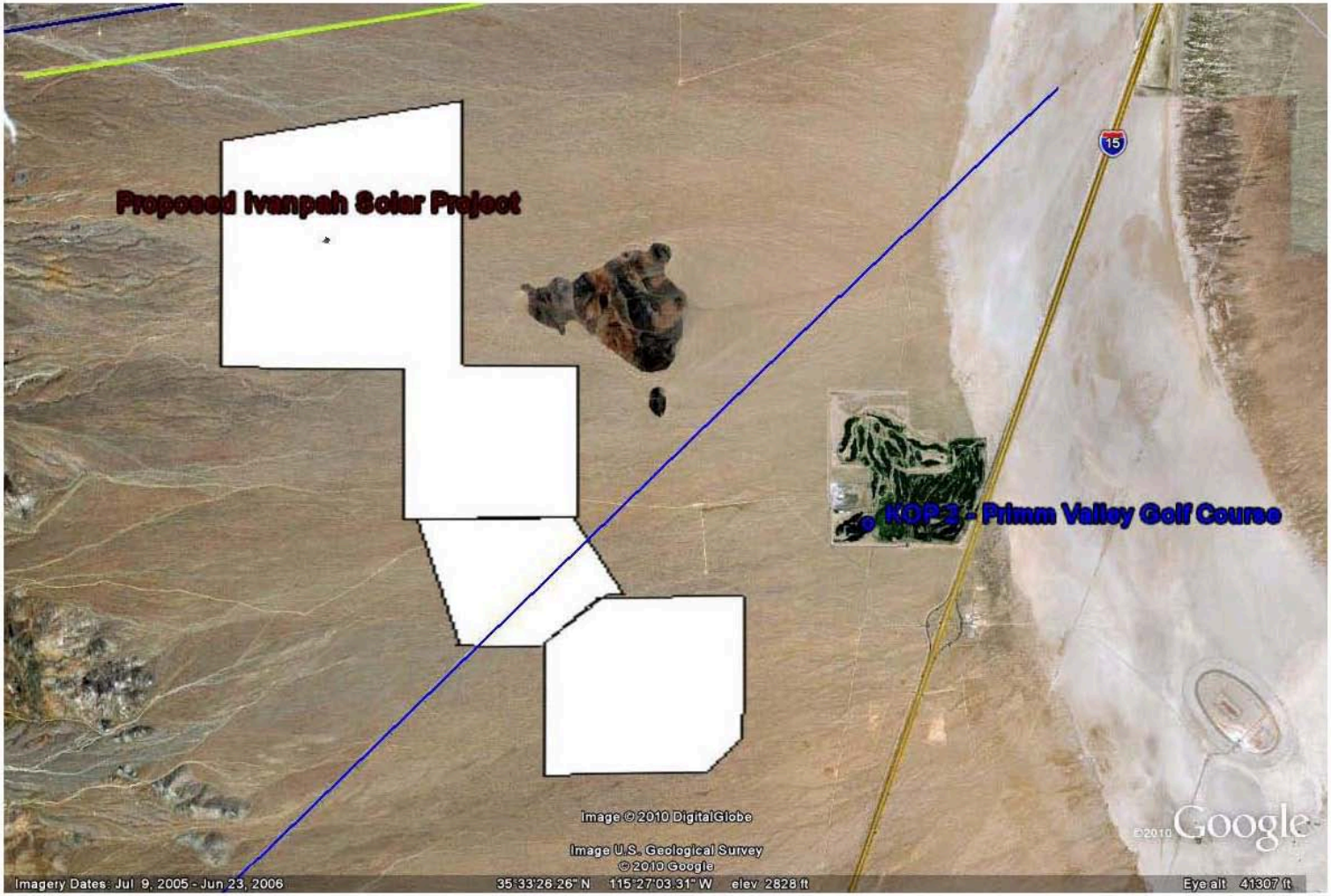
