Rancho Viejo Solar Project Decommissioning Plan

JULY 2024

PREPARED FOR

Rancho Viejo Solar, LLC

PREPARED BY

SWCA Environmental Consultants

RANCHO VIEJO SOLAR PROJECT
DECOMMISSIONING PLAN

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ACRONYMS AND ABBREVIATIONS

BESS	battery energy storage system
BMP	best management practice
LGP	low ground pressure
m	meter(s)
MW	megawatt

1 INTRODUCTION

Rancho Viejo Solar, LLC (Rancho Viejo), proposes to construct the Rancho Viejo Solar Project (project) in Santa Fe County, New Mexico. The project consists of an up to 96-megawatt (MW), alternating current utility-scale solar energy system, an up to 48-MW (4-megawatt-hour storage energy capacity) battery energy storage system (BESS), a 2.3-mile generation-tie line, and ancillary facilities. Project components include solar panels mounted on trackers arranged in multiple arrays, transformers, direct current to alternating current inverters, a collection system that connects the arrays to a BESS, a substation, an operations and maintenance building, and a switchyard. The solar facility project would be located on approximately 680 acres of private land in Santa Fe County, New Mexico, approximately 4.2 miles east of La Cienega (project area). Rancho Viejo is submitting this decommissioning/reclamation plan for the project in accordance with Chapter 12, Energy Systems, of the 2021 International Fire Code; Section 1207.2.3 of the Santa Fe Fire Code; and the applicable sections of the Santa Fe County Sustainable Land Development Code.

1.1 Triggering Events and Expected Lifetime of Project

Project decommissioning may be initiated by specific events such as the termination of the power purchase agreement or the completion of the project's operational life cycle. Furthermore, the project will be deemed abandoned if it remains non-operational and inactive towards achieving operational status for a consecutive 12-month period.

The anticipated lifespan of a utility-scale solar facility, if properly maintained, typically ranges from 25 to 35 years. However, with strategic equipment replacement and repowering, the project lifespan can be extended to 50 years or more. Flexibility exists for retrofitting the solar arrays with updated components, such as panels, frames, and tracking systems, to prolong the project's viability. In instances where retrofitting is not pursued or upon reaching the end of the project's useful life, decommissioning entails the removal of panels and associated components from the project site.

The value of individual components within the solar facility fluctuates over time. Generally, the highest component value is realized during the construction phase, gradually declining over the project's lifecycle. Throughout most of the project's duration, components (e.g., solar panels) can be resold in the wholesale market for reuse or refurbishment. As panels age or endure weathering, their efficiency and power production decrease, resulting in a corresponding decline in resale value. Secondary markets for used solar components cater to other utility-scale solar facilities, with similar designs requiring replacement equipment due to damage or wear over time, as well as to other buyers—such as developers and consumers—seeking a cost-effective option with a slightly reduced power output compared to new equipment.

Components of the solar facility retaining their resale value may be marketed in the wholesale market, while those lacking resale value will undergo salvage for recycling or disposal at an approved off-site licensed solid waste disposal facility (i.e., landfill). Decommissioning activities will include removing the arrays and associated components (see Section 2).

1.2 Decommissioning Sequence

Decommissioning/reclamation will commence according to the timelines specified in this plan. Decommissioning activities and reclamation activities are planned to be completed within 12 months of the end of electricity generation. Rancho Viejo assumes responsibility for these tasks. Continuous monitoring and site restoration efforts may extend beyond this period to ensure the successful

revegetation and rehabilitation of the project area. Although there may be an overlap of activities, the anticipated sequence of decommissioning and removal is outlined below:

1. Assess and reinforce access roads, if necessary, and prepare the site for component removal.
2. Implement erosion control measures, including the installation of fencing and other best management practices (BMPs), to safeguard sensitive resources and mitigate erosion during decommissioning activities.
3. De-energize the solar arrays.
4. Dismantle panels and racking.
5. Remove frames and internal components.
6. Excavate portions of structural foundations to a depth of at least 3 feet (36 inches) below the surface, and backfill the site as necessary.
7. Remove inverter stations and associated foundations.
8. Extract electrical cables and conduits to a depth of at least 3 feet (36 inches) below the surface.
9. Remove BESS equipment and associated foundations.
10. Demolish access and internal roads and grade the site as required.
11. Disassemble the substation.
12. Eliminate overhead transmission lines and poles.
13. De-compact subsoils as needed, and restore and revegetate disturbed land to preconstruction conditions to the extent feasible.

