

# Agricultural Restoration Plan

## Ferrell Solar Farm

NWC and SEC Ferrell and Kubler Roads  
Imperial County, California

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Prepared for:

**85JP 8ME, LLC**  
5455 Wilshire Boulevard, Suite 2010  
Los Angeles, CA 90036



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Prepared by:



**GS Lyon Consultants, Inc.**  
780 N. 4<sup>th</sup> Street  
El Centro, CA 92243  
(760) 337-1100

**July 2014**

July 21, 2014

Mr. Alexander Sundquist  
85JP 8ME, LLC  
5455 Wilshire Boulevard, Suite 2010  
Los Angeles, CA 90036

**Engineer's Estimate of Probable Costs  
Agricultural Restoration Plan  
Ferrell Solar Farm  
Calexico, California  
GSL Project No. GS1405**

Dear Mr. Sundquist:

GS Lyon personnel have developed an Engineer's Estimate of Probable Costs to restore the agricultural lands to "farm ready conditions" at the Ferrell Solar Farm PV Solar Facility in southern Imperial County, California. The solar farm project consists of 90MW of PV solar generation and will encompass six (6) farm fields totaling approximately 367 acres, generally located northwest and southeast of Kuber and Ferrell Roads about 5 miles west of Calexico.

The restoration plan exhibits indicate current conditions of the farm fields and a typical layout for the proposed solar power arrays. The estimate accounts for costs to restore the land to farm-ready conditions upon ceasing the power facility operation and removal of all power facility improvements. No crop planting is included in the restoration costs since customary farm practices do not include planting prior to leasing. Crop type and planting is each individual farmer's selection. Costs are provided for replacement of concrete irrigation ditches and subsurface agricultural tile drainage pipelines, deep chiseling (sub-soiling), discing, landplaning and restoration of irrigation land slopes (land-leveling).

This report also identifies Prime Farmland and Farmland of Statewide Importance as defined by the California Department of Conservation.

GS Lyon appreciates the opportunity to provide professional services in developing the restoration plan. Please contact our office with any questions or comments.

Sincerely Yours,  
**GS Lyon Consultants, Inc.**



Jeffrey O. Lyon, P.E.  
Principal Engineer



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## 1.0 Introduction

The Ferrell Solar Farm project will occupy six (6) agricultural fields that are currently in agricultural crop production. The lands generally consist of silty clay to fat clay soil that require subsurface tile drains to maintain crop yields, normally used for growing field crops such as alfalfa, bermuda grass, sudan grass and wheat. Even though there are lands identified as “Prime Farmland” by the California Department of Conservation, the cropping patterns of all of the agricultural lands within the Ferrell Solar Farm have historically been “field crops”. A complete Land Evaluation and Site Assessment (LESA) Model has been prepared for the project (see **Appendix F**).

The Ferrell Solar Farm project is expected to consist of 90MW of PV solar generation and extend a minimum of 25 years and may extend up to 40 years (see **Appendix E** – Project Description for project specifics). Without regular crop irrigation occurring during this period, there should be an insignificant increase in salts in the field (water table is not high enough to drive salts to the surface).

This restoration plan has been prepared to document the agricultural improvements of each farm field and to provide an estimate of the work (cost) required to return the land to agricultural production upon ceasing operation of the PV solar energy generating facility.

## 2.0 Restoration Methods

2.1 Irrigation Ditches - During extended periods of non-use (as has occurred recently as a result of the on-farm fallowing program), it has been found that the clay soils dry and shrink away from the concrete lining. The thin concrete lining (1.5 inches thick) is prone to cracking and breakage without support of moist soil behind the lining and the amount of ditch repairs required after extended non-use is generally extensive. It is generally more cost efficient to replace the ditch and field gates than to chase the problems created by fractured ditches.

2.2 Sub-surface Tile Drains - Tile drains that currently exist below the farm fields may be punctured by installation of PV panel frame support posts. In order to insure proper operation of the tile drainage system, a new system has been planned for each farm field that currently has sub-surface tile drains. Should the steel support posts not be driven to the tile system depth, then only the red clay or concrete tile portions of the tile system would need to be replaced. The plastic tile lines have been found to be relatively unaffected by extended fallowing periods. No new tile drains are specified at fields that currently do not have tile drainage systems.

2.3 Ground Preparation - Without agricultural tillage over the 25 to 40 year span of the PV solar energy generating facility operation, the clay soils will become compacted. In order to insure crop growth, the fields will need to be sub-soiled (plow shanks extending to 36" to 42" below ground surface), re-leveled with laser controlled drag-scrapers, manure fertilizer applied, disced (2 directions) and landplaned (or tri-planed). A minimum of six (6) soil samples have been scheduled to be collected from each field and analyzed for agronomic minerals, salts and fertilizer compounds.

### **3.0 Cost Estimating/Unit Pricing**

3.1 Irrigation Ditches - Contractors that routinely install concrete lined irrigation ditches in the Imperial Valley were contacted to develop unit pricing of a farm ditch. The overall cost of placing and compacting a 15 ft. by 2 ft. high ditch pad (native soil from the farm field), trenching for concrete lining, placement of concrete lining, installation of jack gates, installation of outlet pipes and slide gates were included into one cost per foot of concrete ditch construction.

3.2 Subsurface Tile Drains – A specialty tile drainage installation contractor in the Imperial Valley was consulted on the installation of tile drain baselines (8-inch diameter pipelines) and laterals (4-inch pipelines) to establish unit rate pricing of the tile system installations. The lengths of the laterals and baselines were taken from the existing tile drainage maps obtained from Imperial Irrigation District records.

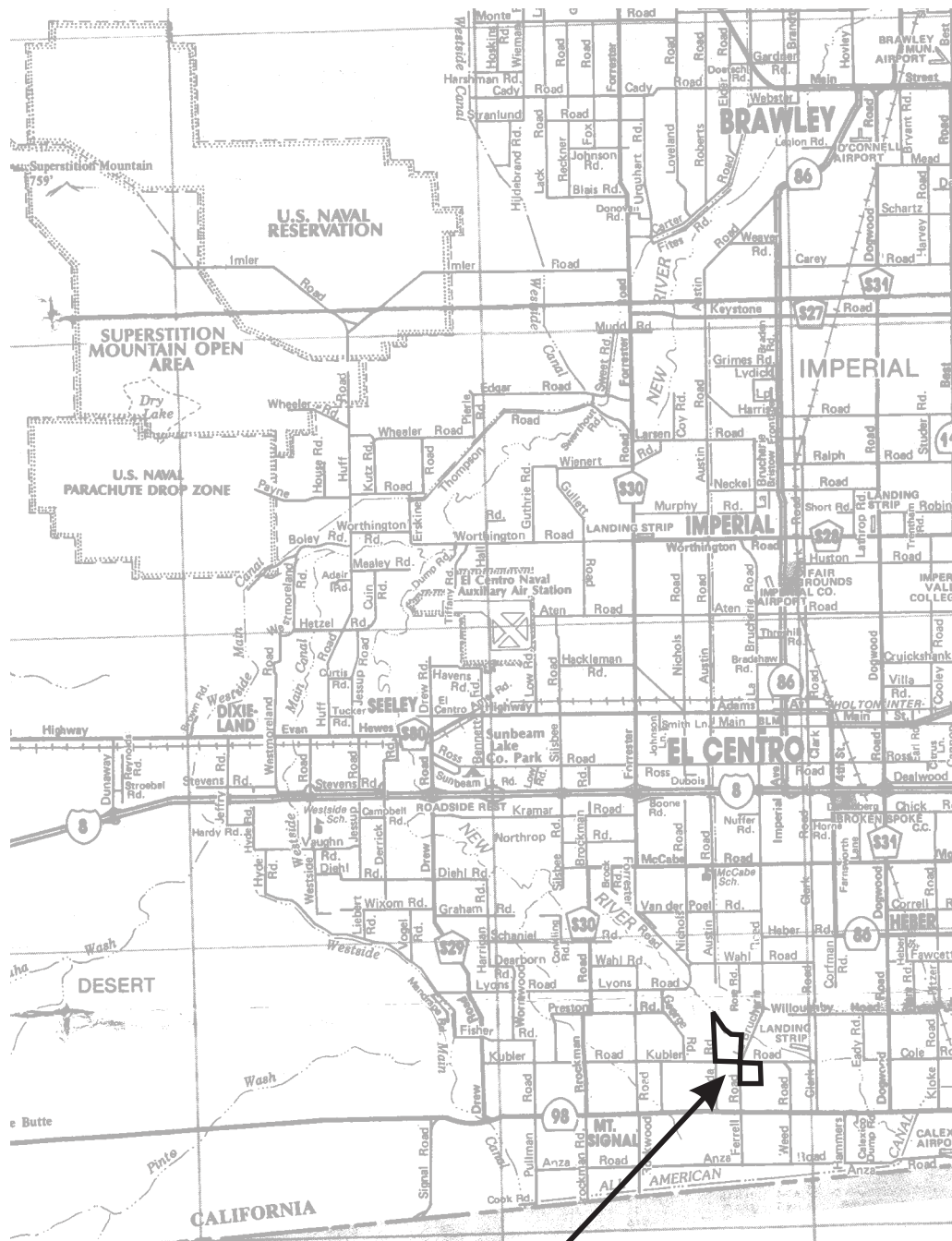
3.3 Ground Preparation - Pricing from local farm service providers was used to determine the unit rate pricing for ground preparation prior to placement of irrigation borders and planting. Standard agricultural practices were used for the work to be performed. Land-leveling costs were developed by consultation with an agricultural land-leveling specialty contractor in the Imperial Valley.

### **4.0 Prime Farmland and Farmland of State Importance**

The California Department of Conservation has classified all agricultural lands in the Imperial Valley as identified in the FARMLAND MAPPING and MONITORING PROGRAM – 2012 Imperial County Important Farmland Map. The Soil Candidate Listing for Prime Farmland and Farmland of Statewide Importance-Imperial County (Rev. 2010) appends the Farmland Map, identifying each soil type described by the US Department of Agriculture, Natural Resources Conservation Service, Soil Survey of Imperial County, Imperial Valley Area, October 1981. The areas that make up Prime Farmland are identified as the Soil Survey Soil Mapping Units described in the Soil Candidate Listing (see **Appendix D**).

