Drainage, Erosion, and Sediment Control Plan

Blythe Solar Power Project

Blythe, California

Submitted to the:
California Energy Commission

PLAN REVIEW ACCEPTANCE

for compliance with the laws, ordinances, regulations and standards (LORS) established by the California Energy Commission.

Plan review acceptance of documents does not authorize construction to proceed in violation of any federal, state or local regulations.

BY: _____ DATE: 10/13/2010

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Submitted by:
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SECTION 1: INTRODUCTION

1.1 Introduction and Project Description

Palo Verde Solar I, LLC proposes to locate a solar power plant near the City of Blythe, in Riverside County, California, on a right-of-way (ROW) leased from the Bureau of Land Management (BLM). The Blythe Solar Power Project (Project) consists of four nominal 250 MW parabolic trough solar thermal power plants, each of which has a "solar field" comprised of rows of parabolic mirrors focusing solar energy on collector tubes. These collector tubes carry heated oil to a boiler which sends live steam to a Rankine-Cycle reheat steam turbine. The boiler turbine and other associated equipment are located at the power block in the center of each unit. The solar field and power generation equipment would be put into operation each morning after sunrise and insolation build-up, and shut down in the evening when insolation drops. Electricity would be produced by each plant's solar receiver boiler and the steam turbine generator. The expected life of the project is 30 years.

The site consists of approximately 9,400 acres and is located about 8 miles west of Blythe, California and 2 miles north of Interstate Highway I-10. Access to the site is from the Mesa Drive exit on I-10. Refer to Appendix A, DESCP Title Sheet CN-100, for a vicinity map of the proposed project. The power generating units are referred to as Unit #1, Unit #2, Unit #3, and Unit #4. Unit #1 is on the northeast corner, Unit #2 is on the northwest corner, Unit #3 is on the southwest corner, and Unit #4 is on the southeast corner. Each unit has its own solar array field and power block. Ancillary facilities, many of which will be shared by multiple units, include an administration building, a parking area, a maintenance building, central switchyard, bioremediation areas, wastewater treatment facilities, onsite access and maintenance roadways, perimeter fencing, and utilities. The total expected disturbed land area including rerouted desert washes outside the facility fence line will be about 7,025 acres. Two areas of private property of 160 acres each are located within or adjacent to the ROW; neither is currently proposed for use by the Project.

This Drainage Erosion and Sedimentation Plan has been prepared in accordance with Mitigation Measure "Soil and Water-1" of the Final Commission Decision (September 2010-CEC-800-2010-009-CMF). This document will be updated once detailed design, engineering and construction planning is complete. Final site layout, drainage control, and BMP selection will be updated and/or modified within this document once completed and will be detailed in the SWPPP prepared for construction activities. BMPs for this project have been selected to meet construction and post-construction requirements of the CA General Construction Permit.

1.2 Drainage, Erosion, and Sediment Control Plan Elements

This DESCP includes the following elements. Each element corresponds to the specific requirements listed in Mitigation Measure "Soil & Water-1" of the Final Commission Decision (September 2010 – CEC-800-2010-009-CMF) for ease of review.

A. **Vicinity Map:** A Project vicinity map (at 1"=500' scale) is provided in Appendix A (2008-045-CN-100), indicating the location of all project elements (construction site, laydown area, etc.) with depictions of all significant geographic features.

B. **Site Delineation Map:** All areas subject to soil disturbance for the Project (project site, laydown areas, all linear facilities, and any other project elements) are delineated showing boundary lines of all construction areas and the location of all existing and proposed structures, pipelines, roads, and drainage facilities. The Site Delineation maps are included in Appendix A (2008-045-CC-001 through CC-008).

C. **Watercourses and Critical Areas Map:** As required, the DESCP provides a map that shows the location of all nearby watercourses including swales, intermittent streams, and drainage ditches, as well as their proximity to the Project. These features are shown on the project vicinity maps. These maps are included in Appendix A (2008-045-CW-001 through CW-012).

D. **Drainage Map:** As required, the DESCP provides a topographic site map at 1" to 500' showing all existing, interim and proposed drainage systems. Due to the unusually large scale of the project, these drainage maps have been enlarged from a 1"=200' scale. Drainage area boundaries are found on the Pre and Post-Development Drainage Maps in Appendix B (2008-045-CM-002 & CW-001 through CW-012).

E. **Narrative of Project Site Drainage:** As required, the DESCP includes a narrative of the drainage measures to be taken to protect the site and downstream facilities. The narrative is presented in Section 2 of this report. Required summary tables from hydrologic and hydraulic calculations are contained in Appendix B and include watershed sizes in acres.

F. **Clearing and Grading Plans:** As required, the DESCP provides elevations, slopes, locations, and the extent of all proposed grading as shown by the contours, and identifies areas to be preserved. Proposed contours are shown in conjunction with existing topography. The Clearing and Grading Plans are contained in Appendix A (2008-045-CM-400 through CM-453).

G. **Clearing and Grading Narrative:** As required, the DESCP includes quantities of material excavated and filled for the site and all project elements whether such excavations or fill is temporary or permanent, and the amount of such material to be imported or exported. The narrative is presented in Section 3 of this report.

H. **Soil, Wind and Water Erosion Control:** The DESCP describes the method for approval of chemical-based dust palliatives and soil bonding agents proposed for use on the Project (Section 4.4). Any materials used will be submitted for approval prior to use.

I. **Best Management Practices Plan:** As required, the DESCP includes a Best Management Practices Plan (BMPP) which identifies the location of site-specific BMPs (including dust control,

entrance/exit stabilization, and erosion/sediment/drainage control BMPs) on the topographic site maps. The BMPP is incorporated with the Erosion and Sediment Control Drawings.

J. **Best Management Practices Narrative:** As required, the DESCP describes the location (as shown in the BMPP), timing, and maintenance schedule of all erosion and sediment control BMPs to be used prior to initial grading, during all project element excavations and construction, final grading/stabilization, and post-construction. The narrative is presented in Section 4 of this report and also indicates specific soil, wind, and water erosion control methods. Separate BMP implementation schedules will be provided for each project element for each phase of construction and also the post-construction maintenance for structural BMPs once detailed design is completed.

K. **Project Schedule:** As required, the DESCP identifies the location of the site-specific BMPs to be employed during each phase of construction (initial grading, Project element construction, and final grading/stabilization). The schedule is provided in Table 4.1 of this report. Separate BMP implementation schedules will be provided for each phase of construction once detailed design is completed.

