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MEMORANDUM

To:	Robert Hingten, County of San Diego
From:	Michael Sweesy, Michael Huff
Subject:	Landscape Screen Design for the Soitec Solar Development Program EIR
Date:	July 26, 2013
cc:	Ashley Gungle, County of San Diego
	Patrick Brown, Soitec Solar Inc.
Attachment(s):	Figures 1–4

At the July 3, 2013, meeting with County staff to discuss the Visual Resources section of the Soitec Solar Development Program Environmental Impact Report (EIR), staff and Soitec discussed measures to create landscape screens that block views of the project and are compatible with fire protection requirements. This memorandum provides an approach and typical design for landscape screens that maintain site defensibility for wildfire protection.

Landscape screens are recommended along Tierra Del Sol (TDS) Road, McCain Valley Road, and Old Highway 80 to screen views of proposed solar facilities from motorists, bicyclists, and pedestrians in public rights-of-way. The landscape screen is a mitigation measure that has been proposed to reduce impacts to visual quality and character from public viewpoints within the communities of Tierra Del Sol and Boulevard.

Features of the solar facility to be screened include the 50-foot-wide fire buffer with 6-foot-tall perimeter fence, concentrated PV (CPV) solar panels, and other associated features that exceed the perimeter fence height. The perimeter fence will be constructed of chain link slats or other attached material that block views through the fence. The fence will be topped with 3 strands of barbed wire. Although the perimeter fence is designed to screen views of the solar panels as well as provide site security, the fence is not consistent with the community character and therefore requires screening to reduce impacts to visual quality within these communities.

Complete screening of views from public viewpoints to the proposed solar facilities is not possible due to the plant density limitation that is required to achieve wildfire protection standards. These standards include limitations on plant density to reduce the potential for surface-to-crown fire spread (laddering), crown-to-crown fire, ember-bed formation, and to maintain fire equipment and personnel access to the project perimeter.

Landscape screens will help break-up the mass and scale of the solar projects from key viewpoints rather than screen the entire view. Foreground detail helps to attract viewer attention away from the facility behind the landscaped area. However, the CPV Trackers will remain partially visible beyond the landscape screen. Visual interest and landscape detail will vary depending upon the viewer and viewing distance. For example, at Tierra Del Sol solar farm, the landscape screen will address foreground views of motorists on TDS Road and hikers on the community trail. In addition to tree and shrub vegetation, the landscape buffer may include fields of cobble rock or other non-organic materials (i.e., native soil and/or decomposed granite) that create visual interest on the ground plane. These details would be omitted at Rugged Solar Farm where public viewpoints are more distant.

Table 1 provides a list of plant species that were selected from the County of San Diego (2004) "Suggested Plant List for a Defensible Space." The listed plants are compatible with the climate zone of the Boulevard area as presented by the *Western Garden Book* (Brenzel 1995). The table indicates the range of expected heights of the each species at the time of planting and after 10 years of growth. These height estimates assume that trees will be planted from 36- to 42-inch nursery boxes and shrubs will be installed from 5-gallon, 15-gallon, and/or 24-inch boxed materials depending upon availability. Larger nursery container sizes are recommended in recognition of the need to establish a beneficial visual screen at the time of construction.

Table 1
Recommended Plants for Landscape Screening on Soitec Solar Projects

Botanical Name	Common Name	Estimated Height at Planting[1]	Estimated Height at 10 Years
Trees			
Arbutus unedo	Strawberry Tree	6'-8'	16'-20'
Cercis occidentalis	Western Redbud	6'-8'	16'-20'
Cornus stolonifera	Redtwig Dogwood	5'-6'	8'-10'
Gleditisia triacanthos	Honey Locust	10'-12'	30'-40'
Juglans californica	California Walnut	6'-8'	16'-20'
Juglans hindsii	California Black Walnut	6'-8'	20'-25'
Quercus agrifolia	Coast Live Oak	6'-8'	16'-20'
Quercus engelmannii	Engelmann Oak	8'-10'	16'-20'
Rhus lancea	African Sumac	8'-10'	16'-20'
Shrubs			
Arbutus menziesii	Madrone	3'-5'	12'-16'
Elaeagnus pungens	Silverberry	3'-5'	6'-10'
Encelia californica	Coast Sunflower	1'-1.5'	3'-4'
Encelia farinose	White Brittlebush	1'-1.5'	3'-4'
Fremontodendron californicum	Flannelbush	4'-6'	10'-16'
Fremontodendron mexicanum	Southern Flannelbush	4'-6'	10'-14'

