



CEQA Exempt Referral Staff Approval Permit

Date: August 24, 2016
To: Distribution List (See Attachment A)
From: Timothy Vertino, Assistant Planner, Planning and Community Development
Subject: STAFF APPROVAL APPLICATION NO. PLN 2016-0058 – A.L. GILBERT
Respond By: September 8, 2016

Under the California Environmental Quality Act of 1970, the project described herein is **exempt** from CEQA review (Section 15061(b)(3)); however, the Stanislaus County Department of Planning and Community Development is soliciting comments from responsible agencies to determine if specific conditions should be placed upon project approval. Therefore, please contact this office within **15 days** if you have any comments pertaining to the proposal. Comments made identifying potential impacts should be as specific as possible and should be based on supporting data (e.g., traffic counts, expected pollutant levels, etc.). Your comments should emphasize potential impacts in areas which your agency has expertise and/or jurisdictional responsibilities.

These comments will assist our Department to recommend for approval or denial and/or apply conditions of approval to the requested staff approval; therefore, please list any conditions that you wish to have included as well as any other comments you may have. Please return all comments and/or conditions as soon as possible or no later than the response date referenced above.

Thank you for your cooperation. Please call (209) 525-6330 if you have any questions.

Applicant: JKB Energy, C/O A.L. Gilbert
Project Location: 11701 Warnerville Road, south of Sierra Road, east of S. Sterns Road, and southeast of the City of Oakdale Airport.
APN: 010-039-030
Williamson Act Contract: N/A
General Plan: AG (Agriculture)
Current Zoning: A-2-40 (General Agriculture)

Project Description: Request to construct a six foot tall, 191 kw, fixed ground mount photovoltaic system. The solar will be used to offset electrical use of the agricultural irrigation well on-site. The project is located 265± feet from the adjacent Oakdale Airport, located within "Zone 3" of the current Stanislaus County Airport Land Use Plan.

Full document with attachments available for viewing at:
<http://www.stancounty.com/planning/pl/act-projects.shtm>

STAFF APPROVAL APPLICATION NO. PLN2016-0058 – A.L. GILBERT

Attachment A

Distribution List

	CA DEPT OF CONSERVATION Land Resources / Mine Reclamation		STAN CO AG COMMISSIONER
	CA DEPT OF FISH & WILDLIFE	X	STAN CO ALUC
	CA DEPT OF FORESTRY (CAL FIRE)		STAN CO ANIMAL SERVICES
	CA DEPT OF TRANSPORTATION DIST 10	X	STAN CO BUILDING PERMITS DIVISION
	CA OPR STATE CLEARINGHOUSE		STAN CO CEO
	CA RWQCB CENTRAL VALLEY REGION		STAN CO CSA
	CA STATE LANDS COMMISSION		STAN CO DER
	CEMETERY DISTRICT		STAN CO ERC
	CENTRAL VALLEY FLOOD PROTECTION		STAN CO FARM BUREAU
X	CITY OF OAKDALE		STAN CO HAZARDOUS MATERIALS
	COMMUNITY SERVICES/SANITARY DIST		STAN CO PARKS & RECREATION
	COOPERATIVE EXTENSION		STAN CO PUBLIC WORKS
	COUNTY OF:		STAN CO RISK MANAGEMENT
X	FIRE PROTECTION DIST: OAKDALE RURAL		STAN CO SHERIFF
	HOSPITAL DIST:		STAN CO SUPERVISOR DIST
	IRRIGATION DIST:		STAN COUNTY COUNSEL
X	STANISLAUS FIRE PREVENTION BUREAU		StanCOG
	MOSQUITO DIST:		STANISLAUS LAFCO
	MOUNTIAN VALLEY EMERGENCY MEDICAL SERVICES		SURROUNDING LAND OWNERS (on file w/the Clerk to the Board of Supervisors)
	MUNICIPAL ADVISORY COUNCIL:		TELEPHONE COMPANY:
X	OAKDALE AIRPORT		TRIBAL CONTACTS (CA Government Code §65352.3)
	POSTMASTER:		TUOLUMNE RIVER TRUST
	RAILROAD:		US ARMY CORPS OF ENGINEERS
	SAN JOAQUIN VALLEY APCD		US FISH & WILDLIFE
	SCHOOL DIST 1:		US MILITARY (SB 1462) (7 agencies)
	SCHOOL DIST 2:		USDA NRCS
	STAN ALLIANCE		WATER DIST:

**STANISLAUS COUNTY
CEQA REFERRAL RESPONSE FORM**

TO: Stanislaus County Planning & Community Development
1010 10th Street, Suite 3400
Modesto, CA 95354

FROM: _____

SUBJECT: STAFF APPROVAL APPLICATION NO. PLN2016-0058 – A.L. GILBERT

Based on this agencies particular field(s) of expertise, it is our position the above described project:

- Will not have a significant effect on the environment.
- May have a significant effect on the environment.
- No Comments.

Listed below are specific impacts which support our determination (e.g., traffic general, carrying capacity, soil types, air quality, etc.) – (attach additional sheet if necessary)

- 1.
- 2.
- 3.
- 4.

Listed below are possible mitigation measures for the above-listed impacts: *PLEASE BE SURE TO INCLUDE WHEN THE MITIGATION OR CONDITION NEEDS TO BE IMPLEMENTED (PRIOR TO RECORDING A MAP, PRIOR TO ISSUANCE OF A BUILDING PERMIT, ETC.):*

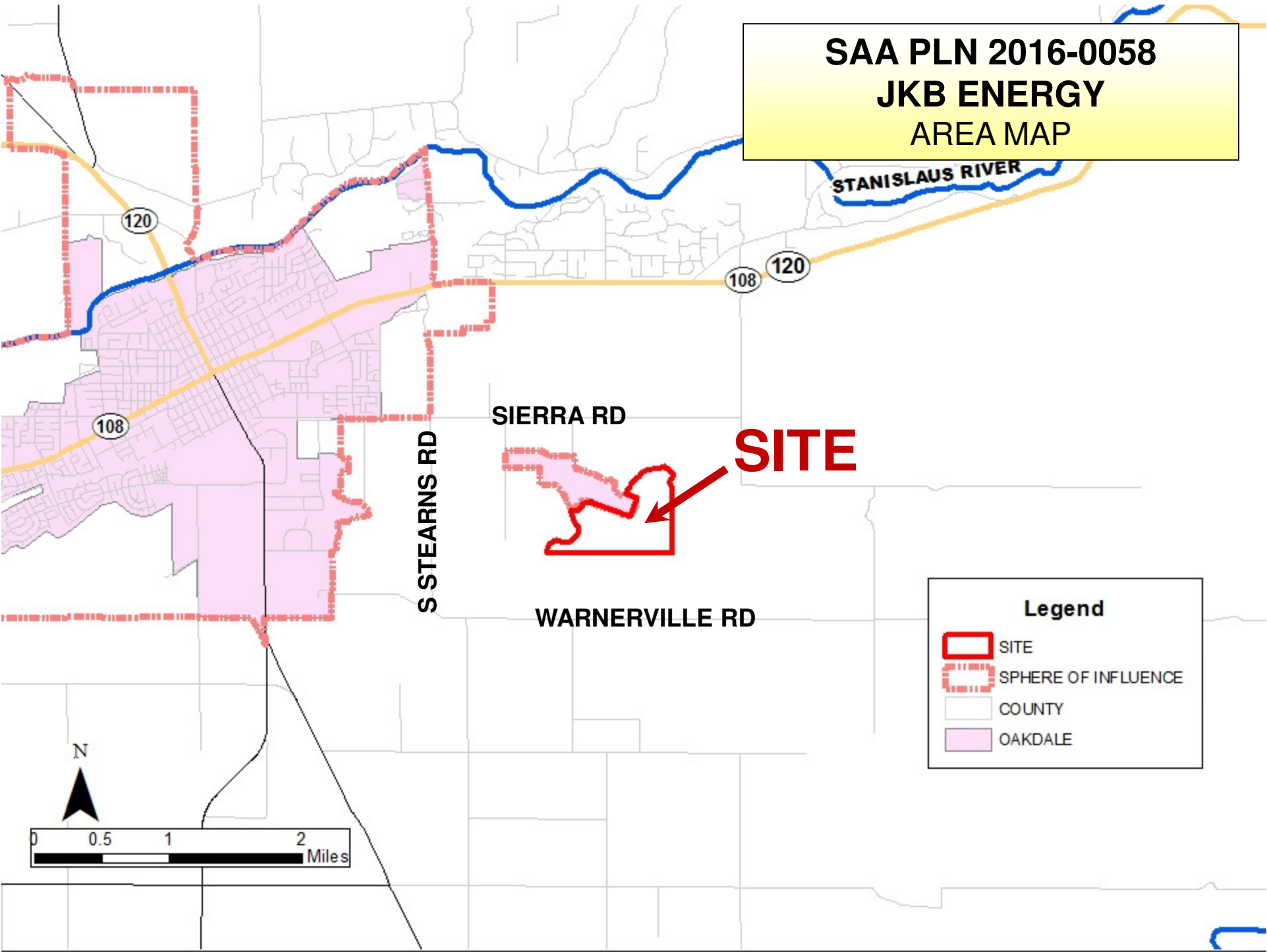
- 1.
- 2.
- 3.
- 4.

In addition, our agency has the following comments (attach additional sheets if necessary).

