CH2M HILL
2485 Natomas Park Drive
Suite 600
Sacramento, CA 95833-2937
Tel 916.920.0300
Fax 916.920.8463

CH2MHILL

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DATE JUN 14 2010
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June 14, 2010

Mr. John Kessler
Siting Project Manager
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

Subject: Rice Solar Energy Project (09-AFC-10)
Response to CEC Staff Workshop Query 13

Dear Mr. Kessler:

Attached, please find the Response to CEC Staff Workshop Query 13 for Rice Solar Energy Project (09-AFC-10). One hard copy and one (1) electronic copy on CD-ROM are provided.

If you have any questions about this matter, please contact me at (916) 286-0278 or Sarah Madams at (916) 286-0249.

Sincerely,

CH2M HILL

Douglas M. Davy, Ph.D.
AFC Project Manager

Attachment

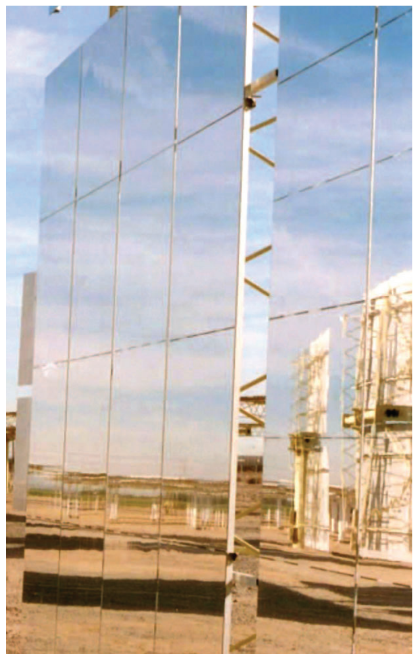
cc: POS List
Project File

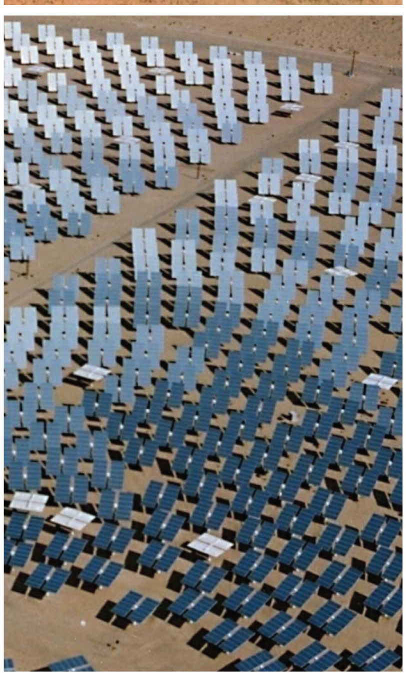
Supplemental Filing

Application for Certification

Response to CEC Staff Workshop Query 13

Rice Solar Energy Project





Submitted by

SOLARRESERVE

Submitted to

California Energy Commission

With Technical Assistance by

CH2MHILL

June 2010

EY072009005SAC

Supplemental Filing

Response to CEC Staff Workshop Query 13

In support of the

Application for Certification

for the

Rice Solar Energy Project

(09-AFC-10)

Submitted to the:

California Energy Commission

Submitted by:

SOLARRESERVE

With Technical Assistance by:

CH2MHILL

Sacramento, California

June 2010

Contents

Introduction

Attached is Rice Solar Energy, LLC's (RSE's) response to California Energy Commission (CEC) Staff Workshop Query 13, submitted in support of RSE's Application for Certification (AFC) for the Rice Solar Energy Project (RSEP) (09-AFC-10). The Workshop Queries are informal requests for additional information that Staff raised during the Data Request Response and Issue Resolution Workshop that was held on March 19, 2010, and for which RSE has agreed to provide a response or additional information to assist Staff in preparing their environmental and engineering assessment of the RSEP. Workshop Query 13 has to do with transmission system engineering and alternatives.

