PLANNING & ZONING
STAFF SUMMARY REPORT

MEETING DATE: DECEMBER 27, 2022

CASE # ETZ 2022-23

REVIEWING BOARD	**ROSWELL-CHAVES COUNTY EXTRATERRITORIAL ZONING AUTHORITY**

ACTION REQUESTED:	Per Section 2.1.4 of the Roswell-Chaves County Extraterritorial Zoning Ordinance #80-1 and State Statute 3-21-8 NMAC. An **Appeal** of the Roswell-Chaves County Extraterritorial Planning and Zoning Commission decision to **DENY** Case ETZ 2022-23- A Special Use Permit for a Community Solar Facility in the R-S Rural Suburban District. **Per State Statute 3-21-8.C.2 The Roswell-Chaves County ETZ Authority may, by a majority vote of all its members(3):** • Reverse any order, requirement, decision, or determination of an administrative official or commission; • Decide in favor of the appellant; or • Make any change in any order, requirement, decision, or determination of an administrative official or commission.
LAND OWNERS & AGENT:	SKS Schnedar 1998 Trust DG Roadrunner LLC

LOCATION:	4800-5200 block of W. 2nd St. A portion of land in the NE/4 of Section 3, T.11S, R. 23E.

ITEM SUMMARY	Staff gave a brief summary of the case at the November 15, 2022 Roswell-Chaves County ETZ Commission public hearing. Brian Harper of DG Roadrunner LLC presented his case and answered questions from the Commission. Dave Kunko spoke in favor the Special Use Permit as the family representative of the property. Jack Harrelson, Lori Doerhoefer, Betty Jenkins, Edward Williams, Bill Brewer, Patricia Gunderson, Randy Doerhoefer John Scott, Jackie Oilfield, Hiram Hudson and Berry Steven spoke against the case due to health concerns, wind and heat issues and site nuisance. The City of Roswell gave no opinion on the case. **The final vote was 5-0 to deny ETZ Case 2022-23. Commissioner Doerhoefer absent due to illness. Finding of Facts- 1. Not in the best interest of the surrounding residents base on public testimony.** Article 25 SUP; states reasons for granting a SUP 1. shall not be a danger to public health and safety; 2. shall not be detrimental to the economic welfare of the county; 3. shall not be a nuisance; 4. shall meet the use standard for R-S district; 5. shall be compatible with the surrounding area; 6. shall conform with the 2016 Comp. Master Plan.

STAFF'S REPORT

CASE # ETZ 2022-23

DG Roadrunner, LLC and Schnedar 1998 Trust SKS are requesting a Special Use Permit for a community solar facility located along West 2nd Street on the south side. The proposed site would be located on the southern portion (25.5 acres) of a large and odd shaped lot being 94.5 acres in size. The lot itself is accessible from W. 2nd Street, Brown Road, Foothill Blvd. and Hendricks Street. The site plan indicates the proposed community solar facility would be accessible from W. Hendricks Street at the intersection of Foothill Boulevard and Hendricks Road.

DG Roadrunner, LLC proposes to construct a twenty-four (24') foot service road along the perimeter of the facility for fire prevention and emergency service access. DG Roadrunner, LLC has provided a development plan showing the solar panels will be ground based. The solar facility would be fenced in for security reasons. (See Project Description for details.) The facility will tie into the overhead electric line that runs along Hendrick Road and onto Brown Road. The nearest substation is located at Eisenhower Road and W. 2nd Street. Xcel Energy is unable to determine if they will be able to accept the 5-megawatt community solar facility on their distribution line.

The proposed site, along with the remaining lot area, is zoned R-S Rural-Suburban District. The properties located to the north and across W.2nd Street are a mix of residential and commercial. All of the surrounding properties on the south side of 2nd Street are zoned R-S Rural Suburban with the exception of the commercial property at the intersection of Brown Road and W. 2nd Street. The larger properties located to the southwest, west and northwest of the proposed site are undeveloped parcels. To the east, there are two subdivisions Los Lomas and Lynndale Heights Subdivision. These two subdivisions contain numerous small lots that, on their own, are undersized for residential developed per the NM Environmental Department's regulations and must be combined with an adjacent lot in order to place a home and septic system. Western Hills Subdivision, to the west, is only developed on the west side and contains medium size lots that meet the NM Environmental Department's regulations for a 2-bedroom home and septic.

Staff has reviewed Mitchell A. Pavao-Zuckerman's (2016 assistant professor University of Maryland) report which states that the measured ambient air temperature over a solar facility was warmer than the surrounding area by 5-7-degrees F (3-4 C), at night and that the added heat was unmeasurable and dissipated within 100 feet of the facility. The report also states the heat effect may be caused by the natural ground's, underneath the solar panels, inability to cool off as quickly as the surrounding area. (See attachment).

The 2016 Comprehensive Master Plan encourages new commercial or industrial uses be located in areas that are not injurious to residential neighborhoods and, when possible, along major highways and arterial roads. (Land Use 4.3) It also notes that new solar energy facilities should be located and designed to mitigate negative impacts on surrounding residential neighborhoods (Physical Appearance 4.4). The Future Land Use Scenario map recommends this area as Mid-Density Residential (5-10 residential homes per acre) use which is really not possible in the ETZ area due to the 5-acre minimum lot size in the ETZ area.

Staff's recommends the following Conditions of Approval:

1. A twenty-four (24) feet wide hard pack, weather proof, service road shall be required along the perimeter the facility and within the fenced in area for fire and other emergency vehicles.

2. The location and development of the community solar facility shall conform to the presented and approved site plan, included in this report. Any modification to the location or an increase in size of the facility shall require ETZ Commission's approval.

3. The solar facility shall be constructed in accordance with the site plan presented by the agent and included in Staff's Report. Minor changes may be permitted by Staff for public health or for compliance with other Conditions of Approval listed.

4. Failure to complete the construction of the community solar facility within ten years shall result in the Special Use Permit being terminated.

5. DG Roadrunner, LLC shall apply for any necessary building and electrical permits for construction of the community solar facility within one year of being award the solar project by Xcel Energy.

6. DG Roadrunner, LLC shall utilize the existing electric transmission lines in the area.

7. DG Roadrunner, LLC shall provide a de-commissioning and restoration plan for this property.

8. All lighting used on-site shall be shielded from traffic, surrounding properties and shall comply with the NM Night Sky Act.

9. All solar panels and their foundations shall be setback from property lines a minimum of fifty (50) feet.

10. A minimum six (6') foot security fence around the perimeter of the facility.

ROSWELL- CHAVES COUNTY EXTRATERRESTRIAL ZONE

APPEAL APPLICATION

Case Number: ETZ Case 2022-23 **Date Received:** _____ **Fee: $100**

Type of Request: □ Rezone **XX** Special Use □ Variance □ Change of Use

Appellant's Name: **DG Roadrunner**

Mailing Address: **700 Universe Blvd., Juno Beach, FL 33408**

Email **brian.harper@nee.com** Phone Number: **561-400-8076**

ETZ COMMISSION'S DECISION ON THIS DATE:

□ **APPROVED** on _____

XX DENIED on **11-15-2022**

Reason for the Appeal: (Attach Letter if necessary) **Please see attached Letter**

PLEASE INCLUDE ALL DOCUMENTS, PLANS, & LETTERS.

I OR MY AGENT SHALL ATTEND THE PUBLIC HEARING IN ORDER TO FULFILL THE REQUIREMENTS OF THIS APPLICATION. FAILURE TO ATTEND MAY RESULT IN THE TERRIMINATION OF THIS APPEAL.

Brian Harper

Appellant's Signature

12/15/22

Date

CHAVES COUNTY		ETZ Commission
Date: November 15, 2022	*Public Hearing Minutes*	Created By: Jennifer Latimer

Members Present:
Matthew Bristol
Michael Lackey
Neil Roe
Mona Kirk
Rita Kane-Doerhoefer
Royce Maples

Staff Present:

Louis Jaramillo
Richard Gutierrez
Jennifer Latimer

Guests:
Randy Doerhoefer
Edward Williams
Corey Hubbard
Jack Harrelson
Jon Scott
George Harris
Dave Kunko
Debbie Scott
Lori Doerhoefer
Betty Jenkins
Bill Brewer
Patricia Gunderson
Joe Scott
Jackie Oilfield
Hiram Hudson
Berry Stevens
Duanita Rich
Sadie Cardenas

A public hearing before the Chaves County Extraterritorial Zoning Commission (ETZ Commission) was held at the Chaves County Administrative Center, in the Commission Chambers, on November 15, 2022, beginning at 5:30 PM.

Minutes

Commissioner Kirk made a motion to approve the minutes of the October 18, 2022, meeting. **Commissioner Kane-Doerhoefer** second the motion. The minutes were approved unanimously as submitted.

Case ETZ 2022-21

Request for a Special Use Permit for Community Solar Facility in Rural Suburban District; located E4SW4, less the highway and SE4NW4, of Sec.31 in T.10S of R.25E of the N.M.P.M; On the NW corner of US/380 E. Second St and Bosque Rd; Landowner Ed Purcell; Agent SolarStone Partners.

Louis Jaramillo informed the Commission that SolarStone Partners had requested a postponement of case ETZ 2022-21 due to the submission of the first round of solar applications with the PRC on December 1, 2022, and they are also still working to coordinate with neighbors.

Case ETZ 2022-22

Rezone to I-1 Industrial District for Community Solar Facility in a Rural Suburban District; located E2SW4, Sec.34, T.10S R.23E N.M.P.M; Along W. 2nd Street; Landowner Mandi & Michael Nappier; Agent Zac Gordon.

Louis Jaramillo gave a brief description of the case and noted there was a correction to the Conditions of Approval in Staff's Report. He stated there was a mistake in requiring a road to be built that is not in this area and the setbacks from all side property lines would be a minimum of forty (40) feet and eighty (80) feet. from the front and rear property lines.

Zac Gordon, Agent for Energy Management, Inc. (EMI) gave a brief presentation of his project particulars, impact, layout, and best management practices with the use of the televisions in the Chamber.

Commissioner Kane-Doerhoefer asked if he has contacted NMDOT regarding access from 2nd Street. Mr. Gordon stated no. She also asked if he has been out to the property when it's windy and Mr. Gordon responded no, he has not. She then asked what the fence would be made out of. Mr. Gordon said it was a chain link fence.

Commissioner Kirk asked how tall the fence would be and Mr. Gordon said it will be an eight (8) foot in height. She then asked if dirt and dust could affect the operation of the panels. Mr. Gordon said that yes it possibly could.

Commissioner Kane-Doerhoefer asked who would be doing the maintenance and about the longevity of the panels and where would they go after their life cycle. Mr. Gordon stated that a possible third-party company in New Mexico would be hired for maintenance. He continued by stating the solar panels have a twenty-five (25) year life span and after that they will be recycled.

Commissioner Roe commented that the fence should be tied down to try to deter antelope from crawling under the fence. Mr. Gordon said he will take that into consideration.

Commissioner Kane-Doerhoefer asked if they were going to tie into the Xcel line and she also asked if they had a low-income program for residents in the area. Mr. Gordon responded and said yes, they are planning to tie into the Xcel line and yes, they have a program for low-income residents.

No one spoke in favor of the case.

Randy Doerhoefer, 4716 & 4718 W. 2nd Street, spoke against the case. He stated the solar facility could affect the growth of West Roswell because of residents would not want to live near the solar facility. He also stated that the intersection of Brown Rd and 2nd St is already very dangerous and the extra traffic for the construction would make it worse.

Edward Williams, 118 Ransom Rd**,** spoke against the case due to sight obstruction and dust complaints.

Corey Hubbard, 5210 Thunderbird Ln, was in opposition due to sight obstruction and the soil being disturbed which would cause an increase of dirt and dust in the area.

Jack Harrelson, owner of Happy Jacks, stated he was opposed because the property values would decrease. He also mentioned a study from the University of Tucson about heat island effects and the heat in the area could increase 60 degrees Fahrenheit.

John Scott, 125 Ransom Rd, was opposed to the SUP due to security issues and decrease in development in the area.

George Harris stated concerns that were irrelevant to the project and were towards the purpose of the ETZ Commission and Commissioners.

Commissioner Kane-Doerhoefer recused herself.

Chairman Maples asked Zac Gordon to respond to some of the questions.

Commissioner Kirk asked Mr. Gordon if they had talked to the surrounding neighbors. Mr. Gordon stated they did talk to some neighbors and passed out flyers.

Commissioner Bristol made a motion to approve Case ETZ 2022-22 and was seconded by **Commissioner Roe.**

Discussion ensued amongst the Commissioners and the audience started to get disruptive.

Chairman Maples asked for a roll call. The motion failed by a 2-3 vote, with **Commissioner Kirk, Commissioner Lackey, and Commissioner Roe** voting against and **Chairman Maples** and **Commissioner Bristol** voting in favor.

ETZ Case 2022-23

Special Use Permit for Community Solar Facility in a Rural Suburban District; located NE4, Sec.3 T.11S R.23E N.M.P.M; located at 4800 W 2nd Street; Landowner SKS: Schnedar 1998 Trust; Agent DG Roadrunner LLC.