L. **Erosion Control Drawings:** As required, the DESCP will include final erosion and sediment control drawings that are designed, stamped, and sealed by a professional engineer. The preliminary Erosion Control Drawings are included in Appendix A (2008-045-CM-400 through CM-453).

M. **Agency Comments:** Recommendations, conditions, and provisions from the California Department of Fish and Game (CDFG) and Colorado River Basin Regional Water Quality Control Board (CRBRWQCB) have been included in the CEC License.

N. **Monitoring Plan:** Monitoring activities shall include routine measurement of the volume of accumulated sediment in the onsite drainage ditches and storm water diversions. The monitoring plan shall be part of the Channel Maintenance Program. Information can be found in Section 5.

SECTION 2: DRAINAGE

2.1 Existing Project Site

The Blythe Solar Power Project site is located on the Palo Verde Mesa in the McCoy Wash within the Colorado River watershed. The existing topographic conditions show generally low relief until near the surrounding mountains (McCoy, Big Maria, and Little Maria Mountains). There are two distinct river-cut terraces that form a topographic break westward from the Colorado River. The Project site is located on the uppermost of the two terraces that comprise the mesa. Approximately three miles east of the eastern site boundary, a sharp break in the slope forms the boundary between the Palo Verde Mesa and the Palo Verde Valley, which is 80 to 130 feet below the mesa. In this region, the Palo Verde Valley is roughly equivalent to the recent historic floodplain of the Colorado River.

Regionally, the ground surface slopes gently downward in a southeast direction at a gradient of less than 1%. Topography at the Project site slopes gently away from the McCoy Mountains from the west to the southeast. The existing topographic conditions of the Project site show an average slope of approximately one foot in 67 feet (1.50%) toward the east on the west side of the site and approximately one foot in 200 feet (0.50%) toward the southeast on the east side of the site. Steeper grades (10 to 15%) are present along the western side of the unnamed mound in Sections 5, 6, and 7 (T06S R22E). No ground disturbance or project elements will lie on these steeper grades.

The general stormwater flow pattern is from the higher elevations in the mountains located 3 miles west of the site to the lower elevations in the McCoy Wash to the east. McCoy Wash receives runoff from McCoy Mountains to the west, Little Maria Mountains to the north and the Big Maria Mountains to the northeast. Runoff from the McCoy Mountains, west of the Project site, discharges into shallow moderately defined channels at the base of the mountains and passes through the Project site in a southeasterly direction and is intercepted offsite by irrigation canals before reaching McCoy Wash.

Ground surface elevations at the Project site range from 830 feet above mean sea level (msl) in the west, to 410 feet above msl in the east (United States Geological Survey [USGS] 1975, 1983, and Towill 2009). See Appendix B for Drawing CM-002, Pre-Development Drainage Map.

2.2 Proposed Project Site

Offsite (Run-On) Drainage

Run-on to the Project site, up to the 100-year storm event, will be collected in peripheral drainage channels and conveyed around and/or through the Project site. The existing downstream drainage patterns and flow rates will be slightly altered from pre-development due to flows being channelized and partially combined with drainage from the Project site flows; however, construction and post-construction discharge rates have been designed not to exceed pre-development rates as discussed further in Section 2.3 and shown in Table 2.1 below.

Onsite Drainage

The proposed onsite drainage improvements have been designed to replicate the existing site hydrology. To accomplish this goal, five main drainage channels are proposed adjacent to or through the site; the North, Central, South, Southeast and West channels. Refer to Appendix B for Post Development Drainage Maps (2008-045-CW-001 through CW-012) to locate the main channels. Three of these

channels intercept flows up-gradient of the site then re-direct flows around or through the site to discharge points that are similar conditions to pre-development conditions utilizing drainage diffusers. The remaining two channels collect runoff from the solar fields and convey them along an alignment and discharge points that are similar conditions to pre-development conditions utilizing drainage diffusers. Each of the proposed channels have been sized to convey the peak flow of the 100-year, 24-hour storm event and will include necessary earth compaction and soil cement for side-slope erosion protection along key reaches (e.g., directional transitions, proposed-to-natural channel transitions, and reaches with significant design velocities). A description of the construction phasing for these major channels can be found below.

A drainage swale will be placed at every fourth row of solar panels to direct runoff into larger collector channels. These drainage swales will function as sediment traps and infiltration areas prior to discharging to collector channels. The drainage swales have been designed and spaced to prevent runoff from concentrating and creating erosion on the side slope of the swales. Erosion protection in the collector channels will be provided by the use of rip rap, as approved by the CDFG. The collector channels in each solar unit will convey runoff into the Central and West channels.

The Central Channel will be constructed to convey runoff from Units #1 and #2 as well as the northern portions of Units #3 and #4. This channel will only convey onsite runoff and will not contain any offsite run-on. The Central Channel will flow west to east through the site between Units #1 and #2 and Units #3 and #4. The channel will outlet to a drainage diffuser to return the flow to shallow, slow runoff similar to pre development conditions.

The North Channel will be constructed to collect a portion of the run-on flows from the McCoy Mountains as well as run-on from the north of the site. The North Channel will utilize an existing wash near the northwest corner of the Project site in order to minimize earthwork and maintain existing drainage patterns. The North Channel will outlet by drainage diffuser at the northeast corner of the site.

The West Channel will be constructed to collect the remaining portion of flows from the McCoy Mountains tributary to the west side of the site. The West Channel will flow west to east through Units #3 and #4 and will collect additional onsite runoff from approximately half of Units #3 and #4. The channel will split into two channels near the east side of Unit #3. The West Channel will continue in a southeasterly direction to the south side of Unit #4. The smaller Southeast Channel will continue to flow east through Unit #4. Both channels will also outlet to a drainage diffuser at the southeast end of the site to return the flow to shallow, slow runoff similar to pre development conditions.

The Southeast Channel will be constructed to collect onsite runoff from Unit #4. This channel will also use a drainage diffuser to return the flow shallow, slow runoff similar to pre development conditions. The South Channel will collect a small portion of offsite runoff and some of the flows from Unit #3. This channel will outlet to a drainage diffuser at the southeast end of the site to return the flow the shallow, slow runoff similar to pre development conditions.

Each powerblock area will drain by way of shallow swales and inlet drains through an oil-water separator and into a collector channel in the corresponding solar field unit.