It is important to note that while the outlined sequence provides a structured approach, flexibility is maintained to accommodate any variations in the decommissioning process and to ensure effective execution.

2 DECOMISSIONING/RECLAMATION

This section outlines the solar facility components and decommissioning activities required to restore the project area, as closely as practicable, to its preconstruction conditions.

2.1 Overview of Solar Facility System

Rancho Viejo anticipates using approximately 205,712 solar modules, with a total nameplate generating capacity of approximately 96 MW. The project area encompasses approximately 680 acres. The generating facilities will be placed within approximately 400 acres of land bounded by perimeter fencing as shown on Figure 1 (preliminary design; subject to modification). The land within the perimeter fencing is predominantly used for cattle grazing. Statistics and estimates provided in this plan are based on a BYD Solar MLTK 560W module, although the final panel manufacturer has not been selected at the time of the writing of this report.

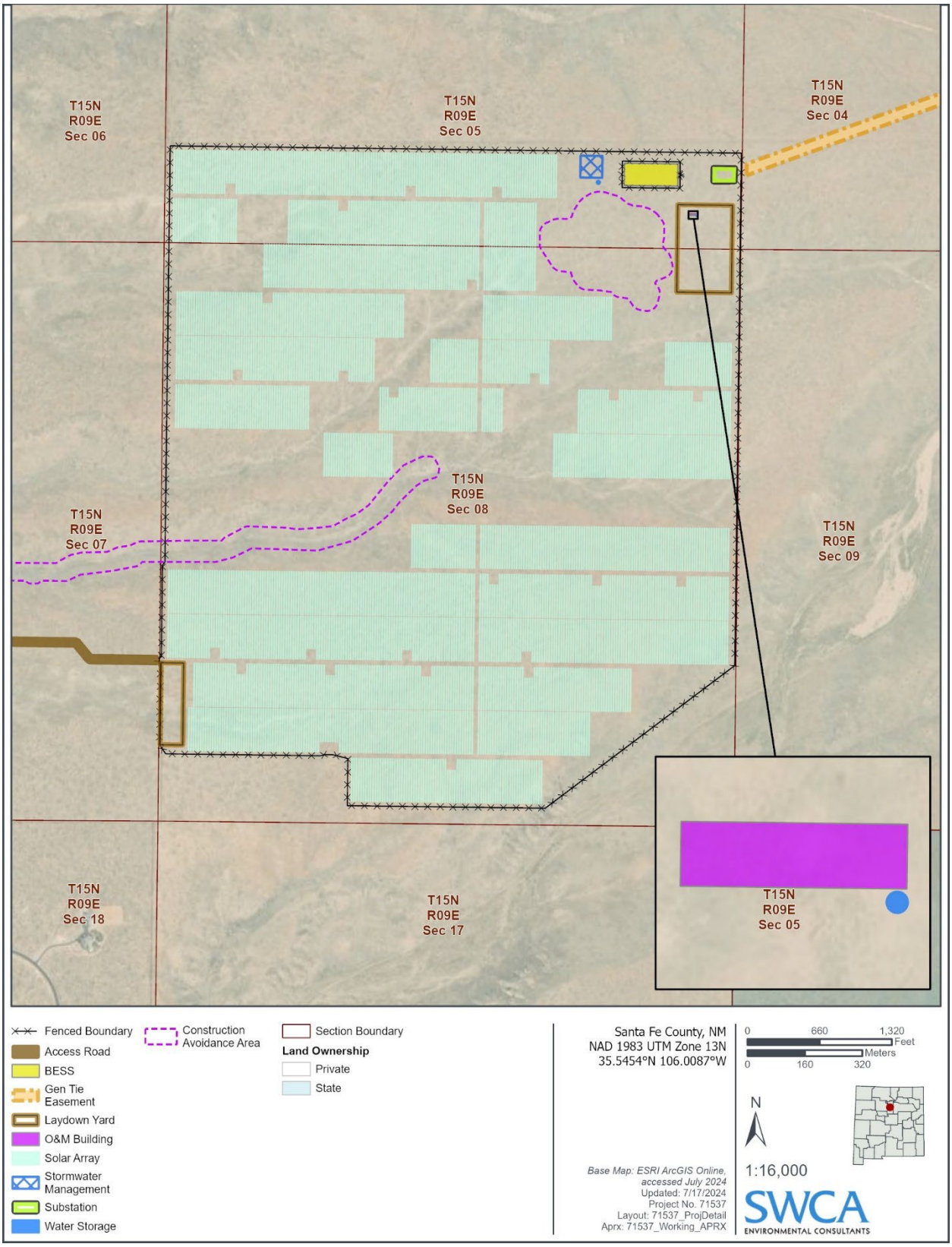

Figure 1. Site layout.