Response prepared by:

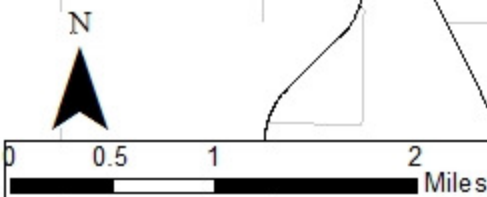
Name Title Date

**SAA PLN 2016-0058
JKB ENERGY
AREA MAP**



Legend

- SITE
- SPHERE OF INFLUENCE
- COUNTY
- OAKDALE







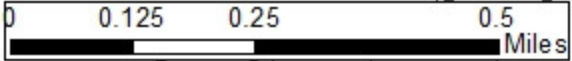
**SAA PLN 2016-0058
JKB ENERGY
GENERAL PLAN MAP**

SITE

**OAKDALE
AIRPORT**

Legend

-  SITE
-  SPHERE OF INFLUENCE
-  AG= AGRICULTURE
-  CITY OF OAKDALE



N







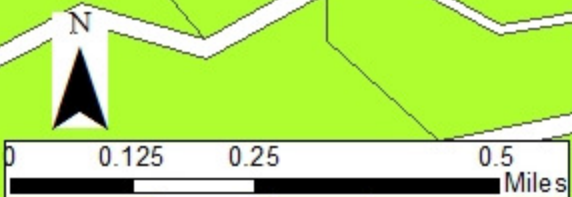
**SAA PLN 2016-0058
JKB ENERGY
ZONING MAP**

**OAKDALE
AIRPORT**

SITE

Legend



-  SITE
-  SPHERE OF INFLUENCE
-  A-2-40= AGRICULTURE
-  CITY OF OAKDALE

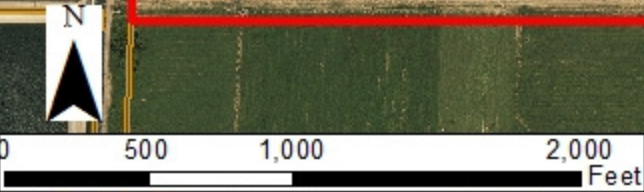


SAA PLN 2016-0058
JKB ENERGY
2015 COUNTY AERIAL

SITE

Legend

-  SITE
-  SPHERE OF INFLUENCE

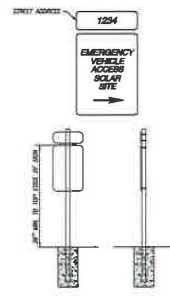


SITE PLAN FOR:
A.L. GILBERT AIRPORT
 STANISLAUS COUNTY, CALIFORNIA



OWNERS:
 A.L. GILBERT COMPANY
 PO BOX 28
 OAKDALE, CA 95361

- GENERAL NOTES:**
1. SITE ADDRESS: 2030A 2 OF ASL OAKDALE, CA 95361
 2. EXISTING ZONING: A-1-B-40
 3. EXISTING GENERAL PLAN: AGRICULTURE
 4. ADJOINING PARCEL: 010-039-020
 5. SITE IS 2.0 ACRES ACRES
 6. OCCUPANCY: U



**ADDRESS AND EYA
 ACCESS SIGN**
 NTS

DATE	2/12/2016
DRAWN BY	JKR
CHECKED BY	JKR
SCALE	AS SHOWN

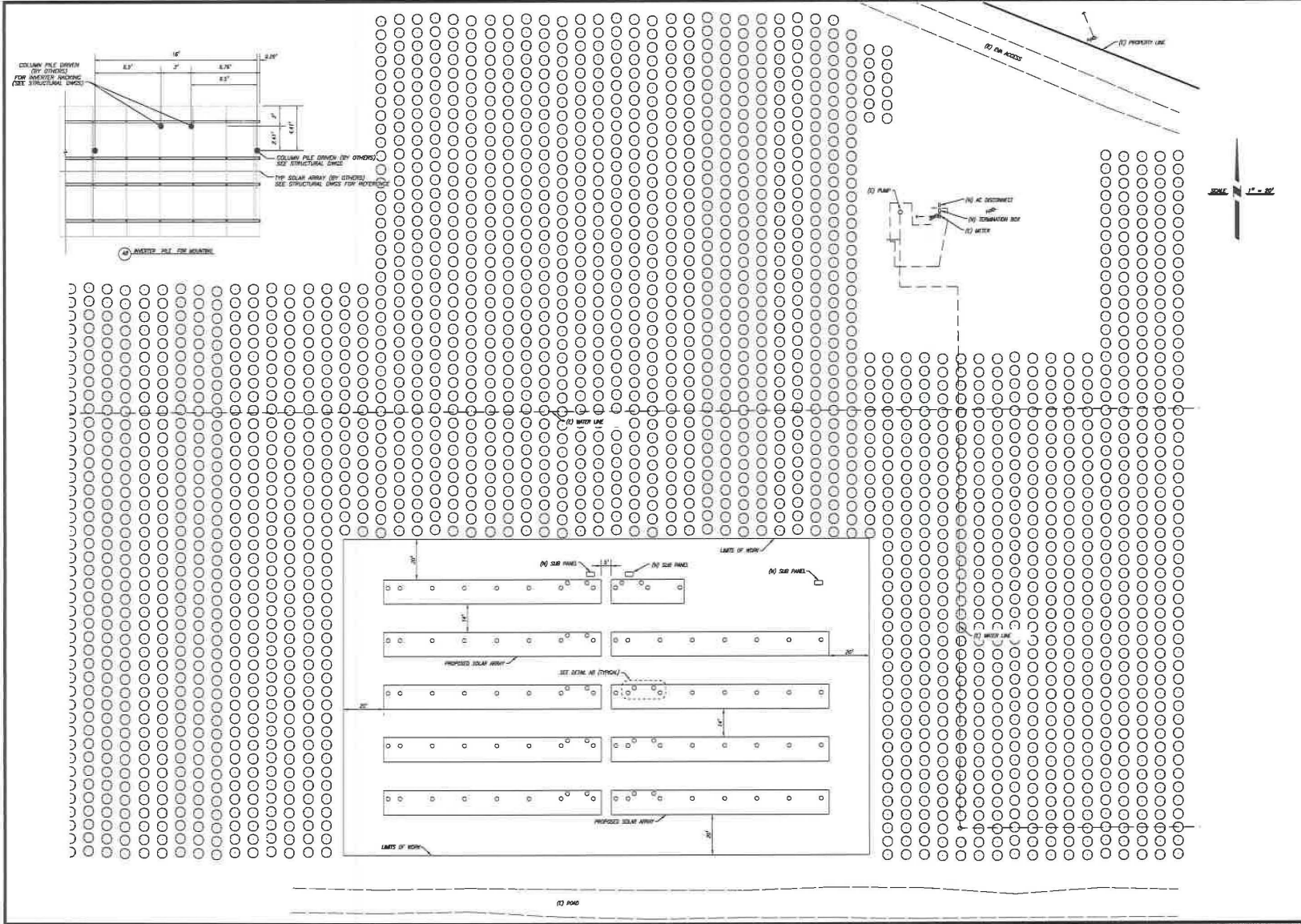
BENCHMARK ENGINEERING, INC.
 CIVIL ENGINEERING & LAND SURVEYING
 1121 COMDALE ROAD - SUITE 1 - MODesto, CALIFORNIA - 95368
 (209) 548-8900
 (209) 548-8908