Louis Jaramillo briefed the Commission on the project particulars, location access and indicates the rural suburban zone. Mr. Jaramillo stated staff did received two (2) letters of opposition and copies were given to the Commissioners.

Brian Harper, Agent for DG Roadrunner LLC, describes the company and project.

Commissioner Kane-Doerhoefer asked if Mr. Harper has been out to the property when it's windy and she asked who will be doing the maintenance of the facility. Mr. Harper responded and said no, he has not been out to the property when it's windy and they hope to hire a local maintenance company. She then asked if they had a low-income program for residents and she also inquired about the fence height. Mr. Harper stated yes, they do have low-income program and the power consumption rate would be 25%. He then stated the fence would be seven (7) feet.

Commissioner Lackey asked if they are only going to lease what they use regarding the acreage of the property. Total acreage is 94.5 and DG Roadrunner is proposing to use 25.5 acres. Mr. Harper stated yes, they are only leasing the 25.5 acres as stated on the application. **Commissioner Lackey** asked what would happen if they were to increase the acreage in order to put more solar panels out. **Louis Jaramillo** responded and said they would have to apply for a new Special Use Permit.

Commissioner Kirk asked if they have had conversations with the surrounding neighborhood. Mr. Harper responded that they have not.

Chariman Maples asked if anyone would like to speak in favor of the application.

Dave Kunko, 500 block of North Washington, representative for the landowners, states he is in favor of their application.

Chairman Maples asked if anyone would like to speak against the application.

Debbie Scott, 4901 W 2nd Street, stated several reasons for her opposition of the case. She said it could disrupt habitat. She fears the heat would affect her pecan orchard causing an increase in water due to the heat coming from the solar panels. She also voiced concerns about flooding in the area, mineral rights, decrease in property values and radiation emissions.

Jack Harrelson, owner of Happy Jacks, stated he is opposed due to wind issues.

Lori Doerhoefer, 4718 W 2nd Street, stated her opposition is due to the wind blowing and dangerous chemicals in the solar panels.

Betty Jenkins, 1508 S Brown Rd, spoke against the application. She stated that because of the excess heat, she would have to water her plants more. She said it would decrease the property values. She suggested for the solar company to invest in a cooling system, and she feels like it should be put somewhere else.

Edward Williams, 118 Ransom Rd, said he was opposed.

Bill Brewer, 4503 W McGaffey stated he is opposed and does not want the solar facility next to his property.

Patricia Gunderson, 1305 S Brown Rd, stated she's opposed because her grandkids play in that area.

Randy Doerhoefer, 4716 & 4718 W 2nd Street, is against the application. He stated that the area needs more commercial business and not Industrial.

John Scott, 125 Ransom Rd, stated he was opposed to the application.

Jackie Oilfield, 200 E 22nd St, stated she was opposed.

Hiram Hudson, spoke in opposition. He stated the ordinance needs to be revised in regard to the solar facilities.

Berry Stevens, Thunderbird Lane, state his opposition. He said the structural integrity of the panel structure needs to be investigated.

Commissioner Kane-Doerhoefer exited the meeting at this time due to illness.

Commissioner Bristol made a motion to deny case ETZ 2022-23 based on it's not in the general welfare of the community and the property values will be affected. **Commissioner Kirk** second the motion. Motion passed unanimously.

Case ETZ 2022-24

Special Use Permit for Community Solar Facility in a Rural Suburban District; located SE4NW4, Sec.19, T.10S R.25E N.M.P.M; Along Horizon Rd; Landowner Chaves County Solar II, LLC; Agent DG Horizon, LLC.

Louis Jaramillo briefed the commission on the particulars of the project. Mr. Jaramillo stated that NextEra was using the site area as a staging area for the construction of Chaves County II Phase 2, the commercial solar facility. He noted there were two offices, heavy equipment and lots of material on the site.

Brian Harper, Agent for DG Roadrunner LLC, spoke briefly about the project.

Chairman Maples asked if they have contacted the neighbors. Mr. Harper responded no.

No one spoke in favor of the application.

Chairman Maples asked if anyone would like to speak against the application.

Sadie Cardenas, 3768 Horizon Rd, spoke in opposition of the case because of the excess vehicle traffic, and the roads being in terrible condition. Wildlife (owl) killed in the vicinity. **Commissioner Maples** advised Ms. Cardenas to contact the NM Game & Fish Department

Duanita Rich, 3742 Horizon Rd, spoke against the case. She stated her opposition was due to large vehicular traffic, vehicles speeding, children in proximity of the project and the reduction of property values.

Patricia Gunderson, 1305 S Brown Rd, stated her opposition was due to ambient heat and kids in the area of the facility.

Commissioner Roe made a motion to deny case ETZ 2022-24. **Commissioner Lackey** second the motion. Motion passed unanimously. Finding of Facts not in the best interest of the residential neighbors.

There being no other business listed on the agenda or to come before the ETZ Commission, the meeting adjourned at 7:13PM.

Approved this _____day of _____, 2022.

_____ _____

Chairman Attest

Note: The recorded minutes of this meeting are on file in the Chaves County Planning and Zoning office for review.

MODRALL SPERLING

LAWYERS

Bayard Roberts IV
Tel: 505.848.1836
Fax: 505.848.9710
Bayard.Roberts@modrall.com

December 15, 2022

Roswell-Chaves County Extraterritorial Zoning Authority
1 St Mary's Place
Roswell, NM 88203

Re: Appeal Application ETZ Case 2022-23

Dear: Esteemed Members of the Roswell-Chaves County Extraterritorial Zoning Authority

Please accept this letter containing additional information, material, and argument as to why it was error to deny DG Roadrunner, LLC's Application for a Special Use Permit in ETZ case 2022-23. ETZ Case 2022-23 concerns DG Roadrunner's application for a Special Use Permit to develop a community solar facility at 4800 W 2nd Street. The total acreage of the proposed site is approximately 94.5 acers and DG Roadrunner is proposing to use only 25.5 acres. 4800 W 2nd Street lies about 4.5 miles from Roswell's city center and just about a mile west of the intersection of the Roswell Relief route and W. 2nd Street.

According to the Chaves County property information portal, provided by Eagle Web[1], the land is categorized as NON-RESIDENTIAL LAND. Additionally, apparent from the Chavez County Parcel Viewer, properties to the north, east, and west of 4800 W. 2nd Street have all received some type of special permission to engage in industrial and/or commercial activities. I mention this here because DG Roadrunner is concerned that its application for a Special Use Permit was not given the same reasonable consideration that similar applications have otherwise received by the ETZ Commission. Instead, it appears that concerns from those who spoke in opposition to ETZ case 2022-23 at the November 15, 2022, public hearing swayed the ETZ Commission, when the competent facts associated with the solar facility project should have been the deciding factor. While public concerns and comment is important, it should not sway the ETZ Commission, when such concerns are untethered from the truth.

In this letter, I endeavor to set forth the facts that the ETZ Commission should have considered when assessing if, among other things, the proposed solar facility is consistent with the general welfare of the community. I hope the straightforward facts

[1] https://eagleweb.chavescounty.gov/assessor/web/
Parcel No: 4131062402124000000

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shed light on the how a solar facility would affect Chaves County and the City of Roswell and lay bare how such a project is in line with the community's general welfare.

A. Special Use Permit Standard and Standard of Review

As you know, in order for the ETZ Commission grant an application for a Special Use Permit, it must determine whether:

> a. The granting of the Special Use Permit will not be injurious to the public health, safety, morals, and general welfare of the community.
> b. The use or value of the area adjacent to the property included in the Special Use Permit will not be affected in a substantially adverse manner.
> c. The site for the proposed Special Use Permit is suitable for that use, and the surrounding properties are compatible with that use.
> d. That the grant of the Special Use Permit would be within the spirit, intent, purpose, and general plan of this ETZ Ordinance.

Roswell-Chaves County Extraterritorial Zoning Ordinance No. 81, as revised August 31, 2021, Article 25, Section 25.1(2) (referred to throughout as the "ETZ Ordinance").

When the ETZ Commission grants or denies a Special Use Permit it is acting in a quasi-judicial capacity, and as such, must have a certain justification for the basis of its decisions. "A local governing body is acting in a quasi-judicial capacity when it is 'required to investigate facts, or ascertain the existence of facts, hold hearings, weigh evidence, and draw conclusions from them, as a basis for their official action, and to exercise discretion of a judicial nature.'" *Dick v. City of Portales*, 1994-NMSC-092, ¶ 5, 118 N.M. 541, 543, 883 P.2d 127, 129 (quoting *Black's Law Dictionary* 1245 (6th ed.1990)); *cf. State ex rel. Battershell v. Albuquerque*, 108 N.M. 658, 662, 777 P.2d 386, 390 (Ct.App.1989) (stating that hearings before a zoning commission are quasi judicial).

Therefore, ETZ Commission's decision to deny ETZ case 2022-23 application for a Special Use Permit must be supported by substantial evidence. The evidence the ETZ Commission uses to support its decision must be "competent evidence." "Competent evidence is "evidence, which in legal proceedings is admissible for the purpose of proving a relevant fact." " *Dick*, 1994-NMSC-092, ¶ 7, (quoting *Chiordi v. Jernigan*, 46 N.M. 396, 402, 129 P.2d 640, 643 (1942)). An example of incompetent evidence is opinion testimony of witnesses, unsupported by substantiated facts. *Id*. Generally, "witnesses must testify to facts, and not to opinions." *Id*. In other words, a lay witness "who gives opinion testimony must show first-hand knowledge of the facts supporting his opinion and 'a rational connection between the observations made and the opinion formed.'" *Id*.

"Substantial evidence supporting administrative agency action is *relevant* evidence that a reasonable mind might accept as adequate to support a conclusion." *Id*. ¶ 8. Substantial evidence is not conjecture, speculation, or unsupported opinion testimony. *See id*.

B. The General Welfare of the Community and Public Knowledge Regarding Solar Facilities.

Items (a) through (c) from the ETZ Ordinance mentioned above are all related and concern whether the solar facility is a good fit for the proposed site. Clearly, local citizens are concerned about the impact of a solar facility and voiced their concerns at the November 15, 2022, Public Hearing. *See* Public Hearing Minutes, enclosed herewith. The Public Hearing Minutes make clear that the opinions of these citizens who spoke against the issuance of a Special Use Permit swayed the ETZ Commission and formed the basis of its denial. The concerns the local citizens raised are worth addressing and warrant further consideration by the ETZ Authority. However, as the below discussion makes clear, the citizens did not offer *competent testimony* that would provide substantial evidence to support the ETZ Commission's decisions. Rather, the citizens expressed their lay opinions that are unsupported by substantiated facts.

Generally, those who spoke against the solar facility were concerned about: disruption of habitat, heat transference, flooding, mineral rights, decrease in property values, "wind issues," and dangerous chemicals in the solar panels. These are common concerns that arise nationwide whenever a solar facility is proposed. Fortunately, most, if not all these concerns have no basis in fact and are instead rumors or fears that have spread due to an unfamiliarity with solar panels. Enclosed herewith, is a paper from the North Carolina State University Clean Energy Technology Center, entitled the Health and Safety Impacts of Solar Photovoltaics that addresses these concerns. The paper states:

> Photovoltaic (PV) technologies and **solar inverters are not known to pose any significant health dangers to their neighbors**. The most important dangers posed are increased highway traffic during the relative short construction period and dangers posed to trespassers of contact with high voltage equipment. This latter risk is mitigated by signage and the security measures that industry uses to deter trespassing. Risks of site contamination are much less than for most other industrial uses because PV technologies employ few toxic chemicals and those used are used in very small quantities. Due to the reduction in the pollution from fossil-fuel-fired electric generators, the overall impact of solar development on human health is overwhelmingly positive.

Health and Safety Impacts of Solar Photovoltaics, pg. 3. With respect to habitat, flooding, mineral rights, and wind issues, these concerns are already addressed by the local building codes and ordinances that take into account the environmental factors specific to Chaves County and the City of Roswell. As with any other development, the construction of a solar facility must, and will comply with the applicable regulations to ensure it is safely and thoughtfully constructed.

The paper also addressees how heat may be produced by a solar facility. Solar panels do produce a small electromagnetic field (EMF) when in use. However, the EMF is small and isolated enough that there are no "negative health impact from the EMF

produced in a solar farm." Health and Safety Impacts of Solar Photovoltaics, pg. 14. The paper states "modern humans are all exposed to EMF throughout our daily lives without negative health impact." A solar facilities introduces nothing into the atmosphere, heat or otherwise, that could harm humans or plants outside of its perimeter.

Finally, with respect to property values—this is the most often cited concern when attempting to establish a solar facility. It is such a common concern that a variety of studies have been undertaken on the issue. Notably, the American Society of Farm Managers and Rural Appraisers ("ASFMRA") recently published an article on the issue and cited a variety of studies. The ASFMRA found "no associated impact on property values for solar farms located in rural areas."[2] Another study in the article "found no consistent negative impact on residential property value that could be attributed to nearby solar farms." While in some cases property values can be effected, this is less often the case when the solar farm is constructed in a rural area. Even then, the impact to property values can be mitigated by fencing, or screening around the solar facility.