Phasing

Phase 1
The entire lengths of the North Channel and the Central Channel will be constructed during Phase 1A and Phase 1B, along with the very northwestern 1035 feet of the West Channel. Flow exiting the partially completed West Channel will flow into an existing natural wash and return to pre development flow pattern. The North Channel will be constructed prior to construction of the solar field in order to convey run-on around the perimeter of the site so as to minimize disturbance of construction activity. The flow patterns to the south of Units #1 and #2, future Phase 2, will remain unchanged. See Appendix A for delineation of Phase 1A and 1B, drawings 2008-045-CC-001 through 008.

Phase 2
Phase 2 will include the construction of Units #3 and #4 and the remainder of the West Channel as well as the Southeast and South Channels. These channels will be constructed prior to construction of the solar field in order to convey run-on around the perimeter of the site so as to minimize disturbance of construction activity. Flow patterns southeast of the Project area will be unaffected. See Appendix A for delineation of Phase 2, drawings 2008-045-CC-001 through 008.

2.3 Hydrologic Calculations

Precipitation Data
Precipitation data to be used in hydrologic calculations has been obtained from NOAA's Precipitation Frequency Data Server (PFDS) by entering the latitude and longitude of the Project site. The PFDS server can be accessed online at: http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html.

Other data was obtained from the U.S. Soil Conservation Service (now Natural Resources Conservation Service - NRCS), U.S. Department of Agriculture (USDA) Technical Release 55: Urban Hydrology for Small Watersheds (1986). This document presents four storm patterns, Type I, IA, II and III based on geographic regions of the United States and on the synthetic 24-hour rainfall distributions from available National Weather Service (NWS) duration-frequency data or local storm data. Type IA is the least intense and Type II is the most intense short duration rainfall. The correct storm pattern for the Project site is Type II. This document can be found at: http://directives.sc.egov.usda.gov

Pre-Development Calculations
The Riverside County Flood Control and Water Conservation District Hydrology Manual indicates that areas in excess of 300 – 500 acres should be analyzed using unit hydrograph graph methodology. For this reason, pre-development hydrology calculations were performed using the United States Army Corps of Engineers' (USACE) Hydrologic Engineering Center Hydrological Modeling System (HEC-HMS 3.3.0). Documentation and program downloads for HEC-HMS 3.3.0 can be found online at: http://www.hec.usace.army.mil/software/hec-hms/documentation.html

Post-Development Calculations
As with the pre-development conditions, watershed areas offsite and upstream of the Project site were analyzed with USACE's HEC-HMS 3.3.0. Hydraflow Hydrographs (2007 v. 9.23 by Intelisolve) software was used in performing onsite hydrology calculations. This program is better suited than HEC-HMS for combining and routing several small drainage areas together. Each drainage area in the solar field was

divided into one acre units and routed downstream through the drainage swales. Additional information on this program may be found at www.intelisolve.com.

All drainage facilities have been sized to convey the 100-year, 24-hour storm event. The 25-yr and 10-yr events have also been analyzed to present the more probable storm events that can be expected on this site.

Table 2.1, Hydrologic Analyses for Pre-Development and Post-Development Conditions, shows precipitation and discharge (peak flow) data for the 10-year, 25-year, and 100-year 24-hour storm events for pre-development and post-development conditions for the Project site. This data is inclusive of the proposed facility as a whole. A slightly lower peak discharge is predicted for the developed condition from the pre-developed condition due to a delayed time of concentration for the design storm event due to designed drainage controls.

Table 2.1
Hydrologic Analyses for Pre-Development and Post-Development Conditions

	Project Pre-Development	Project Post-Development
Area (Acres)*	18430	18430
Average Curve Number	85	85
Precipitation – 10-Year, 24-Hour Storm (inches)	2.00	2.00
Precipitation – 25-Year, 24-Hour Storm (inches)	2.54	2.54
Precipitation – 100-Year, 24 Hour Storm (inches)	3.44	3.44
Peak Discharge – 10-Year Storm (cfs)	5,970	4,720
Peak Discharge – 25-Year Storm (cfs)	9,630	8,700
Peak Discharge – 100-Year Storm (cfs)	16,550	15,810

**Project area includes all offsite acreage that contributes to storm water runoff across the site*

SECTION 3: CLEARING AND GRADING

3.1 Areas to be Cleared and Graded

Proposed Facility
The proposed facility is located on exposed soil, desert pavement, and light brush consisting of mostly creosote bush and mesquite. Brush and top soil will need to be cleared before grading is performed. Top soil will be stockpiled for later use to be disposed of on site. Clearing and Grading Plans are located in Appendix A.

Access Road
The construction of the access road will require a disturbance corridor width of 100 feet. The alignment of the road has been designed to disturb the minimal amount of land required and avoid environmentally sensitive areas. All excavated soils from the access road construction will be used as backfill for the access road. Applicable BMPs such as silt fence and rock check dams will be in place during construction to protect the existing washes as well as roadside channels.

3.2 Location of Disposal Areas, Fills, or Other Special Areas

All excavated soil will be used onsite for grading and leveling purposes. No soil will be imported to or exported from the Project site. Any excess excavation material will be utilized onsite for grade leveling. Excess material containing organics and not suited for structural fill will be stockpiled as berms in the shared facilities area.

3.3 Existing and Proposed Topography

The existing topography depicts an average slope of 1.50% to the east on the west side of the site and 0.50% to the southeast on the east side of the site. At completion of the proposed facility, the grading on the solar fields will generally maintain the existing slopes. Each power block area will have finish grade elevation consistent with the average existing elevation at that location. Surface grading within each power block loop road will direct storm water runoff to shallow swales within the power block area. The runoff will then be conveyed to a collector channel within the corresponding solar field.

Temporary construction laydown areas will be located to the north and south of each power block (contained within the solar field area) as well as in the shared facilities area.

3.4 Volumes of Cut and Fill

In order to balance the site, it is anticipated approximately 10.4 million cubic yards (CY) of soil will be cut and reused as fill material. No soil will be imported or exported from the Project site. Table 3.1 indicates the estimated quantities of material excavated or filled for the site and all Project elements.