SITE PLAN
A.L. GILBERT AIRPORT
 STANISLAUS COUNTY, CALIFORNIA

JOB NO. 121558
 DATE: 2/12/2016
 DR BY: JKR
 CK BY: JKR
 SCALE: AS SHOWN

SHEET NUMBER
1
 OF 2 SHEETS



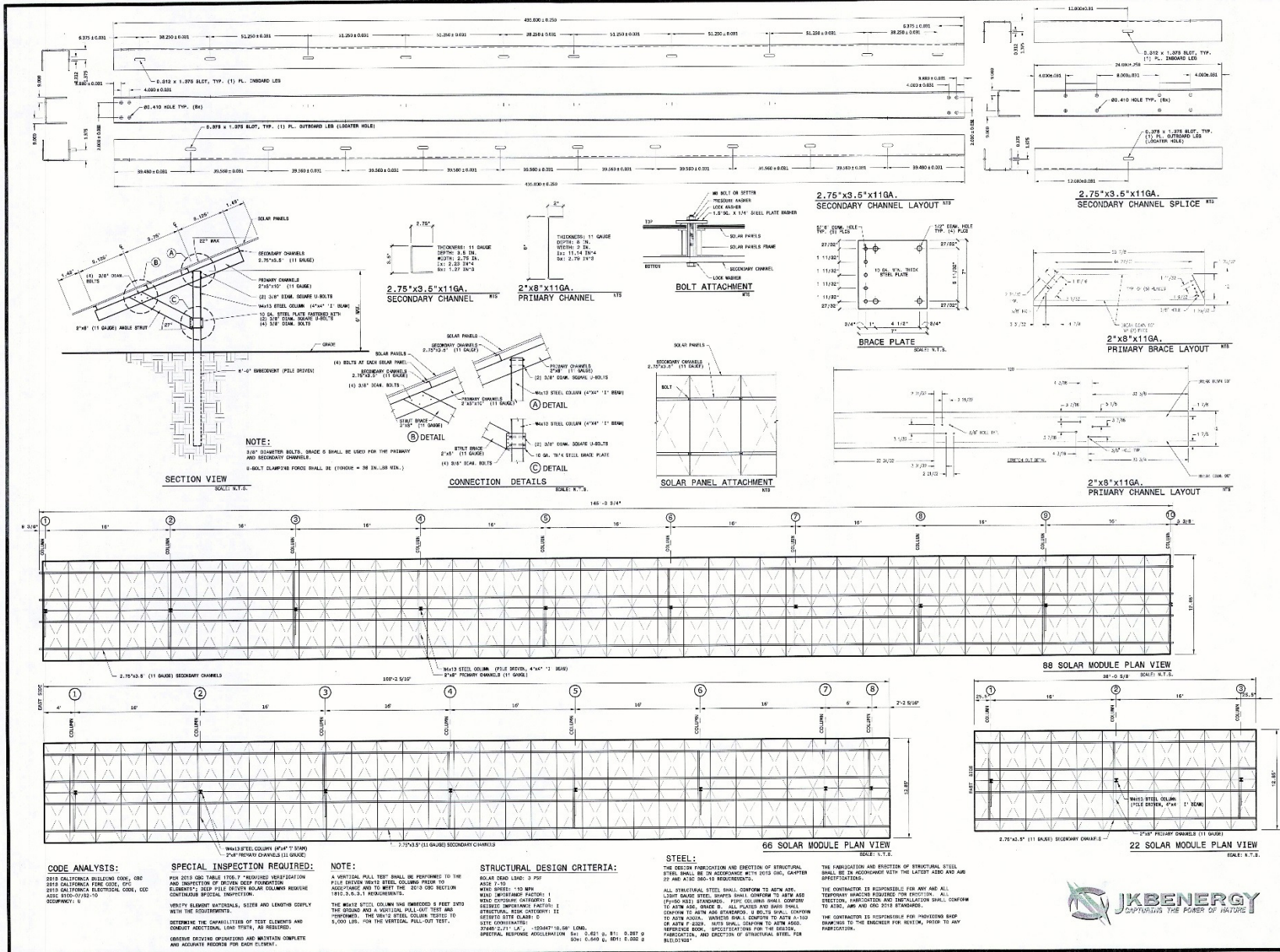
NO.	DESCRIPTION	DATE

BENCHMARK ENGINEERING, INC.
 CIVIL ENGINEERING & LAND SURVEYING
 1131 OAKDALE ROAD - SUITE 1 - MODESTO, CALIFORNIA 95350
 (937) 546-8000 (FAX) 546-8000

SITE PLAN
A.L. GILBERT AIRPORT
 STANISLAUS COUNTY, CALIFORNIA

JOB NO.	12130
DATE	2/22/11
DRAWN BY	JR
CHECKED BY	SCORR
SHEET NUMBER	2
OF 2 SHEETS	





CODE ANALYSIS:
 PER 2013 CALIFORNIA BUILDING CODE, CBC
 PER 2013 CALIFORNIA FIRE CODE, CFC
 PER 2013 CALIFORNIA ELECTRICAL CODE, CEC
 AISC 360-10 (STEEL)
 AISC 308-10 (WELDS)

SPECIAL INSPECTION REQUIRED:
 PER 2013 CBC TABLE 1706.7 "REQUIRED VERIFICATION AND INSPECTION OF CRITICAL BEARINGS"
 ELEMENTS: STEEL WELDS AT COLUMN BEARINGS
 CONTINGENT SPECIAL INSPECTION

NOTE:
 A VERTICAL PULL TEST SHALL BE PERFORMED TO THE FULL DESIGN STEEL COLUMN PRIOR TO ACCEPTANCE AND TO MEET THE "20" OCS REDUCION PER 1.2.2.3.1 REQUIREMENTS.
 THE HEAVY STEEL COLUMN WELDED 5 FEET INTO THE SECOND AND A VERTICAL PULL-OUT TEST WELDED PERFORMED. THE HEAVY STEEL COLUMN TESTED TO 5,000 LBS. FOR THE VERTICAL PULL-OUT TEST.

STRUCTURAL DESIGN CRITERIA:
 SOLAR DEAD LOAD: 3 PSF
 WIND SPEED: 130 MPH
 WIND DIRECTION FACTOR: I
 WIND EXPOSURE FACTOR: I
 GUST EFFECT FACTOR: I
 SEISMIC IMPORTANCE FACTOR: I
 SEISMIC DESIGN CATEGORY: II
 DESIGN WIND SPEED (30 SECONDS DURATION): 130 MPH
 DESIGN WIND PRESSURE (30 SECONDS DURATION): 27.9 PSF
 SPECIAL REQUIRED ACCCELERATION: 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 2.0

STEEL:
 THE DESIGN FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH THE LATEST AISC AND AIA SPECIFICATIONS.
 ALL STRUCTURAL STEEL SHALL CONFORM TO AISC AND AIA (F4130) STEEL STANDARDS. PIPING SHALL CONFORM TO ASME B31.3 AND ASME B31.1. ALL PLATES AND BOLTS SHALL CONFORM TO THE REQUIREMENTS OF THE LATEST AISC AND AIA SPECIFICATIONS.
 THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN, FABRICATION, AND ERECTION OF ALL TEMPORARY BRACINGS REQUIRED FOR ERECTION. ALL TEMPORARY BRACINGS SHALL CONFORM TO AISC AND AIA SPECIFICATIONS.
 THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING SHOP DRAWINGS TO THE ENGINEER FOR REVIEW, PRIOR TO ANY FABRICATION.

**THE FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH THE LATEST AISC AND AIA SPECIFICATIONS.
 ALL STRUCTURAL STEEL SHALL CONFORM TO AISC AND AIA (F4130) STEEL STANDARDS. PIPING SHALL CONFORM TO ASME B31.3 AND ASME B31.1. ALL PLATES AND BOLTS SHALL CONFORM TO THE REQUIREMENTS OF THE LATEST AISC AND AIA SPECIFICATIONS.
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 THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING SHOP DRAWINGS TO THE ENGINEER FOR REVIEW, PRIOR TO ANY FABRICATION.**

CVE CENTRAL VALLEY ENGINEERING INC.
 CIVIL - STRUCTURAL - SURVEYING
 1121 OAKDALE ROAD, SUITE 3
 MODesto, CALIFORNIA 95355
 OFFICE: 209-552-4100 FAX: 209-552-4144

CONTRACT VALLEY ENGINEERING INC. IS NOT PROVIDING ANY WARRANTIES OR REPRESENTATIONS REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION CONTAINED HEREIN. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING ALL INFORMATION AND FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPLICABLE AGENCIES.
 PREPARED BY: [Signature]
 CHECKED BY: [Signature]
 DATE: 4/26/16

Structural Plan & Details
A.L. Gilbert Airport
FGM PV Solar Structure

SEISMIC ZONE MAP
 No. 97399
 CIVIL
 SCALE: 1"=100'

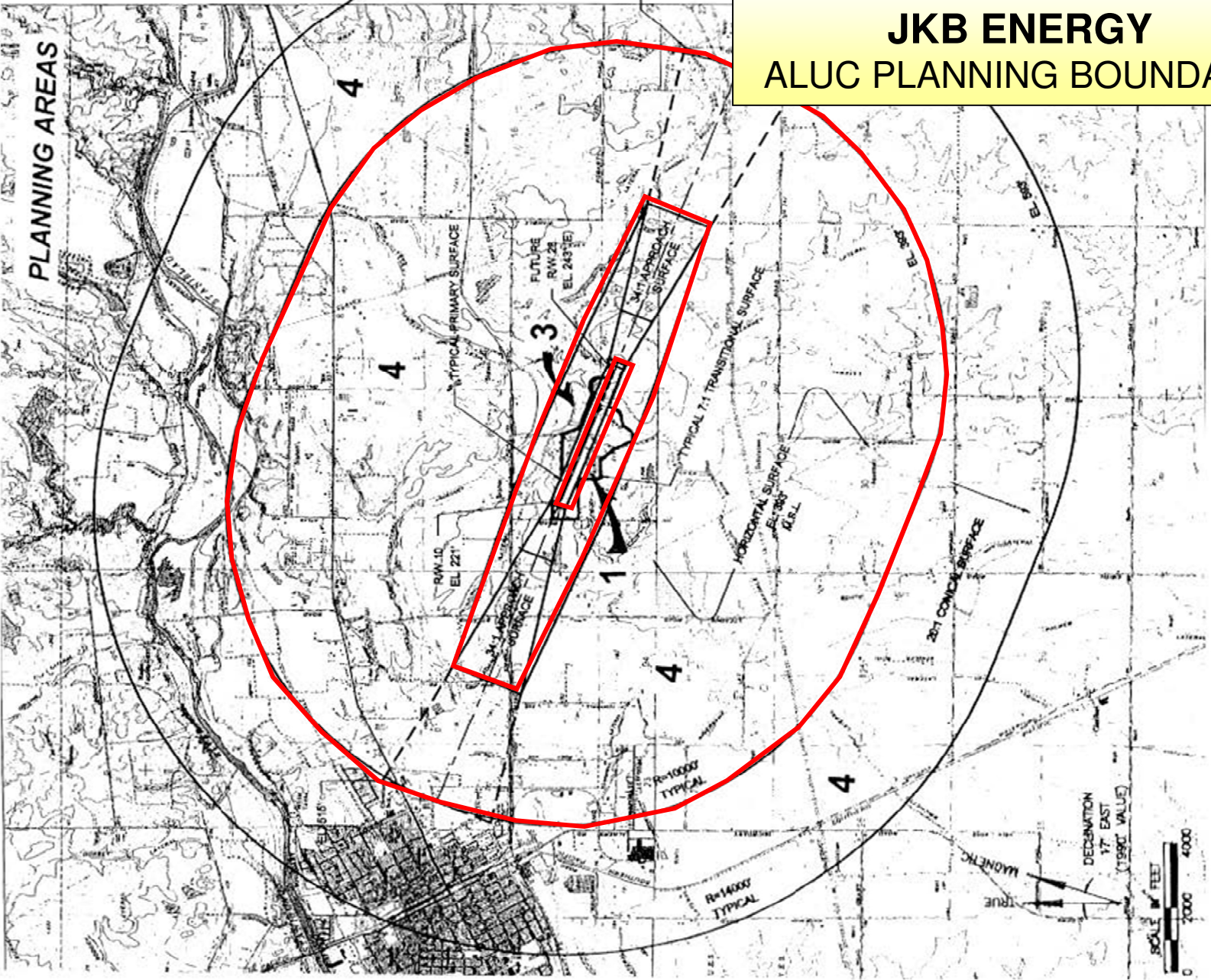
STANISLAUS COUNTY, CALIFORNIA

NO.	REVISION	DATE

JKBENERGY
 COMPANIES THE POWER OF NATURE

S1

SAA PLN 2016-0058
JKB ENERGY
ALUC PLANNING BOUNDARY





Structural Calculations

A.L. Gilbert Airport
Fixed Ground Mount PV Solar Structure
Stanislaus County, CA

For:

JKB Energy
941 E. Monte Vista
Turlock, California 95381

Prepared by:

Central Valley Engineering, Inc.
1121 Oakdale Rd., Suite 3
Modesto, California 95355



Date: April 28, 2016
Job # 16-035

CVE **CENTRAL VALLEY**
ENGINEERING INC.
CIVIL • SURVEYING • STRUCTURAL

WIND DESIGN CRITERIA:

ASCE 7-10

Risk Category = I

Basic Wind Design Speed (V) = 110 mph

Exposure Category = C

SEISMIC DESIGN CRITERIA:

Latitude = 37d45'2.71"

Longitude = -120d47'18.56"

Sps = 0.540 g

SD1 = 0.332 g

A. GENERAL REQUIREMENTS

1. All engineer's drawings, calculations, specifications, sketches and the idea incorporated therein, whether in the form of original documents or copies thereof as instruments of service, are and shall remain the property of the **ENGINEER**. Such documents may not be used by the **CLIENT** or others on any other project nor modified for this or any other project without the expressed written permission.
2. In accordance with generally accepted construction practices, the **CONSTRUCTION CONTRACTOR** will be required to assume sole and complete responsibility for job site conditions during the course of construction of the project, including safety of all persons and property and that this requirement shall be made to apply continuously and not be limited to normal working hours.
3. The **ENGINEER** makes no representations concerning soil conditions and is not responsible for any liability that may arise out of making or failure to make soil surveys, or sub-surface soil tests, or general soil testing.
4. The **ENGINEER** is not responsible for the **CONTRACTOR'S** operations in the areas of construction safety, methods of accomplishing the work, or time of completing.
5. The **ENGINEER** is not responsible for any personal injuries or casualties on the job site while under construction and or any time thereafter.
6. The **ENGINEER** is not responsible for delay, nor shall **ENGINEER** be responsible for damages or be in default or deemed to be in default by reasons of strikes, lockouts, accidents, or natural disasters, or the failure of the **CLIENT** to furnish timely information or to approve or disapprove **ENGINEER'S** work promptly or delay of faulty performance of the **CLIENT**, other contractors, governmental agencies, or any other delays beyond consultant's reasonable control.
7. A complete set of calculations shall be on the job.

B. GENERAL NOTES

1. The **GENERAL CONTRACTOR** shall verify all dimensions, framing conditions and site conditions before starting work. The **ARCHITECT** or **ENGINEER** shall be notified of any discrepancy.
2. The design, adequacy and safety of erection bracing, shoring, temporary supports, etc. is the sole responsibility of the **CONTRACTOR** and has not been considered by **ENGINEER**. The **CONTRACTOR** is responsible for the stability of the structure prior to the application of all shear walls, roof and floor diaphragms and finish materials. He shall provide the necessary aforementioned materials. Observation visits to the site by **ENGINEER** shall not include inspection of the above mentioned items.

3. **CONTRACTOR** shall investigate site during clearing and earthwork operations for filled excavations or buried structures such as cesspools, cisterns, foundations, etc. If any such structures are found, **ENGINEER** shall be notified immediately.
4. The **GENERAL CONTRACTOR** shall coordinate and verify with the plumbing, mechanical, and electrical contractors the size and locations of all piping, duct-work, pits, depressions, roof openings, trenches, sleeves, special bolting for equipment conduits, etc., through and under concrete slabs prior to pouring of footings and floor slabs.
5. All work shall conform to the minimum standards of the latest edition of the **C.B.C.** and any other regulating agencies which have authority over any portion of the work.
6. These notes shall be used in conjunction with the plans and any discrepancies shall be brought to the attention of the **ARCHITECT/ENGINEER**.
7. Dimensions shall take precedence over scales shown on drawings. Typical details and general notes are minimum requirements to be used when conditions are not shown otherwise.
8. Notes and details on drawings shall take precedence over general notes and typical details. Where no details are shown, construction shall conform to similar work on the project.
9. Approval by the inspector does not mean approval or failure to comply with the plans and specifications. Any design which fails to be clear or is ambiguous must be referred to the **DESIGNER** or **ENGINEER** for interpretation or clarification.
11. Construction materials shall be spread out if placed on framed floors or roof. Loads shall not exceed the design live load per square foot. Provide adequate shoring and /or bracing where structure has not attained design strength.
12. Design, materials, equipment and products other than those described below or indicated on the drawings may be considered for use, provided prior approval is obtained from the **ARCHITECT/ENGINEER**, and the applicable governing code authority.

C. QUALITY & DESIGN CRITERIA OF MATERIALS FOR CONSTRUCTION

1. **GENERAL:**
2013 Edition of C.B.C.
Calculation sheets will supersede this design criteria sheet in all cases.
2. **STRUCTURAL STEEL:**
 - Steel shall conform to ASTM A-36
 - Pipe columns shall conform to ASTM A-53, Grade B.
 - Reference Book, "Specifications for the Design, Fabrication, and Erection of Structural Steel for Building" and "AISC", current edition.
 - All welding shall be performed by certified welder, using the electrical shielded arc process at licensed shops or otherwise approved by the Building Department. Continuous inspection required for all field welding.
 - All steel exposed to weather shall be hot-dip galvanized after fabrication or other approved weather proofing method.

USGS Design Maps Summary Report

User-Specified Input

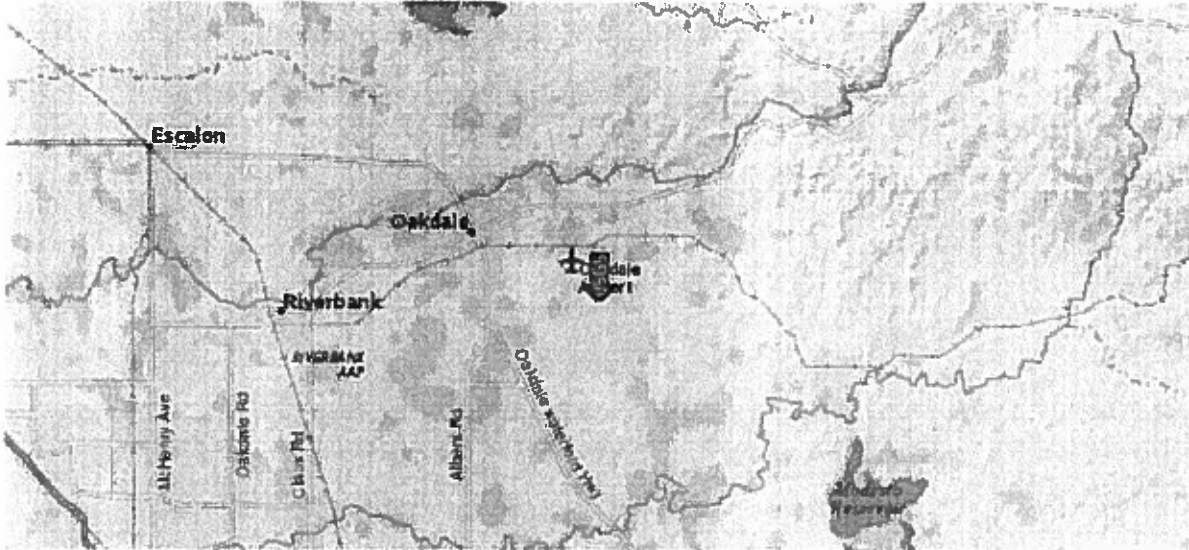
Report Title AL Gilbert Airport
Thu April 28, 2016 18:34:47 UTC

Building Code Reference Document 2012 International Building Code
(which utilizes USGS hazard data available in 2008)

Site Coordinates 37.75075°N, 120.78849°W

Site Soil Classification Site Class D - "Stiff Soil"

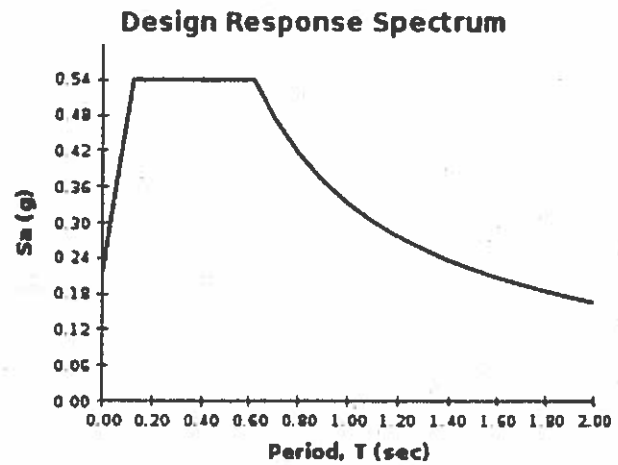
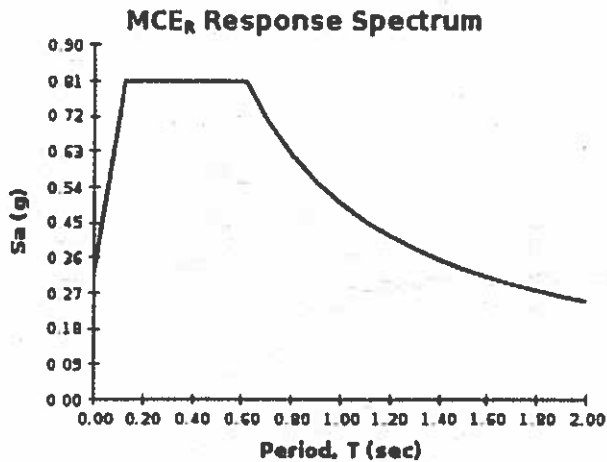
Risk Category I/II/III



USGS-Provided Output

$S_s = 0.621 \text{ g}$	$S_{MS} = 0.809 \text{ g}$	$S_{DS} = 0.540 \text{ g}$
$S_1 = 0.267 \text{ g}$	$S_{M1} = 0.499 \text{ g}$	$S_{D1} = 0.332 \text{ g}$

For information on how the S_s and S_1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.