The background, academic studies, and research discussed in this section endeavors to provide additional information to the ETZ Authority so that it can accurately assess what may be a) injurious to the public health, safety, morals, and general welfare of the community; b) the adverse effect to the use or value of the area adjacent to the property included in the Special Use; and c) whether the site for the proposed Special Use Permit is suitable for that use, and the surrounding properties are compatible with that use. While community comment, as made during the November 15, 2022, public hearing is helpful, it is only helpful to the extent it is accurate. The applicable law governing these quasi-judicial proceedings mandates that the ETZ Commission's decision be based on *competent evidence* or evidence that has a rational connection between the observations made and the opinion formed. *Dick*, 1994-NMSC-092, ¶ 7. The above academic and technical literature shows that the testimony from the concerned citizens, while informative, does not have a rational connections with the realities of a solar facility.

Thus, DG Roadrunner asks the ETZ Authority to overturn the ETZ Commission, as the proposed solar project is in line with the general welfare of the community, as well as the stated goals of Chaves County and the City of Roswell.

C. Chaves County and the City of Roswell's Position on Solar and Renewable Energy

With respect to the "spirit, intent, purpose, and general plan" of the ETZ Ordinance, the ETZ Ordinance derives its purpose from the "recommendations of the Chaves County Comprehensive Land Use Planning and Zoning Report, the Chaves County Land Use Policies Plan, and update thereto, and the City of Roswell Comprehensive Master Plan." *See* ETZ Ordinance, Section 1.3.1. According to the City of Roswell Comprehensive Master Plan a stated objective is to:

[2] Solar's Impact on Rural Property Values, 02-15-2021 https://www.asfmra.org/blogs/asfmra-press/2021/02/16/solars-impact-on-land-values

> Objective C: To encourage redevelopment of East and West Second Street and South Main Street with new commercial retail and light industrial uses.

Section 4.9 Land Use Goals, Objectives, And Implementation Strategies, Land Use Goal 3. Moreover, Infrastructure Goal 6 and 6.1 assert that Roswell's objectives are to:

> Objective B: To **provide incentives for the use of solar**, wind, biomass, and other renewable energy technologies; and to
>
> **Promote the use and expansion of renewable energy** alternatives including solar, wind, and biomass technologies.

In addition to the City of Roswell's stated goals, Chaves County expressly identifies "renewable energy" as an industry the County should work to attract and recruit. Chaves County Comprehensive Plan, Section 6: Economic Development; Goal 6.3.

This is all to say that the development of a community solar facility comports with the goals and aspirations of both Chaves County and the City of Roswell. This is true, not just generally, but also specifically to the area of the proposed project—along West 2nd Street.

D. Conclusion

As mentioned at the outset of this letter, the area of West 2nd Street, outside of Roswell's city limits, where this solar facility is proposed to be built, contains a variety of business and land uses; ranging from commercial to what appears to be heavy industrial. Therefore, the denial of DG Roadrunner's application for a Special Use Permit for a solar facility, appears not to be based on substantial evidence of the harm it will impose, but rather on the opinions of a handful of concerned citizens. It is not my intent to disparage the voices of these citizens, but I must stress that governmental decisions, like the one here, must be based on facts—not conjecture. The facts are clear that a solar facility has little negative impact on the community, it a good and viable use of open land, and comports with the development goals of both Chaves County and the City of Roswell.

I respectfully request that the ETZ Authority overturn the decision of the ETZ Commission and grant DG Roadrunner a Special Use Permit in ETZ case 2022-23. Please let me know if we may provide any additional information or address your concerns ahead of the December 26, 2022, hearing in this matter.

Sincerely,

Bayard Roberts

WHITE PAPER

Health and Safety Impacts of Solar Photovoltaics

By Tommy Cleveland
May 2017

NC CLEAN ENERGY TECHNOLOGY CENTER

NC STATE UNIVERSITY

Contents

Health and Safety Impacts of Solar Photovoltaics

The increasing presence of utility-scale solar photovoltaic (PV) systems (sometimes referred to as solar farms) is a rather new development in North Carolina's landscape. Due to the new and unknown nature of this technology, it is natural for communities near such developments to be concerned about health and safety impacts. Unfortunately, the quick emergence of utility-scale solar has cultivated fertile grounds for myths and half-truths about the health impacts of this technology, which can lead to unnecessary fear and conflict.

Photovoltaic (PV) technologies and solar inverters are not known to pose any significant health dangers to their neighbors. The most important dangers posed are increased highway traffic during the relative short construction period and dangers posed to trespassers of contact with high voltage equipment. This latter risk is mitigated by signage and the security measures that industry uses to deter trespassing. As will be discussed in more detail below, risks of site contamination are much less than for most other industrial uses because PV technologies employ few toxic chemicals and those used are used in very small quantities. Due to the reduction in the pollution from fossil-fuel-fired electric generators, the overall impact of solar development on human health is overwhelmingly positive. This pollution reduction results from a partial replacement of fossil-fuel fired generation by emission-free PV-generated electricity, which reduces harmful sulfur dioxide (SO2), nitrogen oxides (NOx), and fine particulate matter (PM2.5). Analysis from the National Renewable Energy Laboratory and the Lawrence Berkeley National Laboratory, both affiliates of the U.S. Department of Energy, estimates the health-related air quality benefits to the southeast region from solar PV generators to be worth 8.0 ¢ per kilowatt-hour of solar generation.[1] This is in addition to the value of the electricity and suggests that the air quality benefits of solar are worth more than the electricity itself.

Even though we have only recently seen large-scale installation of PV technologies, the technology and its potential impacts have been studied since the 1950s. A combination of this solar-specific research and general scientific research has led to the scientific community having a good understanding of the science behind potential health and safety impacts of solar energy. This paper utilizes the latest scientific literature and knowledge of solar practices in N.C. to address the health and safety risks associated with solar PV technology. These risks are extremely small, far less than those associated with common activities such as driving a car, and vastly outweighed by health benefits of the generation of clean electricity.

This paper addresses the potential health and safety impacts of solar PV development in North Carolina, organized into the following four categories:
(1) Hazardous Materials
(2) Electromagnetic Fields (EMF)
(3) Electric Shock and Arc Flash
(4) Fire Safety

1 • Hazardous Materials

One of the more common concerns towards solar is that the panels (referred to as "modules" in the solar industry) consist of toxic materials that endanger public health. However, as shown in this section, solar energy systems may contain small amounts of toxic materials, but these materials do not endanger public health. To understand potential toxic hazards coming from a solar project, one

must understand system installation, materials used, the panel end-of-life protocols, and system operation. This section will examine these aspects of a solar farm and the potential for toxicity impacts in the following subsections:

(1.2) Project Installation/Construction
(1.2) System Components
  1.2.1 Solar Panels: Construction and Durability
  1.2.2 Photovoltaic technologies
    (a) Crystalline Silicon
    (b) Cadmium Telluride (CdTe)
    (c) CIS/CIGS
  1.2.3 Panel End of Life Management
  1.2.4 Non-panel System Components
(1.3) Operations and Maintenance

1.1 Project Installation/ Construction

The system installation, or construction, process does not require toxic chemicals or processes. The site is mechanically cleared of large vegetation, fences are constructed, and the land is surveyed to layout exact installation locations. Trenches for underground wiring are dug and support posts are driven into the ground. The solar panels are bolted to steel and aluminum support structures and wired together. Inverter pads are installed, and an inverter and transformer are installed on each pad. Once everything is connected, the system is tested, and only then turned on.

Figure 1: Utility-scale solar facility (5 MWAC) located in Catawba County. *Source: Strata Solar*

1.2 · System Components

1.2.1 Solar Panels: Construction and Durability

Solar PV panels typically consist of glass, polymer, aluminum, copper, and semiconductor materials that can be recovered and recycled at the end of their useful life.[2] Today there are two PV technologies used in PV panels at utility-scale solar facilities, silicon, and thin film. As of 2016, all thin film used in North Carolina solar facilities are cadmium telluride (CdTe) panels from the US manufacturer First Solar, but there are other thin film PV panels available on the market, such as Solar Frontier's CIGS panels. Crystalline silicon technology consists of silicon wafers which are made into cells and assembled into panels, thin film technologies consist of thin layers of semiconductor material deposited onto glass, polymer or metal substrates. While there are differences in the components and manufacturing processes of these two types of solar technologies, many aspects of their PV panel construction are very similar. Specifics about each type of PV chemistry as it relates to toxicity are covered in subsections a, b, and c in section 1.2.2; on crystalline silicon, cadmium telluride, and CIS/CIGS respectively. The rest of this section applies equally to both silicon and thin film panels.

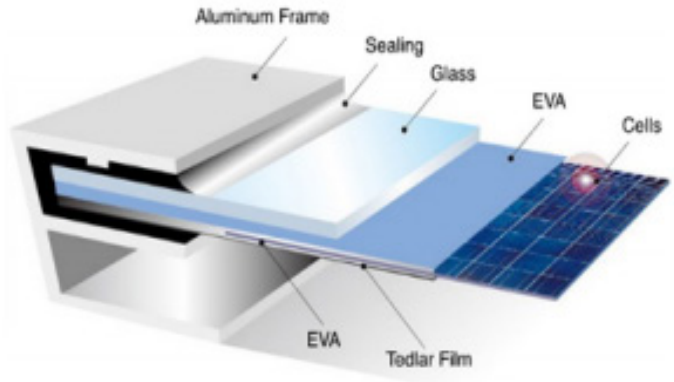

Figure 2: Components of crystalline silicon panels. The vast majority of silicon panels consist of a glass sheet on the topside with an aluminum frame providing structural support. Image Source: www.riteksolar.com.tw

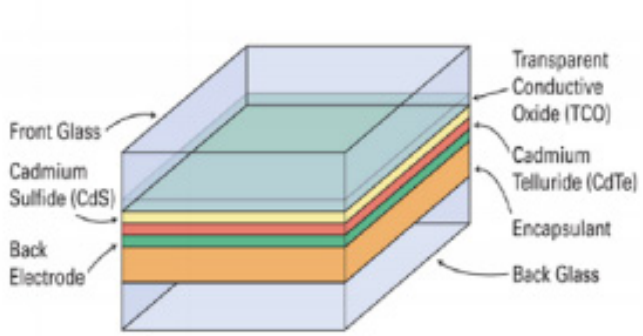

Figure 3: Layers of a common frameless thin-film panel (CdTe). Many thin film panels are frameless, including the most common thin-film panels, First Solar's CdTe. Frameless panels have protective glass on both the front and back of the panel. Layer thicknesses not to scale. Image Source: www.homepower.com

To provide decades of corrosion-free operation, PV cells in PV panels are encapsulated from air and moisture between two layers of plastic. The encapsulation layers are protected on the top with a layer of tempered glass and on the backside with a polymer sheet. Frameless modules include a protective layer of glass on the rear of the panel, which may also be tempered. The plastic ethylene-vinyl acetate (EVA) commonly provides the cell encapsulation. For decades, this same material has been used between layers of tempered glass to give car windshields and hurricane windows their great strength. In the same way that a car windshield cracks but stays intact, the EVA layers in PV panels keep broken panels intact (see Figure 4). Thus, a damaged module does not generally create small pieces of debris; instead, it largely remains together as one piece.

Figure 4: The mangled PV panels in this picture illustrate the nature of broken solar panels; the glass cracks but the panel is still in one piece. Image Source: http://img.alibaba.com/photo/115259576/broken_solar_panel.jpg

PV panels constructed with the same basic components as modern panels have been installed across the globe for well over thirty years.[3] The long-term durability and performance demonstrated over these decades, as well as the results of accelerated lifetime testing, helped lead to an industrystandard 25-year power production warranty for PV panels. These power warranties warrant a PV panel to produce at least 80% of their original nameplate production after 25 years of use. A recent SolarCity and DNV GL study reported that today's quality PV panels should be expected to reliably and efficiently produce power for thirty-five years.[4]

Local building codes require all structures, including ground mounted solar arrays, to be engineered to withstand anticipated wind speeds, as defined by the local wind speed requirements. Many racking products are available in versions engineered for wind speeds of up to 150 miles per hour, which is significantly higher than the wind speed requirement anywhere in North Carolina. The strength of PV mounting structures were demonstrated during Hurricane Sandy in 2012 and again during Hurricane Matthew in 2016. During Hurricane Sandy, the many large-scale solar facilities in New Jersey and New York at that time suffered only minor damage.[5] In the fall of 2016, the US and Caribbean experienced destructive winds and torrential rains from Hurricane Matthew, yet one leading solar tracker manufacturer reported that their numerous systems in the impacted area received zero damage from wind or flooding.[6]

In the event of a catastrophic event capable of damaging solar equipment, such as a tornado, the system will almost certainly have property insurance

that will cover the cost to cleanup and repair the project. It is in the best interest of the system owner to protect their investment against such risks. It is also in their interest to get the project repaired and producing full power as soon as possible. Therefore, the investment in adequate insurance is a wise business practice for the system owner. For the same reasons, adequate insurance coverage is also generally a requirement of the bank or firm providing financing for the project.