Collection cabling will be installed below the surface at a depth of approximately 3 feet (36 inches). Foundations, steel piles, and electric cabling and conduit that are less than 3 feet (36 inches) below the soil surface will be removed. Components and cabling deeper than 3 feet (36 inches) below the surface may be abandoned in place upon agreement with the landowner. Access roads may be left in place if requested and/or agreed to by the landowner in writing; however, for purposes of this assessment, it is assumed that all access roads will be removed. Public roads damaged or modified during the decommissioning and reclamation process will be repaired upon completion of the decommissioning phase. The estimated cost of repairing the public road is included in Section 4.1.

Estimated quantities of materials to be removed and salvaged or disposed of are included in this section and in Table 1. Many of the materials described have salvage value; although, some components will likely have no value at the time of decommissioning. Removed materials will be salvaged or recycled to the extent possible. Other waste materials will be disposed of in accordance with state and federal law in an approved licensed solid waste facility. Solar panels may have value in a resale market, depending on their condition at the end of the project's life. If the project is decommissioned prior to the anticipated 25 to 30–year timeframe, the resale value of components may be substantially higher than at the end of the projected project. Table 1 presents a summary of the primary components of the project included in this decommissioning plan.

Table 1. Primary Installed Facility Components

Component	Quantity	Unit of Measure
Solar Array		
Solar modules (approximation)	205,712	Each
Tracking system	2,022	Each
Steel piles	65,440	Each
Inverters	25	Each
Electrical cables and conduit	47,350	Linear feet
5,000-gallon water tank	1	Each
30,000-gallon water tank (fire suppression)	1	Each
O&M building (20' x 70')	1	Each
Septic system	1	Each
Perimeter fencing	22,884	Linear feet
Fence posts	2,288	Each
Access road	45,093	Linear feet
Substation	1	Each
Generation-Tie Line		
Transmissions poles	32	Each
Length of transmission cable	12,030	Linear feet
BESS		
40-foot battery container	38	Each
Battery module (Samsung SDI-E5S)	494	Each
Battery racks	723	Each
BESS cables	45,851	Linear feet

Inverters (MsWD3-V730)	19	Each

2.2 Solar Modules

Rancho Viejo Solar is deliberating the adoption of a mono bifacial half-cell panel (560 watts) from BYD Solar or a comparable module from other manufacturers for the project. Each module assembly (including frame) weighs approximately 29 kilograms (64 pounds) and measures about 2.2 × 1.1 meters (m) (7.5 × 3.6 feet). Each module assembly is mainly made up of nonmetallic materials such as silicon, glass, composite film, plastic, and epoxies, with an anodized aluminum frame; these modules comprise the solar array.

At the time of decommissioning, modules that are operational may undergo refurbishment and be sold in the secondary market, yielding a higher revenue compared to selling them as salvage material.

Nonfunctional modules will be shipped to either the manufacturer or a third party for recycling or disposal.

2.3 Tracking System and Support

The solar modules will be affixed to a single-axis tracking system, such as the Duratrack HZ v3 manufactured by Array Technologies, or an equivalent system. Each full, three-string tracker measures approximately 104 m (341 feet) in length and will support 303 solar modules per tracker. Smaller two-string trackers will accommodate 202 panels each and will be deployed at the periphery of the solar array layout to optimize space usage. Composed mainly of high-strength galvanized steel and anodized aluminum, with steel piles supporting the system, the tracking system will be deactivated and disassembled during decommissioning.

Salvageable materials from the supports, tracking system, and posts can be sold to generate revenue, thereby offsetting the decommissioning costs.

Non-salvageable materials will be sent to a metal recycling facility.