MecaWind Std v2.2.7.3 per ASCE 7-10

Developed by MECA Enterprises, Inc. Copyright www.mecaenterprises.com

Date : 4/28/2016	Project No. : 16-035
Company Name : Central Valley Engineering	Designed By : Sergio Carrera
Address : 1121 Oakdale Rd., Ste #3	Description : FGM
City : Modesto	Customer Name : AL Gilbert Airport
State : CA	Proj Location : Stan Co., CA

Input Parameters: Other Structures & Building Appurtances MWFRS (Ch 29)

Basic Wind Speed(V) = 110.00 mph	Exposure Category = C
Structural Category = II	Flexible Structure = No
Natural Frequency = N/A	Kd Directional Factor = 0.85
Importance Factor = 1.00	Zg = 900.00 ft
Alpha = 9.50	Bt = 1.00
At = 0.11	Bm = 0.65
Am = 0.15	l = 500.00 ft
Cc = 0.20	Zmin = 15.00 ft
Epsilon = 0.20	Ht- Grade to Top of Sign = 14.00 ft
B - Horizontal Dim. = 145.00 ft	S - Vertical Sign Dim. = 10.00 ft
W - Sign Depth = 1.00 ft	Sh- Ratio of S / Ht = 0.71
Bs- Ratio of B / S = 14.50	Elb - Base Elevation = .00 ft
E - Solidity Ratio = 100.00 %	

Gust Factor Calculations

Gust Factor Category I Rigid Structures - Simplified Method
 Gust1: For Rigid Structures (Nat. Freq.>1 Hz) use 0.85 = 0.85

Gust Factor Category II Rigid Structures - Complete Analysis
 Zm: 0.6*Ht = 15.00 ft
 lzm: Cc*(33/Zm)^0.167 = 0.23
 Lzm: 1*(Zm/33)^Epsilon = 427.06 ft
 Q: (1/(1+0.63*((B+Ht)/Lzm)^0.63))^0.5 = 0.86
 Gust2: 0.925*((1+1.7*lzm*3.4*Q)/(1+1.7*3.4*lzm)) = 0.85

Gust Factor Summary
 Not a Flexible Structure use the Lessor of Gust1 or Gust2 = 0.85

Design Wind Pressure - Other Structures

Elev ft	Kz	Kzt	qz psf	W_Pres_Cf(1.54) psf
14.00	0.85	1.00	13.410	17.55
12.00	0.85	1.00	13.410	17.55
10.00	0.85	1.00	13.410	17.55
8.00	0.85	1.00	13.410	17.55
6.00	0.85	1.00	13.410	17.55
4.00	0.85	1.00	13.410	17.55
2.00	0.85	1.00	13.410	17.55

Note: W_Pres_Cf is Wind Pressure based on Cf(Force Coefficient)

Figure 29.4-1: Wind Loads for Solid Signs & Freestanding Walls

Cf - Force Coefficient	= 1.54
Rd - Reduction Factor (1-(1-E)^1.5)	= 1.00
Kz	= 0.85
Kzt	= 1.00
Qz	= 13.41 psf
Wind Pressure at Elevation 14 ft	= 17.55 psf

- Notes: 1) Signs with openings comprising < 30% of gross area are considered solid signs
 2) Force Coefficients for solid signs with openings shall be multiplied by Rd
 3) Case C only applies when Bs >= 2

Distance from leading edge ft	Cf Force Coeff.	Kz	Kzt	Qh psf	Wind_Pressure @ Distance psf
From 0 to 10.0	4.01	0.85	1.00	13.41	45.71
From 10.0 to 20.0	2.60	0.85	1.00	13.41	29.64

From 20.0 to 30.0	2.00	0.85	1.00	13.41	22.80
From 30.0 to 40.0	1.52	0.85	1.00	13.41	17.33
From 40.0 to 50.0	1.37	0.85	1.00	13.41	15.62
From 50.0 to 100.0	0.91	0.85	1.00	13.41	10.37
>100.0	0.55	0.85	1.00	13.41	6.27

RdC - Reduction Factor for Case C ($1.8 - S / Ht$) = 1.00

Note: When $S / Ht > 0.8$ then Cf must be multiplied by RdC.



Job# 16-035
Date: 28-Apr-16

1121 Oakdale Rd., Suite 3
Modesto, CA 95355
Office: 209-522-4100
Fax: 209-522-4144

A.L. Gilbert Airport
Fixed Ground Mount Solar Structure
Stanislaus County, CA

Channel Design

wind pressure = 17.6 psf
Dead Load = 3 psf
span = 16 ft
Spacing = 41.57 in

Try: 2.75" x 3.5" (11 gage channel)

b = 2.75 in
d = 3.5 in
h = 3.2608 in
t = 0.1196 in

unit load (w) = 71.4 plf
V = 570.895 lbs
M = 2283.58 ft.lbs
Section modulus = S req'd = 1.2582 in³

Moment of inertia (Ix):

$I_x = [bd^3 - h^3(b-t)]/12$
Ix = 2.23 in⁴

Section modulus provided = $I_x/(d/2) = 1.27 \text{ in}^3 > S \text{ req'd}$

Use: 2.75" x 3.5" (11 gage) channels

PRIMARY STRUT DESIGN

$DL = 3.1 \text{ PSF}, LL = 27.3 \text{ PSF}$

$P_1 = P_4 = DL = 3.1 \text{ PSF} (3.5/2)(16' \text{ MAX.}) = 86.5 \#$
 $LL = 27.3 \text{ PSF} (3.5/2)(16' \text{ MAX.}) = 764.4 \#$
 $TL = 86.5 + 764.4 = 850.9 \#$

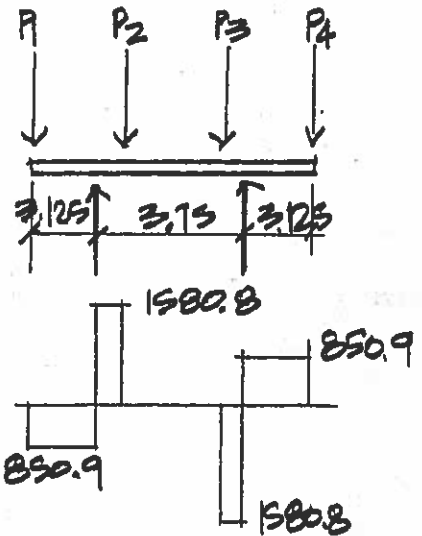
$P_2 = P_3: DL = 3.1 \text{ PSF} (6.5/2)(16' \text{ MAX.}) = 161.2 \#$
 $LL = 27.3 \text{ PSF} (6.5/2)(16' \text{ MAX.}) = 1419.6 \#$
 $TL = 161.2 + 1419.6 = 1580.8 \#$

$V_{PP} = V_{PL}: DL = 86.5 + 161.2 = 247.7 \#$
 $LL = 764.4 + 1419.6 = 2184 \#$
 $TL = 247.7 + 2184 = 2431.7 \#$

$S_{REQ'D} = 2639.1 \#(12) / [0.66 \times 33000] = 1465 \text{ IN}^3$

$I_x = [bd^3 - h^3(b-t)]/12 = [12(8)^3 - (7.76)^3(2-0.1196)]/12 = 12.09 \text{ IN}^4$

$S_{PROV'D} = I_x / (d/2) = 12.09 / (8/2) = 3.02 \text{ IN}^3 > 1.465 \text{ IN}^3 \checkmark \text{ O.K.}$



$2639.1 \# \text{ MAX.}$
 USE: $2'' \times 8'' - 11 \text{ GA. CH.}$
 $b = 2''$
 $h = 7.76''$
 $d = 8''$
 $t = 0.1196''$

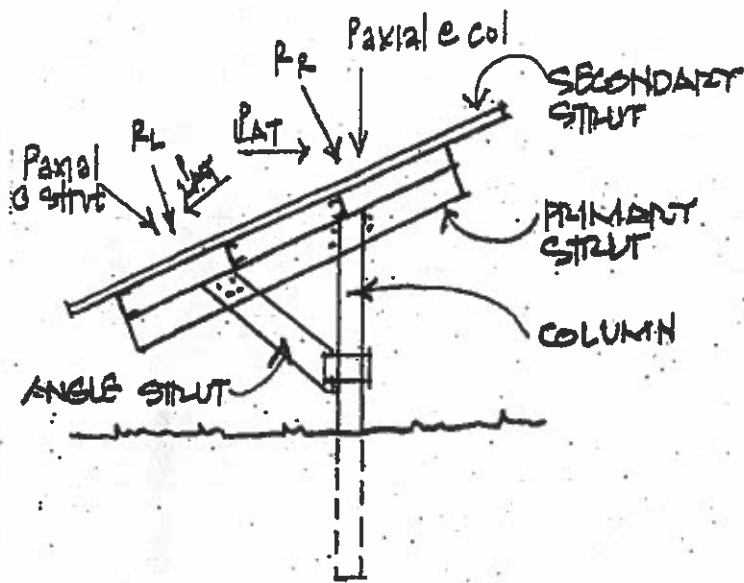
BOLT ATTACHMENT @ SOLAR PANELS:

$1580.8 \# / 5 \text{ BOLTS PER } 16' \text{ SPAN} = 317 \# \text{ @ EA. BOLT (REQ'D)}$

EA. BOLT IS TORQUED W/ 10 FT. LBS, = 120 IN. LBS.