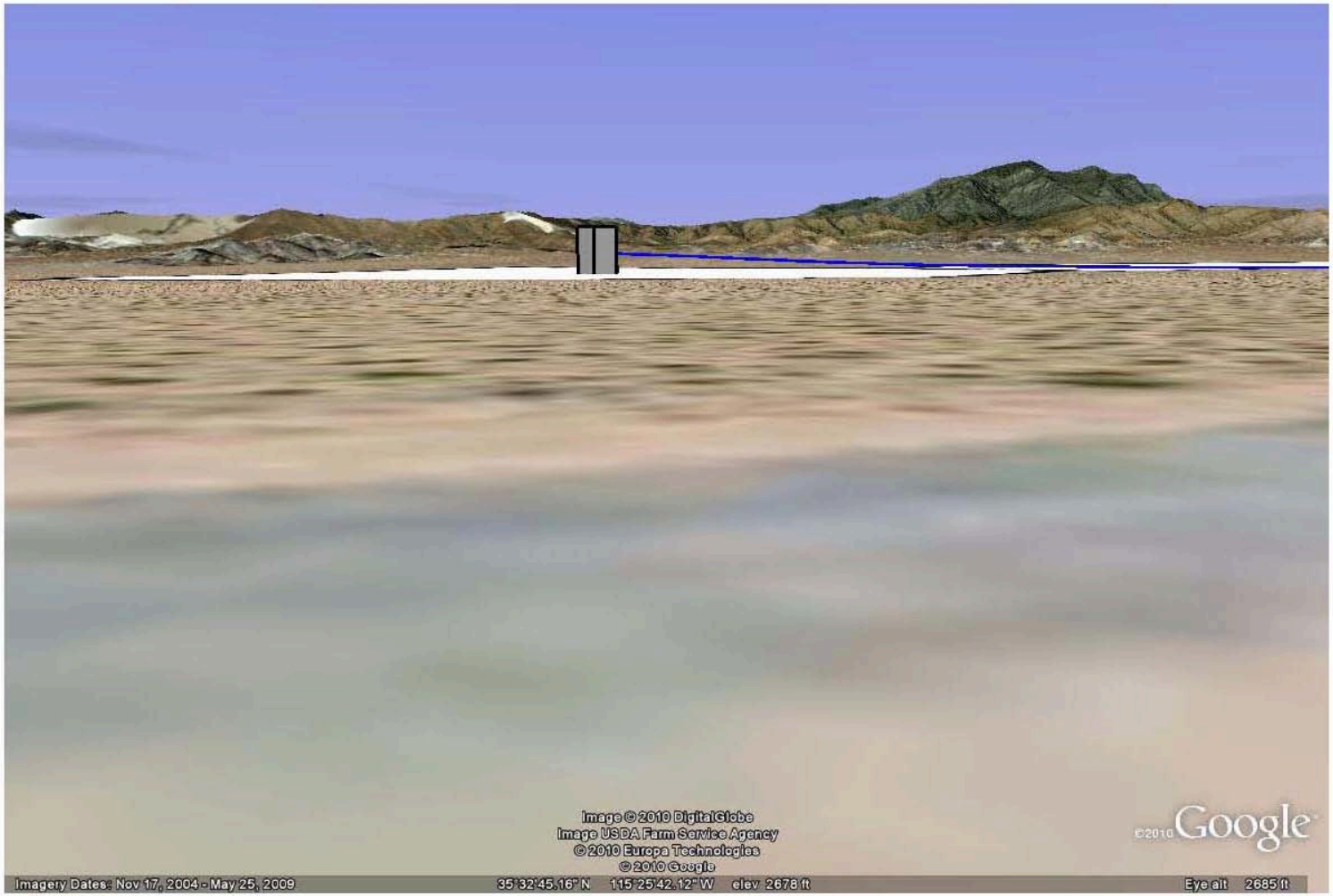
Key Observation Point No. 2