2.4 Inverter Stations

The combined inverters/transformers (inverter stations) will be situated on small concrete footings or piers supported by steel piles within the array. These stations will be deactivated, disassembled, and removed. It is assumed for this report that piers with steel piles will be employed. Depending on their condition, the equipment may be refurbished for reuse or salvaged. If not repurposed, they will be disposed of at an approved waste management facility.

2.5 Electrical Cabling and Conduits

The project's underground electrical collection system will be buried approximately 3 feet (36 inches) below the ground surface. Cabling at or above 3 feet (36 inches) will be salvaged, while deeper cables will be abandoned in place. No recovery cost has been assumed for the collection cabling, although it is likely to have a salvage value at the time of removal.

2.6 Project Substation

The project substation, encompassing an approximately 67 × 53–m (223 × 175–foot) footprint, will house a gravel pad, power transformer and footings, and electrical control house with concrete foundations. Salvageable components of the substation, such as the transformer, may be sold for reuse. Unsalvageable parts will be transported off-site for disposal.

Rancho Viejo will also install a 20-foot by 70-foot Operation and Maintenance (O&M) building containing offices, restrooms and conference room for onsite operations. This structure will contain recyclable materials particularly various metals, which will be included in the salvage efforts. Non-salvageable materials will be disposed of properly disposed of along with other construction waste.

2.7 Septic System

To support the onsite facilities Ranch Viejo will install a 5,000-gallon capacity water tank, this tank will be filled by trucking in water as needed. The tank will be installed behind the O&M building. Additionally, a septic system will be installed that will drain into a septic leach field to the west of the gravel pad supporting the O&M building and BESS system. During Decommissioning the water tank will be removed and sold and the septic system will be removed and the impacted ground will be regraded and restored to pre-construction conditions

2.8 Battery Energy Storage System

Rancho Viejo will be installing 48 MW of battery storage as part of the overall site development. The BESS will be installed within a 129 × 58–m (423 × 189–foot) fenced area in the northeast corner of the project adjacent to the project substation. This footprint will house the 38 Conex 40-foot containers, 19 inverters, and support infrastructure. The batteries planned for this will be Samsung SDI/E5S or equivalent. Salvageable materials from the Conex containers, inverters, and battery racks can be sold to generate revenue, thereby offsetting the decommissioning costs. Located west of the BESS will be a water storage tank (for fire suppression purposes) that will hold approximately 30,000 gallons of water and will be 26.3-feet diameter by 7.2-feet above ground. The water storage tank will meet the requirements of 2021 International Fire Code (IFC) Chapter 5, Fire Service Features, Section 507, Water Supply.

Non-salvageable materials will be sent to a metal recycling facility.

2.8 Transmission Line

Rancho Viejo will construct an approximately 2.3-mile, 115-kilovolt transmission line to connect the project substation to a point of interconnection substation. The line will be strung on 33, 50-foot H-frame structures, which consist of two steel poles per structure, or 23, 70-foot steel monopoles. Each leg of the H-frame steel poles would have a 9-foot-deep foundation. Each of the steel monopoles would have a 10-foot-deep foundation. Current decommissioning cost are based on the H-Frame structures.

Salvageable materials from the poles and cable can be sold to generate revenue, thereby offsetting the decommissioning costs.

Non-salvageable materials will be sent to a metal recycling facility.

2.9 Perimeter Fencing and Access Roads

The Rancho Viejo site will include a security fence around the perimeter of the site and exclusionary area. The fence will total approximately 4.3 miles in length. Access drives will provide direct access to the solar facility from local roads and along the inner perimeter of the arrays. Internal roads will be located within the array to allow access to the equipment. The site access drives will be approximately 20 feet wide and approximately 8.5 miles long. The access road lengths may change in the final Project design. To be conservative, the decommissioning estimate assumes that all access roads will be completely removed.

Unless the landowner states in writing that certain elements are to be retained, all fence parts and associated foundations, gravel pads, and access roads will be removed.

During installation of the project access roads, subgrade conditions may be stabilized by incorporating cement into soft ground. This plan assumes the cement materials will be incorporated into the top 10 inches of existing soil, which will then be capped with 2 inches of granular fill.