Transmission System Engineering/Alternatives

Substation Communication System

WSQ 13 *Please provide a description of the communication system that may be required to provide communications between the new substation at the interconnection with the Western's existing Parker-Blythe #2 Transmission Line and other Western facilities.*

Response: A dual-path telecommunications interconnection between the RSEP and an existing Western Area Power Administration (Western) substation will be required for breaker control, protective relaying, metering, and other data and control needs. Specific requirements for RSEP will be determined as part of the detail facilities study to be performed by Western as part of Western's Large Generator Interconnection Procedures (LGIP). Generally two physically separate paths of communication are necessary to comply with relevant standards including Western, Western Electricity Coordinating Council (WECC), and North American Electric Reliability Corp/Critical Infrastructure Protection (NERC/CIP) requirements.

Several conventional communications systems are widely employed for this purpose, including:

1. Optical Ground Wire (OPGW)
2. Microwave (radio-frequency) transmission
3. Power Line Carrier/Broadband-over-Power-Line (BPL)
4. All-Dielectric, Self-Supporting (ADSS) optical cable

Several factors (e.g., distances involved, terrain, environmental sensitivities, physical security and incremental cost) will have bearing on selection of the most appropriate telecommunications method for the RSEP. More information on these methods is provided below.

Two of the most common solutions contemplated in the LGIP interconnection process for the RSEP are the fiber-optic cable link (items 1 and 4 above) and microwave transmission (item 2 above). Engineering standards have been developed by Western for application of each of these methods, both of which are employed throughout its system. Microwave is said to be the mainstay of Western's communications system—it is relatively inexpensive and requires very little in the way of incremental physical facilities to provide line-of-sight radio frequency transmission—redundant transmitters and backup power supplies ensure high reliability. Fiber-optic requires a physical point-to-point fiber-optic cable connection from transmitting to receiving station, has greater construction impacts, and is subject to breakage.

The System Impact Study (SIS) was issued by Western to RSE on May 14, 2010 (docketed under separate cover). Western has determined in the SIS that fiber-optic may be the only feasible solution. Accordingly, Western will evaluate a dual fiber-optic link from RSEP's new interconnection substation at the Parker-Blythe #2 line heading north to the Parker substation and also south to the Blythe substation, spanning a total of 62 circuit miles. Some hardware replacement or modification is likely to be required on each of the existing Western towers so that the existing OHGW can be replaced with OPGW, pulled into place by ground equipment.

However, RSE believes further consideration of the microwave and Power Line Carrier designs as alternative systems is warranted in light of the distances and terrain involved with implementing a hard-wired OPGW (or ADSS) solution, and the cost and environmental implications of these hard-wired alternatives.

Power Line Carrier

RSE asked Western to consider the so-called "power line carrier" method (also known as broadband-over-power line, or BPL), which is a key component of Smart Grid initiatives including those sponsored by CEC, California Public Utilities Commission (CPUC), and U.S. Department of Energy. This method sends data along the high-voltage conductor and would require no additional physical facilities or installation other than signal conditioning equipment at the sending and receiving terminals. Western's analysis indicates that this method is not generally accepted under current Western engineering standards for data-carrying communications, but that this method is accepted for protections, such as tripping. There have, however, been recent, proven technology advances in this area over the last decade that would lead to acceptance of this method.

RSE is very interested in pursuing this alternative because (1) engineering standards exist for it and the performance and reliability issues are well documented and (2) the state of these technologies has evolved significantly in recent years and is seeing widespread adoption by investor-owned utilities and distribution utilities, both domestically and abroad. Significant market penetration in North America is expected as a result of Smart Grid initiatives included in economic stimulus programs including tax credits favoring application of emerging smart grid technologies. Systems evaluated include Cisco, Motorola, Siemens, ABB, and other leading global providers.

Power Line Carrier would require only signal conditioning equipment at either end of the power circuit, sending communications and data along the existing conductor. As such, this method could cause the least environmental impact of any of the alternatives. Western has indicated that this method is not in active use. However, RSE believes that adoption of PLC/BPL systems is inevitable on most interstate transmission networks in North America at some point in the future.