Key Observation Point No. 2–
Existing Condition

Key Observation Point No. 2–
Proposed Condition



Key Observation Point No. 2

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(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date: OCT 7, 2010
District: NEEDLES FO
Resource Area
Activity (program): SOLAR

SECTION A. PROJECT INFORMATION

1. Project Name: IVANPAH SOLAR PROJECT
2. Key Observation Point: PRIME VALLEY GOLF RESORT
3. VRM Class: III
4. Location: Township _____ Range _____ Section _____
5. Location Sketch

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	ROUNDED AND TRIANGULAR FOR OF BG MOUNTAINS; LOW ROUNDED TRIANGULAR FEATURES IN THE MG; MODERATELY UNIFORM; SLOPING FROM VALLEY IN FOOTHILLS	NONE IN FG; LOW, NO DISTINCT FORM; IRREGULAR; DARK STIPPLING IN MG/BG	VERTICAL, ANGULAR FORMS FROM T-LINE;
LINE	PREDOMINANTLY HORIZONTAL LINES; BROKEN, JAGGED LINES FROM MOUNTAIN SILHOUETTE; STRONG LINE CAUSED BY I-8/8 TRANSMISSION LINES; UNIFORM, DIRECTIONAL LINES FROM PIPELINE AND 2 TRACKS	NO DISTINCT LINE	VERTICAL LINES FROM T-LINES
COLOR	TANS AND GRAYS; PIPELINE AND ROADS LIGHTER TAN	MEDIUM OLIVE	INDISTINCT GRAY FROM LATTICE STRUCTURES; SOME BROWNS FROM WOODEN STRUCTURES
TEXTURE	SMOOTH FG WITH SOME COURSE FEATURES; COURSE IN BG FROM MOUNTAINS	MEDIUM	FINE; SMOOTH

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	NO DISTINCT LANDFORM	RECTILINEAR EDGE CREATED BY PROJECT FOOTPRINT	PROMINENT CYLINDRICAL TOWERS, DISTINCT SALT DOME, RECTANGULAR SUBSTATION
LINE	RADIAL LINES OF DISTURBANCE	DIAGONAL LINES CREATED BY ACCESS ROADS, BOLD LINES CREATED BY PROJECT FOOTPRINT	STRONG RADIAL LINES OF ARRAYS; LARGE VERTICAL LINES OF TOWERS,
COLOR	LIGHT TANS AND GREYS OF BASE MATERIAL	EXPOSED TAN SOILS FROM ACCESS ROAD AND FOOTPRINT DEVELOPMENT	METALLIC CASING OF TOWERS; LUMINOUS GLARE OF SALT DOME; DARK REFLECTIONS OF ARRAYS; DARK GREYS OF PAVED ASPHALT PUBLICC ROAD
TEXTURE	SMOOTH BASE MATERIAL	SMOOTH	SMOOTH

SECTION D. CONTRAST RATING X SHORT TERM ☐ LONG TERM

1. DEGREE OF CONTRAST

	FEATURES: LANDWATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
ELEMENTS: Form			X		X				X			
Line	X				X				X			
Color		X			X				X			

2. Does project design meet visual resource management objectives? ☐ Yes X No (Explain on reverse side)

3. Additional mitigating measures recommended? X Yes ☐ No (Explain on reverse side)

Evaluator's Names: D GILBERT, M SCHWARTZ, R DONIGAN, J SAUNDERS, B KELLEHER, M TANAKA/SANDERS
Date: OCT 7, 2010

	Texture		X				X					X	

SECTION D. (Continued)

Comments from item 2.