1.2.2 Photovoltaic (PV) Technologies

a. Crystalline Silicon

This subsection explores the toxicity of silicon-based PV panels and concludes that they do not pose a material risk of toxicity to public health and safety. Modern crystalline silicon PV panels, which account for over 90% of solar PV panels installed today, are, more or less, a commodity product. The overwhelming majority of panels installed in North Carolina are crystalline silicon panels that are informally classified as Tier I panels. Tier I panels are from well-respected manufacturers that have a good chance of being able to honor warranty claims. Tier I panels are understood to be of high quality, with predictable performance, durability, and content. Well over 80% (by weight) of the content of a PV panel is the tempered glass front and the aluminum frame, both of which are common building materials. Most of the remaining portion are common plastics, including polyethylene terephthalate in the backsheet, EVA encapsulation of the PV cells, polyphenyl ether in the junction box, and polyethylene insulation on the wire leads. The active, working components of the system are the silicon photovoltaic cells, the small electrical leads connecting them together, and to the wires coming out of the back of the panel. The electricity generating and conducting components makeup less than 5% of the weight of most panels. The PV cell itself is nearly 100% silicon, and silicon is the second most common element in the Earth's crust. The silicon for PV cells is obtained by high-temperature processing of quartz sand (SiO2) that removes its oxygen molecules. The refined silicon is converted to a PV cell by adding extremely small amounts of boron and phosphorus, both of which are common and of very low toxicity.

The other minor components of the PV cell are also generally benign; however, some contain lead, which is a human toxicant that is particularly harmful to young children. The minor components include an extremely thin antireflective coating (silicon nitride or titanium dioxide), a thin layer of aluminum on the rear, and thin strips of silver alloy that are screen-printed on the front and rear of cell.[7] In order for the front and rear electrodes to make effective electrical contact with the proper layer of the PV cell, other materials (called glass frit) are mixed with the silver alloy and then heated to etch the metals into the cell. This glass frit historically contains a small amount of lead (Pb) in the form of lead oxide. The 60 or 72 PV cells in a PV panel are connected by soldering thin solder-covered copper tabs from the back of one cell to the front of the next cell. Traditionally a tin-based solder containing some lead (Pb) is used, but some manufacturers have switched to lead-free solder. The glass frit and/or the solder may contain trace amounts of other metals, potentially including some with human toxicity such as cadmium. However, testing to simulate the potential for leaching from broken panels, which is discussed in more detail below, did not find a potential toxicity threat from these trace elements. Therefore, the tiny amount of lead in the grass frit and the solder is the only part of silicon PV panels with a potential to create a negative health impact. However, as described below, the very limited amount of lead involved and its strong physical and chemical attachment to other components of the PV panel means that even in worst-case scenarios the health hazard it poses is insignificant.

As with many electronic industries, the solder in silicon PV panels has historically been a leadbased solder, often 36% lead, due to the superior properties of such solder. However, recent advances in lead-free solders have spurred a trend among PV panel manufacturers to reduce or remove the lead in their panels. According to the 2015 Solar Scorecard from the Silicon Valley Toxics Coalition, a group that tracks environmental responsibility of photovoltaic panel manufacturers, fourteen companies (increased from twelve companies in 2014) manufacture PV panels certified to meet the European Restriction of Hazardous Substances (RoHS) standard. This means that the amount of cadmium and lead in the panels they manufacture fall below the RoHS thresholds, which are set by the European Union and serve as the world's de facto standard for hazardous substances in manufactured goods.[8] The Restriction of Hazardous Substances (RoHS) standard requires that the maximum concentration found in any homogenous material in a produce is less than 0.01% cadmium and less than 0.10% lead, therefore, any solder can be no more than 0.10% lead.[9]

While some manufacturers are producing PV panels that meet the RoHS standard, there is no requirement that they do so because the RoHS Directive explicitly states that the directive does not apply to photovoltaic panels.[10] The justification for this is provided in item 17 of the current RoHS Directive: "The development of renewable forms of energy is one of the Union's key objectives, and the contribution made by renewable energy sources to environmental and climate objectives is crucial. Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources (4) recalls that there should be coherence between those objectives and other Union environmental legislation. Consequently, this Directive should not prevent the development of renewable energy technologies that have no negative impact on health and the environment and that are sustainable and economically viable."

The use of lead is common in our modern economy. However, only about 0.5% of the annual lead consumption in the U.S. is for electronic solder for all uses; PV solder makes up only a tiny portion of this 0.5%. Close to 90% of lead consumption in the US is in batteries, which do not encapsulate the pounds of lead contained in each typical automotive battery. This puts the lead in batteries at great risk of leaching into the environment. Estimates for the lead in a single PV panel with lead-based solder range from 1.6 to 24 grams of lead, with 13g (less than half of an ounce) per panel seen most often in the literature.[11] At 13 g/panel[12], each panel contains one-half of the lead in a typical 12-gauge shotgun shell. This amount equates to roughly 1/750th of the lead in a single car battery. In a panel, it is all durably encapsulated from air or water for the full life of the panel.[14]

As indicated by their 20 to 30-year power warranty, PV modules are designed for a long service life, generally over 25 years. For a panel to comply with its 25-year power warranty, its internal components, including lead, must be sealed from any moisture. Otherwise, they would corrode and the panel's output would fall below power warranty levels. Thus, the lead in operating PV modules is not at risk of release to the environment during their service lifetime. In extreme experiments, researchers have shown that lead can leach from crushed or pulverized panels.[15, 16] However, more real-world tests designed to represent typical trash compaction that are used to classify waste as hazardous or non-hazardous show no danger from leaching.[17,18] For more information about PV panel end-of-life, see the Panel Disposal section.

As illustrated throughout this section, silicon-based PV panels do not pose a material threat to public health and safety. The only aspect of the panels with potential toxicity concerns is the very small amount of lead in some panels. However, any lead in a panel is well sealed from environmental exposure for the operating lifetime of the solar panel and thus not at risk of release into the environment.

b. Cadmium Telluride (CdTe) PV Panels

This subsection examines the components of a cadmium telluride (CdTe) PV panel. Research demonstrates that they pose negligible toxicity risk to public health and safety while significantly reducing the public's exposure to cadmium by reducing coal emissions. As of mid-2016, a few hundred MWs of cadmium telluride (CdTe) panels, all manufactured by the U.S. company First Solar, have been installed in North Carolina.

Questions about the potential health and environmental impacts from the use of this PV technology are related to the concern that these panels contain cadmium, a toxic heavy metal. However, scientific studies have shown that cadmium telluride differs from cadmium due to its high chemical and thermal stability.[19] Research has shown that the tiny amount of cadmium in these panels does not pose a health or safety risk.[20] Further, there are very compelling reasons to welcome its adoption due to reductions in unhealthy pollution associated with burning coal. Every GWh of electricity generated by burning coal produces about 4 grams of cadmium air emissions.[21] Even though North Carolina produces a significant fraction of our electricity from coal, electricity from solar offsets much more natural gas than coal due to natural gas plants being able to adjust their rate of production more easily and quickly. If solar electricity offsets 90% natural gas and 10% coal, each 5-megawatt (5 MWAC, which is generally 7 MWDC) CdTe solar facility in North Carolina keeps about 157 grams, or about a third of a pound, of cadmium *out* of our environment.[22, 23]

Cadmium is toxic, but all the approximately 7 grams of cadmium in one CdTe panel is in the form of a chemical compound cadmium telluride,[24] which has 1/100th the toxicity of free cadmium.[25] Cadmium telluride is a very stable compound that is non-volatile and non-soluble in water. Even in the case of a fire, research shows that less than 0.1% of the cadmium is released when a CdTe panel is exposed to fire. The fire melts the glass and encapsulates over 99.9% of the cadmium in the molten glass.[27]

It is important to understand the source of the cadmium used to manufacture CdTe PV panels. The cadmium is a byproduct of zinc and lead refining. The element is collected from emissions and waste streams during the production of these metals and combined with tellurium to create the CdTe used in PV panels. If the cadmium were not collected for use in the PV panels or other products, it would otherwise either be stockpiled for future use, cemented and buried, or disposed of.[28] Nearly all the cadmium in old or broken panels can be recycled which can eventually serve as the primary source of cadmium for new PV panels.[29]

Similar to silicon-based PV panels, CdTe panels are constructed of a tempered glass front, one instead of two clear plastic encapsulation layers, and a rear heat strengthened glass backing (together >98% by weight). The final product is built to withstand exposure to the elements without significant damage for over 25 years. While not representative of damage that may occur in the field or even at a landfill, laboratory evidence has illustrated that when panels are ground into a fine powder, very acidic water is able to leach portions of the cadmium and tellurium,[30] similar to the process used to recycle CdTe panels. Like many silicon-based panels, CdTe panels are reported (as far back ask 1998[31] to pass the EPA's Toxic Characteristic Leaching Procedure (TCLP) test, which tests the potential for crushed panels in a landfill to leach hazardous substances into groundwater.[32] Passing this test means that they are classified as non-hazardous waste and can be deposited in landfills.[33,34] For more information about PV panel end-of-life, see the Panel Disposal section.

There is also concern of environmental impact resulting from potential catastrophic events involving CdTe PV panels. An analysis of worst-case scenarios for environmental impact from CdTe PV

panels, including earthquakes, fires, and floods, was conducted by the University of Tokyo in 2013. After reviewing the extensive international body of research on CdTe PV technology, their report concluded, "Even in the worst-case scenarios, it is unlikely that the Cd concentrations in air and sea water will exceed the environmental regulation values."[35] In a worst-case scenario of damaged panels abandoned on the ground, insignificant amounts of cadmium will leach from the panels. This is because this scenario is much less conducive (larger module pieces, less acidity) to leaching than the conditions of the EPA's TCLP test used to simulate landfill conditions, which CdTe panels pass.[36]

First Solar, a U.S. company, and the only significant supplier of CdTe panels, has a robust panel take-back and recycling program that has been operating commercially since 2005.[37] The company states that it is "committed to providing a commercially attractive recycling solution for photovoltaic (PV) power plant and module owners to help them meet their module (end of life) EOL obligation simply, costeffectively and responsibly." First Solar global recycling services to their customers to collect and recycle panels once they reach the end of productive life whether due to age or damage. These recycling service agreements are structured to be financially attractive to both First Solar and the solar panel owner. For First Solar, the contract provides the company with an affordable source of raw materials needed for new panels and presumably a diminished risk of undesired release of Cd. The contract also benefits the solar panel owner by allowing them to avoid tipping fees at a waste disposal site. The legal contract helps provide peace of mind by ensuring compliance by both parties when considering the continuing trend of rising disposal costs and increasing regulatory requirements.

c. CIS/CIGS and other PV technologies

Copper indium gallium selenide PV technology, often referred to as CIGS, is the second most common type of thin-film PV panel but a distant second behind CdTe. CIGS cells are composed of a thin layer of copper, indium, gallium, and selenium on a glass or plastic backing. None of these elements are very toxic, although selenium is a regulated metal under the Federal Resource Conservation and Recovery Act (RCRA).[38] The cells often also have an extremely thin layer of cadmium sulfide that contains a tiny amount of cadmium, which is toxic. The promise of high efficiency CIGS panels drove heavy investment in this technology in the past. However, researchers have struggled to transfer high efficiency success in the lab to low-cost full-scale panels in the field.[39] Recently, a CIGS manufacturer based in Japan, Solar Frontier, has achieved some market success with a rigid, glass-faced CIGS module that competes with silicon panels. Solar Frontier produces the majority of CIS panels on the market today.[40] Notably, these panels are RoHS compliant,[41] thus meeting the rigorous toxicity standard adopted by the European Union even thought this directive exempts PV panels. The authors are unaware of any completed or proposed utility-scale system in North Carolina using CIS/CIGS panels.

1.2.3 Panel End-of-Life Management

Concerns about the volume, disposal, toxicity, and recycling of PV panels are addressed in this subsection. To put the volume of PV waste into perspective, consider that by 2050, when PV systems installed in 2020 will reach the end of their lives, it is estimated that the global annual PV panel waste tonnage will be 10% of the 2014 global e-waste tonnage.[42] In the U.S., end-of-life disposal of solar products is governed by the Federal Resource Conservation and Recovery Act (RCRA), as well as state policies in some situations. RCRA separates waste into hazardous (not accepted at ordinary landfill) and solid waste (generally accepted

at ordinary landfill) based on a series of rules. According to RCRA, the way to determine if a PV panel is classified as hazardous waste is the Toxic Characteristic Leaching Procedure (TCLP) test. This EPA test is designed to simulate landfill disposal and determine the risk of hazardous substances leaching out of the landfill.[43,44,45] Multiple sources report that most modern PV panels (both crystalline silicon and cadmium telluride) pass the TCLP test.[46,47] Some studies found that some older (1990s) crystalline silicon panels, and perhaps some newer crystalline silicon panels (specifics are not given about vintage of panels tested), do not pass the lead (Pb) leachate limits in the TCLP test.[48,49]

The test begins with the crushing of a panel into centimeter-sized pieces. The pieces are then mixed in an acid bath. After tumbling for eighteen hours, the fluid is tested for forty hazardous substances that all must be below specific threshold levels to pass the test. Research comparing TCLP conditions to conditions of damaged panels in the field found that simulated landfill conditions provide overly conservative estimates of leaching for field-damaged panels.[50] Additionally, research in Japan has found no detectable Cd leaching from cracked CdTe panels when exposed to simulated acid rain.[51]

Although modern panels can generally be landfilled, they can also be recycled. Even though recent waste volume has not been adequate to support significant PV-specific recycling infrastructure, the existing recycling industry in North Carolina reports that it recycles much of the current small volume of broken PV panels. In an informal survey conducted by the NC Clean Energy Technology Center survey in early 2016, seven of the eight large active North Carolina utility-scale solar developers surveyed reported that they send damaged panels back to the manufacturer and/or to a local recycler. Only one developer reported sending damaged panels to the landfill.