$120 \text{ IN. LBS} / (0.6 \times 3/8'' \phi) = 533 \# > 317 \# \checkmark \text{ O.K.}$

PROJECT: AL GILBERT AIRPORT



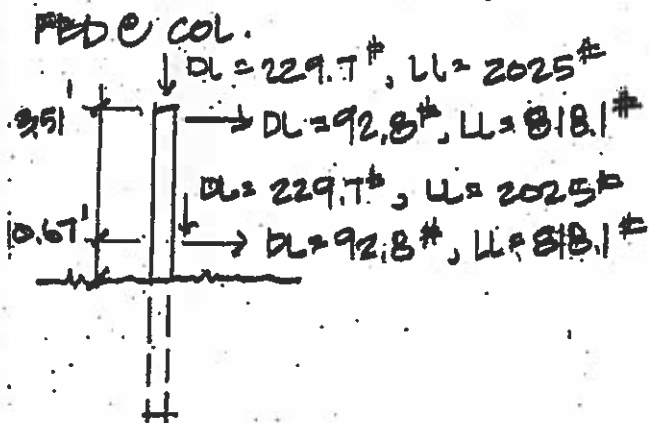
Paxial @ Angle Strut:
 $DL = 247.7 \cos 51^\circ = 155.9\#$
 $LL = 2184 \cos 51^\circ = 1374.4\#$

PLAT. @ Angle strut:
 $DL = 247.7 \cos 39^\circ = 192.5\#$
 $LL = 2184 \cos 39^\circ = 1697.3\#$

Paxial @ col.
 $DL = 247.7 \cos 22^\circ = 229.7\#$
 $LL = 2184 \cos 22^\circ = 2025\#$

PLAT. @ col:
 $DL = 247.7 \cos 68^\circ = 92.8\#$
 $LL = 2184 \cos 68^\circ = 818.1\#$

U-BOLT CLAMPING FORCE
 TORQUE / (K x DIA)
 $= \frac{30(12)14\#}{(0.20 \times 3/8)}$
 $= 4800 \text{ lbs PER U-BOLT}$
 $4800 \text{ lbs} > 2255 \text{ lbs} \checkmark \text{ O.K.}$



BOLT ATTACHMENT (PRIMARY & SECONDARY CHANNELS)
 USE: $3/8" \phi$, GRADE 5 @ EA. INTERSECTION (SEE PLANS)

MEMBER CONNECTIONS:

MAX. SHEAR @ ANGLE STRUT = 2025#

USE: (4) $3/8" \phi$ BOLTS @ BA. CONNECTION &

(2) $3/8" \phi$ SQ. U-BOLTS @ COL. CONNECTION.

Steel Column

File = z:\Projects\UKBENE-1116-035-1\ALGLB-2.EC6
 ENERCALC, INC. 1983-2016, Build:6.16.4.15, Ver:6.16.4.15

Lic. #: KW-06008520

Licensee: CENTRAL VALLEY ENGINEERING INC.

Description: Typical Column

Code References

Calculations per AISC 360-10, IBC 2012, CBC 2013, ASCE 7-10
 Load Combinations Used: ASCE 7-10

General Information

Steel Section Name :	W4x13	Overall Column Height	6.0 ft
Analysis Method :	Allowable Strength	Top & Bottom Fixity	Top Free, Bottom Fixed
Steel Stress Grade		Brace condition for deflection (buckling) along columns :	
Fy : Steel Yield	36.0 ksi	X-X (width) axis :	
E : Elastic Bending Modulus	29,000.0 ksi	Unbraced Length for X-X Axis buckling = 6 ft, K = 2.1	
		Y-Y (depth) axis :	
		Unbraced Length for Y-Y Axis buckling = 6 ft, K = 2.1	

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Column self weight included : 78.224 lbs * Dead Load Factor

AXIAL LOADS . . .

Axial Load at 6.0 ft, D = 0.230, W = 2.025 k

Axial Load at 6.0 ft, D = 0.230, W = 2.025 k

BENDING LOADS . . .

Lat. Point Load at 5.177 ft creating My-y, D = 0.0930, W = 0.8180 k

Lat. Point Load at 0.670 ft creating Mx-x, D = 0.0930, W = 0.480 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.6577 : 1**
 Load Combination **+D+0.60W+H**
 Location of max. above base **0.0 ft**
 At maximum location values are . . .
 Pa : Axial **2.968 k**
 Pn / Omega : Allowable **25.181 k**
 Ma-x : Applied **-0.2553 k-ft**
 Mn-x / Omega : Allowable **11.281 k-ft**
 Ma-y : Applied **-3.022 k-ft**
 Mn-y / Omega : Allowable **5.246 k-ft**

Maximum SERVICE Load Reactions . .
 Top along X-X **0.0 k**
 Bottom along X-X **0.8180 k**
 Top along Y-Y **0.0 k**
 Bottom along Y-Y **0.480 k**

Maximum SERVICE Load Deflections . . .
 Along Y-Y **0.003273 in** at **6.0 ft** above base
 for load combination : W Only
 Along X-X **0.7199 in** at **6.0 ft** above base
 for load combination : W Only

PASS Maximum Shear Stress Ratio = **0.02272 : 1**
 Load Combination **+D+0.60W+H**
 Location of max. above base **0.0 ft**
 At maximum location values are . . .
 Va : Applied **0.3810 k**
 Vn / Omega : Allowable **16.773 k**

Load Combination Results

Load Combination	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
	Stress Ratio	Status	Location	Stress Ratio	Status	Location
+D+H	0.108	PASS	0.00 ft	0.006	PASS	0.00 ft
+D+L+H	0.108	PASS	0.00 ft	0.006	PASS	0.00 ft
+D+Lr+H	0.108	PASS	0.00 ft	0.006	PASS	0.00 ft
+D+S+H	0.108	PASS	0.00 ft	0.006	PASS	0.00 ft
+D+0.750Lr+0.750L+H	0.108	PASS	0.00 ft	0.006	PASS	0.00 ft
+D+0.750L+0.750S+H	0.108	PASS	0.00 ft	0.006	PASS	0.00 ft
+D+0.60W+H	0.658	PASS	0.00 ft	0.023	PASS	0.00 ft
+D+0.70E+H	0.108	PASS	0.00 ft	0.006	PASS	0.00 ft
+D+0.750Lr+0.750L+0.450W+H	0.520	PASS	0.00 ft	0.018	PASS	0.00 ft
+D+0.750L+0.750S+0.450W+H	0.520	PASS	0.00 ft	0.018	PASS	0.00 ft
+D+0.750L+0.750S+0.5250E+H	0.108	PASS	0.00 ft	0.006	PASS	0.00 ft
+0.60D+0.60W+0.60H	0.615	PASS	0.00 ft	0.020	PASS	0.00 ft
+0.60D+0.70E+0.60H	0.065	PASS	0.00 ft	0.003	PASS	0.00 ft



CENTRAL VALLEY

ENGINEERING INC.

CIVIL • SURVEYING • STRUCTURAL

Central Valley Engineering, Inc.
1121 ,Oakdale Rd., Ste#3
Modesto, CA 95355

Project Title: AL Gilbert Airport
Engineer: Sergio Carrera
Project Descr: PV Ground Mounted System

Project ID: 16-035

Printed: 28 APR 2016, 11:54AM

Steel Column

File = z:\Projects\UKBENE-1116-035-1VALGLB-2.EC6
ENERCALC, INC. 1983-2016, Build:8.16.4.15, Ver:6.16.4.15

Lic. #: KW-06008520

Licensee: CENTRAL VALLEY ENGINEERING INC.

Description: Typical Column

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction
	@ Base	@ Top	@ Base	@ Top	@ Base
+D+H	-0.093	k	-0.093	k	0.538 k
+D+L+H	-0.093	k	-0.093	k	0.538 k
+D+Lr+H	-0.093	k	-0.093	k	0.538 k
+D+S+H	-0.093	k	-0.093	k	0.538 k
+D+0.750Lr+0.750L+H	-0.093	k	-0.093	k	0.538 k
+D+0.750L+0.750S+H	-0.093	k	-0.093	k	0.538 k
+D+0.60W+H	-0.584	k	-0.381	k	2.968 k
+D+0.70E+H	-0.093	k	-0.093	k	0.538 k
+D+0.750Lr+0.750L+0.450W+H	-0.461	k	-0.309	k	2.361 k
+D+0.750L+0.750S+0.450W+H	-0.461	k	-0.309	k	2.361 k
+D+0.750L+0.750S+0.5250E+H	-0.093	k	-0.093	k	0.538 k
+0.60D+0.60W+0.60H	-0.547	k	-0.344	k	2.753 k
+0.60D+0.70E+0.60H	-0.056	k	-0.056	k	0.323 k
D Only	-0.093	k	-0.093	k	0.538 k
Lr Only		k		k	k
L Only		k		k	k
S Only		k		k	k
W Only	-0.818	k	-0.480	k	4.050 k
E Only		k		k	k
H Only		k		k	k

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
+D+H	0.0818 in	6.000 ft	0.001 in	6.000 ft
+D+L+H	0.0818 in	6.000 ft	0.001 in	6.000 ft
+D+Lr+H	0.0818 in	6.000 ft	0.001 in	6.000 ft
+D+S+H	0.0818 in	6.000 ft	0.001 in	6.000 ft
+D+0.750Lr+0.750L+H	0.0818 in	6.000 ft	0.001 in	6.000 ft
+D+0.750L+0.750S+H	0.0818 in	6.000 ft	0.001 in	6.000 ft
+D+0.60W+H	0.5138 in	6.000 ft	0.003 in	6.000 ft
+D+0.70E+H	0.0818 in	6.000 ft	0.001 in	6.000 ft
+D+0.750Lr+0.750L+0.450W+H	0.4058 in	6.000 ft	0.002 in	6.000 ft
+D+0.750L+0.750S+0.450W+H	0.4058 in	6.000 ft	0.002 in	6.000 ft
+D+0.750L+0.750S+0.5250E+H	0.0818 in	6.000 ft	0.001 in	6.000 ft
+0.60D+0.60W+0.60H	0.4810 in	6.000 ft	0.002 in	6.000 ft
+0.60D+0.70E+0.60H	0.0491 in	6.000 ft	0.000 in	6.000 ft
D Only	0.0818 in	6.000 ft	0.001 in	6.000 ft
Lr Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
L Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
S Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
W Only	0.7199 in	6.000 ft	0.003 in	6.000 ft
E Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
H Only	0.0000 in	0.000 ft	0.000 in	0.000 ft