Table 1
Recommended Plants for Landscape Screening on Soitec Solar Projects

Botanical Name	Common Name	Estimated Height at Planting[1]	Estimated Height at 10 Years
Garrya elliptica	Coast Silktassel	3'-4'	6'-10'
Heteromeles arbutifolia	Toyon	4'-5'	6'-10'
Nolina parryi	Parry's Nolina	2'-3'	3'-4'
Nolina parryi ssp. *wolfii*	Wolf's Bear Grass	2'-3'	4'-5'
Prunus caroliniana	Carolina Laurel Cherry	4'-5'	18'-24'
Prunus ilicifolia	Hollyleaf Cherry	4'-5'	8'-16'
Prunus lyonii	Catalina Cherry	4'-6'	8'-16'
Rhamus alaternus	Italian Blackthorn	5'-6'	8'-16'
Rhamus californica	Coffee Berry	4'-5'	8'-10'
Rhus ovata	Sugarbush	4'-5'	6'-12'
Salvia leucantha	Mexican Bush Sage	2'-3'	3'-4'
Salvia leucophylla	Purple Sage	2'-3'	2'-4'
Yucca schidigera	Mojave Yucca	4'-6'	3'-4'
Yucca whipplei	Foothill Yucca	2'-3'	3'-4'

[1] Assumes 36-inch or 42-inch box trees and 5-, 15 gallon, and 24-inch box shrubs

Figure 1 provides a landscape screen plan view of a typical plant configuration. Plant densities are designed to maintain ignition resistant vegetation, low fuel loads that are less likely to carry a fire through the landscape screen area and will result in a flame length that does not threaten fire buffer integrity and/or fire personnel and apparatus access. In order to provide effective visual screening balanced with fire defensibility, the landscape buffer should be a minimum of 50 feet wide to provide for necessary layering of vegetation that will juxtapose as viewers move past the project. In addition to the plant species listed in Table 1, existing native vegetation may remain in place within the landscape buffer area in a limited amount subject to approval and maintenance requirements of the County Fire Authority.

Figure 2 depicts the extent of visual screening that can reasonably be expected for the landscape screen of the solar facilities after a 10-year grow-in period. The exhibited plant heights are based on ambient environmental conditions and growth rates described in the *Western Garden Book* (Brenzel 1995) and *Landscape Plants for Western Regions* (Perry 1992). The depicted growth rate also assumes the plants will be irrigated using irrigation measures that promote deep rooted plants (i.e., deep, infrequent watering). In addition, irrigation will be permanent to support plant growth, vigor and longevity for the duration of the solar facility operation. Irrigation water will be applied at optimum intervals, appropriate to each species and plant maturity to maintain healthy plant material through typical environmental and climatic variations that are typical for the area.

In addition to irrigation, landscape screen maintenance will include periodic plant fertilization, soil cultivation and amendment, integrated weed and pest control, trash removal, vegetation pruning and/or plant removal to maintain defensible space as plants increase in size, and plant shape and structure, and plant replacement in the case of plant mortality.

Figure 2 depicts the landscape screen for a static position and at a perpendicular angle to the project. The depicted condition essentially provides a view across the 50-foot-wide landscaped area. However, viewers are most likely to be moving at various rates of speed depending upon the transportation mode (e.g., car, bicycle, pedestrian traffic, etc.). The movement would constantly change the viewpoint relative to the solar facility and the landscape vegetation.

In addition, views to the solar facility along adjacent roadways are more likely to be at acute angles rather than perpendicular as depicted. The acute view angle essentially cause the viewer to look through a greater distance of landscape screen area than when viewed at a perpendicular angle (Figure 1). For example, the view distance through the landscape screen area is 100 feet at a 30-degree view angle, as opposed to 50 feet at a perpendicular angle. This corresponds to a 60-degree view area centered on the direction of travel. Thus, the viewer is looking through more landscaped area before the eye encounters the solar facility. This effect would further strengthen the screening effect that is not depicted in Figure 2.