Table 3.1
Estimated Earthwork Quantities

Project Element	Excavation (CY)	Fill (CY)	Balance (CY)	Permanent?	Import/Export
Unit 1	2,100,000	2,100,000	0	Yes	No
Unit 2	3,000,000	3,000,000	0	Yes	No
Unit 3	2,800,000	2,800,000	0	Yes	No
Unit 4	1,500,000	1,500,000	0	Yes	No
Shared Facilities	560,000	330,000	+230,000	Yes	Export balance to Road Corridor
Road Corridor	40,000	270,000	-230,000	Yes	Import balance from Shared Facilities

SECTION 4: BEST MANAGEMENT PRACTICES

Best Management Practices for this Project will be designed and selected to meet the requirements of the California Construction General Permit (CGP) Order No. 2009-0009-DWQ, NPDES No. CAS000002. Preliminary analysis indicates that this Project will be categorized as a Risk Level 2 project according to the General Permit classification; final determination of risk level and associated requirements will be performed prior to final design, Storm Water Pollution Prevention Plan (SWPPP) preparation and construction permit application.

The Project shall be scheduled to minimize impact on the environment by limiting the amount of exposed, unstabilized soil. Final grading and surfacing shall be completed as soon as feasible to limit the exposure of soils. Construction is expected to proceed as expediently and efficiently as possible, thereby ensuring as little soil is exposed for as short a time as possible. In addition, drainage controls will be implemented to divert run-on around areas of active construction. BMPs, such as native material berms, will serve as slope interruption and interim perimeter control in active areas and will be implemented where needed to maximize on-site retention and infiltration to site soils. The following sections present standard construction Best Management Practices (BMPs), all of which are described in the CASQA Construction BMP Manual (2009). This manual provides comprehensive details on BMP selection and implementation and will be obtained and reviewed by managers for all construction contractors that may have an impact on implementation of this DESCP.

There are six groups of BMP categories: Erosion Control, Sediment Control, Tracking Control, Wind Erosion Control, Non-Storm Water Management, and Waste Management and Materials Pollution Control. Each section below presents the recommended construction BMPs for stormwater pollution prevention in the proposed facility. The DESCP will be updated during detailed design to reflect each BMP to be utilized during each construction phase. While performing the work, the contractors may implement additional control measures if necessary. Personnel will receive training on installing and maintaining BMPs. All BMPs are shown on Erosion and Sediment Control Drawings CM-400 through CM-453 in Appendix A. As part of the SWPPP, a current set of BMP drawings will be maintained in the project construction trailer. The SWPPP must be updated as needed to reflect modified or new BMPs that are being implemented on site.

A Construction Site Monitoring Program (CSMP) will also be developed as part of the SWPPP to comply with visual observation and inspection requirements and monitor effluent levels in comparison to permit-specific turbidity and pH action levels and to monitor the effectiveness of BMPs. This plan will address the timing and methods of such measures, as well as reporting and response requirements. Personnel associated with or specifically assigned to the implementation and maintenance of BMPs will be trained in accordance with permit requirements and will receive supplemental training to inspect, maintain, recognize, and report abnormal/adverse situations so they can be quickly corrected.

Construction will take place over approximately 69 months, from the fourth quarter of 2010 to the first quarter of 2016. Erosion control shall be implemented prior to the defined rainy season (generally October 15 through April 15). An expected schedule of construction activities and commercial operations is shown below in Table 4.1

BMPs Prior to Initial Grading

Silt fences shall be constructed around the perimeter of the areas to be graded prior to any earthwork movement. The silt fence shall act as a barrier for sediment to not leave the disturbed area as well as allowing any sediment upstream from entering the disturbed area. A series of fiber rolls or gravel bag berms shall be used in steep areas where sediment may build-up and overtop a silt fence ruling it ineffective. A stabilized construction entrance/exit will also be established prior to initial grading to limit the amount of sediment and debris leaving the construction site.

BMPs During Project Construction

Silt fences, fiber rolls, and gravel bag berms, as noted above, shall continue to be used and maintained during project construction. Silt fences shall also be installed in the on site drainage swales so as the bottom of the upstream silt fence is not higher than the top of the next silt fence downstream. Rock check dams shall be placed in the on site drainage channels at regular intervals to allow sediments to settle out of runoff. Silt fences and rock check dams will also be utilized upstream of the inlet of all culverts to prevent sediment build-up within the culvert structure. Evaporation ponds adjacent to the power blocks are designed with a permanent berm to prevent any upstream runoff from entering the pond. Once any drainage inlets have been installed in the power block, storm drain inlets will be used to prevent any sediments from entering the storm drainage system.

During construction of transmission lines and towers and underground utilities, silt fences shall be installed locally around the disturbed area until it has been graded back to original conditions.

It is anticipated there will be times during construction when BMPs in place may interfere with construction activities. When this occurs, the Contractor and Resident Engineer shall address each situation individually. Some mitigation measures may include local berms or ditches, sediment barriers, or simply removing and relocating existing BMPs.

Dust control will be perpetually implemented during any and all earthwork movement. This will be achieved by using either potable water or by the addition of a chemical soil binder to exposed soil surfaces and stockpiles during grading activities in all phases. When potable water is used, a sufficient amount will be applied to the soil in order to keep the wind from transporting it yet not excessive amounts to create runoff. The soil binder product will be submitted to CEC for approval prior to use. Selected soil binders will be required to be essentially non-toxic if mobilized to runoff.

BMPs During Final Grading and Stabilization

Once final grading has been established in an area, soil binders shall be used to prevent any further wind or soil erosion. Once final drainage patterns have been established, BMPs mentioned above shall be moved to reflect the final grading. This includes silt fences, fiber rolls, rock check dams, gravel bag berms, etc.

When concrete practices are underway several specific BMPs shall be in place. Concrete curing, finishing, and paving and grinding operations BMPs shall be used to prevent any concrete materials from coming in contact with storm water runoff. Specific areas for concrete waste management, hazardous waste management, etc. shall be established in well defined areas with signs to inform drivers of each station.

New worker parking and laydown areas shall continue to be stabilized throughout the construction process with silt fences, check dams, and fiber rolls to prevent runoff from vehicles and materials leaving the site.

BMPs for Post Construction

Once construction of the project is completed, all areas used for worker parking, material storage, and laydown areas shall be cleared of debris, stabilized, and returned to existing conditions. This shall be done by grading and compacting soil to its original conditions prior to construction activities. Permanent BMPs such as energy dissipation devices shall be monitored on a monthly basis and have the geometry maintained as originally intended.