Steel Section Properties : W4x13

Steel Column

File = z:\Projects\UKBENE-1116-035-1\ALGLB-2.EC6
 ENERCALC, INC. 1983-2016, Build:6.16.4.15, Ver:6.16.4.15

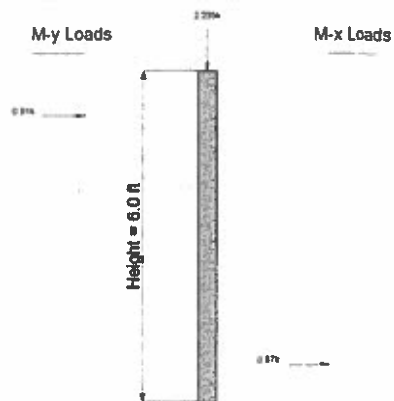
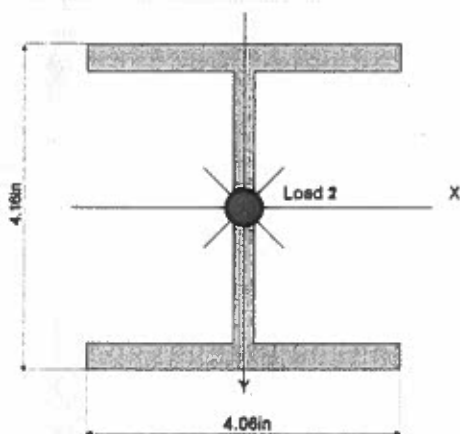
Lic. #: KW-06008520

Licensee: CENTRAL VALLEY ENGINEERING INC.

Description: Typical Column

Steel Section Properties : W4x13

Depth	=	4.160 in	I _{xx}	=	11.30 in ⁴	J	=	0.151 in ⁴
Web Thick	=	0.280 in	S _{xx}	=	5.46 in ³	C _w	=	14.00 in ⁶
Flange Width	=	4.060 in	R _{xx}	=	1.720 in			
Flange Thick	=	0.345 in	Z _x	=	6.280 in ³			
Area	=	3.830 in ²	I _{yy}	=	3.860 in ⁴			
Weight	=	13.037 plf	S _{yy}	=	1.900 in ³	W _{no}	=	3.870 in ²
K _{design}	=	0.595 in	R _{yy}	=	1.000 in	S _w	=	1.360 in ⁴
K ₁	=	0.500 in	Z _y	=	2.920 in ³	C _f	=	1.240 in ³
r _t	=	1.160 in	r _T	=	1.100 in	C _w	=	3.090 in ³
Y _{cg}	=	0.000 in						



Loads are total entered value. Arrows do not reflect absolute direction.



April 28, 2016

RE: Pull-Out & Lateral Load Test Results
AL Gilbert Airport – 191 kW FGM PV Solar Project
Stanislaus County, CA
CVE Project # 16-035a

To whom this may concern:

The steel columns supporting the solar structures for this project are pile driven using a pneumatic pile driver. Since the steel columns do not meet the minimum requirements for the H-piles as stated in section 1810.3.5.3.1 of the 2013 CBC, a “pull-out” test was performed to certify that the pile driven columns are able to resist the maximum design loads. The following maximum vertical load design criteria for each column is based on a 110 mph wind load (worst-case).

Maximum Uplift for each column: 4,700 lbs

A representative W4x13 steel column located within the solar footprint was pile-driven 6'-0" into the existing soil and used for the pull-out test. A calibrated “BVA Hydraulics” hollow-hole cylinder pump and gauge (Model HC2002T) was used for the pull-out test. The W4x13 steel column held the vertical pull-out test to 5,000 lbs.

The undersigned has determined that as of this date, the W4x13 steel column is design compliant based on the above design criteria and allowable deflection. It should be noted that this analysis only reviewed the structural items for the solar structure and their anchorage. Should you have any questions, please do not hesitate to call me.

Should you have any questions or comments, you may contact me at (209) 485-5600 or via e-mail: scarrera@cvengineers.net

Sincerely,

Sergio Carrera
RCE #C67589
President

JKM315P-72

295-315 Watt

POLY CRYSTALLINE MODULE

Positive power tolerance of 0/+3%

ISO9001:2008, ISO14001:2004, OHSAS18001 certified factory.
IEC61215, IEC61730 certified products.



KEY FEATURES



High Efficiency:

High module conversion efficiency (up to 16.23%), through innovative manufacturing technology.



Low-light Performance:

Advanced glass and solar cell surface texturing allow for excellent performance in low-light environments.



Severe Weather Resilience:

Certified to withstand: wind load (2400 Pascal) and snow load (5400 Pascal).



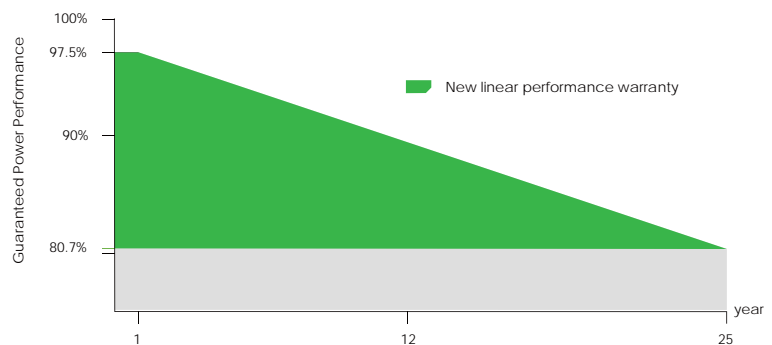
Durability against extreme environmental conditions:

High salt mist and ammonia resistance certified by TUV NORD.

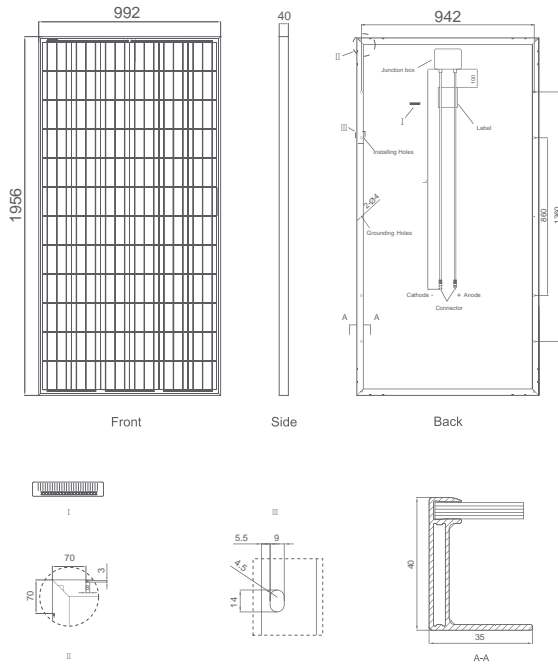


LINEAR PERFORMANCE WARRANTY

10 Year Product Warranty • 25 Year Linear Power Warranty



Engineering Drawings

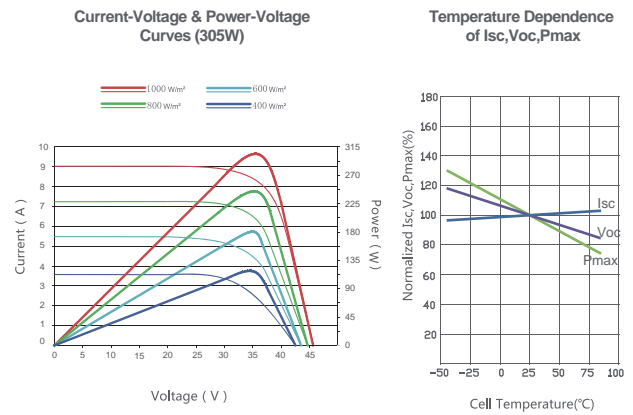


Packaging Configurations

(Two boxes =One pallet)

25 pcs/box, 50 pcs/pallet, 600 pcs/40'HQ Container

Electrical Performance & Temperature Dependence



Mechanical Characteristics

Cell Type	Poly-crystalline 156×156mm (6 inch)
No. of cells	72 (6×12)
Dimensions	1956×992×40mm (77.01×39.05×1.57 inch)
Weight	26.5kg (58.4 lbs)
Front Glass	4.0 mm, High Transmission, Low Iron, Tempered Glass
Frame	Anodized Aluminium Alloy
Junction Box	IP67 Rated
Output Cables	TÜV 1×4.0mm ² , Length:900mm

SPECIFICATIONS

Module Type	JKM295P		JKM300P		JKM305P		JKM310P		JKM315P	
	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax)	295Wp	218Wp	300Wp	221Wp	305Wp	225Wp	310Wp	230Wp	315Wp	233Wp
Maximum Power Voltage (Vmp)	36.2V	33.5V	36.6V	33.7V	36.8V	34.0V	37.0V	34.4V	37.2V	34.7V
Maximum Power Current (Imp)	8.15A	6.50A	8.20A	6.56A	8.30A	6.62A	8.38A	6.68A	8.48A	6.71A
Open-circuit Voltage (Voc)	45.1V	41.9V	45.3V	42.3V	45.6V	42.4V	45.9V	42.7V	46.2V	42.8V
Short-circuit Current (Isc)	8.76A	7.09A	8.84A	7.16A	8.91A	7.21A	8.96A	7.26A	9.01A	7.28A
Module Efficiency STC (%)	15.20%		15.46%		15.72%		15.98%		16.23%	
Operating Temperature(°C)	-40°C~+85°C									
Maximum system voltage	1000VDC (ETL)									
Maximum series fuse rating	15A									
Power tolerance	0~+3%									
Temperature coefficients of Pmax	-0.41%/°C									
Temperature coefficients of Voc	-0.31%/°C									
Temperature coefficients of Isc	0.06%/°C									
Nominal operating cell temperature (NOCT)	45±2°C									