Figures 3 depicts the landscape buffer condition that is anticipated at the Tierra Del Sol project site running the length of Tierra Del Sol Road where the road is adjacent to the project site. A dedicated County trail easement is present at the edge of Tierra Del Sol Road, consisting of a 10-foot wide trail and 5-foot wide landscape area that is incorporated into the overall 50-foot wide landscape buffer area. As previously discussed, the Tierra Del Sol landscape buffer would incorporate boulder groupings and "fields" of rock cobbles into the planted area. These features provide visual benefits by enhancing the foreground view of motorists and trail users on Tierra Del Sol Road. In addition, the rock cobbles would act as noncombustible "mulch" that will protect soil moisture from evaporation, conserving the moisture for use by the landscape plants.

Figure 4 depicts the typical landscape buffer condition at Rugged Solar project site. Landscape buffers are recommended along the outer edge of the project east and west of McCain Valley Road as shown in the Visual Resources Technical Report. Due to the viewing distance from the roadway to the landscape screen, rock features have been eliminated from these landscape buffer areas.

LANDSCAPE BUFFER IRRIGATION

Irrigation is necessary to promote plant growth that will attain 10-year plant screen heights. Irrigation for the Soitec solar facilities will consist of drip irrigation components that may be above or below ground surface. Irrigation water will be sourced from a local groundwater well. The system will be automated with a solar irrigation clock that is programmable for monthly adjustments using published California Irrigation Management Information System (CIMIS) data for the local area. Irrigation will be schedule monthly to correspond with the Reference Evapotranspiration as reported by CIMIS for the mountains east and west of Imperial Valley.

WATER DEMAND CALCULATION

Water demand associated with the landscape screen was calculated in accordance with County of San Diego Ordinance 10032 (County of San Diego, 2010) relating to water conservation in landscaping (Landscape Water Ordinance). The maximum applied water allowance (MAWA) and estimated total water use (ETWU) were calculated for Tierra Del Sol and Rugged project sites. Table 2 summarizes the estimated water use in annual acreage feet of water use. Water volume shown in Table 2 is anticipated to occur during initial plant establishment, to promote growth, and maintain leaf area to maximize screening effects. Once established, plant materials will have a root system capable of accessing a greater soil volume and associated water resources at depth. Therefore, water use for mature plants will decrease from the annual volume shown.

The significant water conservation attained by the project is attributable to the use of drought tolerant plant species, low density defensible space planting, and use of water-efficient drip irrigation. Upon completion of final construction drawings for the actual planting layout and irrigation system to be installed, a final water use calculation should be prepared in accordance with the Landscape Water Ordinance.

Table 2
Estimated Annual Water Use for Landscape Buffers

Project Site	Total Estimated Landscape Area	Maximum Applied Water Allowance (AF/Year)	Estimated Total Water Use (AF/Year)	Estimated Water Conservation (AF/Year)
Tierra Del Sol Solar	6.89 acres	24.98	1.56	23.42
Rugged Solar	6.8 acres	24.68	1.56	23.12
Total	**13.69**	**49.66**	**3.12**	**46.54**

PLANT INSTALLATION AND MAINTENANCE STANDARDS

Plant installation should occur in the spring months concurrent with project construction or during the spring season immediately following installation of a groundwater well and completion of the permanent perimeter fence when the potential for freezing weather and/or frosts have passed.

A minimum of 5 soil samples shall be collected at each project site and tested for agricultural suitability using a saturated extract process to determine the recommended amendment type(s) and application rate(s) by volume of soil to optimize soil backfill to support plant establishment and long term growth. Plant installation shall include excavating a planting pit that is twice the width and depth of the nursery container dimensions. Backfill soil shall be amended with fertilizer and organic amendments per agricultural soil test results. A watering basin should be built around newly installed plants to provide for supplementary water in case the drip system does not fully support plant survival and growth during the initial 120-day grow-in period.

Maintenance shall include irrigation system operation, maintenance and repair to maintain optimum system operations including but not limited to relocation and/or adding drip emitters to optimize water distribution around plants to maximize water availability to the current root system, Other adaptive maintenance actions may include, but are not limited to, pest and herbivory control, weed control, pruning/thinning, staking for temporary structural support for weak plants during windy conditions, trash removal, etc. Maintenance frequency will vary by season and maturity of plant material. Initial plantings will likely require monthly maintenance that can taper to quarterly maintenance when plants are established. Once mature, the landscape may only require bi-annual or annual maintenance.

MITIGATION MONITORING AND REPORTING

The applicant shall install landscape screens as specified herein. The applicant shall also be responsible for continued maintenance of the landscape screens, including installation and maintenance of a drip irrigation system, and implementation of and consistency with, plant installation and maintenance standards identified above.