The developers reported at that time that they are usually paid a small amount per panel by local recycling firms. In early 2017, a PV developer reported that a local recycler was charging a small fee per panel to recycle damaged PV panels. The local recycling firm known to authors to accept PV panels described their current PV panel recycling practice as of early 2016 as removing the aluminum frame for local recycling and removing the wire leads for local copper recycling. The remainder of the panel is sent to a facility for processing the non-metallic portions of crushed vehicles, referred to as “fluff” in the recycling industry.[52] This processing within existing general recycling plants allows for significant material recovery of major components, including glass which is 80% of the module weight, but at lower yields than PV-specific recycling plants. Notably almost half of the material value in a PV panel is in the few grams of silver contained in almost every PV panel produced today. In the long-term, dedicated PV panel recycling plants can increase treatment capacities and maximize revenues resulting in better output quality and the ability to recover a greater fraction of the useful materials.[53] PV-specific panel recycling technologies have been researched and implemented to some extent for the past decade, and have been shown to be able to recover over 95% of PV material (semiconductor) and over 90% of the glass in a PV panel.[54]

A look at global PV recycling trends hints at the future possibilities of the practice in our country. Europe installed MW-scale volumes of PV years before the U.S. In 2007, a public-private partnership between the European Union and the solar industry set up a voluntary collection and recycling system called PV CYCLE. This arrangement was later made mandatory under the EU’s WEEE directive, a program for waste electrical and electronic equipment.[55] Its member companies (PV panel producers) fully finance the association. This makes it possible for end-users to return the member companies’ defective panels for recycling at any of the over 300 collection points around

Europe without added costs. Additionally, PV CYCLE will pick up batches of 40 or more used panels at no cost to the user. This arrangement has been very successful, collecting and recycling over 13,000 tons by the end of 2015.[56]

In 2012, the WEEE Directive added the end-of-life collection and recycling of PV panels to its scope.[57] This directive is based on the principle of extended-producer-responsibility. It has a global impact because producers that want to sell into the EU market are legally responsible for end-of-life management. Starting in 2018, this directive targets that 85% of PV products "put in the market" in Europe are recovered and 80% is prepared for reuse and recycling.

The success of the PV panel collection and recycling practices in Europe provides promise for the future of recycling in the U.S. In mid-2016, the US Solar Energy Industry Association (SEIA) announced that they are starting a national solar panel recycling program with the guidance and support of many leading PV panel producers.[58] The program will aggregate the services offered by recycling vendors and PV manufacturers, which will make it easier for consumers to select a cost-effective and environmentally responsible end-of-life management solution for their PV products. According to SEIA, they are planning the program in an effort to make the entire industry landfill-free. In addition to the national recycling network program, the program will provide a portal for system owners and consumers with information on how to responsibly recycle their PV systems.

While a cautious approach toward the potential for negative environmental and/or health impacts from retired PV panels is fully warranted, this section has shown that the positive health impacts of reduced emissions from fossil fuel combustion from PV systems more than outweighs any potential risk. Testing shows that silicon and CdTe panels are both safe to dispose of in landfills, and are also safe in worst case conditions of abandonment or damage in a disaster. Additionally, analysis by local engineers has found that the current salvage value of the equipment in a utility scale PV facility generally exceeds general contractor estimates for the cost to remove the entire PV system.[59,60,61]

1.2.4 Non-Panel System Components

(racking, wiring, inverter, transformer)

While previous toxicity subsections discussed PV panels, this subsection describes the non-panel components of utility-scale PV systems and investigates any potential public health and safety concerns. The most significant non-panel component of a ground-mounted PV system is the mounting structure of the rows of panels, commonly referred to as "racking". The vertical post portion of the racking is galvanized steel and the remaining above-ground racking components are either galvanized steel or aluminum, which are both extremely common and benign building materials. The inverters that make the solar generated electricity ready to send to the grid have weather-proof steel enclosures that protect the working components from the elements. The only fluids that they might contain are associated with their cooling systems, which are not unlike the cooling system in a computer. Many inverters today are RoHS compliant.

The electrical transformers (to boost the inverter output voltage to the voltage of the utility connection point) do contain a liquid cooling oil. However, the fluid used for that function is either a nontoxic mineral oil or a biodegradable non-toxic vegetable oil, such as BIOTEMP from ABB. These vegetable transformer oils have the additional advantage of being much less flammable than traditional mineral oils. Significant health hazards are associated with old transformers containing cooling oil with toxic PCBs. Transfers with PCB-containing oil were common before PCBs were outlawed in the U.S. in 1979. PCBs still exist in older transformers in the field across the country.

Other than a few utility research sites, there are no batteries on- or off-site associated with utility-scale solar energy facilities in North Carolina, avoiding any potential health or safety concerns related to battery technologies. However, as battery technologies continue to improve and prices continue to decline we are likely to start seeing some batteries at solar facilities. Lithium ion batteries currently dominate the world utility-scale battery market, which are not very toxic. No non-panel system components were found to pose any health or environmental dangers.

1.4 Operations and Maintenance – Panel Washing and Vegetation Control

Throughout the eastern U.S., the climate provides frequent and heavy enough rain to keep panels adequately clean. This dependable weather pattern eliminates the need to wash the panels on a regular basis. Some system owners may choose to wash panels as often as once a year to increase production, but most in N.C. do not regularly wash any PV panels. Dirt build up over time may justify panel washing a few times over the panels' lifetime; however, nothing more than soap and water are required for this activity.

The maintenance of ground-mounted PV facilities requires that vegetation be kept low, both for aesthetics and to avoid shading of the PV panels. Several approaches are used to maintain vegetation at NC solar facilities, including planting of limited-height species, mowing, weed-eating, herbicides, and grazing livestock (sheep). The following descriptions of vegetation maintenance practices are based on interviews with several solar developers as well as with three maintenance firms that together are contracted to maintain well over 100 of the solar facilities in N.C. The majority of solar facilities in North Carolina maintain vegetation primarily by mowing. Each row of panels has a single row of supports, allowing sickle mowers to mow under the panels. The sites usually require mowing about once a month during the growing season. Some sites employ sheep to graze the site, which greatly reduces the human effort required to maintain the vegetation and produces high quality lamb meat.[62]

In addition to mowing and weed eating, solar facilities often use some herbicides. Solar facilities generally do not spray herbicides over the entire acreage; rather they apply them only in strategic locations such as at the base of the perimeter fence, around exterior vegetative buffer, on interior dirt roads, and near the panel support posts. Also unlike many row crop operations, solar facilities generally use only general use herbicides, which are available over the counter, as opposed to restricted use herbicides commonly used in commercial agriculture that require a special restricted use license. The herbicides used at solar facilities are primarily 2-4-D and glyphosate (Round-up®), which are two of the most common herbicides used in lawns, parks, and agriculture across the country. One maintenance firm that was interviewed sprays the grass with a class of herbicide known as a growth regulator in order to slow the growth of grass so that mowing is only required twice a year. Growth regulators are commonly used on highway roadsides and golf courses for the same purpose. A commercial pesticide applicator license is required for anyone other than the landowner to apply herbicides, which helps ensure that all applicators are adequately educated about proper herbicide use and application. The license must be renewed annually and requires passing of a certification exam appropriate to the area in which the applicator wishes to work. Based on the limited data available, it appears that solar facilities in N.C. generally use significantly less herbicides per acre than most commercial agriculture or lawn maintenance services.

2. Electromagnetic Fields (EMF)

PV systems do not emit any material during their operation; however, they do generate electromagnetic fields (EMF), sometimes referred to as radiation. EMF produced by electricity is non-ionizing radiation, meaning the radiation has enough energy to move atoms in a molecule around (experienced as heat), but not enough energy to remove electrons from an atom or molecule (ionize) or to damage DNA. As shown below, modern humans are all exposed to EMF throughout our daily lives without negative health impact. Someone outside of the fenced perimeter of a solar facility is not exposed to significant EMF from the solar facility. Therefore, there is no negative health impact from the EMF produced in a solar farm. The following paragraphs provide some additional background and detail to support this conclusion.

Since the 1970s, some have expressed concern over potential health consequences of EMF from electricity, but no studies have ever shown this EMF to cause health problems.[63] These concerns are based on some epidemiological studies that found a slight increase in childhood leukemia associated with average exposure to residential power-frequency magnetic fields above 0.3 to 0.4 μT (microteslas) (equal to 3.0 to 4.0 mG (milligauss)). μT and mG are both units used to measure magnetic field strength. For comparison, the average exposure for people in the U.S. is one mG or 0.1 μT, with about 1% of the population with an average exposure in excess of 0.4 μT (or 4 mG).[64] These epidemiological studies, which found an association but not a causal relationship, led the World Health Organization's International Agency for Research on Cancer (IARC) to classify ELF magnetic fields as "possibly carcinogenic to humans". Coffee also has this classification. This classification means there is limited evidence but not enough evidence to designate as either a "probable carcinogen" or "human carcinogen". Overall, there is very little concern that ELF EMF damages public health. The only concern that does exist is for long-term exposure above 0.4 μT (4 mG) that may have some connection to increased cases of childhood leukemia. In 1997, the National Academies of Science were directed by Congress to examine this concern and concluded:

"Based on a comprehensive evaluation of published studies relating to the effects of power-frequency electric and magnetic fields on cells, tissues, and organisms (including humans), the conclusion of the committee is that the current body of evidence does not show that exposure to these fields presents a human-health hazard. Specifically, no conclusive and consistent evidence shows that exposures to residential electric and magnetic fields produce cancer, adverse neurobehavioral effects, or reproductive and developmental effects."[65]

There are two aspects to electromagnetic fields, an electric field and a magnetic field. The electric field is generated by voltage and the magnetic field is generated by electric current, i.e., moving electrons. A task group of scientific experts convened by the World Health Organization (WHO) in 2005 concluded that there were no substantive health issues related to electric fields (0 to 100,000 Hz) at levels generally encountered by members of the public.[66] The relatively low voltages in a solar facility and the fact that electric fields are easily shielded (i.e., blocked) by common materials, such as plastic, metal, or soil means that there is no concern of negative health impacts from the electric fields generated by a solar facility. Thus, the remainder of this section addresses magnetic fields. Magnetic fields are not shielded by most common materials and thus can easily pass through them. Both types of fields are strongest close to the source of electric generation and weaken quickly with distance from the source.

The direct current (DC) electricity produced by PV panels produce stationary (0 Hz) electric and magnetic fields. Because of minimal concern about potential risks of stationary fields, little scientific research has examined stationary fields' impact on human health.[67] In even the largest PV facilities, the DC voltages and currents are not very high. One can illustrate the weakness of the EMF generated by a PV panel by placing a compass on an operating solar panel and observing that the needle still points north.

While the electricity throughout the majority of a solar site is DC electricity, the inverters convert this DC electricity to alternating current (AC) electricity matching the 60 Hz frequency of the grid. Therefore, the inverters and the wires delivering this power to the grid are producing non-stationary EMF, known as extremely low frequency (ELF) EMF, normally oscillating with a frequency of 60 Hz. This frequency is at the low-energy end of the electromagnetic spectrum. Therefore, it has less energy than other commonly encountered types of non-ionizing radiation like radio waves, infrared radiation, and visible light.

The wide use of electricity results in background levels of ELF EMFs in nearly all locations where people spend time – homes, workplaces, schools, cars, the supermarket, etc. A person's average exposure depends upon the sources they encounter, how close they are to them, and the amount of time they spend there.[68] As stated above, the average exposure to magnetic fields in the U.S. is estimated to be around one mG or 0.1 μT, but can vary considerably depending on a person's exposure to EMF from electrical devices and wiring.[69] At times we are often exposed to much higher ELF magnetic fields, for example when standing three feet from a refrigerator the ELF magnetic field is 6 mG and when standing three feet from a microwave oven the field is about 50 mG.[70] The strength of these fields diminish quickly with distance from the source, but when surrounded by electricity in our homes and other buildings moving away from one source moves you closer to another. However, unless you are inside of the fence at a utility-scale solar facility or electrical substation it is impossible to get very close to the EMF sources. Because of this, EMF levels at the fence of electrical substations containing high voltages and currents are considered "generally negligible".[71,72]

The strength of ELF-EMF present at the perimeter of a solar facility or near a PV system in a commercial or residential building is significantly lower than the typical American's average EMF exposure.[73,74] Researchers in Massachusetts measured magnetic fields at PV projects and found the magnetic fields dropped to very low levels of 0.5 mG or less, and in many cases to less than background levels (0.2 mG), at distances of no more than nine feet from the residential inverters and 150 feet from the utility-scale inverters.[75] Even when measured within a few feet of the utility-scale inverter, the ELF magnetic fields were well below the International Commission on Non-Ionizing Radiation Protection's recommended magnetic field level exposure limit for the general public of 2,000 mG.[76] It is typical that utility scale designs locate large inverters central to the PV panels that feed them because this minimizes the length of wire required and shields neighbors from the sound of the inverter's cooling fans. Thus, it is rare for a large PV inverter to be within 150 feet of the project's security fence.