## **Appendix A**

### Project Location Maps and Maps of Existing Conditions



Subject Site



Project No.: GS1405

Vicinity Map  
Ferrell Solar Farm

Plate  
A-1



1 - Craig Corda - 204 ac. (APN 052-180-042)

### Field Numbers

2 - Matthew Johnson - 163.1 ac. (APN 059-050-001)



Project No.: GS1405

Site Map  
Ferrell Solar Farm

Plate  
A-2

## **Appendix B**

### Typical Solar Farm Layout

REV. No.	REVISION	DATE



PREPARED UNDER THE DIRECT SUPERVISION OF:  
JEFFREY O. LYON, R.C.E. 31,921  
ENGINEER OF RECORD



**CSL** Lyon

Engineering & Construction Management

780 N. 4th Street  
Centre, CA 92243

(760) 370-3000  
FAX (760) 337-8900

FERRELL SOLAR FARM

LOCATION	CALEXICO, CA
SHEET TITLE	SITE PLAN
CLIENT	8MINUTENERGY RENEWABLES

SHEET NO. 3

BY: GMG  
DATE: 1/21/13  
REV.: 4/14/14  
JOB # GS



SCALE: 1"=400'

SCALE: 1"=400'

## **Appendix C**

### Restoration Cost Summary

**Ferrell Solar Farm - 90 MW (367 ac.)****Field No. 1 - 052-180-042 (Northwest Field) (55 ac)**

Subsurface Tile Drainage System - Baseline	0	LF	\$	8.00	\$	-
Subsurface Tile Drainage System - Laterals	0	LF	\$	2.50	\$	-
Irrigation Ditch/Pad and Outlets/Gates/Slide Gates	2,500	LF	\$	72.00	\$	180,000.00
Land Leveling	55.0	ac	\$	150.00	\$	8,250.00
Ground Work (Subsoil/ Stubble Disc/Landplane)	55.0	ac	\$	130.00	\$	7,150.00
Manure Application	55.0	ac	\$	75.00	\$	4,125.00
Agronomic Soil Sampling	1	LS	\$	800.00	\$	800.00
<b>Total</b>					<b>\$</b>	<b>200,325.00</b>
<b>Cost/Ac.</b>					<b>\$</b>	<b>3,642.27</b>

**Field No. 2 - 052-180-042 (Southwest Field) (31 ac)**

Subsurface Tile Drainage System - Baseline	0	LF	\$	8.00	\$	-
Subsurface Tile Drainage System - Laterals	0	LF	\$	2.50	\$	-
Irrigation Ditch/Pad and Outlets/Gates/Slide Gates	1,560	LF	\$	72.00	\$	112,320.00
Land Leveling	31.0	ac	\$	150.00	\$	4,650.00
Ground Work (Subsoil/ Stubble Disc/Landplane)	31.0	ac	\$	130.00	\$	4,030.00
Manure Application	31.0	ac	\$	75.00	\$	2,325.00
Agronomic Soil Sampling	1	LS	\$	800.00	\$	800.00
<b>Total</b>					<b>\$</b>	<b>124,125.00</b>
<b>Cost/Ac.</b>					<b>\$</b>	<b>4,004.03</b>

**Field No. 3 - 052-180-042 (Northeast Field) (50 ac)**

Subsurface Tile Drainage System - Baseline	0	LF	\$	8.00	\$	-
Subsurface Tile Drainage System - Laterals	0	LF	\$	2.50	\$	-
Irrigation Ditch/Pad and Outlets/Gates/Slide Gates	1,345	LF	\$	72.00	\$	96,840.00
Land Leveling	50.0	ac	\$	150.00	\$	7,500.00
Ground Work (Subsoil/ Stubble Disc/Landplane)	50.0	ac	\$	130.00	\$	6,500.00
Manure Application	50.0	ac	\$	75.00	\$	3,750.00
Agronomic Soil Sampling	1	LS	\$	800.00	\$	800.00
<b>Total</b>					<b>\$</b>	<b>115,390.00</b>
<b>Cost/Ac.</b>					<b>\$</b>	<b>2,307.80</b>

**Field No. 4 - 052-180-042 (Southeast Field) (68 ac)**

Subsurface Tile Drainage System - Baseline	0	LF	\$	8.00	\$	-
Subsurface Tile Drainage System - Laterals	0	LF	\$	2.50	\$	-
Irrigation Ditch/Pad and Outlets/Gates/Slide Gates	1,760	LF	\$	72.00	\$	126,720.00
Land Leveling	68.0	ac	\$	150.00	\$	10,200.00
Ground Work (Subsoil/ Stubble Disc/Landplane)	68.0	ac	\$	130.00	\$	8,840.00
Manure Application	68.0	ac	\$	75.00	\$	5,100.00
Agronomic Soil Sampling	1	LS	\$	800.00	\$	800.00
<b>Total</b>					<b>\$</b>	<b>151,660.00</b>
<b>Cost/Ac.</b>					<b>\$</b>	<b>2,230.29</b>

**Field No. 5 - 059-050-001 (North Field) (81 ac)**

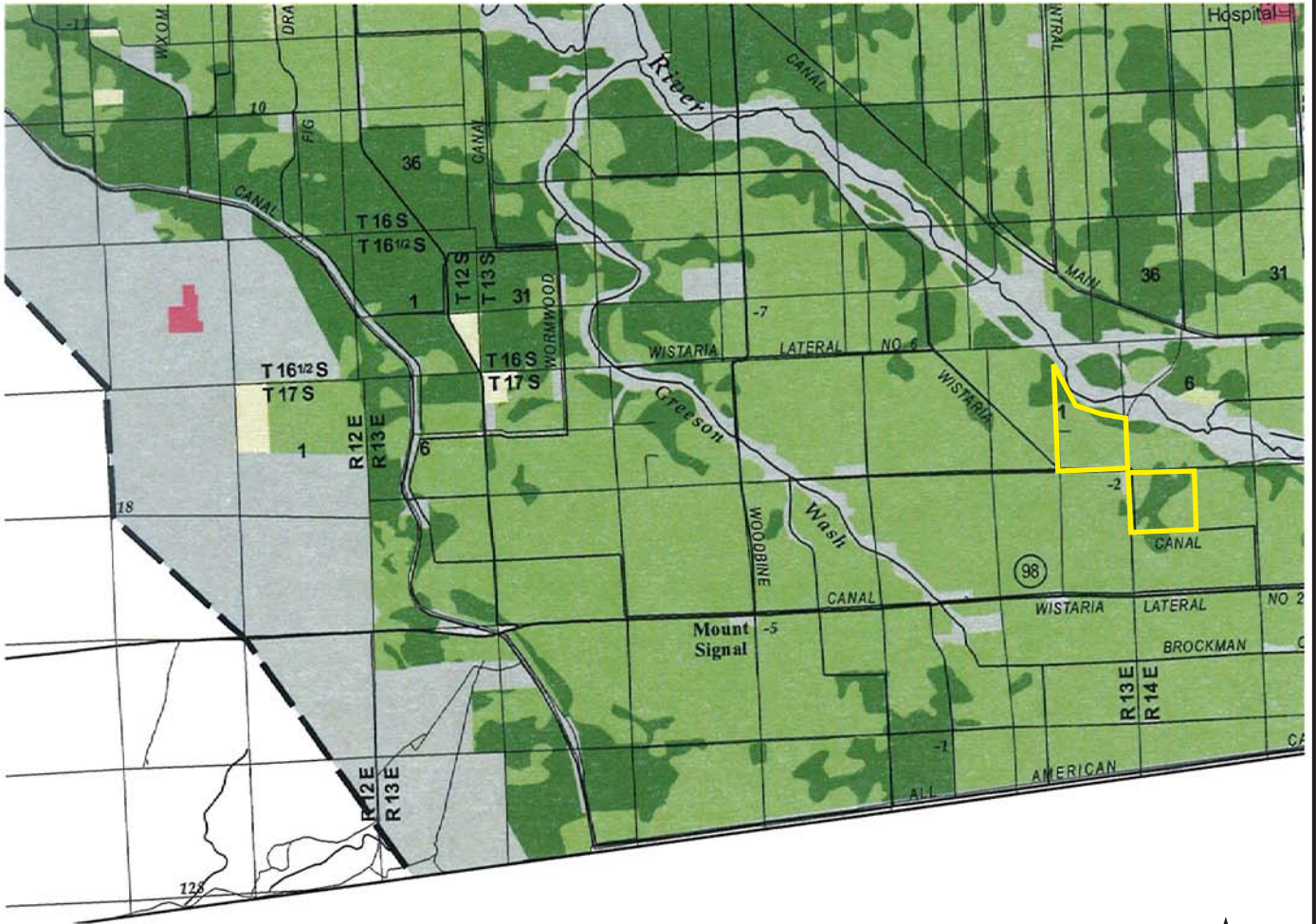
Subsurface Tile Drainage System - Baseline	1,775	LF	\$	8.00	\$	14,200.00
Subsurface Tile Drainage System - Laterals	15,625	LF	\$	2.50	\$	39,062.50
Irrigation Ditch/Pad and Outlets/Gates/Slide Gates	2,575	LF	\$	72.00	\$	185,400.00
Land Leveling	81.0	ac	\$	150.00	\$	12,150.00
Ground Work (Subsoil/ Stubble Disc/Landplane)	81.0	ac	\$	130.00	\$	10,530.00
Manure Application	81.0	ac	\$	75.00	\$	6,075.00
Agronomic Soil Sampling	1	LS	\$	800.00	\$	800.00
<b>Total</b>					<b>\$</b>	<b>268,217.50</b>
<b>Cost/Ac.</b>					<b>\$</b>	<b>3,311.33</b>

**Field No. 6 - 059-050-001 (South Field) (82 ac)**

Subsurface Tile Drainage System - Baseline	8,395	LF	\$	8.00	\$	67,160.00
Subsurface Tile Drainage System - Laterals	30,374	LF	\$	2.50	\$	75,935.00
Irrigation Ditch/Pad and Outlets/Gates/Slide Gates	2,535	LF	\$	72.00	\$	182,520.00
Land Leveling	82.0	ac	\$	150.00	\$	12,300.00
Ground Work (Subsoil/ Stubble Disc/Landplane)	82.0	ac	\$	130.00	\$	10,660.00
Manure Application	82.0	ac	\$	75.00	\$	6,150.00
Agronomic Soil Sampling	1	LS	\$	800.00	\$	800.00
<b>Total</b>					<b>\$</b>	<b>355,525.00</b>
<b>Cost/Ac.</b>					<b>\$</b>	<b>4,335.67</b>
<b>TOTAL</b>					<b>\$</b>	<b>1,215,242.50</b>

## **Appendix D**

### Prime Farmland and Farmland of Statewide Importance



\*Legend on following page



**GS Lyon**

Project No.: GS1405

Ferrell Solar Farm  
Imperial County Important Farmland 2010

Plate  
D-1



### PRIME FARMLAND - 195,589 acres

PRIME FARMLAND HAS THE BEST COMBINATION OF PHYSICAL AND CHEMICAL FEATURES ABLE TO SUSTAIN LONG-TERM AGRICULTURAL PRODUCTION. THIS LAND HAS THE SOIL QUALITY, GROWING SEASON, AND MOISTURE SUPPLY NEEDED TO PRODUCE SUSTAINED HIGH YIELDS. LAND MUST HAVE BEEN USED FOR IRRIGATED AGRICULTURAL PRODUCTION AT SOME TIME DURING THE FOUR YEARS PRIOR TO THE MAPPING DATE.



### FARMLAND OF STATEWIDE IMPORTANCE - 311,048 acres

FARMLAND OF STATEWIDE IMPORTANCE IS SIMILAR TO PRIME FARMLAND BUT WITH MINOR SHORTCOMINGS, SUCH AS GREATER SLOPES OR LESS ABILITY TO STORE SOIL MOISTURE. LAND MUST HAVE BEEN USED FOR IRRIGATED AGRICULTURAL PRODUCTION AT SOME TIME DURING THE FOUR YEARS PRIOR TO THE MAPPING DATE.



### UNIQUE FARMLAND - 2,196 acres

UNIQUE FARMLAND CONSISTS OF LESSER QUALITY SOILS USED FOR THE PRODUCTION OF THE STATE'S LEADING AGRICULTURAL CROPS. THIS LAND IS USUALLY IRRIGATED, BUT MAY INCLUDE NONIRRIGATED ORCHARDS OR VINEYARDS AS FOUND IN SOME CLIMATIC ZONES IN CALIFORNIA. LAND MUST HAVE BEEN CROPPED AT SOME TIME DURING THE FOUR YEARS PRIOR TO THE MAPPING DATE.



### FARMLAND OF LOCAL IMPORTANCE - 32,109 acres

UNIRRIGATED AND UNCULTIVATED LANDS WITH PRIME AND STATEWIDE SOILS.



### URBAN AND BUILT-UP LAND - 27,709 acres

URBAN AND BUILT-UP LAND IS OCCUPIED BY STRUCTURES WITH A BUILDING DENSITY OF AT LEAST 1 UNIT TO 1.5 ACRES, OR APPROXIMATELY 6 STRUCTURES TO A 10-ACRE PARCEL. COMMON EXAMPLES INCLUDE RESIDENTIAL, INDUSTRIAL, COMMERCIAL, INSTITUTIONAL FACILITIES, CEMETERIES, AIRPORTS, GOLF COURSES, SANITARY LANDFILLS, SEWAGE TREATMENT, AND WATER CONTROL STRUCTURES.