Monitoring of the landscape buffer/screen planting shall be performed during the 10 years after installation. The purpose of the monitoring is to observe and assess the maintenance regime and implementation of appropriate measures to promote plant survival, growth, overall health and vigor. Monitoring will assess plant survival and growth toward achieving the intended level of landscape screening as depicted in Figures 1–4.

In addition, monitoring shall assess landscape plants and maintenance regime with regard to fire protection and the maintenance of defensible space. Monitoring shall include an assessment of individual and overall plant density to determine if thinning is necessary to maintain appropriate plant spacing and fuel loads within the landscape buffer area consistent with County fire ordinances.

Monitoring shall be performed once annually during the monitoring period. Following each monitoring site visit, the applicant shall coordinate with the maintenance entity to adjust maintenance procedures to address project deficiencies. Adaptive measures should be implemented in the subsequent spring season to address project deficiencies. These measures may include, but not be limited to, fertilizer applications, modification of the irrigation schedule, trimming and pruning to adjust fuel loads and plant spacing, replanting where plant mortality has occurred, etc.

The applicant shall maintain records that document the landscape status, attainment of the desired landscape screening effect, and maintenance of defensible fire protection features. These records shall include a description of project deficiencies and remedial actions, if any, that were observed or occurred during the monitoring period, and will be available for County review upon request. Project compliance with landscaping maintenance will be ensured through compliance with the condition of approval in the Major Use Permit.

REFERENCES CITED

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Perry, B. 1992. *Landscape Plants for Western Regions*. Claremont, California: Land Design Publishing.