In fact, the U.S. Department of Energy, Office of Electricity Delivery and Energy Reliability (OE), in accordance with Title XIII of the Energy Independence and Security Act of 2007 (EISA), is tasked with accelerating the deployment and integration of advanced digital systems that are needed to modernize the nation's electric delivery network for enhanced interoperability and cyber security. The goal of the program is to develop an integrated, national electric communication-IT infrastructure with the ability to dynamically optimize grid operations and resources and incorporate demand response and consumer participation. The National Institute of Standards and Technology (NIST), an agency of the U.S. Department of Commerce, has been charged under EISA with identifying and evaluating existing standards, measurement methods, technologies, and other support in service to Smart Grid adoption.

RSE believes that this alternative offers the opportunity to apply proven technology, at least as one of the two redundant means necessary for data communications and control functions.

Microwave versus Fiber-Optic

Because of the remote location of the interconnection substation, RSE believes that the microwave transmitter/receiver option described above is technically and environmentally optimal. However, in Western's assessment, the point-to-point microwave option was not considered attainable for several technical reasons that were not fully investigated because the OPGW option was determined technically viable. RSE, however, advocates the use of microwave or possibly buried fiber-optic cable as alternative methods to Western's proposed OPGW option, as described further below.

Western's assessment indicates that expected attenuation losses in the waveguide, considering an antenna placement atop the 653-foot-high solar tower, to be prohibitive and therefore technically infeasible. However, as the SIS was only just issued, RSE and Western have not coordinated sufficiently to ascertain technical requirements, engineering limitations, or other restrictions. The RSEP plant data highway extends to the top of the solar tower. RSE believes that radio-frequency conversion equipment can be co-located within the electrical equipment room located at the 500-foot elevation inside the solar tower. The resulting waveguide length of approximately 150-feet is comparable to conventional communication tower configurations and therefore could be feasible. A 6-foot dish could be mounted atop the solar receiver (subject to detail engineering) without increasing the overall height of the 653-foot structure. Given the 54-foot cross-section of the solar receiver topped by the maintenance crane, the addition of a microwave transmitter will be visually unobtrusive.

RSE's preliminary line-of-sight analysis indicates that microwave transmission is possible from the top of the solar tower with a direct line-of-sight path from RSEP to Western's Headgate Rock substation with installation of a receiver tower at Headgate Rock (see Attachment WSQ13-1). The RSEP tower sits at a base elevation of approximately 808-feet above mean sea level (AMSL), with the concrete tower and solar receiver rising to an overall elevation at the top of 1,461 feet AMSL. Approximately 8 miles to the east of the site are the scattered peaks of the West Riverside Mountains, representing the high points in the direct line-of-sight between RSEP and the Headgate Rock substation. At the eastern limit of these mountains, at approximate elevation 1,080 feet AMSL, the land gently slopes away eastward toward the Colorado River valley. The Headgate Rock substation is at approximately 425 feet AMSL

An alternative microwave configuration would include transmitting data to an intermediate tower location situated just south of SR 62 near Radio Tower Road approximately 7 miles east-northeast of the RSEP project site (see Attachment WSQ13-1). Communications signals would be routed to the communications tower site either hard-wired via fiber-optic cable extending between RSEP and the new tower site buried in the SR 62 highway easement or, alternatively, via microwave transmission from a transmitter mounted on the solar tower or other structure within the RSEP. The latter method would require a receiver dish on the new tower as well as the transmitter dish.

For line-of-sight determination for the transmitter placed atop the RSEP solar tower, the configuration of a new receiving tower at Headgate Rock substation would necessitate a tower height of approximately 150 feet to maintain ample beam clearance above the ground at the high-point of 1,195 feet AMSL, which is approximately 8.4 miles east of RSEP (800 feet AMSL). If an intermediate tower is used instead of the solar-tower-mounted transmitter—or in addition to a transmitter at a lower position on the solar tower—a tower approximately 60 feet tall would be situated above the RSEP site in the valley saddle sloping away east-southeast toward Headgate Rock substation. This location provides an unobstructed line-of-sight to Headgate Rock; therefore, a new tower of moderate height would be required to clear any structures in the line-of-sight between Rice, the reflector tower, and Headgate Rock.