Table 4.1
Expected Schedule of Construction

Date	Construction Activity
November 2010	Site mobilization
November 2010	BMPs in place for Phase 1A linears
December 2010	Begin construction of Phase 1A linears
February 2011	BMPs in place for balance of Phase 1A
February 2011	Begin construction of balance of Phase 1A
July 2011	BMPs in place for Phase 1B
July 2011	Completion of Phase 1A
July 2011	Begin construction of Phase 1B
April 2013	Mechanical completion of Unit 1
May 2013	Commercial operation of Unit 1
July 2013	BMPs in place for Phase 2 (Unit 3)
July 2013	Begin construction for Phase 2 (Unit 3)
November 2013	Mechanical completion of Unit 2
December 2013	Commercial operation of Unit 2 (Completion of Phase 1B)
February 2014	BMPs in place for Phase 2 (Unit 4)
February 2014	Begin construction for Phase 2 (Unit 4)
January 2016	Mechanical completion of Unit 3
February 2016	Commercial operation of Unit 3
August 2016	Mechanical completion of Unit 4
September 2016	Commercial operation of Unit 4 (Completion of Phase 2)

4.1 Erosion Controls

Erosion control BMPs protect the soil surface by covering and/or binding soil particles. Final site layout, drainage control, and BMP selection will be updated and/or modified within this document once completed and will be detailed in the SWPPP prepared for construction activities. This Project will implement the following practices for effective temporary and final erosion control during construction:

- Apply temporary erosion control to remaining active and non-active areas as soon as practicable, but no later than 14 days after cessation of activity as required by the California Construction General Permit. Reapply as necessary to maintain effectiveness.
- The Resident Engineer, or duly appointed assistant, shall monitor weather using the National Weather Service, or another reliable source, to track conditions and alert crews to the onset of rainfall events.
- Prior to forecasted events, temporary soil stabilization BMPs shall be deployed and inspected.
- Implement temporary erosion control measures at regular intervals throughout the defined rainy season.
- During the rainy season, arrange the construction schedule, if practical, to leave existing vegetation undisturbed until immediately prior to grading.
- Stabilize non-active areas as soon as feasible after the cessation of construction activities.
- Reinforce drainage channels with soil cement where required on Grading Plans to prevent erosion.
- At completion of construction, permanent erosion control will be applied to all remaining disturbed soil areas.

The following are erosion control measures that will be used during all phases of the Project:

- EC-1, Scheduling
- EC-2, Preservation of Existing Vegetation
- EC-5, Soil Binders
- EC-9, Earth Dikes and Drainage Swales
- EC-10, Velocity Dissipation Devices

4.2 Sediment Controls

Sufficient quantities of temporary sediment control materials will be maintained on-site throughout the duration of the Project, to allow implementation of temporary sediment controls in the event of predicted rain, and for rapid response to failures. Check dams will be installed in all collector channels; Silt fences will be installed in drainage swales, downstream of power blocks and downstream of any construction activities. Street sweeping and vacuuming will be performed when visual accumulation of sediments has built up on roads. Sediment controls will be implemented during the rainy and non-rainy season according to BMP specifications. All inlets will be protected until work is completed and final controls and surfacing is in place and all down gradient perimeters will be protected when up gradient drainage area is disturbed. During the rainy season, temporary sediment controls should be implemented at the downstream perimeter of disturbed soil areas. Sediment control materials shall be stored at the construction well site initially, and then shall be stored in the shared facilities area for the duration of construction.

The following are sediment control measures that will be used during all phases of the Project:

- SE-1, Silt Fence
- SE-4, Check Dams
- SE-5, Fiber Rolls
- SE-6, Gravel Bag Berm
- SE-7, Street Sweeping and Vacuuming
- SE-10, Storm Drain Inlet Protection

4.3 Tracking Controls

Tracking controls will be implemented to reduce sediment from entering public or private roads including the Proposed Access Road and Black Rock Road. These controls will be implemented on a routine basis or for any visual accumulation of sediments. Tire washes will be used in conjunction with all stabilized construction entrances/exits. Final locations will be determined during final design. Wash water will be supplied by the construction wells onsite and will be either piped or transported to the wash areas by water tank.

The following are tracking control measures that will be used during all phases of the Project:

- TC-1, Stabilized Construction Entrance/Exit
- TC-2, Stabilized Construction Roadway
- TC-3, Entrance/Outlet Tire Wash
- SE-7, Street Sweeping and Vacuuming

4.4 Soil, Wind and Water Erosion Controls

Wind erosion controls will be implemented to control dust from the construction site. Wind erosion control will be achieved through the use of potable water or the addition of a soil binder to exposed soil surfaces and stockpiles during grading activities in all phases. When potable water is used, a sufficient amount will be applied to the soil in order to keep the wind from transporting it yet not excessive amounts to create runoff. The soil binder product will be submitted to CEC for approval prior to use. Selected soil binders will be required to be essentially non-toxic if mobilized to runoff.

Stockpiles will be covered and bermed when not actively being utilized.

The following are wind erosion control measures that will be used, as needed, during all phases of the Project:

- EC-5, Soil Binders
- NS-1, Water Conservation Practices
- WE-1, Wind Erosion Control
- WM-3, Stockpile Management

4.5 Non-Storm Water Controls

There are many supplemental BMPs used to control non-storm water that will be utilized during active construction which will be described in detail in the Site Storm Water Pollution Prevention Plan (SWPPP) to be developed prior to site mobilization. All non-storm water controls will be managed in accordance with the California Construction General Permit requirements. Paving and grinding controls, concrete curing, and concrete finishing will be utilized during foundation pouring for the power blocks and parabolic mirrors. All vehicle and equipment controls will be performed on an as needed basis.

The following BMPs will be used, as needed, to control non-storm water pollution on the construction site:

- NS-1, Water Conservation Practices

- NS-2, Dewatering Operations
- NS-3, Paving and Grinding Operations
- NS-6, Illicit Connection/Discharge
- NS-7, Potable Water/Irrigation
- NS-8, Vehicle and Equipment Cleaning
- NS-9, Vehicle and Equipment Fueling
- NS-10, Vehicle and Equipment Maintenance
- NS-12, Concrete Curing
- NS-13, Concrete Finishing

4.6 Waste Management and Materials Pollution Controls

There are many supplemental BMPs used to control waste and site material use that will be utilized during active construction which will be described in detail in the Site Storm Water Pollution Prevention Plan (SWPPP) to be developed prior to site mobilization. All chemicals used on-site will be stored in watertight containers or in enclosed storage facilities with appropriate secondary containment, and all waste and material use will be managed in accordance with the California Construction General Permit requirements. Stockpile management will be performed any time excess cut is stored on site. All waste management controls will only be performed when spills occur.