Decommissioning activities include removing and stockpiling aggregate materials on-site for salvage preparation. It is conservatively assumed that all cement-stabilized soil and aggregate materials will be removed from the project site and transported up to 10 miles from the project area. Following removal of the aggregate and cement-stabilized soil, the access road areas will be graded; loosened with a deep ripper or chisel plow (ripped to 18 inches); backfilled with native subsoil and topsoil, as needed; and graded as necessary.

3 LAND USE AND ENVIRONMENT

All hazardous materials will be disposed of in a manner consistent with federal, state, and local laws.

Soil shall be tested once energy production has ceased but before any equipment is removed. At least five samples will be taken, and they shall be representative of the overall project area; outliers in terms of soil type, drainage, or plant growth shall be excluded. The samples from before and after the operation of the facility will be compared to determine what contaminants, if any, are present and to develop a remediation program if necessary.

3.1 Soils and Rangeland

Areas previously used for rangeland within the project will be generally restored to their preconstruction condition, aligning with landowner lease agreements. Restoration efforts will be guided by consultations with current landowners and compliance with applicable regulations at the time of decommissioning. Disturbed land will be restored to its preconstruction state. Any soil exposed during decommissioning will be stabilized in accordance with New Mexico Department of Transportation erosion control and stormwater quality standards.

3.2 Restoration and Revegetation

Excavated and backfilled project sites will undergo grading as previously detailed. Any voids or holes remaining after equipment removal will be filled. Soil compaction resulting from deconstruction activities will be rectified as needed to restore land to its preconstruction state. Damaged drain tiles, if present, will be restored to preconstruction condition. Disturbed areas will be enriched with topsoil and seeded with appropriate vegetation, in coordination with landowners. All work will adhere to conditions agreed upon

by Rancho Viejo and Santa Fe County, or as dictated by prevailing regulations at the time of decommissioning.

During decommissioning, disturbances or removal of additional native vegetation shall be avoided to the greatest extent practicable. And land disturbed during the decommissioning process and any land that is not intended to be returned to rangeland use will be revegetated or reseeded with native plants according to the Santa Fe County Sustainable Land Development Code, or with other species that provide ecological services. Revegetation will be completed within 1 year of the removal of equipment, with a 6-month extension available, if needed, to complete a growing season.

3.3 Surface Water Drainage and Control

Predominantly situated within rangeland, the proposed project area features relatively flat terrain. The project layout has been designed to circumvent wetlands, waterways, and drainage ditches to the greatest extent feasible. Project site conditions and proposed BMPs for safeguarding surface water features will be delineated in a project Stormwater Pollution Prevention Plan before construction begins.

Surface water conditions will undergo reassessment before decommissioning. Rancho Viejo will secure requisite water quality permits from the New Mexico Environment Department Surface Water Quality Bureau and the U.S. Army Corps of Engineers, if necessary, prior to project decommissioning. Additionally, construction stormwater permits will be obtained, and a Stormwater Pollution Prevention Plan will be developed to account for prevalent conditions at the decommissioning stage. BMPs may encompass construction entrances, temporary and permanent seeding, mulching (in non-agricultural areas), erosion control matting, silt fence, filter berms, and filter socks.

3.4 Major Equipment Required for Decommissioning

Decommissioning activities involve the removal of aboveground project components and subsequent restoration (see Sections 2 and 3.2).

Equipment needed for decommissioning the mirrors that were needed to construct the solar facility may include, but is not limited to, the following: small cranes, low ground pressure (LGP) track-mounted excavators, backhoes, LGP track bulldozers, LGP off-road end-dump trucks, front-end loaders, deep rippers, water trucks, disc plows, tractors for subgrade restoration, and ancillary equipment. Over-the-road dump trucks will facilitate material transport from the site to disposal facilities.

4 DECOMMISSIONING COST ESTIMATE SUMMARY

Expenses associated with decommissioning the project will be dependent on labor costs at the time of decommissioning. For this report, 2023 to 2024 average market value approximations were used to estimate labor expenses. Fluctuation and inflation of the labor costs were not factored into the estimates.

4.1 Decommissioning Expenses

Project decommissioning will incur costs associated with disposal of components not sold for salvage, including materials which will be disposed of at a licensed facility, as required. Decommissioning costs also include backfilling, grading, and restoration of the proposed project site as described in Section 2. Table 2 provides a summary of the estimated costs for the decommissioning activities associated with the major components of the project.