RSE notes Western's requirement for two physically separate communication paths. The proposed Western solution would entail pulling new OPGW over the existing Parker-Blythe #2 transmission towers in both the north and south directions from the initial point-of-interconnection for a total of 62 miles of new optical wire. If OPGW is the only method studied, then this is the only way to comply with the requirement for two physically separate communication paths, which are not subject to the same failure mechanism in utility contingency planning scenarios. RSE believes that Western's proposed method poses the most significant potential for impacts. Although the expected impacts would be temporary and transient, they nevertheless could entail substantial monitoring and mitigation. Installation logistics, methods, and impacts have yet to be fully evaluated under the requisite CEQA or NEPA protocols, though these analyses are underway by CEC (as lead CEQA agency) and Western and BLM (as NEPA co-lead agencies).

In order to accomplish the anticipated OPGW solution, a line truck would be used to install hardware and or to pull the new OPGW into place. The line truck would be a large multi-axle, rough-terrain vehicle with an articulating boom man-bucket. The line truck(s) would access the area along existing dirt roads over BLM land and follow the existing dirt maintenance road that parallels the existing 161 kV transmission line. Any areas not accessible by the line truck (e.g., rugged mountainous portions of the dirt road, drift sands at the valley floor) may necessitate use of off-road vehicles or, in the extreme alternative, a helicopter may be necessary for aerial installation of the new hardware or OPGW. OPGW installation would be completed with a small installation crew with one line truck supported by a pickup truck. These vehicles would use existing maintenance roads paralleling the transmission line. However, they may drive off the road at specific locations to set up and pull the OPGW into place. It is expected that this would take place in the same locations used for the original construction of this transmission line. Therefore, it is possible that some temporary impact to vegetation would occur at these positions.

The optical wire would be incorporated with the existing Parker-Blythe #2 161 kV line using one of three methods: (1) OPGW installed as a replacement to one of the existing OHGW wires, (2) ADSS hung from the poles beneath the existing high-voltage conductors, or (3) optical cable wrapped directly onto one of the OHGW or high-voltage conductors. Currently, it is anticipated that Western would require installation of a new OPGW in place of one of the existing OHGW wires, as the two other methods are not presently sanctioned by Western. Figure WSQ13-1 is a sketch of a typical cross section of the existing Western transmission poles, indicating positions where the new optical wire may be mounted in either the OPGW, ADSS, or wrapped-on-conductor method.