### OTHER LAND - 458,829 acres

OTHER LAND IS LAND NOT INCLUDED IN ANY OTHER MAPPING CATEGORY. COMMON EXAMPLES INCLUDE LOW DENSITY RURAL DEVELOPMENTS, BRUSH, TIMBER, WETLAND, AND RIPARIAN AREAS NOT SUITABLE FOR LIVESTOCK GRAZING, CONFINED LIVESTOCK, POULTRY, OR AQUACULTURE FACILITIES, STRIP MINES, BORROW PITS, AND WATER BODIES SMALLER THAN 40 ACRES. VACANT AND NONAGRICULTURAL LAND SURROUNDED ON ALL SIDES BY URBAN DEVELOPMENT AND GREATER THAN 40 ACRES IS MAPPED AS OTHER LAND.



### WATER - 1,029 acres

PERENNIAL WATER BODIES WITH AN EXTENT OF AT LEAST 40 ACRES.

**(All acreages are totals for Imperial County)**



Project No.: GS1405

Ferrell Solar Farm  
I.C. Important Farmland 2010 Legend

Plate  
D-2



- 109 - Holtville (Prime Farmland)**    **122 - Meloland (Prime Farmland)**  
**110 - Holtville (Prime Farmland)**  
**114 - Imperial (Statewide Importance Farmland)**  
**115 - Imperial/Glenbar (Statewide Importance Farmland)**  
**115 - Imperial/Glenbar (Statewide Importance Farmland)**  
**119 - Indio/Vent (Prime Farmland)**



**GS Lyon**

Project No.: GS1405

Soil Survey Map  
Ferrell Solar Farm

Plate  
D-3

California Department of Conservation  
FARMLAND MAPPING AND MONITORING PROGRAM

**SOIL CANDIDATE LISTING**

for

**PRIME FARMLAND AND FARMLAND OF STATEWIDE IMPORTANCE**

**IMPERIAL COUNTY**

U.S. Department of Agriculture, Natural Resources Conservation Service, soil surveys for Imperial County include:

Soil Survey of Imperial County, California, Imperial Valley Area,  
October 1981

Soil Survey of Yuma-Wellton Area: Parts of Yuma County, Arizona, and  
Imperial County, California, December 1980

Soil Survey of Palo Verde Area, California, September 1974

Beginning in 2002, SSURGO digital soil information has been incorporated into the Imperial County Important Farmland Map. Prior versions of the map have not been modified.

The SSURGO data includes Imperial County, Imperial Valley Area (published 3/22/2004), Yuma-Wellton Area (published 08/11/2004) and Palo Verde Area (published 4/20/2004). The digital surveys contain additional soil units beyond those published in the original paper surveys. Soils on the Prime and Statewide lists that only occur in the SSURGO data are appended to this list in italics.

For more information on the NRCS SSURGO data, please see:  
<http://soils.usda.gov/survey/geography/ssurgo/>

7/12/95, updated 06/02/2010

**IMPERIAL COUNTY  
PRIME FARMLAND SOILS**

U.S. DEPARTMENT OF AGRICULTURE  
NATURAL RESOURCES CONSERVATION SERVICE  
DAVIS, CALIFORNIA 95616

THESE SOIL MAPPING UNITS MEET THE CRITERIA FOR PRIME FARMLAND AS OUTLINED IN THE U.S. DEPARTMENT OF AGRICULTURE'S LAND INVENTORY AND MONITORING (LIM) PROJECT FOR THE IMPERIAL VALLEY AREA, YUMA-WELLTON AREA (WINTERHAVEN), AND PALO VERDE AREA SOIL SURVEYS.

IMPERIAL VALLEY AREA

<u>Symbol</u>	<u>Name</u>
100	Antho loamy fine sand
101*	Antho-Superstition complex
105	Glenbar clay loam
106 <sup>#</sup>	Glenbar clay loam, wet
108	Holtville loam
109	Holtville silty clay
110 <sup>#</sup>	Holtville silty clay, wet
117	Indio loam
118 <sup>#</sup>	Indio loam, wet
119	Indio-Vint complex
120	Laveen loam
122 <sup>#</sup>	Meloland very fine sandy loam, wet
123 <sup>#</sup>	Meloland and Holtville loams, wet
137	Rositas silt loam, 0 to 2 percent slopes
139*	Superstition loamy fine sand
142 <sup>#</sup>	Vint loamy very fine sand, wet

IMPERIAL VALLEY AREA Continued

<u>Symbol</u>	<u>Name</u>
143	Vint fine sandy loam
144 <sup>#</sup>	Vint and Indio very fine sandy loams, wet

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\* Prime Farmland is managed so that in all horizons within a depth of 40 inches (1 meter), during part of each year the conductivity of the saturation extract is less than 4 mmhos/cm and the exchangeable sodium percentage (ESP) is less than 15.

<sup>#</sup> Prime Farmland if drained

Note: Soils 107 (Glenbar complex), 132 (Rositas fine sand, 0 to 2 percent slopes), 133 (Rositas fine sand, 2 to 5 percent slopes), 135 (Rositas fine sand, wet, 0 to 2 percent slopes), 136 (Rositas loamy fine sand, 0 to 2 percent slopes) and 138 (Rositas and Superstition loamy fine sands) have been moved from the Prime Farmland list to the Farmland of Statewide Importance list per NRCS in 1995.

YUMA-WELLTON AREA (Imperial County portion)

<u>Symbol</u>	<u>Name</u>
8 <sup>#</sup>	Gadsden clay
10 <sup>#</sup>	Glenbar silty clay loam
12 <sup>#</sup>	Holtville clay
13 <sup>#</sup>	Indio silt loam
17	Kofa clay
24	Ripley silt loam

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<sup>#</sup> Prime Farmland if reclaimed of excess salts and sodium.

Notes: *Soil 8* (Gadsden clay) was moved from the Farmland of Statewide Importance list to the Prime Farmland list per AZ NRCS letter of September 27, 2004.

*Soil 19* (Lagunita silt loam) was removed from the Prime Farmland list per AZ NRCS letter of September 27, 2004.

PALO VERDE AREA

<u>Symbol</u>	<u>Name</u>
Ac	Aco gravelly loamy sand
Af	Aco sandy loam
Gb	Gilman fine sandy loam
Gc	Gilman silty clay loam
Ge	Glenbar silty clay loam
Hb <sup>*</sup>	Holtville fine sandy loam
Hc <sup>*</sup>	Holtville silty clay
Id <sup>*</sup>	Indio very fine sandy loam
Ie <sup>*</sup>	Indio silty clay loam
Oc <sup>*</sup>	Orita fine sand
Og <sup>*</sup>	Orita gravelly loamy sand
Or <sup>*</sup>	Orita gravelly fine sandy loam
Rb <sup>*</sup>	Ripley very fine sandy loam
Rc <sup>*</sup>	Ripley silty clay loam
RoA	Rositas fine sand, 0 to 2 percent slopes
RoB	Rositas fine sand, 2 to 9 percent slopes
RtA	Rositas silty clay loam, 0 to 2 percent slopes
<i>g<sup>#</sup></i>	<i>Gadsden clay</i>

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PALO VERDE AREA Continued

<u>Symbol</u>	<u>Name</u>
9A <sup>#</sup>	<i>Gadsden loam</i>
36 <sup>#</sup>	<i>Indio silt loam</i>

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\* Prime Farmland if reclaimed of excess salts and sodium.

# Prime Farmland if either protected from flooding or not frequently flooded during the growing season.

**IMPERIAL COUNTY  
FARMLAND OF STATEWIDE  
IMPORTANCE SOILS**

U.S. DEPARTMENT OF AGRICULTURE  
NATURAL RESOURCES CONSERVATION SERVICE  
DAVIS, CALIFORNIA 95616

THESE SOIL MAPPING UNITS MEET THE CRITERIA FOR FARMLAND OF STATEWIDE IMPORTANCE AS OUTLINED IN THE U.S. DEPARTMENT OF AGRICULTURE'S LAND INVENTORY AND MONITORING (LIM) PROJECT FOR THE IMPERIAL VALLEY AREA, YUMA-WELLTON AREA (WINTERHAVEN), AND PALO VERDE AREA SOIL SURVEYS.

IMPERIAL VALLEY AREA

<u>Symbol</u>	<u>Name</u>
107	Glenbar complex
111	Holtville-Imperial silty clay loams
112	Imperial silty clay
113	Imperial silty clay, saline
114	Imperial silty clay, wet
115	Imperial-Glenbar silty clay loams, wet, 0 to 2 percent slopes
116	Imperial-Glenbar silty clay loams, 2 to 5 percent slopes
121	Meloland fine sand
124	Niland gravelly sand
125	Niland gravelly sand, wet
126	Niland fine sand
127	Niland loamy fine sand
128	Niland-Imperial complex, wet
130	Rositas sand, 0 to 2 percent slopes

IMPERIAL VALLEY AREA Continued

<u>Symbol</u>	<u>Name</u>
131	Rositas sand, 2 to 5 percent slopes
132	Rositas fine sand, 0 to 2 percent slopes
133	Rositas fine sand, 2 to 9 percent slopes
135	Rositas fine sand, wet, 0 to 2 percent slopes
136	Rositas loamy fine sand, 0 to 2 percent slopes
138	Rositas-Superstition loamy fine sands

YUMA-WELLTON AREA (Imperial County Portion)

<u>Symbol</u>	<u>Name</u>
14*	Indio silt loam, saline
16*	Indio-Lagunita-Ripley complex
18*	Lagunita loamy sand
<u>25*</u>	<u>Rositas sand</u>

\* Due to insufficient documentation of qualifying criteria, these units were dropped from the Farmland of Statewide Importance list per the Arizona office of NRCS (September 27, 2004).

Note: *Soil 8* (Gadsden Clay) was moved to the Prime Farmland list from the Farmland of Statewide Importance list per AZ NRCS letter of September 27, 2004.

PALO VERDE AREA

<u>Symbol</u>	<u>Name</u>
Co	Cibola fine sandy loam
Cs	Cibola silty clay loam
Ib	Imperial fine sandy loam
Ic	Imperial silty clay
Md	Meloland fine sandy loam
Me	Meloland silty clay loam
RsA	Rositas gravelly loamy sand, 0 to 2 percent slopes