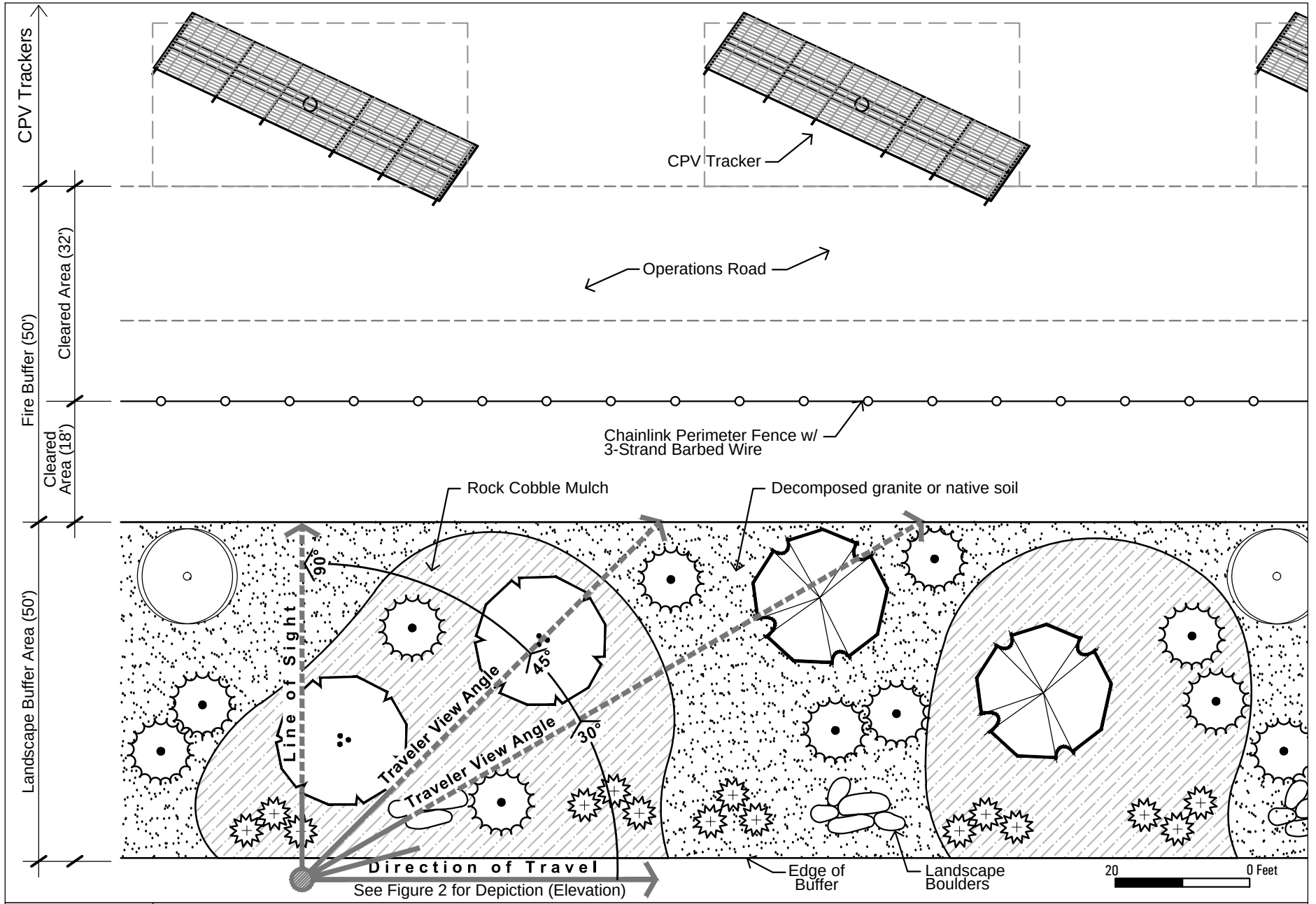

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FIGURE 1

Landscape Screen - Typical

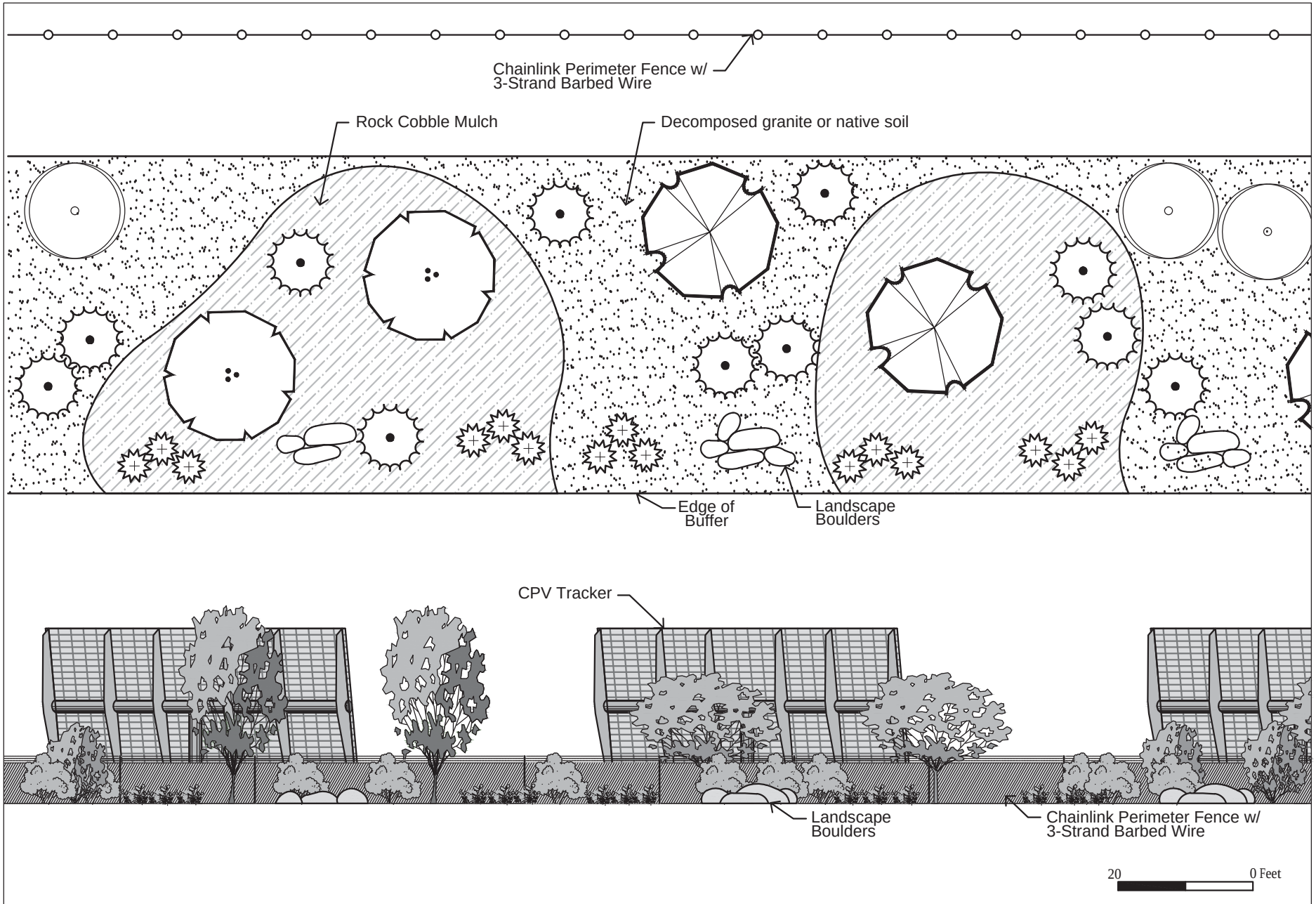

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FIGURE 2