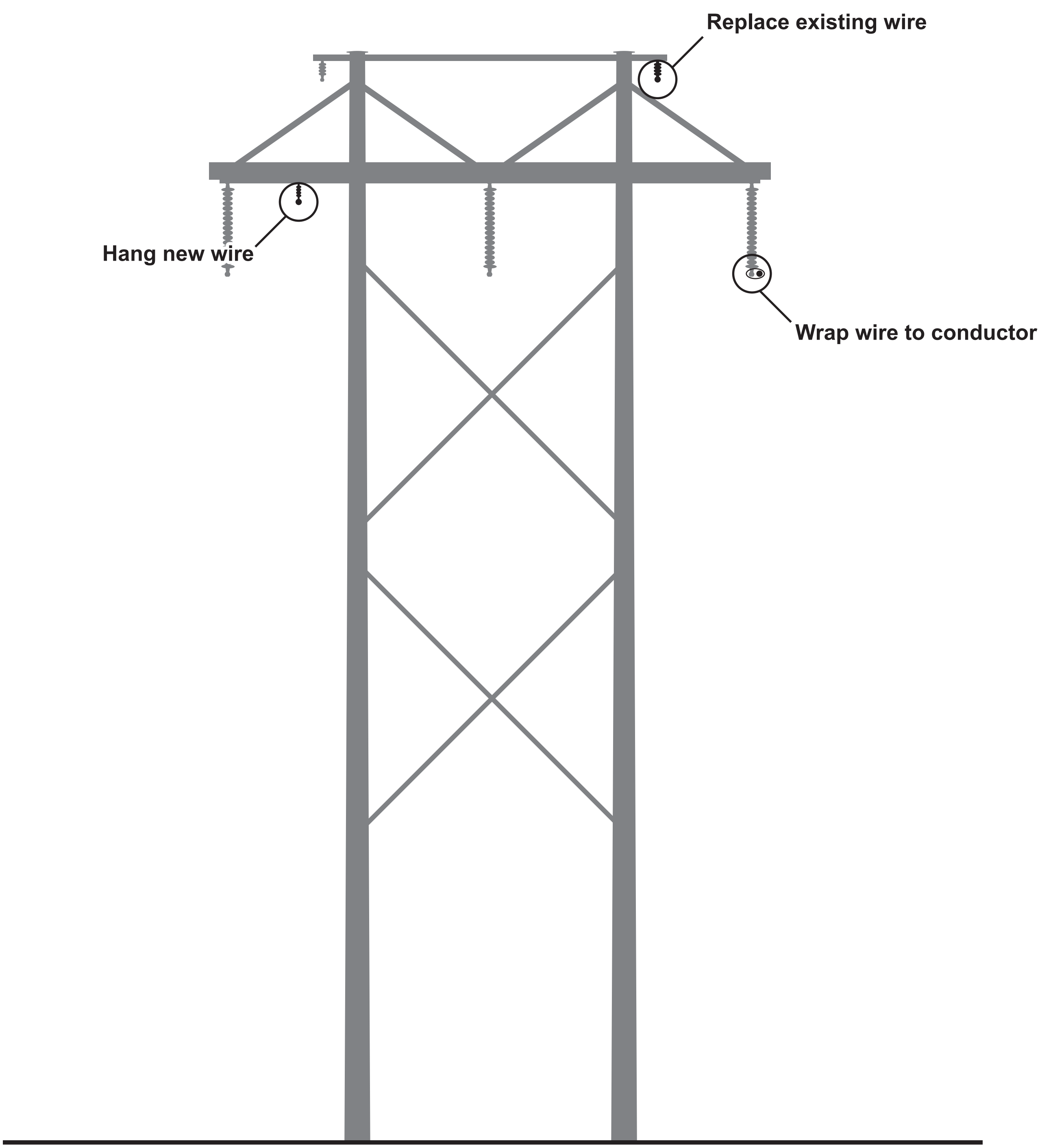


FIGURE WSQ13-1
FIBER-OPTIC CABLE ATTACHMENT ALTERNATIVES, PARKER-BLYTHE 161 KV TRANSMISSION LINE
Rice Solar Energy Project
Riverside County, California

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Buried Fiber-Optic and or Common Carrier ISDN/Broadband Connection

Alternatively, methods other than the overhead methods identified by Western (OPGW, ADSS, etc.) could include direct-burying a new fiber-optic cable following a route that is parallel with and adjacent to the existing Parker-Blythe #2 line from the new interconnection substation to Parker Dam substation (or from the RSEP site directly to Parker Dam, for example, buried in the SR 62 right-of-way using a simple trenching method). In general, buried fiber-optic cable could follow any practical path subject to establishment of land rights including necessary utility easement and or crossing rights. Given that Western's Headgate Rock substation is located on the Parker, Arizona side of the Colorado River, a river crossing with buried fiber-optic cable may be impracticable, unless bundled with existing underground or overhead utilities or, alternatively, if routed to Western's Parker Dam substation, a much greater distance.

Related fiber-optic alternatives might include use of Integrated Services Digital Network (ISDN) or broadband over common carrier lines—none of which are present in the rural towns surrounding the remote RSEP site and would need to be installed by a common carrier telecommunications company network (i.e., Verizon). These methods are also being pursued via the common carrier telecommunications company as many state and federal financial incentives are available under economic stimulus programs to encourage installation of high-speed internet in under-served rural areas such as Vidal Junction and Big River and other isolated communities on the California side of the Lower Colorado River Valley. In respect to application of such methods for critical infrastructure telecommunications, cyber security is a significant area of focus by NERC and numerous standards have been adopted. Engineering standards have been implemented and hardware/firmware and necessary internet protocols are in common use for similar power applications throughout North America.