## **Appendix E**

### Project Description

# Iris Cluster

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## Project Description

**85JP 8ME, LLC  
5455 Wilshire Boulevard  
Suite 2010  
Los Angeles, CA 90036  
(323) 595-0900**

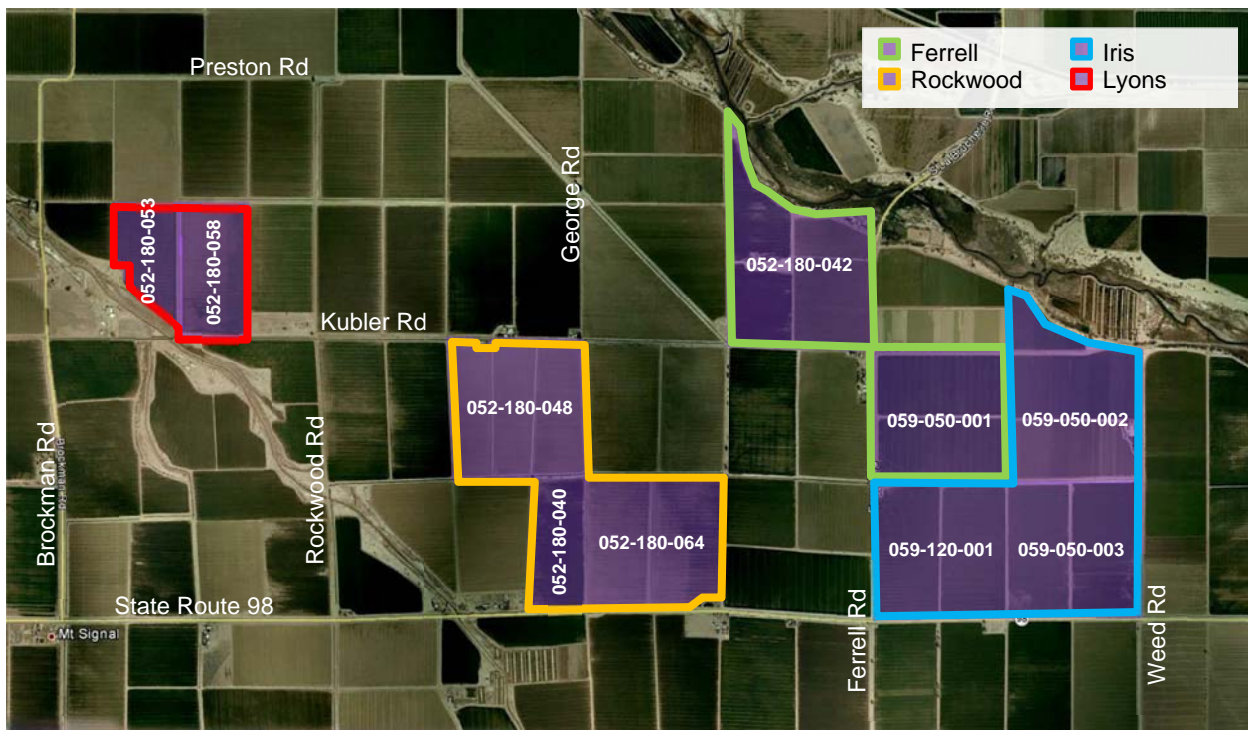
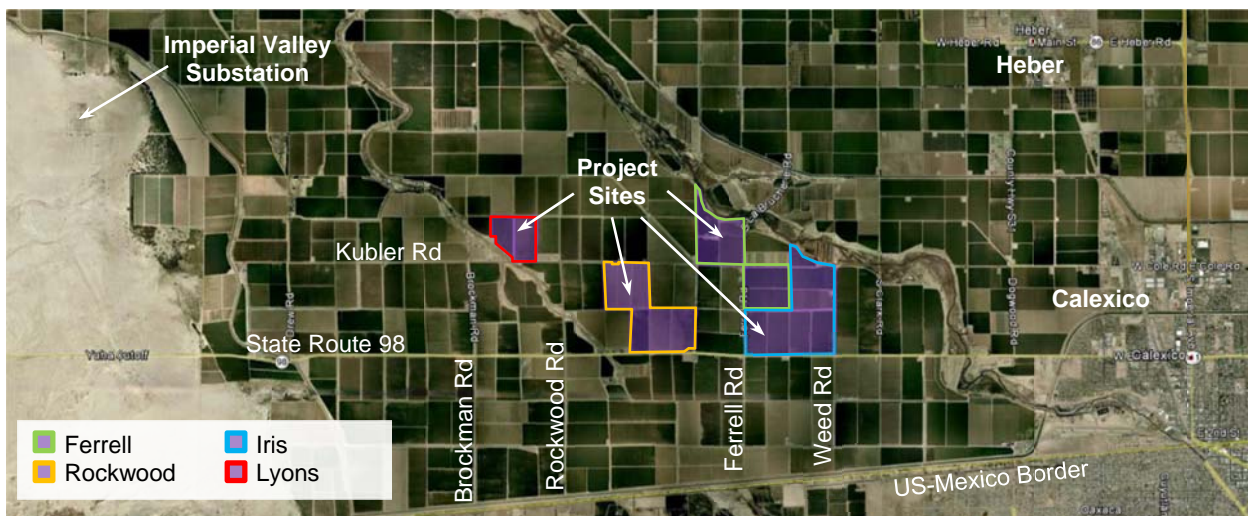
**With Technical Assistance By:  
GS Lyon Consultants, Inc.  
780 North 4th Street  
El Centro, CA 92243  
(760) 337-1100**

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## PROJECT INFORMATION

85JP 8ME, LLC, known herein as the “Applicant”, is seeking approval of four Conditional Use Permits (“CUP”) for the construction of four utility scale solar farms in Imperial County, California collectively known as the Iris Cluster (the “Cluster” or the “Projects”). The four projects (each a “Project”) are as follows: Ferrell Solar Farm (“Ferrell”), Rockwood Solar Farm (“Rockwood”), Iris Solar Farm (“Iris”), and Lyons Solar Farm (“Lyons”). Projects may cooperate if necessary to meet power production requirements. Each Project is intended to have O&M facilities and an on-site substation, but may also utilize shared facilities.



## Site Information

The Cluster comprises ten separate assessor's parcels (collectively, the "Site" or "Cluster Site") totaling ±1,422 gross acres. The Cluster Site has historically been used for agriculture. The topography of the Site is relatively flat.

Project	APN	Owner	Zoning	Gross AC
Ferrell	052-180-042	Craig Corda	A2R	204.0
Ferrell	059-050-001	Matthew Johnson	A2R	163.1
<b>Ferrell Subtotal</b>				<b>367.0</b>
Rockwood	052-180-040	Land/Calexico, LLC	A2/A2R	67.9
Rockwood	052-180-048	Land/Calexico, LLC	A2R	170.7
Rockwood	052-180-064	Land/Calexico, LLC	A2/A2R	157.7
<b>Rockwood Subtotal</b>				<b>396.2</b>
Iris	059-050-002	KM Ranches LLC	A2R	188.1
Iris	059-050-003	Leslie Johnson	A2/A2R	165.5
Iris	059-120-001	Leslie Johnson	A2R	167.2
<b>Iris Subtotal</b>				<b>520.8</b>
Lyons	052-180-053	Curtis John & Julie Ann Corda	A3	57.2
Lyons	052-180-058	Kay Brockman Bishop	A2R	81.2
<b>Lyons Subtotal</b>				<b>138.4</b>
<b>Iris Cluster Total</b>				<b>1,422.4</b>

## Location

The Cluster Site is located approximately 2 miles west of the City of Calexico, California in southern Imperial County. The Cluster is adjacent to the Mount Signal Solar Farm I project currently under construction. The Cluster Site is generally located between State Route 98 to the south, Kubler Road and Preston Road to the north, Weed Road to the east, and Brockman Road to the west. Agricultural uses lie to the north and east, and solar farms are under construction to the west and to the south.

## DESCRIPTION OF PROPOSED PROJECT

The Applicant proposes to develop four photovoltaic energy facilities on the Cluster Site. The Projects are planned to generate the following electrical output during peak daylight hours:

- Ferrell: up to 90 MW AC
- Rockwood: up to 100 MW AC
- Iris: up to 130 MW AC
- Lyons: up to 40 MW AC

The Cluster's interconnection will occur at the 230 kV side of the San Diego Gas & Electric ("SDG&E") Imperial Valley ("IV") Substation, located approximately 5 miles northwest of the Project Site. The Applicant intends to interconnect via 230 kV transmission facilities shared with other solar projects in the vicinity. The Projects intend to transfer electrical power from each of four on-site substations (one each on Ferrell, Rockwood, Iris, and Lyons land) to IV Substation via an off-site shared substation currently under construction by Mount Signal Solar Farm I. Power will be delivered from the Projects to this off-site shared substation via one or more collector lines (up to 230 kV).

Each Project may share operations and maintenance ("O&M"), substation, and/or transmission facilities as necessary with one or more of the other Projects, or with another nearby project. Any "unused" O&M, substation, and/or transmission facility areas on-site would be covered by solar panels under such a scenario.

The Applicant has considered the following in its selection of the Site:

- Land availability (approximately 1,422 acres);
- Zoning – A2 (General Agriculture), A-2R (General Agriculture Rural Zone), and A-3 (Heavy Agriculture)
- Minimal environmental consequences (the Projects will be located on previously disturbed land currently used for agriculture);
- Water availability (no water wells required);
- Primarily (almost 90%) non-Prime Farmland (Farmland of Statewide Importance); and
- Option to lease or purchase.

Up to twenty-four (24) full-time employees will operate the Cluster, split roughly evenly between the four Projects. Typically, up to half of the staff will work during the day shift and the remainder during the night shifts and weekend. As noted earlier, it is possible that two or more Projects

would share O&M, substation, and/or transmission facilities. In such a scenario, the cooperating Projects c/would share personnel, thereby reducing the total staff required. It is also possible that one or more Projects would share another nearby project's facilities (e.g., those of Mount Signal Solar Farm I). In that scenario, the Project(s) c/would also share personnel with that nearby project, thereby reducing or eliminating the Project's on-site staff.

Any Imperial Irrigation District ("IID") irrigation canals and drains will remain in place, including any maintenance access roads as per existing IID easements. After the useful life of each Project, the panels will be disassembled from the mounting frames and the land restored to its pre-development condition.

### **PV Module Configuration**

The Projects will utilize photovoltaic panels or modules<sup>1</sup> on mounting frameworks to convert sunlight directly into electricity. Individual panels will be installed on either fixed-tilt or tracker mount systems (single- or dual-axis, using galvanized steel or aluminum). If the panels are configured for fixed tilt, the panels will be oriented toward the south. For tracking configurations, the panels will rotate to follow the sun over the course of the day. The panels will stand up to 30 feet high, depending on mounting system used.



**Typical fixed-tilt solar panel rows**

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<sup>1</sup> Including but not limited to concentrated photovoltaic ("CPV") technology



**Typical single-axis tracking solar panels**



**Typical dual-axis tracking solar panels**

The solar array fields will be arranged in groups called “blocks,” with inverter stations generally located centrally within the blocks. Blocks will produce direct electrical current (DC), which is converted to alternating electrical current (AC) at the inverter stations. The blocks are up to 500' x 500' (typ).



**Typical fixed-tilt mounting structure**



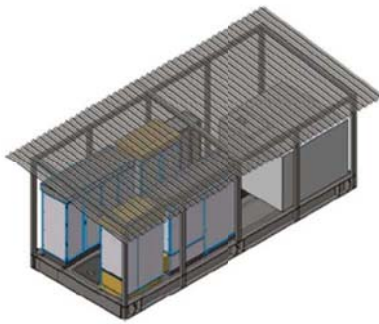
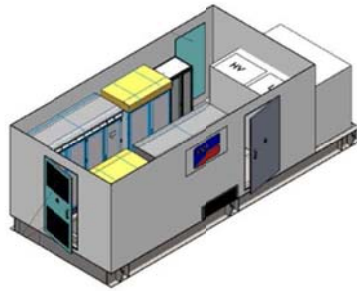
**Typical dual-axis mounting structure**

Each PV module will be placed on a fixed-tilt or tracker mounting structure. The foundations for the mounting structures can extend up to 20 feet below ground, depending on the structure, soil conditions, and wind loads, and may be encased in concrete or utilize small concrete footings. Final solar panel layout and spacing will be optimized for Site characteristics and the desired energy production profile. Panel rows will be spaced up to 90 feet apart and will comply with fire department regulations regarding minimum row spacing.

## **Inverter Stations**

Photovoltaic energy is delivered via cable to inverter stations, generally located near the center of each block. Inverter stations are typically comprised of one or more inverter modules with a rated power of up to 2 MW each, a unit transformer, and voltage switch gear. The unit transformer and voltage switch gear are housed in steel enclosures, while the inverter

module(s) are housed in cabinets. Depending on the vendor selected, the inverter station may lie within an enclosed or canopied metal structure, typically on a skid or concrete mounted pad.



**Typical Inverter Stations**

## Energy Storage System

An energy storage system in the form of modular and scalable battery packs and battery control systems may be located at or near substations and/or inverter stations. The battery packs utilize non-hazardous solid state materials (i.e. lithium ion or other commercially available large-scale system) and are fully recyclable. The energy storage devices are typically housed in pad- or post-mounted metal containers. It is estimated that the energy storage system would utilize approximately one container per MW (typically approximately 40'L x 11'W x 11'H each) for each Project. The actual dimensions of the container may vary depending upon the supplier chosen, with the length measuring up to approximately 60 feet.



**Typical Energy Storage Unit**

## Substations and Transmission Facilities

For each Project, output from the inverter stations will be transferred via electrical conduits and electrical conductor wires to an on-site switchyard or substation (collectively referred to as a substation from here on). The substation may contain several components, including auxiliary power transformers, distribution cabinets, revenue metering systems, and voltage switch gear. Each substation will occupy an area of up to approximately 500' x 500', secured separately by an additional chain-link fence, and located along the perimeter of the project (see conceptual site layouts in appendix for examples of such substation locations). Final location will be determined before issuance of building permits.