Additional Mitigating Measures (See item 3)

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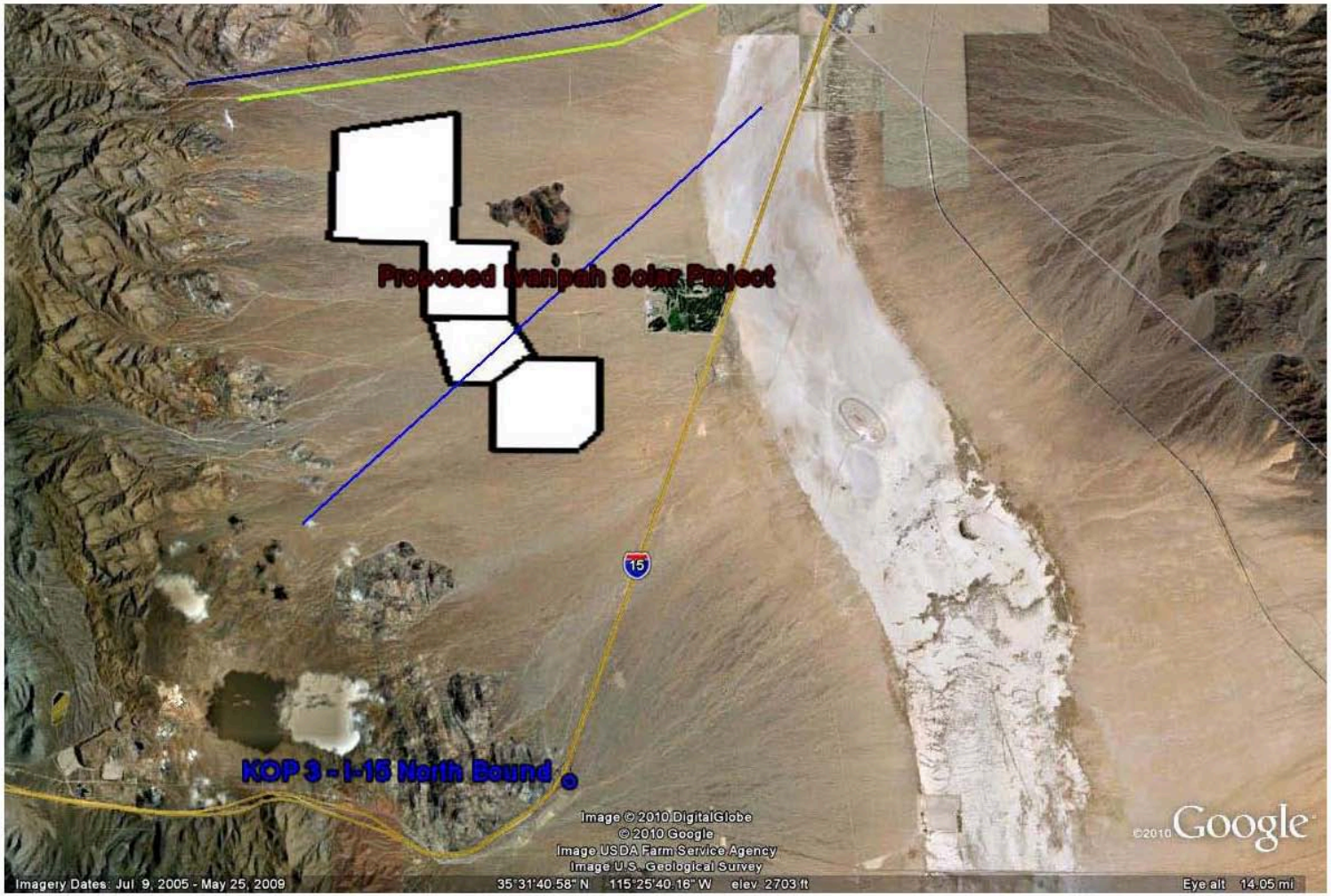
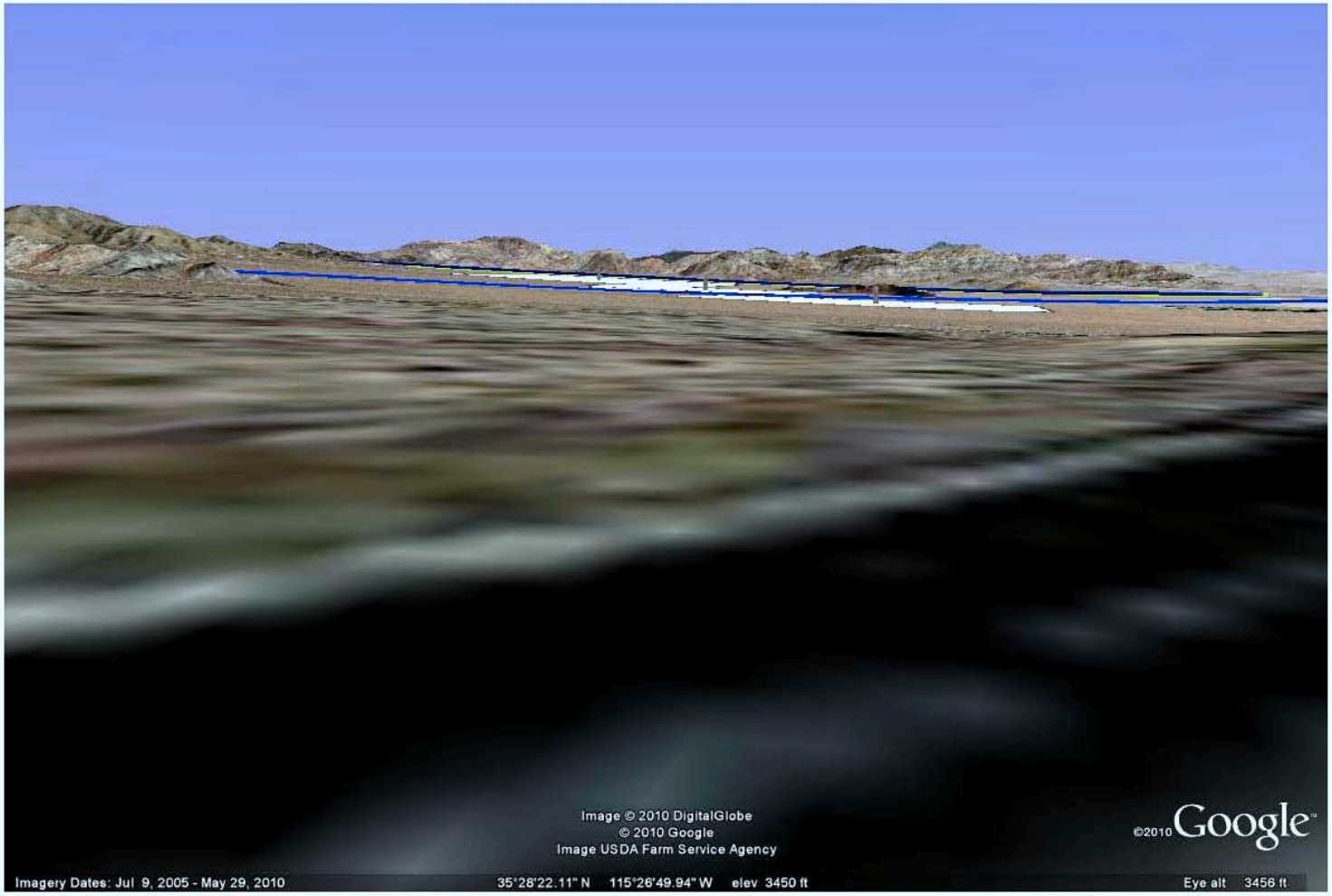
Key Observation Point No. 3