Microwave Alternative—Incremental Construction

If the microwave alternative were selected, and subject to further permitting with Federal Communications Commission (FCC), Federal Aviation Administration (FAA), and applicable local requirements, RSE would construct a 100-foot-tall microwave tower in a new tower site with approximately dimensions of 40 feet by 40 feet. One 6-foot-diameter microwave transmitter antenna would be installed near the top of the tower. The tower would be a triangular steel lattice tower 100 feet or less in overall structure height. The tower foundation would consist of a poured concrete slab approximately 15 feet wide by 15 feet long by 3 to 4 feet deep with tubular steel supports at approximately 10 feet between centers of each of the three legs.

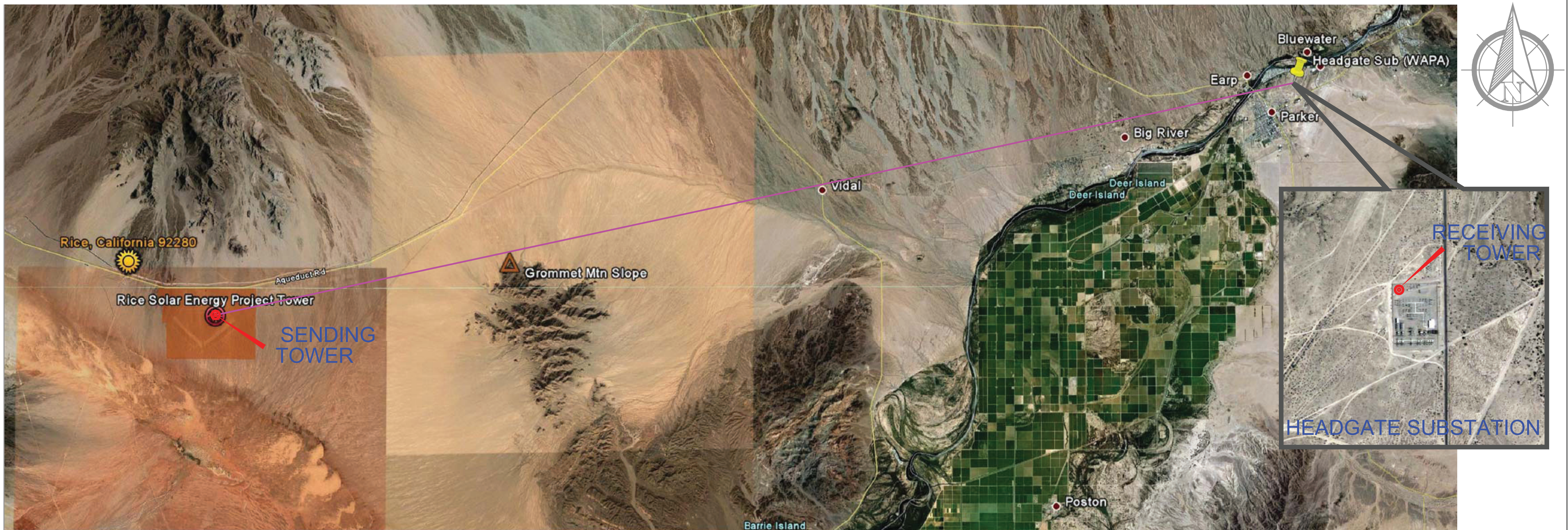
An electrical equipment room would be installed inside the fence line. Power would be supplied from Southern California Edison via a new metered connection with the existing 12 kV distribution line adjacent to the tower site. The microwave waveguides would be supported by a cable tray on the tower. Communications signals would be routed to the tower either via microwave transmission (transmitter mounted on the solar tower or other structure within the RSE, requiring a receiver dish on the new tower) or, alternatively, hard-wired via buried fiber-optic cable extending between RSEP and the new tower site. Electronic equipment inside the tower site fence line would convert the signal into radio-frequency for transmission. The waveguides and the tray would bend from vertical to horizontal and run approximately 10 feet off the ground into the building, which would be located adjacent to the tower.