Substations typically include a small control building (roughly 500 square feet) standing approximately 10 feet tall. The building is either prefabricated concrete or steel housing with rooms for the voltage switch gear and the metering equipment, a room for the station supply transformer, and a separate control technology room in which the main computer, the intrusion

detection system, and the main distribution equipment are housed. Components of this building (e.g., control technology room and intrusion detection system) may alternatively be located at a potential O&M building described later in this document.

From the substations, power will be transmitted to the IV Substation via shared 230 kV transmission facilities currently under construction. As noted earlier, power from the Projects may be collected at one or more shared on-site substations and/or may be transmitted to a shared substation located off-site at a nearby solar project such as Mount Signal Solar Farm I via an up to 230 kV overhead or underground line(s).



**Typical Substation Design**

## **Water Usage**

Water demand for panel washing and O&M domestic use is expected to be less than 20 acre-feet per year (approximately 0.4% of current agricultural water demand) total for the Cluster as a whole, split roughly evenly between the four Projects. Water used for panel washing will be sourced from existing IID canals adjacent to the Site. A small water treatment system may be installed for each Project to provide deionized water for panel washing.

The Applicant may irrigate and maintain a cover crop (saltgrass or similar) on previously disturbed portions of the Site for dust control and/or biological mitigation purposes, on parts of or all of each Project. In that scenario, up to an additional 500 acre-feet per year of water would be needed (approximately 10% of current agricultural water demand), split between the Projects roughly in proportion to their respective acreages. Alternatively or in addition, a soil stabilizer may be used.

## **Water Storage Tank(s)**

Above-ground water storage tank(s) with total capacity of up to approximately 80,000 gallons may be placed on-site near the O&M buildings. The storage tank(s) near the O&M buildings will have the appropriate fire department connections in order to be used for fire suppression purposes. 10,000 gallons of water at each O&M site will be exclusively dedicated for O&M firefighting purposes, i.e., to protect the O&M building only.

## **Operations and Maintenance Building**

Each Project is intended to feature an O&M building of up to 50'x 100' in size, with associated on-site parking. The O&M building will be steel framed, with metal siding and roof panels, painted to match the surrounding setting. The O&M building will be located along the perimeter of each project site (see the conceptual site layouts in the appendix for examples of such O&M building locations), and the final location will be determined before issuance of building permits. The O&M building may include:

1. Office
2. Repair building/parts storage
3. Control room
4. Restroom
5. Septic tank and leach field

The parking lot and access driveway to each O&M building will be paved. Roads, driveways and parking lot entrances will be constructed in accordance with appropriate Imperial County improvement standards. Parking spaces and walkways will be constructed in conformance with all California Accessibility Regulations.

As noted earlier, each Project may share O&M facilities and staff with one or more of the other Projects, or with another nearby project. Any "unused" O&M areas on-site would be covered by solar panels under such a scenario.

## **Site Security and Fencing**

The Projects will be enclosed with a chain link fence with barbed wire measuring up to eight (8) feet in height (from finished grade). An intrusion alarm system comprised of sensor cables integrated into the perimeter fence, intrusion detection cabinets placed approximately every 1,500 feet along the perimeter fence, and an intrusions control unit, located either in the substation control room or at the O&M Building, or similar technology, will be installed.

Additionally, the Projects may include additional security measures including, but not limited to, barbed wire, low voltage fencing with warning reflective signage, controlled access points, security alarms, security camera systems, and security guard vehicle patrols to deter trespassing and/or unauthorized activities that could interfere with operation of the Projects.

Controlled access gates will be maintained at the main entrance to each Project. Project access will be provided to off-site emergency response teams that respond in the event of an “after-hours” emergency. Enclosure gates will be manually operated with a key provided in an identified key box location.

### **Site Lighting**

All Site lighting will be directed away from any public right-of-ways. Lighting used on-site will be minimal. Typical lighting which may be used may include motion sensor Site lighting for security purposes. Lighting used on-site will be of the lowest intensity foot candle level which when taken after dark will be measured at the property line.

### **ANNUAL PRODUCTION**

The Projects will generate electricity during daylight hours. Peak electricity demand in California corresponds with air conditioning use on summer afternoons when ambient temperatures are high. Peak generating capacity corresponds to this time-period when the peak solar energy, solar insolation value, is highest. There is no generating capacity between sunset and sunrise due to the lack of solar energy, though power may be released from the energy storage system.

The Projects will have the following nominal output capacities:

- Ferrell: up to 90 MW AC
- Rockwood: up to 100 MW AC
- Iris: up to 130 MW AC
- Lyons: up to 40 MW AC

The initial energy production for the Cluster as a whole will be up to approximately 860,000 MWh per year, sufficient to power over 120,000 homes and displacing 490,000 tons of carbon dioxide equivalent (CO<sub>2</sub>e) per year when compared to a gas-fired power plant or 970,000 tons when compared to a coal-fired power plant.

## CONSTRUCTION ACTIVITIES

The construction period for the Cluster, from site preparation through construction, testing, and commercial operation, is expected to commence as early as Q2 2014 and will extend for approximately 12 months.

Construction of the Projects will include the following activities:

- Site preparation
- Grading and earthwork
- Concrete foundations
- Structural steel work
- Electrical/instrumentation work
- Gen-tie installation
- Architecture and landscaping work

No roadways will be affected by the Projects, except during the construction period. Construction traffic will access the Site via State Route 98, Ferrell Road, Weed Road, Brockman Road, and Kubler Road, to varying degrees. It is estimated that up to 400 workers per day (during peak construction periods) will be required during the construction period.

Heavy construction is expected to occur between 6:00 am and 5:00 pm, Monday through Friday. Additional hours may be necessary to make up schedule deficiencies or to complete critical construction activities. Some activities may continue 24 hours per day, seven days per week. Low level noise activities may potentially occur between the hours of 10:00 pm and 7:00 am. Nighttime activities could potentially include, but are not limited to, refueling equipment, staging material for the following day's construction activities, quality assurance/control, and commissioning.

Materials and supplies will be delivered to the Site by truck. Truck deliveries will normally occur during daylight hours. However, there will be offloading and/or transporting to the Site on weekends and during evening hours.

Earthmoving activities are expected to be limited to the construction of the access roads, any O&M buildings, any substations, and any storm water protection or storage (detention) facilities. Final grading may include revegetation with low lying grass or applying earth-binding materials to disturbed areas.

## **WORK FORCE**

Once the Projects are constructed, maintenance needs are generally limited to:

1. Cleaning of PV panels
2. Monitoring electricity generation
3. Providing Site security
4. Facility maintenance - replacing or repairing inverters, wiring and PV modules

It is expected that the Cluster as a whole will require an operational staff of up to twenty-four (24) full-time employees, split roughly evenly between the four Projects. As noted earlier, it is possible that two or more Projects would share O&M, substation, and/or transmission facilities. In that scenario, the cooperating Projects c/would share personnel, thereby reducing the staff required. It is also possible that one or more Projects would share another nearby project's facilities (e.g., those of Mount Signal Solar Farm I). In that scenario, the Projects(s) c/would also share personnel with that project, thereby reducing or eliminating the on-site staff required.

The Projects will operate seven days a week, 24 hours a day, generating electricity during normal daylight hours when the solar energy is available. Maintenance activities may occur seven days a week, 24 hours a day to ensure PV panel output when solar energy is available.

## **PROJECT FEATURES AND BEST MANAGEMENT PRACTICES**

The following sections describe standard Project features and best management practices that will be applied during construction and long-term operation of the Projects in an effort to maintain safety and avoid environmental impact.

### **Waste and Hazardous Materials Management**

The Projects will have minimal levels of materials on-site that have been defined as hazardous under 40CFR, Part 261. The following materials are expected to be used during the construction, operation, and long term maintenance of the Projects:

- Insulating oil – used for electrical equipment
- Lubricating oil – used for maintenance vehicles
- Various solvents/detergents – equipment cleaning
- Gasoline – used for maintenance vehicles

Wastes will be managed in accordance with applicable regulations. Waste management for the approved Projects will include the following:

- All hazardous wastes will be maintained at quantities below the threshold requiring a Hazardous Material Management Program ("HMMP") (one 55 gallon drum per Project).
- All waste drums will be stored in accordance with good practice and applicable regulations, and will be protected from environmental conditions, including rain, wind, and direct heat and physical hazards such as vehicle traffic and sources of heat and impact.
- Waste lubricating oils will be recovered and reclaimed by a waste oil-recycling contractor.
- Spent lubricating oil filters from vehicles will be disposed at an authorized waste disposal facility.
- Batteries will be reclaimed and recycled by authorized facilities.
- Hazardous waste generation, handling, and storage areas will be inspected and monitored on a regular basis.
- California-authorized and certified hazardous waste haulers will transport hazardous wastes to registered waste treatment, storage, disposal, and recycling facilities.
- Emergency response and reporting will be performed per written procedures that follow government and industry requirements and standards.
- Workers will be trained to handle hazardous wastes generated at the Site.
- If 55 gallons of hazardous waste or more should accumulate on-site for a Project, storage of such hazardous waste will at no time exceed 90 days from the date of initial accumulation exceeding 55 gallons for that Project, and a HMMP shall be developed as described below.

The storage, use, and handling of any hazardous materials will be in accordance with applicable regulations and will include the following items:

- Facility personnel will be trained in hazardous materials and hazardous waste awareness, handling, and management as required for their level of responsibility.
- Bulk chemicals will be stored in the original shipping container provided by and returned to the chemical provider.
- Chemical storage areas and feed/transfer areas will be equipped with secondary containment sufficient in size to contain the volume of the largest container or tank including an allowance for rainwater.

- Small-quantity chemicals used for maintenance tasks will be kept in appropriate flammable material or corrosive material storage lockers following applicable regulations.
- Periodic inspections will ensure that all containers are secure and properly marked.
- Sanitary wastewater generated at the facility cannot be conveyed to an existing sewage public treatment facility. There are no public entities that manage sanitary wastewater flows for locations in the vicinity of the Site.

Should on-site storage of hazardous materials exceed one 55 gallon drum for a Project, that Project will implement an HMMP developed for the construction and operation stages, and will include, at a minimum, procedures for:

1. Hazardous materials handling, use and storage,
2. Emergency response,
3. Spill control and prevention,
4. Employee training,
5. Record keeping and reporting.

The HMMP (if required) will be developed and implemented prior to start of construction or prior to the storage on-site of an excess of 55 gallons of hazardous materials per Project. The program will be revised and updated as required in a timely manner. Employees will be trained and the program implemented prior to the start of commercial operation. The procedures outlined in the HMMP will be in accordance with all applicable regulations.

## **Spill Prevention and Containment**

Hazardous materials stored on-site will be in quantities of less than 55 gallons per Project. Spill prevention and containment for construction and operation of the Projects will adhere to the Environmental Protection Agency's ("EPA") guidance on Spill Prevention Control and Countermeasures ("SPCC") as follows.

*Regularly scheduled inspections, evaluations, and testing by qualified personnel are critical parts of discharge prevention. Their purpose is to prevent, predict, and readily detect discharges. They are conducted not only on containers, but also on associated piping, valves, and appurtenances, and on other equipment and components that could be a source or cause of an oil release.*

## **Waste Water/Septic System**

A standard on-site septic tank and leach field will be used for each O&M building to dispose sanitary wastewater, designed to meet operation and maintenance guidelines required by Imperial County laws, ordinances, regulations and standards.

## **Inert Solids**

Inert solid wastes resulting from construction activities may include recyclable items such as paper, cardboard, solid concrete and block, metals, wire, glass, type 1-4 plastics, drywall, wood, and lubricating oils. Non-recyclable items include insulation, other plastics, food waste, vinyl flooring and base, carpeting, paint containers, packing materials, and other construction wastes. Management of these wastes will be the responsibility of the construction contractor(s). All packaging materials for components shall be crated and recycled off-site. No crating or packaging materials will be placed in local landfills. Management practices require recycling of contractor waste when possible, and proper storage of non-recyclable waste and debris to prevent wind dispersion, and weekly pickup of non-recyclable wastes with disposal at a local approved landfill.