Anyone relying on a medical device such as pacemaker or other implanted device to maintain proper heart rhythm may have concern about the potential for a solar project to interfere with the operation of his or her device. However, there is no reason for concern because the EMF outside of the solar facility's fence is less than 1/1000 of the level at which manufacturers test for ELF EMF interference, which is 1,000 mG.[77] Manufacturers of potentially affected implanted devices often provide advice on electromagnetic interference that includes avoiding letting the implanted device get too close to certain sources of fields such as some

household appliances, some walkie-talkies, and similar transmitting devices. Some manufacturers' literature does not mention high-voltage power lines, some say that exposure in public areas should not give interference, and some advise not spending extended periods of time close to power lines.[78]

3. Electric Shock and Arc Flash Hazards

There is a real danger of electric shock to anyone entering any of the electrical cabinets such as combiner boxes, disconnect switches, inverters, or transformers; or otherwise coming in contact with voltages over 50 Volts.[79] Another electrical hazard is an arc flash, which is an explosion of energy that can occur in a short circuit situation. This explosive release of energy causes a flash of heat and a shockwave, both of which can cause serious injury or death. Properly trained and equipped technicians and electricians know how to safely install, test, and repair PV systems, but there is always some risk of injury when hazardous voltages and/or currents are present. Untrained individuals should not attempt to inspect, test, or repair any aspect of a PV system due to the potential for injury or death due to electric shock and arc flash, The National Electric Code (NEC) requires appropriate levels of warning signs on all electrical components based on the level of danger determined by the voltages and current potentials. The national electric code also requires the site to be secured from unauthorized visitors with either a six-foot chain link fence with three strands of barbed wire or an eight-foot fence, both with adequate hazard warning signs.

4. Fire Safety

The possibility of fires resulting from or intensified by PV systems may trigger concern among the general public as well as among firefighters. However, concern over solar fire hazards should be limited because only a small portion of materials in the panels are flammable, and those components cannot self-support a significant fire. Flammable components of PV panels include the thin layers of polymer encapsulates surrounding the PV cells, polymer backsheets (framed panels only), plastic junction boxes on rear of panel, and insulation on wiring. The rest of the panel is composed of non-flammable components, notably including one or two layers of protective glass that make up over three quarters of the panel's weight.

Heat from a small flame is not adequate to ignite a PV panel, but heat from a more intense fire or energy from an electrical fault can ignite a PV panel.[80] One real-world example of this occurred during July 2015 in an arid area of California. Three acres of grass under a thin film PV facility burned without igniting the panels mounted on fixed-tilt racks just above the grass.[81] While it is possible for electrical faults in PV systems on homes or commercial buildings to start a fire, this is extremely rare.[82] Improving understanding of the PV-specific risks, safer system designs, and updated fire-related codes and standards will continue to reduce the risk of fire caused by PV systems.

PV systems on buildings can affect firefighters in two primary ways, 1) impact their methods of fighting the fire, and 2) pose safety hazard to the firefighters. One of the most important techniques that firefighters use to suppress fire is ventilation of a building's roof. This technique allows superheated toxic gases to quickly exit the building. By doing so, the firefighters gain easier and safer access to the building, Ventilation of the roof also makes the challenge of putting out the fire easier. However, the placement of rooftop PV panels may interfere with ventilating the roof by limiting access to desired venting locations.

New solar-specific building code requirements are working to minimize these concerns. Also, the

latest National Electric Code has added requirements that make it easier for first responders to safely and effectively turn off a PV system. Concern for firefighting a building with PV can be reduced with proper fire fighter training, system design, and installation. Numerous organizations have studied fire fighter safety related to PV. Many organizations have published valuable guides and training programs. Some notable examples are listed below.

- The International Association of Fire Fighters (IAFF) and International Renewable Energy Council (IREC) partnered to create an online training course that is far beyond the PowerPoint click-andview model. The self-paced online course, "Solar PV Safety for Fire Fighters," features rich video content and simulated environments so fire fighters can practice the knowledge they've learned. www.iaff.org/pvsafetytraining
- Photovoltaic Systems and the Fire Code: Office of NC Fire Marshal
- Fire Service Training, Underwriter's Laboratory
- Firefighter Safety and Response for Solar Power Systems, National Fire Protection Research Foundation
- Bridging the Gap: Fire Safety & Green Buildings, National Association of State Fire Marshalls
- Guidelines for Fire Safety Elements of Solar Photovoltaic Systems, Orange County Fire Chiefs Association
- Solar Photovoltaic Installation Guidelines, California Department of Forestry & Fire Protection, Office of the State Fire Marshall
- PV Safety & Firefighting, Matthew Paiss, Homepower Magazine
- PV Safety and Code Development: Matthew Paiss, Cooperative Research Network

Summary

The purpose of this paper is to address and alleviate concerns of public health and safety for utility-scale solar PV projects. Concerns of public health and safety were divided and discussed in the four following sections: (1) Toxicity, (2) Electromagnetic Fields, (3) Electric Shock and Arc Flash, and (4) Fire. In each of these sections, the negative health and safety impacts of utility-scale PV development were shown to be negligible, while the public health and safety benefits of installing these facilities are significant and far outweigh any negative impacts.

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CHAVES COUNTY/ETZ ZONING ORDINANCE
APPLICATION FOR A SPECIAL USE PERMIT

Case Number: ETZ 2022-23 Date Received: _____ Fee: $ 300.00

Name of Property Owner: SKS: Schnedar 1998 Trust Phone Number: _____

Mailing Address: 415 Viale Bond, Roswell, New Mexico 88201

Name of Applicant: DG Roadrunner, LLC

Mailing Address: 700 Universal Blvd. Home Phone Number: _____

City, State, Zip: Juno Beach, Florida 33408 Business Phone Number: 772-382-9176

Applicant Status: ☐ Owner ☐ Agent ☐ Tenant ☒ Other Lease Option

Site Address: 4800 West Second St., Roswell, New Mexico 88201 ☒ ETZ ☐ Chaves County

Property Legal Description: S: 3 T: 11S R: 23E NE4 EXCEPT S2SW4NE4NE4 - W2NW4NE4 - SE4NE4 BK 724 PG 526 QCD UPN: 4131062402124000000

Present Land Use: Undeveloped

Intended Land Use: Solar Energy Facility

Present Zoning: RS Size of Development in Acres: 25.5 acres

Reason for Request (Attach sheets if more space is needed): Special Use Permit for Solar Energy Facility in RS zoning district.

Copy of Deed Attached: ☒

I ACKNOWLEDGE THAT I HAVE BEEN INFORMED OF THE DATES, TIMES, AND LOCATIONS OF THE PUBLIC MEETINGS WHICH I OR MY AGENT MUST ATTEND IN ORDER TO FULFILL THE REQUIREMENTS OF THIS APPLICATION.

D. Parks
Owner's Signature

Oct. 14, 2022
Date

STATE OF NEW MEXICO, COUNTY OF CHAVES
FILE FOR RECORD DEC 11, 2013 AT 08:10 O CLOCK AM
Receipt Number: 365618 Fee: $25.00
Book 00724 Page 00526Pages 3
To Whom Returned: CUSACK JARAMILLO & ASSOCIATES
PO BOX 250
ROSWELL, NM 88202

Dave Kunko, County Clerk

By _____ Deputy

QUITCLAIM DEED

Rita Schnedar, a widow, for consideration paid, quitclaims to the Schnedar 1998 Trust, John Schnedar and Rita Schnedar, Trustees, the following described real estate located in Chaves County, New Mexico, to-wit:

Township 11 South, Range 23 East, N.M.P.M.

Section 3: N½NE¼
SW¼NE¼

LESS the S½SW¼NE¼NE¼ given to Roman Catholic Church of the Archdiocese of Santa Fe and less 3 acres for Highway from said Section 3.

WITNESS my hand and seal this 11th day of December, 2012.

Rita Schnedar
Rita Schnedar

STATE OF _____)
: ss.
COUNTY OF _____)

The foregoing instrument was acknowledged before me this ____ day of _____, 2012, by Rita Schnedar, a widow.

See Attached
Notary Public

My Commission Expires:
12/26/12

ALL-PURPOSE ACKNOWLEDGMENT

State of California
County of San Diego } SS.

On December 11th 2012 (DATE) before me, Ash Nickle, Notary Public (NOTARY),
personally appeared Rita Schneider (SIGNER(S))

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.
I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

ASH NICKLE
COMM. # 1825273
NOTARY PUBLIC - CALIFORNIA
SAN DIEGO COUNTY
MY COMM. EXP. DEC. 25, 2012

Effective January 1, 2006, the California certificate of acknowledgment must be in the form set forth in Civil Code section 1189, rather than "substantially" in the form set forth therein. The form set forth in Civil Code section 1189 did not change, but variations in the California form are no longer permitted. (The law regarding acknowledgments to be used with documents to be filed in other states has not changed (Civil Code § 1189(c)).

WITNESS my hand and official seal.

NOTARY'S SIGNATURE

OPTIONAL INFORMATION

The information below is not required by law. However, it could prevent fraudulent attachment of this acknowledgment to an unauthorized document.

CAPACITY CLAIMED BY SIGNER (PRINCIPAL)

- ☐ INDIVIDUAL
- ☐ CORPORATE OFFICER

TITLE(S)

- ☐ PARTNER(S)
- ☐ ATTORNEY-IN-FACT
- ☐ TRUSTEE(S)
- ☐ GUARDIAN/CONSERVATOR
- ☒ OTHER: Widow

DESCRIPTION OF ATTACHED DOCUMENT

Quitclaim Deed
TITLE OR TYPE OF DOCUMENT

1
NUMBER OF PAGES

DATE OF DOCUMENT

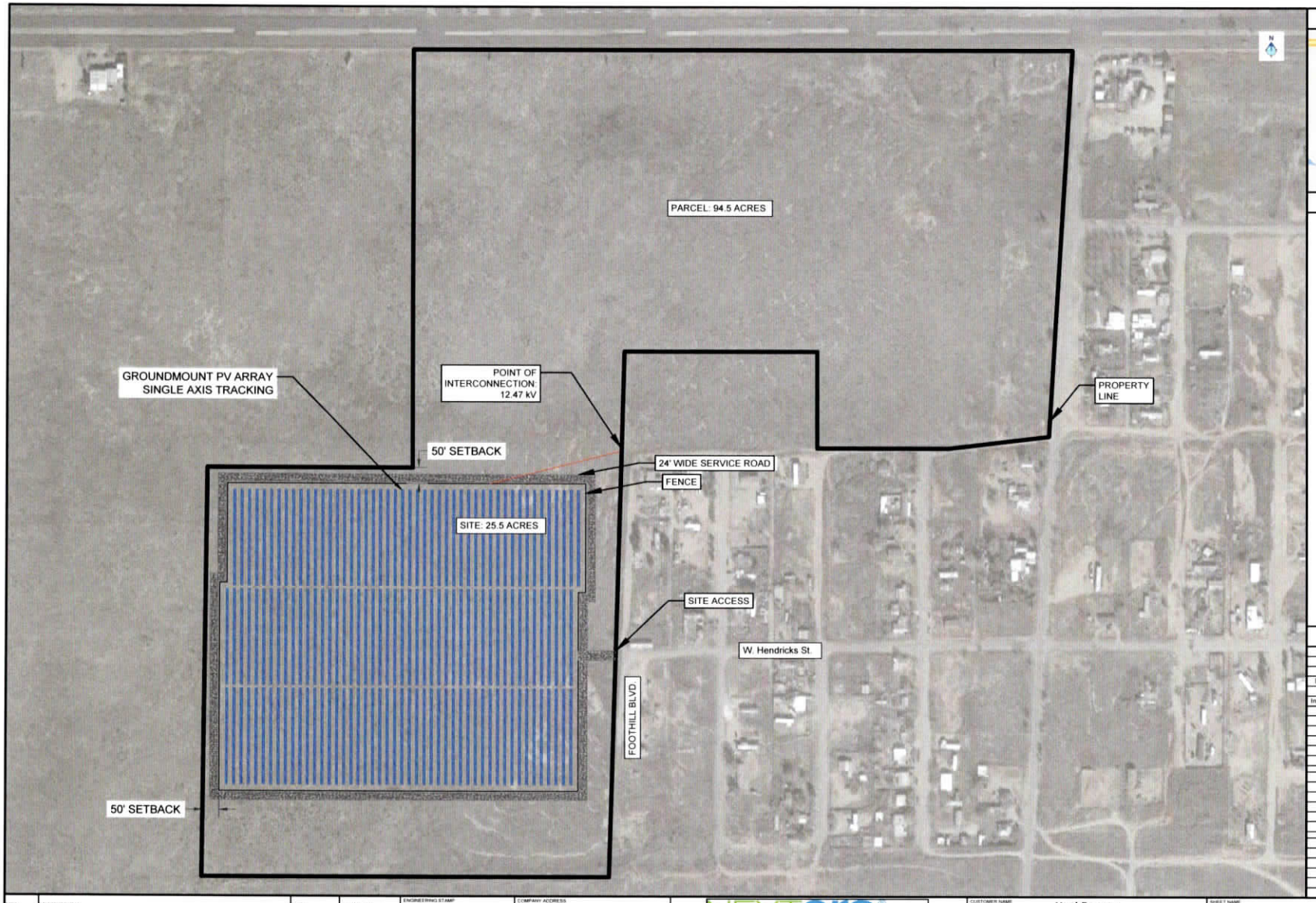
OTHER

SIGNER IS REPRESENTING:
NAME OF PERSON(S) OR ENTITY(IES)