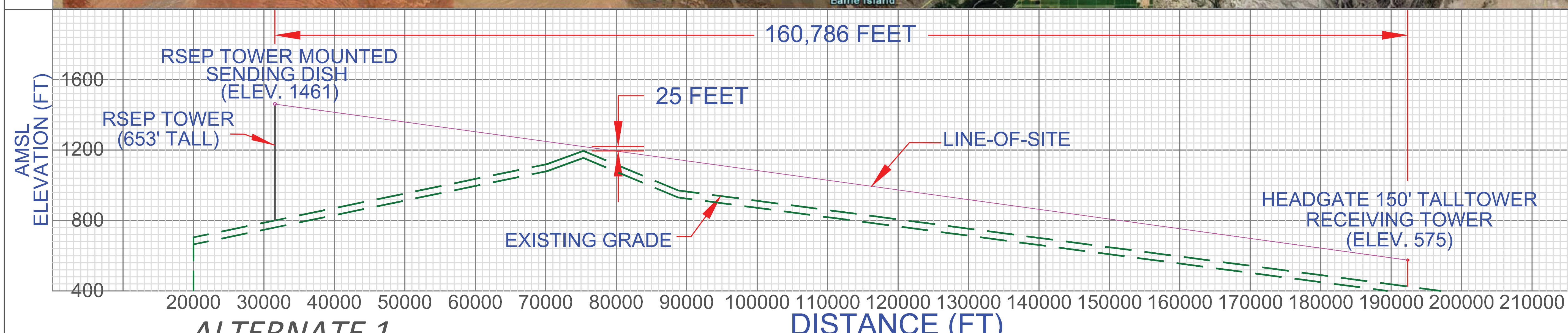
All tower material would be delivered by truck to a temporary staging area (50 feet by 100 feet) just outside the tower site. The construction crew would restore the temporary staging area to pre-construction conditions at completion of tower installation. Tower construction and installation of the antennas and associated equipment would be performed by Western personnel and/or by contractors under the supervision of Western.

Conclusion

RSE requests the CEC permit and evaluate several of these options so that once more detailed feasibility, scoping, and design have been completed, Western and RSE can select the technically viable, cost effective, and environmentally preferred option or options in tandem to achieve redundant, physically separate paths that also satisfy project objectives.