The following BMPs will be used, as needed, to handle materials and control construction site wastes:

- WM-1, Material Delivery and Storage
- WM-2, Material Use
- WM-3, Stockpile Management
- WM-4, Spill Prevention and Control
- WM-5, Solid Waste Management
- WM-6, Hazardous Waste Management
- WM-7, Contaminated Soil Management
- WM-8, Concrete Waste Management
- WM-9, Sanitary/Septic Waste Management
- WM-10, Liquid Waste Management

The following waste products shall be addressed:

Petroleum Products: Because construction equipment will require use of diesel fuel and oil on a regular basis, a potential exists for spills or leaks. All onsite vehicles should be monitored for leaks and receive regular preventative maintenance to ensure proper operations and reduce the chance of leakage.

No “topping off” of fuel tanks should be allowed to reduce the possibility of spills.

Petroleum products should be stored in clearly labeled and tightly sealed containers or tanks.

Any asphalt used onsite should be applied in accordance with the manufacturer’s recommendations.

Any soil impacted by fuel or oil spills should be removed and disposed of by the Contractor at an approved disposal site.

The secondary containment around fuel/oil tanks (stationary or mobile) must meet the minimum requirements of the U.S. Environmental Protection Agency (EPA) 40 CFR Part 112 with regard to secondary containment or more stringent Riverside County or state requirements, if applicable.

Any spills should be contained and cleaned up immediately.

Sanitary Wastes: Construction or temporary sanitary waste from the portable units must be collected by a licensed sanitary waste management contractor. The units must be maintained on a regular basis.

Portable units should be placed on a flat area at least 50 feet from streets, waterways, drain inlets, etc.

Portable units should be anchored to prevent blowing or tipping over and all leaks or spills should be reported immediately (sampling may be required).

Hazardous Wastes: Liquids and solids such as lubricating oils, acids for equipment cleanup, concrete curing compounds, mirror adhesives, and waste paint are some of the potentially hazardous waste associated with construction of this solar project. Any wastes shall be disposed in accordance with applicable LORS and with the manufacturer's recommendations.

Hazardous wastes shall be either recycled or disposed of in a licensed Class I disposal facility, as deemed appropriate. Waste oil and used oil filters can be recycled if the maintenance activities will take place onsite.

Waste generated during any chemical cleaning operation should be temporarily stored onsite in portable tanks and disposed offsite by the chemical cleaning contractor at an appropriate disposal facility. Site personnel shall be instructed of any procedures established and the Contractor's Site Manager shall be responsible for implementing these policies.

Mirror Adhesives and Paints: All paint and adhesive containers shall be tightly sealed and properly stored to prevent leaks or spills. Excess paint and adhesive must not be discharged to the stormwater system.

Unused paints and adhesives shall be disposed in labeled original containers according to applicable Riverside County, state, and federal laws and regulations.

Spray painting should not occur on windy or rainy days, and a drop cloth should be used to collect and dispose of drips associated with painting activities.

All paints shall be mixed in a containment area.

If using water-based paints, painting equipment shall be cleaned such that the water used for cleaning will not enter the natural waterways.

Concrete Trucks: Concrete trucks shall not be allowed to dischard surplus concrete and drum wash at the site, unless these materials are fully contained in an engineered washout area that can adequately hold all free liquid until dry.

Once dried, the concrete can then be removed and disposed of at an offsite location. Alternatively, concrete washout can be taken offsite for disposal by the concrete contractor.

No surplus concrete or drum wash water can be discharged onto the ground surface, in storm drains, ditches, channels, etc.

Waste Materials: All construction waste material, trash, and construction debris shall be collected and stored in metal dumpsters. The dumpsters must conform with all Riverside County and State solid waste management regulations.

The dumpster shall be emptied a minimum of once per week or more often if necessary, and the trash will be hauled to the local dump. No construction waste will be buried onsite.

All dumpsters shall be covered when possible.

All site personnel shall be instructed in the correct procedure for waste disposal. The Resident Engineer will be responsible for seeing that these procedures are followed.

4.7 Good Housekeeping Practices

Good housekeeping practices are required under the State Water Resources Control Board Construction Permit. These published practices are designed to maintain a clean and orderly work environment and to reduce the risk of potential pollutants entering stormwater discharges. All construction personnel should be responsible to monitoring and maintaining housekeeping tasks and reporting potential problems to the Contractor and Resident Engineer. A partial list of such practices are described as follows:

- Store only enough products required for doing the job.
- Store all materials in a neat and orderly manner in the appropriate containers. Materials that may adversely impact stormwater, such as paints, oils, greases, sealers, etc., will be stored in covered areas such as temporary/permanent buildings or trailers, in accordance with the SWPPP.
- Keep products in the original container with the original manufacturer's label.
- Do not mix products unless recommended by the manufacturer.
- Use all of a product before disposing of the container.
- Use and dispose of products according to the Site Manager's direction or manufacturer's recommendations.
- Perform regular inspections of the stormwater system and the material storage areas.
- When and where appropriate, use posters, bulletin boards, or meetings to remind and inform construction personnel of required procedures.
- Preventative maintenance should be performed which would include regular inspection and maintenance of structural stormwater controls (catch basins, culverts, oil-water separators, etc.) as well as facility equipment and systems.

4.8 Spill Response Procedures

A Spill Prevention Controls and Countermeasures Plan (SPCC) will be permanently located in the construction trailer. The Environmental Manager shall be responsible for training personnel in the correct spill response procedures. Procedures shall include the following:

Step 1: Upon discovery of a spill, stop the source of the spill.
Step 2: Cease all spill material transfer until the release is stopped and waste removed from the spill site.
Step 3: Initiate containment to prevent spill from reaching storm drainage facilities.
Step 4: Notify Supervisor of spill.
Step 5: The Supervisor should immediately notify the emergency coordinator, and coordinate further cleanup activities.
Step 6: Any significant spill of hazardous material will be reported to the appropriate state and/or Riverside County agency.