STC: Irradiance 1000W/m²

Cell Temperature 25°C

AM=1.5

NOCT: Irradiance 800W/m²

Ambient Temperature 20°C

Wind Speed 1m/s

* Power measurement tolerance: ± 3%

SUNNY TRIPOWER

12000TL-US / 15000TL-US / 20000TL-US / 24000TL-US



STP 12000TL-US-10 / STP 15000TL-US-10 / STP 20000TL-US-10 / STP 24000TL-US-10



RATED FOR
1000 V DC & 600 V DC
SYSTEMS



Design flexibility

- 1000 V DC or 600 V DC
- Two independent DC inputs
- 15° to 90° mounting angle range
- Detachable DC Connection Unit

System efficiency

- 98% CEC, 98.5% Peak
- 1000 V DC increases system efficiency
- OptiTrac advanced MPPT
- OptiTrac Global Peak MPPT

Enhanced safety

- Integrated DC AFCI
- Floating system with all-pole sensitive ground fault protection
- Reverse polarity indicator

Future-proof

- Cluster Controller, WebConnect/Speedwire
- Bi-directional Ethernet communications
- Complete grid management feature set
- Ability to satisfy future utility requirements

SUNNY TRIPOWER

12000TL-US / 15000TL-US / 20000TL-US / 24000TL-US

The ultimate solution for decentralized PV plants

SMA's new Sunny Tripower TL-US is raising the level of performance for decentralized commercial PV plants. This three-phase transformerless inverter is UL listed for up to 1000 V DC maximum system voltage and has peak efficiency above 98 percent, while OptiTrac Global Peak minimizes the effects of shade for maximum energy production. The Sunny Tripower delivers a future-proof solution with full grid management, and communications and monitoring features. The Sunny Tripower is also equipped with all-pole ground fault protection and integrated AFCI for a safe, reliable solution. It offers unmatched flexibility with a wide input voltage range and two independent MPP trackers. Suitable for both 600 V DC and 1,000 V DC applications, the Sunny Tripower allows for flexible design and a lower levelized cost of energy.



THE TOTAL PACKAGE

The Sunny Tripower TL-US is engineered to optimize design, production, and reliability—reducing a project’s leveled cost of energy and improving its financial returns.

Unmatched flexibility

Available in four power classes, the Sunny Tripower TL-US features a wide operating window, two MPP trackers, and 600 V DC or 1,000 V DC operation, making it ideal for any decentralized project. System engineering is made simple and repeatable, resulting in a shortened design cycle.

Easy to transport and install, the Sunny Tripower can be mounted in a variety of ways from vertical to nearly horizontal. Concrete pads usually required by central inverters are unnecessary, preserving site real estate.

Enhanced power production

Leading efficiency and SMA’s proprietary OptiTrac Global Peak MPP tracking means owners benefit from superior power production and improved economics. When operated at 1,000 V DC, balance of system costs can also be significantly reduced.

The Sunny Tripower TL-US also features advanced diagnostics, including a reverse polarity indicator via the Connection Unit 1000-US.

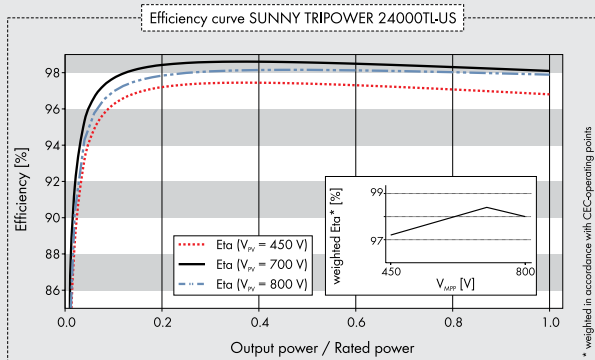
Future proof

The Sunny Tripower TL-US includes a number of technologies designed to meet tomorrow’s requirements. Full grid management functionality is available, as are cutting edge communication options like SMA’s Cluster Controller and Speedwire.

SMA Service can also simplify long-term planning with comprehensive packages covering inverters through plant-wide operations and maintenance (O&M). And, as a decentralized technology, inverter-level O&M is reduced from the beginning compared to centralized architecture.

Optimized cost

The Sunny Tripower TL-US allows integrators to optimally use real estate, shorten design and installation time, and produce more power. Inverter-level O&M is reduced through string technology and long-term support is made simple through SMA’s service organization, making the Sunny Tripower TL-US the ultimate solution for decentralized PV.



Accessories



RS485 interface
DM-485CB-US-10



SMA Cluster Controller
CLCON-10

- Standard features
 - Optional features
 - Not available
- Data at nominal conditions

Technical data	Sunny Tripower 12000TL-US	Sunny Tripower 15000TL-US	Sunny Tripower 20000TL-US	Sunny Tripower 24000TL-US
Input (DC)				
Max. recommended PV power (@ module STC)	15000 W	18750 W	25000 W	30000 W
Max. DC power (@ cos φ = 1)	12250 W	15300 W	20400 W	24500 W
Max. DC voltage*	1000 V	1000 V	1000 V	1000 V
Rated MPPT voltage range	300 V...800 V	300 V...800 V	380 V...800 V	450 V...800 V
MPPT operating voltage range	150 V...1000 V	150 V...1000 V	150 V...1000 V	150 V...1000 V
Min. DC voltage / start voltage	150 V / 188 V	150 V / 188 V	150 V / 188 V	150 V / 188 V
Number of MPPT tracker inputs	2	2	2	2
Max. input current / per MPPT tracker input	66 A / 33 A	66 A / 33 A	66 A / 33 A	66 A / 33 A
Output (AC)				
AC nominal power	12000 W	15000 W	20000 W	24000 W
Max. AC apparent power	12000 VA	15000 VA	20000 VA	24000 VA
Output phases / line connections	3 / 3-N-PE			
Nominal AC voltage	480 / 277 V WYE			
AC voltage range	244 V...305 V			
Rated AC grid frequency	60 Hz			
AC grid frequency / range	50 Hz, 60 Hz / -6 Hz...+5 Hz			
Max. output current	14.4 A	18 A	24 A	29 A
Power factor at rated power / adjustable displacement	1 / 0.8 leading...0.8 lagging			
Harmonics	< 3 %			
Efficiency				
Max. efficiency	98.2 %	98.2 %	98.5 %	98.5 %
CEC efficiency	97.5%	97.5%	97.5%	98.0%
Protection devices				
DC reverse polarity protection	●	●	●	●
Ground fault monitoring / Grid monitoring	●	●	●	●
All-pole sensitive residual current monitoring unit	●	●	●	●
DC AFCI compliant to UL 1699B	●	●	●	●
AC short circuit protection	●	●	●	●
Protection class / overvoltage category	I / IV	I / IV	I / IV	I / IV
General data				
Dimensions (W / H / D) in mm (in)	665 / 690 / 265 (26.1 / 27.1 / 10.4)			
Packing dimensions (W / H / D) in mm (in)	780 / 790 / 380 (30.7 / 31.1 / 15.0)			
Weight	55 kg (121 lbs)			
Packing weight	61 kg (134.5 lbs)			
Operating temperature range	-25°C...+60°C			
Noise emission (typical)	51 dB(A)			
Internal consumption at night	1 W			
Topology	Transformerless			
Cooling concept	OptiCool			
Electronics protection rating	NEMA 3R			
Features				
Display / LED indicators (Status / Fault / Communication)	– / ●	– / ●	– / ●	– / ●
Interfaces: Speedwire / RS485	● / ○	● / ○	● / ○	● / ○
Mounting angle range	15°...90°	15°...90°	15°...90°	15°...90°
Warranty: 10 / 15 / 20 years	● / ○ / ○	● / ○ / ○	● / ○ / ○	● / ○ / ○
Certifications and approvals	UL 1741, UL 1998, UL 1699B, IEEE 1547, FCC Part 15 (Class A & B), CAN/CSA C22.2 107.1-1			
NOTE: US inverters ship with gray lids				
*Suitable for 600 V DC max. systems				
Type designation	STP 12000TL-US-10	STP 15000TL-US-10	STP 20000TL-US-10	STP 24000TL-US-10

CONNECTION UNIT 1000-US

CU 1000-US-10



The Connection Unit is an optional system component of the Sunny Tripower TL-US series and includes combiner box and disconnect functionality in one convenient housing. Its integrated reverse polarity indicator supports safe installation.

Technical data	Connection Unit 1000 V	
Input (DC)		
Max. DC voltage	1000 V	
Number of input source circuits (strings)	8 (4 + 4)	
Input conductor size	#12 to #6 AWG	
Max. fuse size	20 A	
Output (DC)		
Output circuits	2	
Output conductor size	#8 to #2 AWG	
Max. rated continuous current / per output circuit	66 A / 33 A	
Protection devices		
Touchsafe fuse holders	●	
Reverse polarity indicator	●	
Load-break rated output disconnect	●	
General data		
Dimensions (W / H / D) in mm (in)	466 / 398 / 136 (18.4 / 15.7 / 5.4)	
Packing dimensions (W / H / D) in mm (in)	563 / 543 / 240 (22.2 / 21.4 / 9.5)	
Weight	10 kg (22 lbs)	
Packing weight	11 kg (24 lbs)	
Protection rating	NEMA 3R	
Features		
Certificates and permits	UL 1741, CAN/CSA C22.2 107.1-1	
● Standard features ○ Optional features – Not available		
Type designation	CU 1000-US-10	

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