Attachment WSQ13-1
Microwave Line-of-sight Analysis



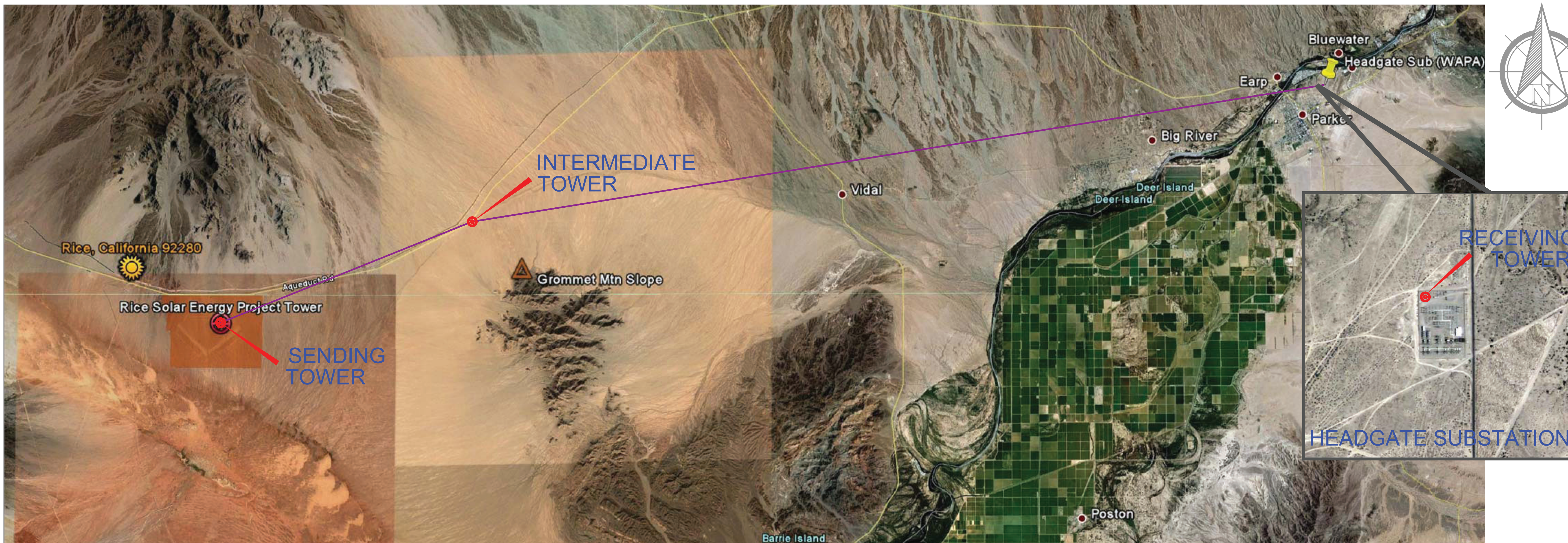


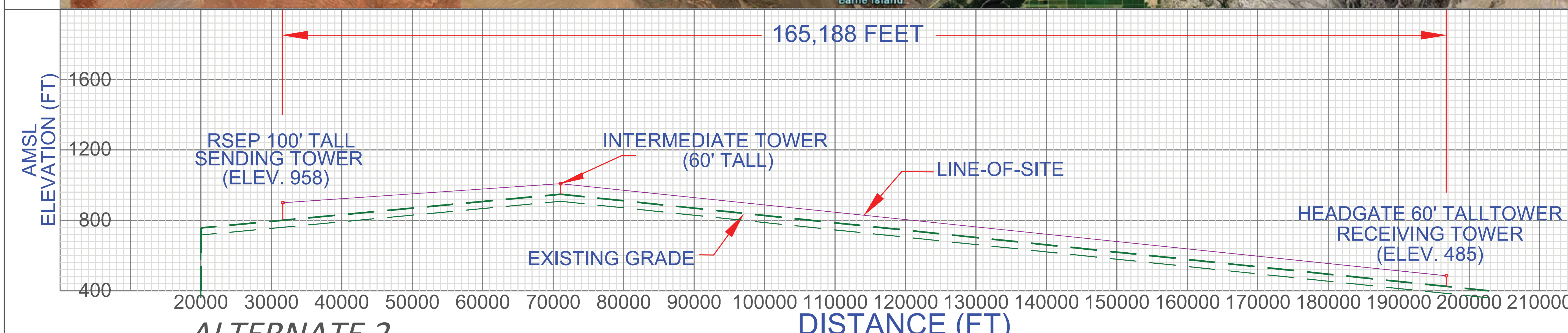
ALTERNATE 1

DRAWING SCALE

SCALE: 1" = 600' (V)
SCALE: 1" = 15,000' (H)

RICE SOLAR ENERGY, LLC *2425 OLYMPIC BOULEVARD, SUITE 500 EAST* *SANTA MONICA, CA 90404*	MICROWAVE RF TRANSMISSION LINE-OF-SIGHT ANALYSIS RICE SOLAR ENERGY PROJECT RICE, CALIFORNIA	DATE: 05.27.10 SHEET 1 OF 2





ALTERNATE 2

DRAWING SCALE

SCALE: 1" = 600' (V)
SCALE: 1" = 15,000' (H)

RICE SOLAR ENERGY, LLC *2425 OLYMPIC BOULEVARD, SUITE 500 EAST* *SANTA MONICA, CA 90404*	*MICROWAVE RF TRANSMISSION* *LINE-OF-SIGHT ANALYSIS* RICE SOLAR ENERGY PROJECT RICE, CALIFORNIA	DATE: 05.27.10 SHEET 2 OF 2