Key Observation Point No. 3–
Existing Condition

Key Observation Point No. 3–
Proposed Condition



Key Observation Point No. 3

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date OCT 7, 2010

District NEEDLES FO

Resource Area

Activity (program)
SOLAR

SECTION A. PROJECT INFORMATION

1. Project Name
IVANPAH SOLAR PROJECT

2. Key Observation Point
KOP 3-HS NORTHBOUND

3. VRM Class
III

4. Location
Township _____
Range _____
Section _____

5. Location Sketch

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	ROUNDED AND TRIANGULAR FOR OF BG MOUNTAINS; LOW ROUNDED TRIANGULAR FEATURES IN THE MG; MODERATELY UNIFORMLY SLOPING FROM VALLEY IN FOOTHILLS	NONE IN FG; LOW, NO DISTINCT FORM; REGULAR; DARK STIPPLING IN MG BG	FLAT, EVEN, REGULAR
LINE	PREDOMINANTLY HORIZONTAL LINES; BROKEN, JAGGED LINES FROM MOUNTAINS SILHOUETTE; STRONG LINE CAUSED BY I-5 & TRANSMISSION LINES; UNIFORM, DIRECTIONAL LINES FROM PIPELINE AND 2 TRACKS	NO DISTINCT LINE	DIRECTIONAL, CONTINUOUS, HORIZONTAL
COLOR	TANS AND GRAYS; PIPELINE AND ROADS LIGHTER TAN	LIGHT-MEDIUM OLIVE	INDISTINCT GRAY FROM LATTICE STRUCTURES
TEXTURE	SMOOTH BG WITH SOME COURSE FEATURES; COURSE IN BG FROM MOUNTAINS	FINE	FINE, SMOOTH

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LANDWATER	2. VEGETATION	3. STRUCTURES
FORM	NO DISTINCT LANDFORM	RECTALINEAR EDGE CREATED BY PROJECT FOOTPRINT	CYLINDRICAL TOWERS, DISTINCT SALT DOME, CIRCULAR ORIENTATION OF ARRAYS,
LINE	RADIAL LINES OF DISTURBANCE	DIAGONAL LINES CREATED BY ACCESS ROADS, BOLD LINES CREATED BY PROJECT FOOTPRINT	STRONG RADIAL LINES OF ARRAYS; LARGE VERTICAL LINES OF TOWERS
COLOR	LIGHT TANS AND GREYS OF BASE MATERIAL	EXPOSED TAN SOILS FROM ACCESS ROAD AND FOOTPRINT DEVELOPMENT	METALLIC CASING OF TOWERS; ILLUMINOUS GLARE OF SALT DOME; DARK REFLECTIONS OF ARRAYS
TEXTURE	SMOOTH BASE MATERIAL	SMOOTH (REMOVED VEGETATION)	SMOOTH

SECTION D. CONTRAST RATING X SHORT TERM ☐ LONG TERM

1. DEGREE OF CONTRAST

ELEMENTS	FEATURES: LANDWATER BODY (1) Strong	Moderate	Weak	None	VEGETATION (2) Strong	Moderate	Weak	None	STRUCTURES (3) Strong	Moderate	Weak	None
Form			X		X				X			
Line	X				X				X			
Color		X			X					X		

2. Does project design meet visual resource management objectives? ☐ Yes X No (Explain on reverse side)

3. Additional mitigating measures recommended? X Yes ☐ No (Explain on reverse side)

Evaluator's Names — Date
D GILBERT — OCT 7, 2010
M SCHWARTZ
R DONIGAN
J SAUNDERS
B KELLEHER; M TANAKA-SANDERS

	Texture				X			X					X	

SECTION D. (Continued)

Comments from item 2.

Additional Mitigating Measures (See item 3)
NONE – SEE KOP 1

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Recommendations/Mitigation

- Location
  - Discussed relocation of project with proponent
- Minimize Unnecessary Disturbance
  - Discussed reducing project size and tower size
- Mitigation
  - Coloring/Texturing of tower and concrete foundation
  - Reducing vegetation disturbance
  - Scalloping and Feathering edge of vegetation disturbance to eliminate straight edges
  - Additional vegetation along perimeter golf course (screen receiver tower but frame views of preserve)
  - Tinting of soil stabilizer (3 treatments per year)
  - Motion sensor for the required lighting per FAA
  - Proponent develops "Energy and Las Vegas" interpretive site off north bound I-15 (refer to animation 2)

Animations and Discussion

Animations and Discussion