In addition to the spill response procedures, an Emergency Response Contact List shall be prepared and posted on-site. At a minimum, the list shall include:

- Local Fire Department
- Riverside County Sheriff
- Hospital
- Riverside County Environmental Health Department

Because spills and leaks will be one of the largest potential sources of stormwater pollutants at this plant, chemicals should be stored in chemical storage facilities appropriately designed for their individual characteristics.

If not subject to the expected high temperatures, and if in accordance with manufacturer's recommendations, bulk chemicals should be stored outdoors in aboveground storage tanks. Other chemicals should be stored and used in their delivery containers.

All hazardous chemical storage areas should be surrounded by dikes or other devices to contain the chemicals in the event of leaks or spills. Secondary containment should be sized to hold the entire contents of the largest single storage tank.

Containment areas for bulk storage tanks should not be drained. Any chemical spills in these areas should be removed with portable equipment and reused or properly disposed.

It is anticipated that all substances will be applied, dispensed, and disposed of in conformance with manufacturer's recommendations.

SECTION 5: MONITORING PLAN

The engineered channels shall be kept relatively free of impediments to flowing water, the original design geometry of the channel cross section shall be maintained, erosion/scour damage to side slopes and channel bottoms shall be kept at a minimum, and vegetation/weeds shall be managed by the requirements listed below.

Stream repairs shall be promptly made to repair eroding banks and drop structures, erosion at storm drain outfalls, fences, incising toes of slopes and scoured channel beds. Trash and loose debris shall be collected, at minimum, on a monthly basis. Access roads adjacent to the channels shall also be maintained as necessary to allow continuous monitoring of the channels. At a minimum, repairs and/or management actions need to be implemented when the problem 1) causes or could cause significant damage to the project, adjacent property, or structural elements of the channels, 2) is a public safety concern, or 3) negatively affects adjacent plant communities or poses a hazard to wildlife.

All channels shall be monitored for compliance with the below listed standards on a monthly basis by an experienced site maintenance individual acceptable to the Compliance Project Manager. The channels shall also be inspected by this individual after any significant rainfall event such that the channels are maintained in an acceptable condition as noted above. In addition to inspections listed below, additional inspections shall be made at areas which receive excessive maintenance, when complaints are received, and when illicit discharging has been determined in the proximity of the site.

On site drainage swales conveying runoff and sediment from the solar fields shall also be inspected on a monthly basis and after any significant rainfall event. Swales shall be kept free of impediments to flowing water and have the original geometry of the swale cross section maintained. Rills and gullies in the swale side slopes shall be kept at a minimum by immediately repairing identified areas. Other repairs and/or management actions need to be implemented when the problem 1) causes or could cause significant damage to the project, adjacent property, or downstream flooding, or 2) is a public safety concern. Access roads used to enter the solar fields for mirror washing or routine inspection shall also be maintained for continuous access.

On site drainage channels shall be inspected and maintained in the same manner as the engineered channels as noted below

All culverts located along the access road as well as on site shall be inspected on a monthly basis and after any significant rainfall event. Culverts shall be kept free of debris and impediments that reduce the hydraulic area of the structure. Special attention shall be made over time to monitor the settlement of the culverts. The inlet and outlet inverts shall be maintained to convey runoff through the culvert as originally intended. Inspections shall also be made downstream of the culverts to monitor any potential for erosion to the channel. Culverts located along the access road shall have the rip rap basins inspected on a monthly basis to ensure they are functioning as originally intended. Rip rap which has been transported downstream shall be replaced to its original location. Any sediment build-up between rip rap shall be removed in order for the basin to effectively reduce the velocity of the runoff.

- **Sediment**
  The channels shall be provided with monitoring poles to gage the amount of sediment deposited. The poles shall be set at quarter mile intervals along the length of all constructed channels. At each

quarter mile location, the poles shall be set at the center of the channel. Each pole shall be calibrated at one-half foot intervals starting with “0” corresponding to the designed bottom elevation of the channel.

- **Vegetation/Weeds**
  It is anticipated that vegetation or weed control would not be of concern until such time as the vegetation exceeds 8” to 10” in height. Noxious weeds shall be removed as they appear. Mass groups of vegetation in the channels shall be thinned to prevent blockage of stormwater flows.

- **Debris**
  The engineered channels, on site channels, drainage swales, and culverts shall be inspected monthly, and all trash and loose debris shall be collected and disposed of in a proper manner. Special attention must be made at fence crossings of the channels.

- **Erosion/Scour**
  Erosion and scour may be a continuing problem in the desert environment. Prompt action shall be taken when signs of erosion and scour first appear before they become major repairs. In addition to the monthly inspections of the channels, inspections shall be made after any significant rainfall event.

A log of inspections shall be kept on site and updated each time an inspection is performed. Each entry shall indicate the date the inspection was performed, observations made, and mitigation measures taken to repair site along with any other applicable information such as photographs, etc.

SECTION 6: POST CONSTRUCTION STABILIZATION PLAN

Routine inspection and maintenance will need to be performed after the Project has been completed. All main channels shall be inspected and maintained according to the Monitoring Plan in Section 5. A full Channel Maintenance Plan is to be kept on premises during the life of the facility. The entire property shall be inspected at a minimum of once per year for adverse erosion conditions and sediment built-up and also after any significant rainfall event. Any places found to have rills or gullies shall be fixed by re-grading the area and stabilizing the soil. Any terraces within the solar fields shall be inspected for these rills and gullies and slope deterioration and be re-graded.

Drainage facilities shall be inspected at a minimum of twice per year, in the spring and in the fall. All drainage swales shall be inspected to have adequate drainage capacity. Any significant sediment build-up in the drainage swales shall be removed to in order to restore the swale to its original geometric design. Collector channels shall be inspected for rills forming on the side slopes and low flow channels on the channel bottom. Any adverse conditions shall be re-graded to restore the channel to its original geometric design. Collector channels shall also be inspected for sediment build-up at the inlets and outlets of all culverts. Sediment shall be removed in order for runoff to flow through the entire cross section of the culvert.

Debris collection and blockage removal will be conducted on an as-needed basis by the Owner. Trash or vegetation debris may also cause a blockage and require removal. Trash and associated debris removal is necessary to maintain channel design capacity and storm drain outfalls. Spoils, trash, or any debris should be removed offsite to an approved disposal facility. A trash abatement program will also be established.