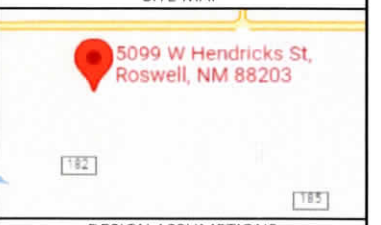
RIGHT THUMBPRINT OF SIGNER

Top of thumbprint here

APA 5/99 VALLEY-SIERRA, 800-362-3369



SITE MAP



DESIGN ASSUMPTIONS

GROUND-MOUNT DESIGN ASSUMPTIONS

1. Assumed commercial operation date: 12/1/2023
2. Point of interconnection is at 12.47kV

PV SYSTEM SUMMARY

Total DC Capacity (kW)	6,007	Total AC Capacity (kW)	5,000.00
Latitude	33.38874°	Longitude	-104.59975°
Wind Exposure Category	C	Risk Category	II
Design Wind Speed (mph)	115	Design Snow Load (psf)	10
Min. Ambient Temp (°C)	-13	Max Ambient Temp (°C)	39
Interconnection Voltage (kV)	12.47	Weighted DC/AC Ratio	1.20
Ground Mount		Single Axis Tracking	
DC:AC Ratio	1.20	Ground Coverage Ratio (%)	32
PV Module:	(11,664)	Longi Solar, LR5-72HBD-515M (515W)	
Inverter	(40)	Delta M125HV or Equivalent	
DC Capacity (kW)	6,007	AC Capacity (kW)	5,000
Tilt/Azimuth (°)	±60/180	String Count/Length	432/27

REV	DESCRIPTION	DATE	DRAWN BY
0	ORIGINAL	10/14/2022	D. Clark

ENGINEERING STAMP

COMPANY ADDRESS

NextEra Energy Resources
700 Universal Blvd.
Juno Beach, FL 33408

NEXTera ENERGY RESOURCES

CUSTOMER NAME: Xcel Energy

PROJECT NAME: Road Runner

PROJECT LOCATION: Roswell, NM

SHEET NAME: SITE PLAN

SCALE: CUSTOM

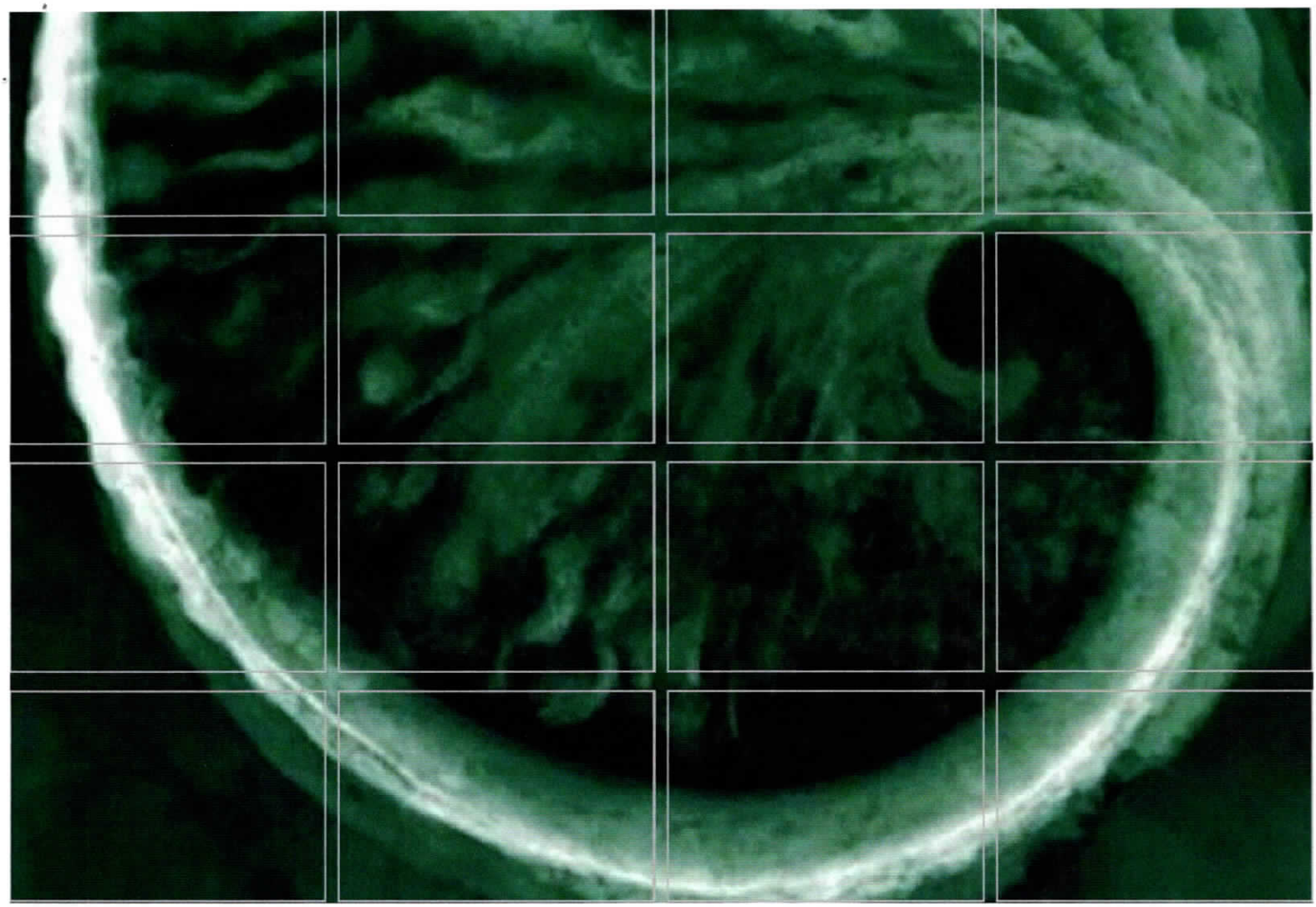
SHEET SIZE: ANSI D - 34" x 22"

SHEETS: 1

ISSUE: 1

SHEET TITLE

SHEET NUMBER



NextEra Energy Resources, LLC

Chaves County Special Use Permit Application

Roadrunner Solar Project

07 October 2022

Project No.: 0658681

The business of sustainability

ERM

CONTENTS

List of Tables

2. APPLICANT OVERVIEW

The Applicant for this special use application is DG Roadrunner, LLC (Applicant), a wholly-owned subsidiary of NextEra Energy Resources, LLC (NEER). The Applicant is proposing to construct and operate a solar photovoltaic (PV) generating facility (the Roadrunner Solar Project or the Project) in unincorporated Chaves County, New Mexico. The Applicant has executed a lease option agreement whereby the Applicant has the exclusive right to develop a solar photovoltaic project on the subject property. Upon permitting approval, the Applicant will construct, own and operate the solar project for a 20-year lease period, which may be extended for up to an additional 10 years.

NEER is the world's largest generator of renewable energy from the wind and sun. Nearly all of NEER's electricity comes from clean or renewable resources, including wind, solar, natural gas and nuclear energy facilities that are located in 38 states and Canada. NEER's success reflects the solid business practices of our parent company, NextEra Energy, Inc., (NextEra Energy) a Fortune 200 company and one of the nation's leading clean energy companies.

NEER has a portfolio of power-generating facilities, totaling approximately 28,000 MW of capacity in the U.S. and Canada. This includes wind, solar, natural gas, and nuclear energy resources. NEER is primarily a wholesale power generator, operating power plants and selling the output to utilities, retail electricity providers, power cooperatives, municipal electric providers, and large industrial companies. NEER has been involved in clean energy development since the 1980s and has earned a reputation for excellence and experience in developing, constructing, and operating wind and solar projects across North America.

Renewable energy projects represent a clean, cost-effective option to meet customers' energy needs. NEER is building strong partnerships with companies across North America that are buying wind- and solar-generated electricity to provide to residential and commercial markets throughout their service areas. Many electric utilities, cooperatives and municipalities have joined with NEER in providing this clean, renewable power to their customers. NEER also incorporates environmental stewardship into the design, construction, operation, and maintenance of our facilities.

3. PROJECT DESCRIPTION

This request for special use approval of a solar energy facility is made in accordance with the Roswell-Chaves County Extraterritorial Zoning Ordinance, Ordinance No. 80-1, Revision No. 20, effective August 31, 2021 (The ETZ Zoning Ordinance). Section 25.1.1 of the ETZ Zoning Ordinance states that "It is the purpose of this article to establish criteria for those uses listed as special uses in Section 25.2 of this Ordinance, and similar uses, as determined by the Planning Director, and to specify the expiration date as appropriate for approval of such uses." Solar energy facilities are not specifically listed in Section 25.2, but the ETZ has previously approved a solar facility in the S-R District as a special use (Case # ETZ 2022-03).

The proposed project will be approximately 5 megawatts (MW) alternating current (AC). The solar array is a single axis tracking system, which is anchored to the ground by a series of driven posts. The panels will automatically rotate from east to west during the day. There is ancillary electrical distribution equipment within the array including inverters that convert the PV generated electricity from DC to AC and equipment to connect to the utility distribution system. The total power by the Project shall not exceed 5 MW AC. The site will be enclosed by a 6' high chain link fence and 1' of 3 strands barbed wire. Gates and a gravel road will be constructed to provide access for maintenance, fire protection, and other municipal requirements.

The Project site consists of 25.5 acres on the southwestern portion of a 94.5-acre undeveloped parcel in Chaves County (Table 1). The Project site is located approximately 0.75 mile west of the city limit of Roswell, and approximately 1,300 feet south of U.S. Route 380, one mile east of New Mexico Route 518.

Table 3-1: Site Parcel Number and Owner Contact Information

Parcel ID	Owner's Name, Address, and Phone Number	Total Parcel Size (Acres)	Land Agreement
Account ID R012256, Parcel 4-131-062-402-124-000000	S K S; Schnedar 1998 Trust 415 Viale Bond, Roswell, New Mexico 88201	94.5	Lease option agreement

Source: Chaves County Assessor's Office Online Land Records, https://eagleweb.chavescounty.gov/assessor/taxweb/account.jsp?accountNum=R012256

The Project has applied for utility interconnection with Southwestern Public Service (SPS). Once received by the Applicant, a redacted Interconnection agreement with SPS can be provided to the County upon request. The Project will interconnect to the onsite existing utility pole located at the GPS coordinates of 33.390460, -104.599771.

No lighting would be installed within the Project site. Signage would be limited to warning signs on electrical equipment, warning signs along fenceline, and a warning sign concerning voltage at the main gate with the name and local phone number for the operator in case of emergency. Signs would be approximately 18 inches by 24 inches or a similar size.

Construction will entail various site preparations, including vegetation removal, grading, and access road construction. Upon completion of construction, the site will be stabilized and revegetated with native grasses. The vegetation of the developed site will be managed with annual inspections to ensure that vegetation does not grow and interfere with the operation of the Project.

Operations and maintenance of the site are primarily conducted by monitoring performance remotely, conducting site visits to perform vegetation management, corrective maintenance in response to abnormalities in operations, and implementing an annual preventive maintenance protocol to ensure optimum system performance.

4. REQUIRED APPLICATION MATERIALS

A site plan complying with Section 2.5.2 of the ETZ Zoning Ordinance is included as **Attachment B** and a copy of the Assessor's map showing properties within 100 feet of the Project site is included as **Attachment C**. Table 2 lists the adjoining and nearby property owners as required by Section 2.5.2. A copy of the recorded deed for the property is included as **Attachment D**.