Chemical storage tanks (if any) will be shop-fabricated, double-walled construction meeting applicable regulations. These tanks, as well as portable drums (if any), will be provided with appropriate anchors or cradles and placed within spill containment basins.

Any wastes classified as hazardous such as solvents, degreasing agents, concrete curing compounds, paints, adhesives, chemicals, or chemical containers will be stored (in an approved storage facility/shed/structure) and disposed of as required by local and state regulations. Material quantities of hazardous wastes are not expected.

## **Health and Safety**

Safety precautions and emergency systems will be implemented as part of the design and construction of the Projects to ensure safe and reliable operation. Administrative controls will include classroom and hands-on training in operating and maintenance procedures, general safety items, and a planned maintenance program. These will work with the system design and monitoring features to enhance safety and reliability.

All employees will be provided with communication devices, cell phones, or walkie-talkies, to provide aid in the event of an emergency.

### *Safety, Auxiliary and Emergency Systems*

Safety, auxiliary, and emergency systems will consist of lighting, grounding, backup uninterruptible power supply (“UPS”) systems and diesel power generators, fire and hazardous materials safety systems, security systems, chemical safety systems, and emergency response teams. Each O&M building will include its own utilities and services, such as emergency power, fire suppression, and domestic water systems.

The Projects will implement programs to assure compliance with federal and state occupational safety and health program requirements. In addition to compliance with these programs, the Projects will identify and implement plant-specific programs that effectively assess potential hazards and mitigate them on a routine basis.

As discussed above, hazardous materials may be both stored and used at the Projects during construction and operation, but will be restricted in quantity to less than one 55 gallon drum per Project. The design and construction of any hazardous materials storage and dispensing systems will be in accordance with applicable regulations. Hazardous materials storage areas will be designed with curbs or other containment measures such as double-walled storage tanks, if applicable, to contain spills and leaks. If hazardous materials exceed 55 gallons for a Project, a Hazardous Material Management Program will be developed as described above.

Emergency eyewashes and showers (if required by fire or safety codes) will be provided at appropriate locations. Appropriate Personal Protective Equipment (PPE) will be provided during both construction and operation of the ISF facility.

### *Emergency Response Plan*

The Projects will have an Emergency Response Plan (“ERP”). The ERP will address potential emergencies including chemical releases, fires, and injuries. The ERP will describe emergency response equipment and equipment locations, evacuation routes, procedures for reporting to local emergency response agencies, responsibilities for emergency response, and other required actions to be taken in the event of an emergency.

Employee response to an emergency will be limited to an immediate response to minimize the risk of escalation of the accident or injury. Employees will be trained to respond to fires, spills, earthquakes, and injuries. A first aid facility with adequate first-aid supplies and personnel qualified in first aid treatment will be on-site.

## **Appendix F**

### Land Evaluation and Site Assessment (LESA) Model

# **LESA ASSESSMENT FERRELL SOLAR FARM**

***FERRELL SOLAR FARM***  
**(E/2 Section 1 (portion), T17S, R13E and NW/4 Section 7, T17S, R14E, SBB&M)**  
**IMPERIAL COUNTY, CALIFORNIA**

May 2013

**EMA Report No. 2248-02-2**

Prepared for:

85JP 8ME, LLC  
5455 Wilshire Boulevard, Suite 2010  
Los Angeles, CA 90036



ENVIRONMENTAL MANAGEMENT ASSOCIATES

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## **LAND EVALUATION AND SITE ASSESSMENT MODEL**

### **FERRELL SOLAR FARM**

**(E/2 Section 1 (portion), T17S, R13E and NW/4 Section 7, T17S, R14E, SBB&M)  
IMPERIAL COUNTY, CALIFORNIA**

The Land Evaluation and Site Assessment (LESA) model is an approach for rating the relative quality of land resources based upon specific measurable features. The LESA model was first developed by the federal Natural Resources Conservation Service (NRCS) in 1981. It was subsequently adapted in 1990 by the California Department of Conservation to evaluate land use decisions that affect the conversion of agriculture lands in California. The formulation of the California LESA Model is intended to provide lead agencies under the California Environmental Quality Act (CEQA) with an optional methodology to ensure that significant effects on the environment of agricultural land conversions are quantitatively and consistently considered in the environmental review process.

For determining the potential CEQA significance resulting from the conversion of agricultural lands to some other purpose, the California Agricultural LESA Model has developed Scoring Thresholds which are used to compare the Final LESA Score and the Weighted Factor Scores for the Project with suggested Scoring Decisions. These LESA Scores do not take into consideration any proposed mitigation measures or other factors that might affect a lead agency's determination of the significance of the agricultural lands conversion impact under CEQA.

The information provided on the following pages present documentation of the LESA assessment prepared using the California Agricultural LESA Model for the Ferrell Solar Farm. The proposed Ferrell Solar Farm would be located about five miles west of the city of Calexico, California, on approximately 367 acres of privately owned land on APN 052-180-042-000 and APN 059-050-001-000 (Figure 1 and Figure 2). APN 052-180-042-000 and APN 059-050-001-000 are bounded on the north by the New River; bounded on the south by the Imperial Irrigation District (IID) Wistaria Canal; and bounded on the west by Corda Road.

**LESA ASSESSMENT**  
**85JP 8ME, LLC**  
**FERRELL SOLAR FARM**  
**IMPERIAL COUNTY, CALIFORNIA**

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Appendix A: FERRELL SOLAR FARM SOILS DETAILS	
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Figure 1: Location Map



Figure 2: Ferrell Solar Farm on an Aerial Photographic Base

Land Evaluation Worksheet							
A	B	C	D	E	F	G	H
Soil Map Unit*	Project Acres	Proportion of Project Area	LCC** (irrigated)	LCC Rating (irrigated)***	LCC Score (C x E)	Storie Index**	Storie Index Score (C x G)
102	1.2	0.003	VIII	0	0.00	0	0.00
109	16.0	0.044	IIs	80	3.50	50	2.19
110	74.4	0.203	IIw	80	16.22	45	9.13
114	2.4	0.007	IIIw	60	0.39	42	0.27
115	242.9	0.662	IIIw	60	39.70	72	47.64
119	6.5	0.018	IIs	80	1.42	96	1.71
122	23.6	0.064	IIIw	60	3.85	44	2.82
Totals	367.1	1.00		LCC Total Score	65	Storie Index Total Score	64
Total Project Area (acres)=	367.1						
* The Soil Map Unit information and acreage were determined from the current soil survey information available at the USDA Natural Resources Conservation Service website: <a href="http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx">http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx</a> (Figure 3).							
** The Land Capability Classification and Storie Index information was obtained from the current soil survey information available at the USDA Natural Resources Conservation Service website: <a href="http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx">http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx</a> (Appendix A).							
*** The LCC Rating for irrigated land was determined from the LCC Point Rating Table 2 from the LESA Instruction Manual (California Department of Conservation 1997).							

**Table 1: Land Capability Classification (LCC) – Storie Index Rating**



**Figure 3: Ferrell Solar Farm Soils Map**

	Site Assessment Worksheet 1		
	Project Size Score*		
	I	J	K
	LCC Class I-II	LCC Class III	LCC Class IV-VIII
Project Acres per LCC Class			1
Project Acres per LCC Class	16		
Project Acres per LCC Class	74		
Project Acres per LCC Class		2	
Project Acres per LCC Class		243	
Project Acres per LCC Class	7		
Project Acres per LCC Class		24	
Total Project Acres per LCC Class	97	269	1
* Project Size Scores	100	100	0
Highest Project Size Score	100		

\* Project Size Score was determined from the Project Size Scoring Table from the LESA Instruction Manual (California Department of Conservation 1997).

**Table 2: Project Size Rating**

Site Assessment Worksheet 2				
Water Resources Availability				
A	B	C	D	E
Project Portion	Water Source	Proportion of Project Area	Water Availability Score*	Weighted Availability Score (C x D)
1	Irrigation District Only	1.0	100	100
2				
3				
4				
5				
6				
		(Must Sum to 1.0)	<b>Total Water Resource Score</b>	100
* The Water Availability Score was determined using the Water Resources Availability Scoring Table from the LESA Instruction Manual (California Department of Conservation 1997).				

**Table 3: Water Resources Availability Rating**

Site Assessment Worksheet 3								
Surrounding Agricultural Land & Surrounding Protected Resource Land								
A	B	C	D	E	F	G		
Zone of Influence*					Surrounding Agricultural Land Score (From LESA Manual Table 6)	Surrounding Protected Resource Land Score (From LESA Manual Table 7)**		
Total Acres	Acres in Agriculture	Acres of Protected Resource Land	Percent in Agriculture (B/A)	Percent Protected Resource Land (C/A)				
2315.6	2038	0	88.0	0.0	90	0		
* In conformance with the instructions in the LESA Instruction Manual (California Department of Conservation 1997), the Zone of Influence was determined by drawing the smallest rectangle that could completely encompass the entire Project Area. A second rectangle was then drawn which extended one quarter mile on all sides beyond the first rectangle. The Zone of Influence is represented by the entire area of all parcels with any lands inside the outer rectangle, less the area of the proposed project (Figure 4).								
** The LESA Instruction Manual (California Department of Conservation 1997) describes <i>Protected Resource Land</i> as those lands with long term use restrictions that are compatible with or supportive of agricultural uses of land. Included among them are the following: Williamson Act contracted lands; Publicly owned lands maintained as park, forest, or watershed resources; and Lands with agricultural, wildlife habitat, open space, or other natural resource easements that restrict the conversion of such land to urban or industrial uses.								
Surrounding Parcels***	Acres	Protected Resource Land?	Percent Protected Resource Land	Acres in Protected Land	Agricultural Land?	Percent Agricultural Land	Acres of Agriculture	
052-180-042	204.0	N	0	0	Y	96	195.8	
052-180-043	178.7	N	0	0	Y	96	171.5	
052-180-050	46.1	N	0	0	Y	100	46.1	
052-180-051	89.4	N	0	0	Y	100	89.4	
052-210-035	14.6	N	0	0	Y	100	14.6	
052-210-036	364.0	N	0	0	Y	100	364.0	
059-040-006	165.6	N	0	0	Y	50	82.8	
059-040-007	15.3	N	0	0	Y	98	15.0	
059-040-008	60.5	N	0	0	Y	15	9.1	
059-040-009	18.1	N	0	0	N	0	0.0	
059-040-010	38.8	N	0	0	N	0	0.0	
059-040-011	10.0	N	0	0	Y	32	3.2	
059-040-012	35.1	N	0	0	N	0	0.0	
059-040-013	128.4	N	0	0	Y	85	109.2	
059-040-014	0.6	N	0	0	N	0	0.0	
059-050-001	163.1	N	0	0	Y	100	163.1	
059-060-006	163.6	N	0	0	Y	95	155.4	
059-060-007	163.2	N	0	0	Y	100	163.2	
059-110-006	134.2	N	0	0	Y	99	132.8	
059-120-002	78.7	N	0	0	Y	100	78.7	
059-120-003	82.1	N	0	0	Y	100	82.1	
059-120-004	161.6	N	0	0	Y	100	161.6	
Total	2315.6		Total	0		Total	2038	
***The Imperial County Assessors website was accessed to identify the surrounding parcel numbers ( <a href="http://imperialcounty.net/Assessor/index.html">http://imperialcounty.net/Assessor/index.html</a> ). The percentage of agriculture was determined from a map overlay used to estimate the proportion of land in agriculture and the California Department of Conservation Important Farmland Map Series.								