Landscape Screen Elevation

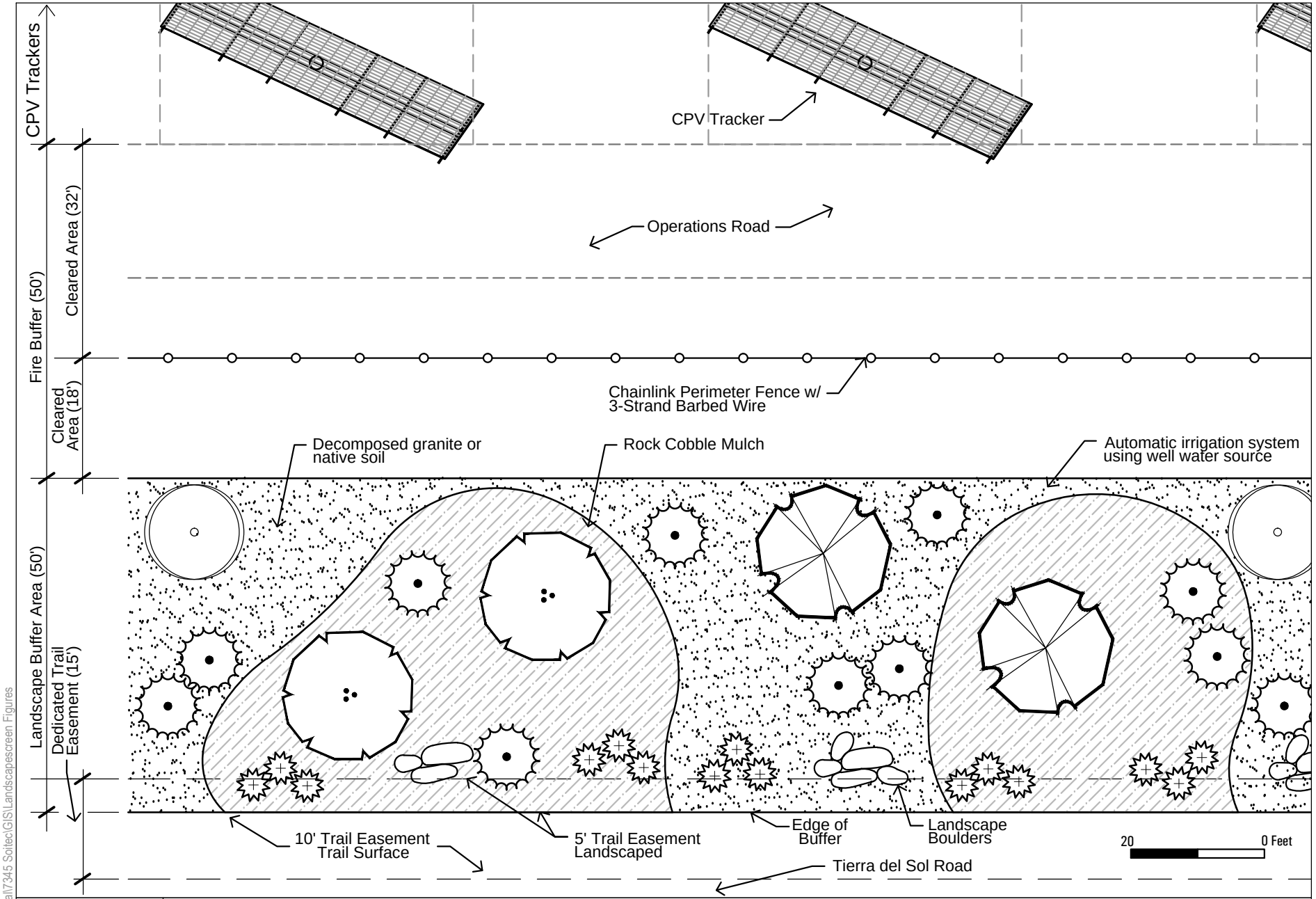

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FIGURE 3

Tierra del Sol Landscape Screen - Typical