Table 2. Estimated Decommissioning Expenses

Activity	Unit	Quantity	Cost Per Unit	Total
Management oversight and permitting	Lump sum	1	$450,000.00	$450,000.00
Mobilization/Demobilization	Lump sum	2	$500,000.00	$1,000,000.00
Solar modules: disassembly and removal	Each	205,712	$4.88	$1,003,874.56
Tracker system: disassembly and removal	Each	2,022	$663.00	$1,340,586.00
Steel pile removal	Each	65,440	$10.29	$673,377.60
Inverter station removal	Each	25	$1,700.00	$42,500.00
Removal of O&M Building	Each	1	$12,500	$12,500
Removal of Septic System	Each	1	$7,500	$7,500
Removal of Water Tank	Each	1	$2,000	$2,000
Access roads and inverter foundation removal	Lump sum	1	$364,700.00	$364,700.00
Perimeter fence removal	Linear feet	22,884	$2.97	$67,965.48
Aboveground cable removal	Linear feet	93,201	$0.25	$23,300.25
Underground cable removal	Linear feet	196,193	$3.50	$686,675.50
Removal of transmission poles (9-foot foundation), including cables	Lump sum	1	$966,000.00	$966,000.00
Battery container removal	Each	13	$7,500.00	$97,500.00
Battery rack removal	Each	723	$478.00	$345,594.00
BESS inverter pad removal	Each	19	$1,700.00	$32,300.00
Site restoration (680 acres)	Lump sum	1	$850,000.00	$850,000.00
Project substation removal	Each	1	$350,000.00	$350,000.00
Repair of public roads	Lump sum	1	$225,000.00	$225,000.00
Trucking/Disposal fees	Lump sum	1	$350,000.00	$350,000.00
Total				**$8,891,373.39**

4.2 Decommissioning Revenues

Project revenue will be realized through the sale of the solar facility components and construction materials. Modules and other components may be sold within a secondary market or as salvage. The market value of steel and other materials fluctuates daily and has varied widely over the past 5 years. Salvage value estimates were based on the approximate 5-year average price of steel and copper derived from sources including online recycling companies and U.S. Geological Survey commodity summaries. The price used to value the steel used in this report is $253 per metric ton; aluminum is $0.40 per pound; silicon is $0.40 per pound; and glass is $0.05 per pound. The main component used in the tracking system and present in the piles is assumed to be salvageable steel. Solar panels are estimated to contain approximately 75% glass, 8% aluminum, and 5% silicon. A 70% recovery rate is assumed for aluminum and all panel components, due to the processing required to separate the panel components. Alternative and more efficient methods of recycling solar panels are anticipated before this project is decommissioned, given the large number of solar facilities that are currently being developed. Table 3 summarizes the potential salvage value for the solar array components and construction materials at end of life.

Table 3. Estimated Decommissioning Revenues

Item	Unit	Salvage Price Per Unit	Units Per Item	Total Salvage Price Per Item	Number of Units	Total
Panels - silicon	Average number of pounds per panel (item)	$0.40	1.7	$0.68	205,712	$139,884.16
Panels - aluminum	Average number of pounds per panel (item)	$0.40	2.8	$1.12	205,712	$230,397.44
Panels - glass	Average number of pounds per panel (item)	$0.05	26.1	$1.31	205,712	$268,454.16
Panels - other	Average number of pounds per panel (item)	$0.50	2.4	$1.20	205,712	$246,854.40
Tracking system, transmission poles, and posts (mixed metals)	Tons	$215	1	$215	200	$43,000.00
Cables	Tons	$3,000	1	$3,000	50	$150,000.00
Inverters	Each	$80	1	$80	43	$3,440.00
Substation/BESS Containers/O&M Building metal	Lump sum	–	–	$200,000	1	$200,000.00
Total						**$1,282,030.16**

4.3 Decommissioning Cost Summary and Financial Assurance

A summary of the net estimated cost to decommission the project, using the information detailed in Sections 4.1 and 4.2, is provided in Table 4. Estimates are based on 2023 to 2024 prices; market fluctuations and inflation were not included in the estimate.

Table 4. Net Decommissioning Summary

Item	Total
Decommissioning expense	$8,891,373.39
Potential revenue – salvage value of panel components and recoverable materials	$1,282,030.16
Net Decommissioning Cost	**$7,609,343.23**