**Table 4: Surrounding Agricultural & Protected Resource Land Rating**

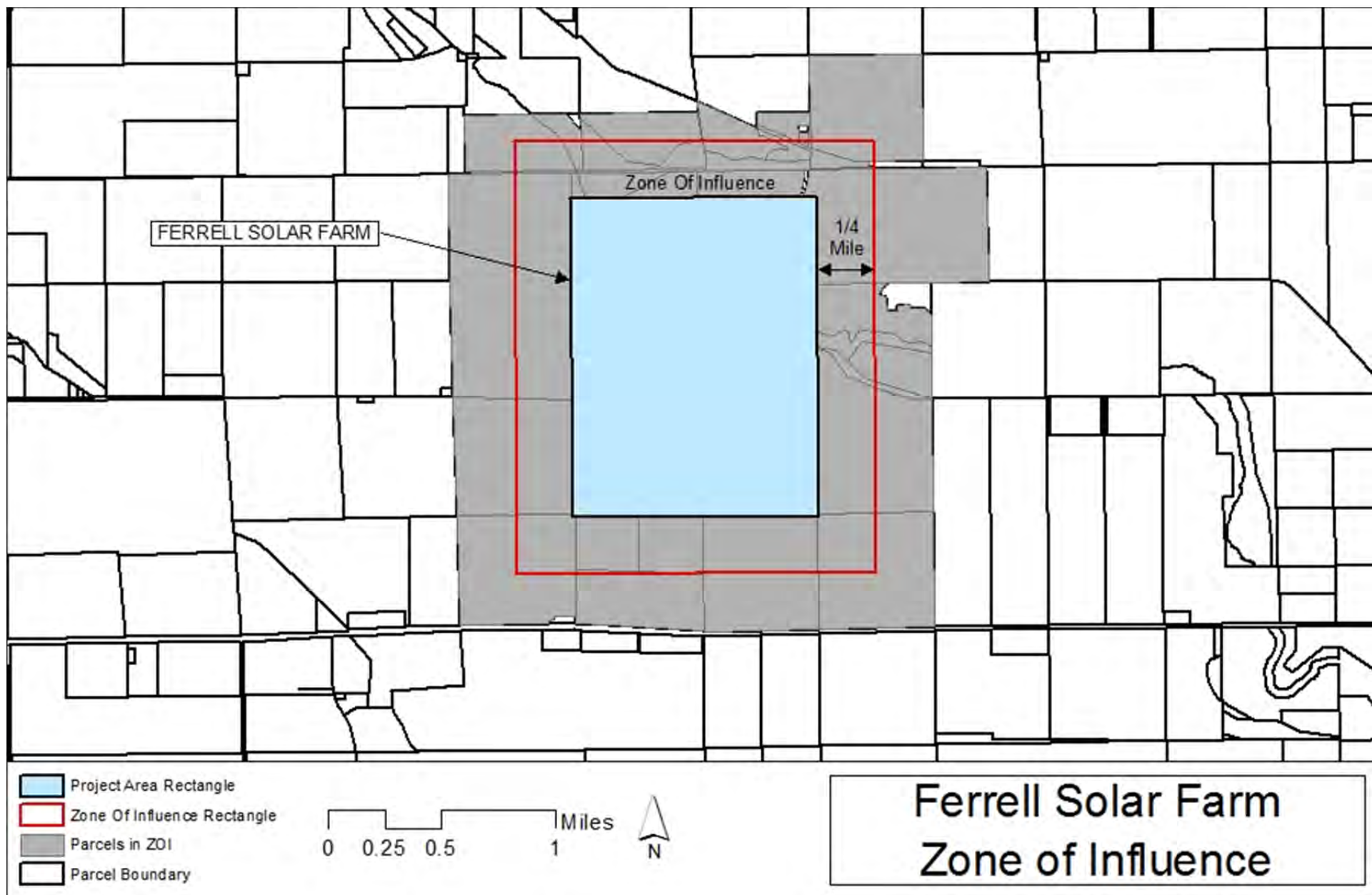


Figure 4: Zone of Influence Map

Final LESA Score Sheet				California LESA Model Scoring Thresholds	
	Factor Scores	Factor Weight	Weighted Factor Scores	Total LESA Score	Scoring Decision
<b>LE Factors</b>					
Land Capability Classification	65.09	0.25	16.27	0 to 39 Points	Not Considered Significant
Storie Index	63.76	0.25	15.94		
LE subtotal		0.50	32.21		
<b>SA Factors</b>					
Project Size	100	0.15	15.00	40 to 59 Points	Considered Significant <u>only</u> if LE <u>and</u> SA subscores are each <u>greater</u> than or equal to 20 points
Water Resource Availability	100	0.15	15.00		
Surrounding Agricultural Land	90	0.15	13.50	60 to 79 Points	Considered Significant <u>unless</u> either LE <u>or</u> SA subscore is <u>less</u> than 20 points
Protected Resource Land	0	0.05	0.00		
SA Subtotal		0.50	43.50		
		<b>Total LESA Score</b>	<b>75.71</b>	80 to 100 Points	Considered Significant

**Table 5: Final LESA Score**

## **APPENDIX A: FERRELL SOLAR FARM SOILS DETAILS**

## Imperial County, California, Imperial Valley Area

### 102—BADLAND

#### Map Unit Setting

*Mean annual precipitation:* 0 to 3 inches

*Mean annual air temperature:* 72 to 75 degrees F

*Frost-free period:* 300 to 350 days

#### Map Unit Composition

*Badland:* 85 percent

*Minor components:* 8 percent

#### Description of Badland

##### Setting

*Parent material:* Alluvium derived from mixed sources

##### Properties and qualities

*Slope:* 30 to 75 percent

*Depth to restrictive feature:* 0 to 4 inches to paralithic bedrock

##### Interpretive groups

*Farmland classification:* Not prime farmland

*Land capability (nonirrigated):* 8e

*Hydrologic Soil Group:* D

#### Minor Components

##### Imperial

*Percent of map unit:* 2 percent

##### Holtville

*Percent of map unit:* 2 percent

##### Meloland

*Percent of map unit:* 2 percent

##### Indio

*Percent of map unit:* 2 percent

## Data Source Information

Soil Survey Area: Imperial County, California, Imperial Valley Area

Survey Area Data: Version 5, Jul 25, 2008

## Imperial County, California, Imperial Valley Area

### 109—HOLTVILLE SILTY CLAY

#### Map Unit Setting

*Elevation:* -230 to 200 feet

*Mean annual precipitation:* 0 to 3 inches

*Mean annual air temperature:* 72 to 75 degrees F

*Frost-free period:* 300 to 350 days

#### Map Unit Composition

*Holtville and similar soils:* 85 percent

*Minor components:* 15 percent

#### Description of Holtville

##### Setting

*Landform:* Basin floors

*Landform position (three-dimensional):* Talf

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Alluvium derived from mixed sources

##### Properties and qualities

*Slope:* 0 to 2 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Well drained

*Capacity of the most limiting layer to transmit water (Ksat):* Very low  
to moderately low (0.00 to 0.06 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Calcium carbonate, maximum content:* 5 percent

*Maximum salinity:* Nonsaline to slightly saline (2.0 to 8.0 mmhos/cm)

*Sodium adsorption ratio, maximum:* 10.0

*Available water capacity:* Moderate (about 7.6 inches)

##### Interpretive groups

*Farmland classification:* Prime farmland if irrigated

*Land capability classification (irrigated):* 2s

*Land capability (nonirrigated):* 7s

*Hydrologic Soil Group:* C

##### Typical profile

*0 to 17 inches:* Silty clay

*17 to 24 inches:* Clay

*24 to 35 inches:* Silt loam

*35 to 60 inches:* Loamy very fine sand

#### Minor Components

##### Glenbar

*Percent of map unit:* 5 percent

**Imperial**

*Percent of map unit: 5 percent*

**Indio**

*Percent of map unit: 3 percent*

**Vint**

*Percent of map unit: 2 percent*

## **Data Source Information**

Soil Survey Area: Imperial County, California, Imperial Valley Area

Survey Area Data: Version 5, Jul 25, 2008

## Imperial County, California, Imperial Valley Area

### 110—HOLTVILLE SILTY CLAY, WET

#### Map Unit Setting

*Elevation:* -230 to 200 feet

*Mean annual precipitation:* 0 to 3 inches

*Mean annual air temperature:* 72 to 75 degrees F

*Frost-free period:* 300 to 350 days

#### Map Unit Composition

*Holtville, wet, and similar soils:* 85 percent

*Minor components:* 15 percent

#### Description of Holtville, Wet

##### Setting

*Landform:* Basin floors

*Landform position (three-dimensional):* Talf

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Alluvium derived from mixed sources

##### Properties and qualities

*Slope:* 0 to 2 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Moderately well drained

*Capacity of the most limiting layer to transmit water (Ksat):* Very low  
to moderately low (0.00 to 0.06 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Calcium carbonate, maximum content:* 5 percent

*Maximum salinity:* Nonsaline to slightly saline (2.0 to 8.0 mmhos/cm)

*Sodium adsorption ratio, maximum:* 10.0

*Available water capacity:* Moderate (about 7.6 inches)

##### Interpretive groups

*Farmland classification:* Prime farmland if irrigated and drained

*Land capability classification (irrigated):* 2w

*Land capability (nonirrigated):* 7w

*Hydrologic Soil Group:* C

##### Typical profile

*0 to 17 inches:* Silty clay

*17 to 24 inches:* Clay

*24 to 35 inches:* Silt loam

*35 to 60 inches:* Loamy very fine sand

#### Minor Components

##### Glenbar

*Percent of map unit:* 5 percent

**Imperial**

*Percent of map unit: 5 percent*

**Indio**

*Percent of map unit: 3 percent*

**Vint**

*Percent of map unit: 2 percent*

## **Data Source Information**

Soil Survey Area: Imperial County, California, Imperial Valley Area

Survey Area Data: Version 5, Jul 25, 2008

## Imperial County, California, Imperial Valley Area

### 114—IMPERIAL SILTY CLAY, WET

#### Map Unit Setting

*Elevation:* -230 to 200 feet

*Mean annual precipitation:* 0 to 3 inches

*Mean annual air temperature:* 72 to 75 degrees F

*Frost-free period:* 300 to 350 days

#### Map Unit Composition

*Imperial, wet, and similar soils:* 85 percent

*Minor components:* 15 percent

#### Description of Imperial, Wet

##### Setting

*Landform:* Basin floors

*Landform position (three-dimensional):* Talf

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Clayey alluvium derived from mixed sources and/or  
clayey lacustrine deposits derived from mixed sources

##### Properties and qualities

*Slope:* 0 to 2 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Moderately well drained

*Capacity of the most limiting layer to transmit water*

*(Ksat):* Moderately low to moderately high (0.06 to 0.20 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Calcium carbonate, maximum content:* 5 percent

*Maximum salinity:* Very slightly saline to slightly saline (4.0 to 8.0  
mmhos/cm)

*Sodium adsorption ratio, maximum:* 20.0

*Available water capacity:* Moderate (about 8.3 inches)

##### Interpretive groups

*Farmland classification:* Farmland of statewide importance

*Land capability classification (irrigated):* 3w

*Land capability (nonirrigated):* 7w

*Hydrologic Soil Group:* C

##### Typical profile

*0 to 12 inches:* Silty clay

*12 to 60 inches:* Silty clay loam

#### Minor Components

##### Glenbar

*Percent of map unit:* 4 percent

**Meloland**

*Percent of map unit: 4 percent*

**Holtville**

*Percent of map unit: 4 percent*

**Niland**

*Percent of map unit: 3 percent*

## **Data Source Information**

Soil Survey Area: Imperial County, California, Imperial Valley Area

Survey Area Data: Version 5, Jul 25, 2008

## Imperial County, California, Imperial Valley Area

### 115—IMPERIAL-GLENBAR SILTY CLAY LOAMS, WET, 0 TO 2 PERCENT SLOPES

#### Map Unit Setting

*Elevation:* -230 to 200 feet

*Mean annual precipitation:* 0 to 3 inches

*Mean annual air temperature:* 72 to 75 degrees F

*Frost-free period:* 300 to 350 days

#### Map Unit Composition

*Glenbar, wet, and similar soils:* 40 percent

*Imperial, wet, and similar soils:* 40 percent

*Minor components:* 20 percent

#### Description of Imperial, Wet

##### Setting

*Landform:* Basin floors

*Landform position (three-dimensional):* Talf

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Clayey alluvium derived from mixed sources and/or clayey lacustrine deposits derived from mixed sources