Sediment removal activities shall be conducted within the drainage channels during periods of no runoff. The number of sediment removal projects undertaken and the quantity of sediment removed in a given year depends on the frequency and extent of past maintenance activities, as well as weather and hydrologic conditions during recent years. Sediment removal needs following wet winters with higher than usual runoff, slope erosion, and sediment delivery to (and transport within) the drainage channels will likely be greater than maintenance requirements following an average or dry winter.

SECTION 7: REFERENCES

California Stormwater Quality Association. 2009. Stormwater Best Management Practice Handbook: Industrial and Commercial.
http://www.cabmphandbooks.com/documents/Industrial/IndustrialCommercial.pdf

United States Department of Agriculture (USDA). 1986. Technical Release 55: Urban Hydrology for Small Watersheds

APPENDIX A
DRAWINGS

APPENDIX B
HYDROLOGIC CALCULATIONS

Hydrologic Calculations

FLOOD WAVE ROUTING:

The Soil Conservation Service (SCS) equation (as outlined in the RCFC & WCD Hydrology Manual) was used for the lag time calculations. The equation is as follows:

$$Lag(hours) = 24n\left(\frac{L * L_{CA}}{S^{0.5}}\right)^{0.38}$$

Where: L = length of the longest watercourse (taken from the USGS quadsheet)

L_{CA} = length of the longest watercourse to a point opposite the centroid of the area (taken from the USGS quad sheet)

S = overall slope of the watercourse in feet per mile (elevations taken from the USGS quad sheet

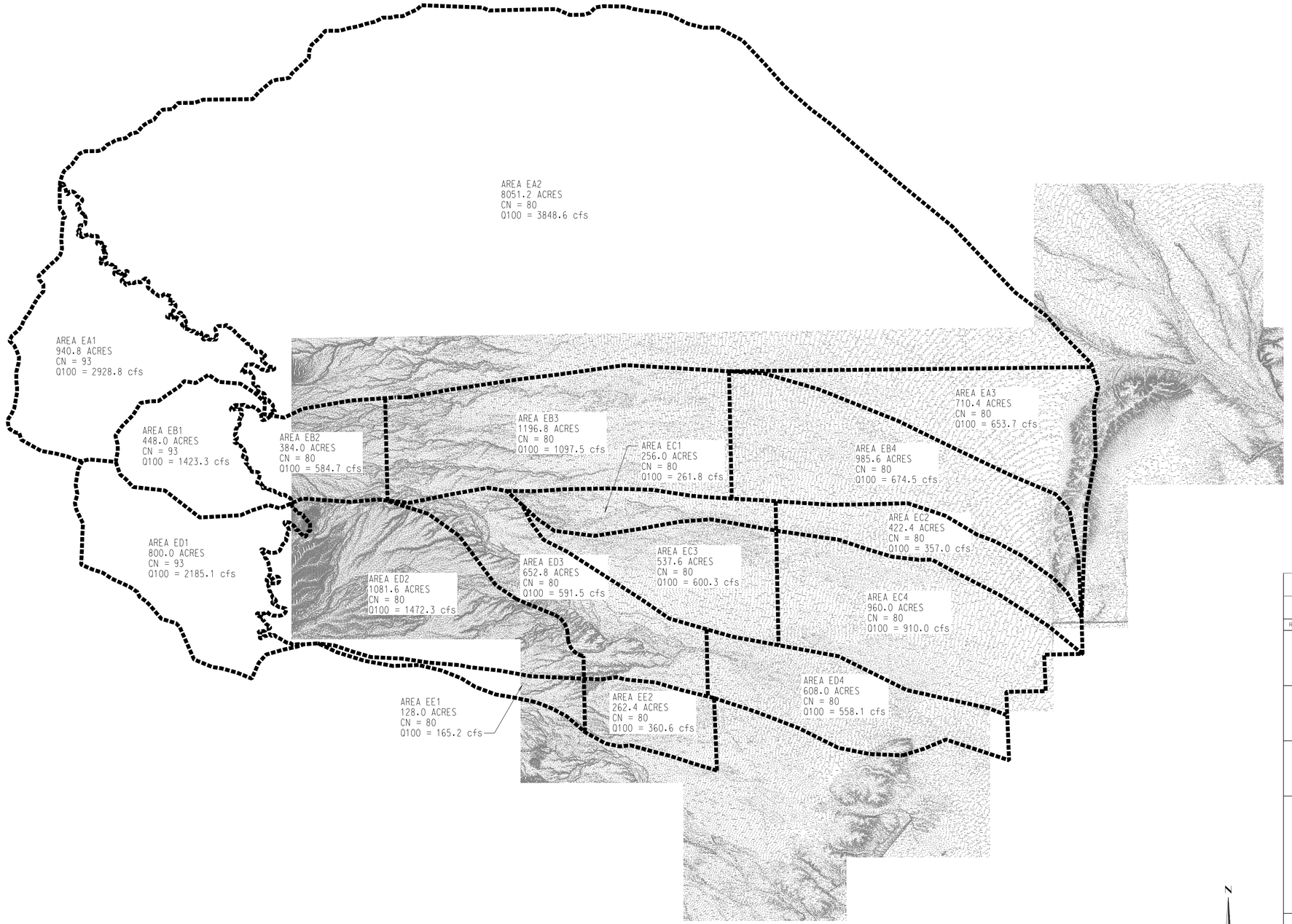
n = average Manning's "n" for the basin watercourses (estimated from field observations). The general description of basin roughness factors can be found in Appendix C.

0.38 is the regional regression coefficient for Southern California.

LOSS:

SCS loss methodologies were used for the basin loss calculations. This method requires entry of the soil Curve Number (CN) (obtained from SCS TR-55 Table 2-2d) and the initial abstraction, I_a where:

$$I_a = 0.2 * S = 0.2\left(\frac{1000}{CN} - 10\right)$$



– PRELIMINARY –
NOT FOR CONSTRUCTION

REV	DESIGN BY	DRAWN BY	CHECKED BY	DATE
B	ISSUED FOR PERMIT	S. MOORE	A. RAINEY	B. SORENSEN	8-30-10
A	ISSUED FOR REVIEW		S. COOK	12-31-09

SOLAR MILLENNIUM LLC

BSPP - BLYTHE SOLAR POWER PROJECT

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PRE-DEVELOPMENT DRAINAGE MAP

ENGINEER/DESIGN ORIGINATOR	SMC	11-10-09
LEAD ENG	BAS	11-10-09
ENG MGR		
PROJ MGR		

DRAWING NUMBER

2008-045-CM-002