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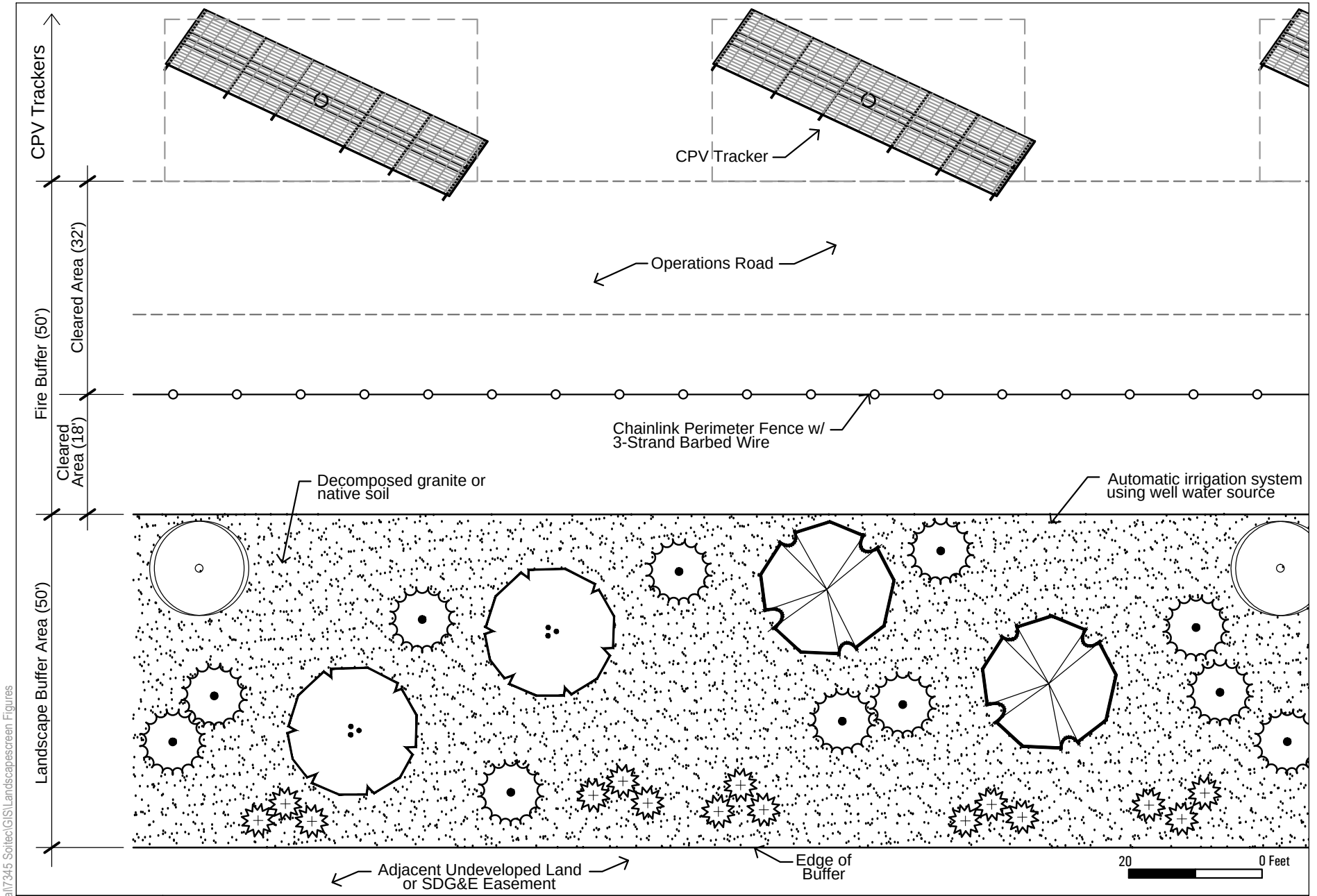

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FIGURE 4

Rugged Solar Landscape Screen - Typical

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