##### Properties and qualities

*Slope:* 0 to 2 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Moderately well drained

*Capacity of the most limiting layer to transmit water*

*(Ksat):* Moderately high (0.20 to 0.57 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Calcium carbonate, maximum content:* 5 percent

*Maximum salinity:* Very slightly saline to slightly saline (4.0 to 8.0 mmhos/cm)

*Sodium adsorption ratio, maximum:* 20.0

*Available water capacity:* Moderate (about 8.6 inches)

##### Interpretive groups

*Farmland classification:* Farmland of statewide importance

*Land capability classification (irrigated):* 3w

*Land capability (nonirrigated):* 7w

*Hydrologic Soil Group:* C

##### Typical profile

*0 to 12 inches:* Silty clay loam

*12 to 60 inches:* Silty clay loam

## Description of Glenbar, Wet

### Setting

*Landform:* Basin floors  
*Landform position (three-dimensional):* Talf  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Alluvium derived from mixed

### Properties and qualities

*Slope:* 0 to 2 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Moderately well drained  
*Capacity of the most limiting layer to transmit water*  
*(Ksat):* Moderately high (0.20 to 0.57 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Calcium carbonate, maximum content:* 5 percent  
*Maximum salinity:* Nonsaline to slightly saline (2.0 to 8.0 mmhos/cm)  
*Sodium adsorption ratio, maximum:* 15.0  
*Available water capacity:* High (about 10.8 inches)

### Interpretive groups

*Farmland classification:* Farmland of statewide importance  
*Land capability classification (irrigated):* 3w  
*Land capability (nonirrigated):* 7w  
*Hydrologic Soil Group:* B

### Typical profile

*0 to 13 inches:* Silty clay loam  
*13 to 60 inches:* Clay loam

## Minor Components

### Holtville

*Percent of map unit:* 10 percent

### Meloland

*Percent of map unit:* 10 percent

## Data Source Information

Soil Survey Area: Imperial County, California, Imperial Valley Area  
Survey Area Data: Version 5, Jul 25, 2008

## Imperial County, California, Imperial Valley Area

### 119—INDIO-VINT COMPLEX

#### Map Unit Setting

*Elevation:* -230 to 300 feet

*Mean annual precipitation:* 0 to 3 inches

*Mean annual air temperature:* 72 to 75 degrees F

*Frost-free period:* 300 to 350 days

#### Map Unit Composition

*Indio and similar soils:* 35 percent

*Vint and similar soils:* 30 percent

*Minor components:* 35 percent

#### Description of Indio

##### Setting

*Landform:* Basin floors

*Landform position (three-dimensional):* Talf

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Alluvium derived from mixed sources and/or eolian deposits derived from mixed sources

##### Properties and qualities

*Slope:* 0 to 2 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Well drained

*Capacity of the most limiting layer to transmit water*

*(Ksat):* Moderately high to high (0.57 to 1.98 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Calcium carbonate, maximum content:* 5 percent

*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 4.0 mmhos/cm)

*Sodium adsorption ratio, maximum:* 5.0

*Available water capacity:* Moderate (about 8.5 inches)

##### Interpretive groups

*Farmland classification:* Prime farmland if irrigated

*Land capability classification (irrigated):* 2s

*Land capability (nonirrigated):* 7e

*Hydrologic Soil Group:* B

##### Typical profile

*0 to 12 inches:* Loam

*12 to 72 inches:* Stratified loamy very fine sand to silt loam

#### Description of Vint

##### Setting

*Landform:* Basin floors

*Landform position (three-dimensional):* Talf

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Alluvium and/or eolian deposits derived from mixed

**Properties and qualities**

*Slope:* 0 to 2 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Well drained

*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Calcium carbonate, maximum content:* 5 percent

*Maximum salinity:* Nonsaline to very slightly saline (2.0 to 4.0 mmhos/cm)

*Sodium adsorption ratio, maximum:* 5.0

*Available water capacity:* Low (about 4.9 inches)

**Interpretive groups**

*Farmland classification:* Prime farmland if irrigated

*Land capability classification (irrigated):* 2s

*Land capability (nonirrigated):* 7e

*Hydrologic Soil Group:* A

**Typical profile**

*0 to 10 inches:* Loamy fine sand

*10 to 60 inches:* Loamy sand

**Minor Components**

**Meloland**

*Percent of map unit:* 12 percent

**Holtville**

*Percent of map unit:* 12 percent

**Rositas**

*Percent of map unit:* 11 percent

## Data Source Information

Soil Survey Area: Imperial County, California, Imperial Valley Area

Survey Area Data: Version 5, Jul 25, 2008

## Imperial County, California, Imperial Valley Area

### 122—MELOLAND VERY FINE SANDY LOAM, WET

#### Map Unit Setting

*Elevation:* -230 to 200 feet

*Mean annual precipitation:* 0 to 3 inches

*Mean annual air temperature:* 72 to 75 degrees F

*Frost-free period:* 300 to 350 days

#### Map Unit Composition

*Meloland, wet, and similar soils:* 85 percent

*Minor components:* 15 percent

#### Description of Meloland, Wet

##### Setting

*Landform:* Basin floors

*Landform position (three-dimensional):* Talf

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Alluvium derived from mixed sources and/or eolian  
deposits derived from mixed sources

##### Properties and qualities

*Slope:* 0 to 2 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Moderately well drained

*Capacity of the most limiting layer to transmit water (Ksat):* Very low  
to moderately low (0.00 to 0.06 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Calcium carbonate, maximum content:* 5 percent

*Maximum salinity:* Slightly saline to moderately saline (8.0 to 16.0  
mmhos/cm)

*Sodium adsorption ratio, maximum:* 13.0

*Available water capacity:* Moderate (about 7.8 inches)

##### Interpretive groups

*Farmland classification:* Prime farmland if irrigated and drained

*Land capability classification (irrigated):* 3w

*Land capability (nonirrigated):* 7w

*Hydrologic Soil Group:* C

##### Typical profile

*0 to 12 inches:* Very fine sandy loam

*12 to 26 inches:* Stratified loamy fine sand to silt loam

*26 to 71 inches:* Clay

#### Minor Components

##### Imperial

*Percent of map unit:* 3 percent

**Indio**

*Percent of map unit: 3 percent*

**Holtville**

*Percent of map unit: 3 percent*

**Glenbar**

*Percent of map unit: 3 percent*

**Vint**

*Percent of map unit: 3 percent*

## Data Source Information

Soil Survey Area: Imperial County, California, Imperial Valley Area

Survey Area Data: Version 5, Jul 25, 2008

## California Revised Storie Index Rating (CA)

The Storie Index is a soil rating based on soil properties that govern a soil's potential for cultivated agriculture in California.

The Storie Index assesses the productivity of a soil from the following four characteristics: Factor A, degree of soil profile development; factor B, texture of the surface layer; factor C, slope; and factor X, manageable features, including drainage, microrelief, fertility, acidity, erosion, and salt content. A score ranging from 0 to 100 percent is determined for each factor, and the scores are multiplied together to derive an index rating.

For simplification, Storie Index ratings have been combined into six grades classes as follows: Grade 1 (excellent), 100 to 80; grade 2 (good), 79 to 60; grade 3 (fair), 59 to 40; grade 4 (poor), 39 to 20; grade 5 (very poor), 19 to 10; and grade 6 (nonagricultural), less than 10.

## Report—California Revised Storie Index Rating (CA)

The Storie Index is a soil rating based on soil properties that govern a soil map unit component's potential for cultivated agriculture. [Absence of an entry indicates that a Storie Index rating is not applicable or was not estimated]. For simplification, Storie Index ratings have been combined into six grades as follows: Grade 1 (Excellent): Soils that rate between 80 and 100 and which are suitable for a wide range of crops. Grade 2 (Good) Soils that rate between 60 and 79 and which are suitable for a wide range of crops. Grade 3 (Fair): Soils that range between 40 and 59. Soils in this grade may give good results with certain specialized crops. Grade 4 (Poor): Soils that rate between 20 and 39 and which have a narrow range in their agricultural potential. Grade 5 (Very Poor): Soil that rate between 10 and 19 and are of very limited agricultural use except for pasture because of adverse soil conditions. Grade 6 (Nonagricultural): Soils that rate less than 10. [The numbers in the "Limiting feature value" column range from 0.01 to 1.00. Soils with a smaller the value have a lower potential for cultivated agriculture. The table shows each of the sub-factors used to generate the Storie Index rating for each soil component].

California Revised Storie Index Rating (CA)— Imperial County, California, Imperial Valley Area				
Map symbol and soil name	Pct. of map unit	California Revised Storie Index (CA)		
		Storie index rating	Storie index grade and limiting features	Limiting feature value
102—BADLAND				
Badland	85		Not Rated	

California Revised Storie Index Rating (CA)— Imperial County, California, Imperial Valley Area				
Map symbol and soil name	Pct. of map unit	California Revised Storie Index (CA)		
		Storie index rating	Storie index grade and limiting features	Limiting feature value
109—HOLTVILLE SILTY CLAY				
Holtville	85	50	Grade Three - Fair	
			Rated Soil Order	1.00
			Profile Group	1.00
			Wetness, flooding, ponding, drainage, erosion	1.00
			Nearly level to gently sloping	0.98
			Toxicity	0.85
110—HOLTVILLE SILTY CLAY, WET				
Holtville, wet	85	45	Grade Three - Fair	
			Rated Soil Order	1.00
			Profile Group	1.00
			Nearly level to gently sloping	0.98
			Wetness, flooding, ponding, drainage, erosion	0.90
			Toxicity	0.85
114—IMPERIAL SILTY CLAY, WET				
Imperial, wet	85	42	Grade Three - Fair	
			Rated Soil Order	1.00
			Profile Group	1.00
			Nearly level to gently sloping	0.98
			Wetness, flooding, ponding, drainage, erosion	0.90
			Toxicity	0.80

California Revised Storie Index Rating (CA)— Imperial County, California, Imperial Valley Area				
Map symbol and soil name	Pct. of map unit	California Revised Storie Index (CA)		
		Storie index rating	Storie index grade and limiting features	Limiting feature value
115—IMPERIAL-GLENBAR SILTY CLAY LOAMS, WET, 0 TO 2 PERCENT SLOPES				
Glenbar, wet	40	72	Grade Two - Good	
			Rated Soil Order	1.00
			Profile Group	1.00
			Nearly level to gently sloping	0.98
			USDA Texture	0.95
			Wetness, flooding, ponding, drainage, erosion	0.90
Imperial, wet	40	67	Grade Two - Good	
			Rated Soil Order	1.00
			Profile Group	1.00
			Nearly level to gently sloping	0.98
			USDA Texture	0.95
			Wetness, flooding, ponding, drainage, erosion	0.90
119—INDIO-VINT COMPLEX				
Indio	35	96	Grade One - Excellent	
			USDA Texture	1.00
			Rated Soil Order	1.00
			Profile Group	1.00
			Wetness, flooding, ponding, drainage, erosion	1.00
			Nearly level to gently sloping	0.98
Vint	30	83	Grade One - Excellent	
			Rated Soil Order	1.00
			Profile Group	1.00
			Wetness, flooding, ponding, drainage, erosion	1.00
			Nearly level to gently sloping	0.98
			Toxicity	0.94

California Revised Storie Index Rating (CA)— Imperial County, California, Imperial Valley Area				
Map symbol and soil name	Pct. of map unit	California Revised Storie Index (CA)		
		Storie index rating	Storie index grade and limiting features	Limiting feature value
122—MELOLAND VERY FINE SANDY LOAM, WET				
Meloland, wet	85	44	Grade Three - Fair	
			USDA Texture	1.00
			Rated Soil Order	1.00
			Profile Group	1.00
			Nearly level to gently sloping	0.98
			Wetness, flooding, ponding, drainage, erosion	0.90

## Data Source Information

Soil Survey Area: Imperial County, California, Imperial Valley Area  
Survey Area Data: Version 5, Jul 25, 2008