Table 4-1: Ownership of Properties Within 100 Feet of Project Site

Account Number	Owner
R008745	Cardona, Robert In Care Of Name: Frazzini, Adam; Frazzini, Rebecca
R008225	Frazzini, Adam; Frazzini, Rebecca
R010731	Cardona, Robert; Cardona, Virginia
R035692	Cardona, Le Roy; Cardona, Patricia
R035241	Cardona, Le Roy; Cardona, Patricia
R006808	Lucero, Ann; Lucero Estate, Richard Elon
R008769	Cardona, Julian Miguel
R008248	Lujan, Jesus C
R035524	Sedillo, Matias
R035523	Sedillo, Matias
R010905	Sedillo, Matias
R035808	Perez, Raymond L
R008789	Perez, Antonio A
R034808	Perez, Lawrence L
R006853	Perez, Lawrence L.
R008794	Anaya, Ysidoro T
R008284	Brewer, Bill
R006931	Doerhoefer, Randy R; Doerhoefer, Lori J
R007862	Doerhoefer, Randy R; Doerhoefer, Lori J
R006929	Sedillo, Susan K; Martinez, Kara
R006943	Sedillo, Susan K; Martinez, Kara
R006967	Lee, Daphine
R033601	Lee, Daphine
R033608	O'Brien & Co LLC; Scott, Suzanne Elizabeth; St Andrews Episcopal Church
R033610	Griffen, Deborah Lee
R033614	Hunter, Jeannie Elizabeth
R009819	Analla, Ruben In Care of Name: Debra Anaya
R035460	Bartlett, Geneva; Gomez, Dominic; Candelaria, Collette D In Care of Name: Dominic Gomez
R007742	Bartlett, Martin; Bartlett, Genoveva
R033474	Delgado, Paul; Delgado, Linda

Account Number	Owner
R009176	Madison Revocable Living Trust, William Fredrick Jr
R007221	Powell, Annetta
R010917	Toles Group/SA, LLC, The; Patterson 1976 Trust Investments LLC; Graham Family Investments LLC
R009409	Schultz Properties LLC
R012257	Catholic Diocese of Las Cruces

Source: Chaves County Assessor's Office

5. CONSIDERATIONS FOR SPECIAL USE APPLICATIONS

Section 2.5.5 of the ETZ Zoning Ordinance requires the ETZ Commission to consider several factors as discussed below.

5.1 Characteristics of the proposed development

The Project site is conducive to development of a solar energy facility. The site provides open land within a context of primarily undeveloped land and availability of connection to existing transmission infrastructure. All Project improvements, including solar racking, panels, and equipment, internal access drives, and fencing will be setback at least 50 feet from property boundaries. The Project will not require road or infrastructure upgrades. Upon decommissioning the land will be available for other uses.

Installation of the Roadrunner solar facility will require only minimal site grading and clearing, due to the open existing site conditions and the ability of the module racking structures to conform with the existing topography. Solar facilities are able to conform to existing terrain, and the system installation consists of driving steel support posts into the ground surface, which requires minimal grading and excavation. Construction areas will be cleared of miscellaneous debris and/or cleared of vegetation that would impede vehicle access in order to prepare the site for safe and efficient installation of Project components. Grading will be limited to cutting, filling, and compaction of earth in isolated areas around the site to meet the final design requirements.

The construction period will extend for approximately 4-6 months. Construction personnel will assemble at the site daily in the morning and depart the site in the afternoon, and scheduled truck deliveries will provide project components.

Once construction is completed, the Project will not produce vibration, dust, or debris. Traffic will be limited to periodic (once or twice monthly) light-duty vehicles used for facility inspections and maintenance. The nature of solar PV panels, which are manufactured with anti-reflective glass so that they absorb sunlight to generate electrical output, minimizes the potential for glare.

5.2 Surrounding Land Use

Surrounding properties are undeveloped to the north, west, and south, and developed with low-density single-family residences to the east. Views of the Project will be mitigated by the low profile of the solar panels and setbacks from residential properties and roadways.

5.3 Public Road Access

Road access to the Project site will be from W. Hendricks Street, which terminates at the parcel's eastern boundary. The site is approximately 0.6 mile from W. 2nd Street (U.S. Route 70/380) via S. Brown Road and W. Hendricks Street, which both have a 22-foot-wide travel way. The applicant will construct the site access shown on the site plan (**Attachment B)** prior to commencing construction and upon receiving approval of an access permit from the Chaves County Roads Department. The access road will be constructed in accordance with the requirements of the Roads Department.

Safety precautions and work-zone recommended practices in accordance with applicable state and federal regulations will be implemented to maintain safe access/egress of personnel and equipment from the Project while minimizing disruptions to local road conditions. During both construction and operation, no pedestrian or unauthorized vehicular access to the Project site is expected and access will be controlled by fencing.

Construction equipment and materials will be delivered by truck and will be staged in the order of installation. Delivery of construction equipment and Project components will be coordinated with local agencies to ensure compliance with all applicable New Mexico Department of Transportation (NMDOT), County, and local requirements. Weight and height restrictions will be verified and any required permits will be obtained by the delivery service.

Upon entering the Project site, construction traffic, including workers and deliveries, will be directed to parking or laydown areas located appropriately for the stage of development. Employees and contractors will be notified of and will comply with standard NEER construction safety policies.

Traffic associated with the operation of the Project during routine security and/or maintenance activities is anticipated to be minimal, less than one to two trips per month.

5.4 Existing and Proposed Water Surface Drainage Facilities

The Roadrunner Solar facility will not require new water surface drainage facilities. Except for the access driveways, the site will be maintained in suitable vegetative cover, including the areas between and under the solar arrays.

During construction, Roadrunner Solar will implement standard erosion control measures as needed based on wind conditions. Upon completion of construction, the site will be restored to pre-construction conditions. During operations, vegetation on the site would be actively maintained to control growth and prevent overshadowing or shading of the PV panels. The Projects would implement traditional mechanized landscaping using lawnmowers, weed eater, etc. Trimming and mowing would be performed on an interval basis to maintain the vegetation.

5.5 Improvement of Off-Site Facilities

No improvement of off-site facilities will be needed to support Roadrunner Solar construction or operations. Existing road access is sufficient for Project construction, operations and decommissioning. The Project will not require water or sewerage. All solid waste generated during construction, and the occasional solid waste generated during maintenance or repair operations will be transported by the applicant/operator to an approved solid waste disposal facility. No extension of public services by the City of Roswell will be necessary.

5.6 Compatibility with Land Use Plan

The Project site is within the "Mid-Density Residential" category on the Future Land Use Scenario of the Chaves County Comprehensive Plan, July 2016. The small-scale Roadrunner project is compatible with residential land uses and will maintain appropriate setbacks from adjacent residential properties.

5.7 Distance to Residential Structures

All improvements associated with the Roadrunner Solar Project, including fencing, will comply with the minimum 50-foot front and rear setback requirement of the R-S zoning district. The closest residential structures are those with frontage on Foothills Boulevard, which parallels the site's eastern boundary. These dwellings are approximately 50 to 100 feet from the parcel boundary. A minimum 50-foot setback will be retained from the parcel boundary, resulting in a minimum 100 to 150-foot setback from the dwellings to the fenceline enclosing the Project.

6. DECOMMISSIONING PLAN

A decommissioning plan is included as **Attachment E**. The plan provides for removal of the project's structures and foundations and restoration of the land at the end of the project's operational life. Decommissioning will commence no longer than 150 days after the date of discontinued operations. A financial surety bond will be provided to ensure timely and complete decommissioning.

7. PUBLIC BENEFITS

The Project's development will support the goals of the New Mexico Energy Transition Act of 2019 by increasing the state's capacity for renewable energy generation. The community benefits of solar energy include a reduction in greenhouse gasses and air pollution attributable to traditional energy generation activities, diversification of energy mix, and increases in regional energy reliability. In summary, the Project is appropriately sited, will have minimal impact on adjacent uses, and a positive impact on the community at large.

Project benefits include:

- Generation of clean, renewable energy without using water, creating emissions, or producing excessive waste products;
- Placing little to no demand on municipal or County infrastructure and services including roads, water, sewer, fire, emergency medical services or schools;
- Creating jobs during construction of the Project with indirect economic benefits in the form of local contracting opportunities, equipment sales and rentals, material purchases, and spending on other local goods and services;
- Bringing economic benefits with a low-profile, quiet development consistent with the rural character of the area; and
- Allowing land to be available for other use at the end of the Project's life, in accordance with the landowner's preferences.

Roadrunner CUP Materials: Surrounding Property Owners (100ft)

Listed below are the PIN, property account numbers, owners, and address of all parcels within 100 feet of the full 94.5-acre parcel. The Project site is 25.5 acres on the southwestern portion of the full parcel. Information is from Chaves County Assessors online information, retrieved on October 6, 2022.

The account numbers below were taken from Chaves County Parcel Viewer.

The parcels listed below are shown on the map (page 4-6).

Property Owners within 100 feet of PN 4-131-062-402-124-000000:

4131062419139000000
R008745
Owner Name: CARDONA, ROBERT
In Care Of Name: FRAZZINI, ADAM; FRAZZINI, REBECCA
Owner Address: 300 CARROL AVE
ROSWELL, NM 88203

4131062418146000000
R008225
Owner Name FRAZZINI, ADAM; FRAZZINI, REBECCA
Owner Address 300 CARROL AVE
ROSWELL, NM 88203
USA

4131062418153000000
R010731
Cardona, Robert; Cardona, Virginia
300 CARROL AVE
ROSWELL, NM 88203
UNITED STATES OF AMERICA

4131062418159000000
R035692
Owner: Cardona, Le Roy; Cardona, Patricia
Owner Address 307 FOOTHILL BLVD
ROSWELL, NM 88203
UNITED STATES OF AMERICA

4131062418166000000
R035241
Owner: Cardona, Le Roy; Cardona, Patricia
Owner Address 307 FOOTHILL BLVD
ROSWELL, NM 88203
UNITED STATES OF AMERICA

4131062418172000000
R006808
Owner: Lucero, Ann; LUCERO ESTATE, RICHARD ELON
Owner Address 1604 S KENTUCKY AVE
ROSWELL, NM 88203
UNITED STATES OF AMERICA

4131062418182000000
R008769
Owner Name CARDONA, JULIAN MIGUEL
Owner Address 300 CARROL AVE
ROSWELL, NM 88203
USA

4131062418192000000
R008248
Owner: Lujan, Jesus C
Owner Address 1102 MELROSE ST
ROSWELL, NM 88201
UNITED STATES OF AMERICA

4131062418207000000
R035524
Owner: Sedillo, Matias
Owner Address 403 FOOTHILL BLVD
ROSWELL, NM 88203
USA

4131062417216000000
R035523
Owner: Sedillo, Matias
Owner Address 403 FOOTHILL BLVD
ROSWELL, NM 88203
USA

4131062417222000000
R010905
Owner: Sedillo, Matias
Owner Address 403 FOOTHILL BLVD
ROSWELL, NM 88203
USA

4131062417228000000
R035808
Owner: Perez, Raymond L
Owner Address PO BOX 327
LOS LUNAS, NM 87031
UNITED STATES OF AMERICA

4131062417234000000
R008789
Owner: Perez, Antonio A
Owner Address 916 DOGWOOD RD
GLEN BURNIE, MD 21060
UNITED STATES OF AMERICA

4131062417240000000
R034808
Owner: Perez, Lawrence L
Owner Address 449 61st ST NW
ALBUQUERQUE, NM 87105
UNITED STATES OF AMERICA

4131062417246000000
R006853
Owner: Perez, Lawrence L.
Owner Address 449 61st ST NW
ALBUQUERQUE, NM 87105
UNITED STATES OF AMERICA

4131062417252000000
R008794
Owner: Anaya, Ysidoro T
Owner Address PO BOX 35
HONDO, NM 88336-0035
UNITED STATES OF AMERICA

4131062417258000000
R008284
Owner: Brewer, Bill
Owner Address 4503 W MCGAFFEY ST
ROSWELL, NM 88203
UNITED STATES OF AMERICA

4132062029012000000
R006931
Owner: Doerhoefer, Randy R; Doerhoefer, Lori J
Owner Address 2606 BAY MEADOWS DR
ROSWELL, NM 88201-5204
UNITED STATES OF AMERICA

4132062028025000000
R007862
Owner: Doerhoefer, Randy R; Doerhoefer, Lori J
Owner Address 2606 BAY MEADOWS DR
ROSWELL, NM 88201-5204
UNITED STATES OF AMERICA

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R006929
Owner: Sedillo, Susan K; Martinez, Kara
Owner Address 4713 CASS RD
ROSWELL, NM 88201
UNITED STATES OF AMERICA

4132062027050000000
R006943
Owner: Sedillo, Susan K; Martinez, Kara
Owner Address 4713 CASS RD
ROSWELL, NM 88201
UNITED STATES OF AMERICA

4132062027071000000
R006967
Owner: Lee, Daphine
Owner Address 211 S BROWN RD
ROSWELL, NM 88203

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R033601
Owner: Lee, Daphine
Owner Address 211 S BROWN RD
ROSWELL, NM 88203

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R033608
Owner: O'Brien & Co LLC; Scott, Suzanne Elizabeth; St Andrews Episcopal Church
Owner Address 215 S BROWN RD
ROSWELL, NM 88203
USA

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Owner: Griffen, Deborah Lee
Owner Address 217 S BROWN RD
ROSWELL, NM 88203

4132062027116000000
R033614
Owner: Hunter, Jeannie Elizabeth
Owner Address 219 S BROWN RD
ROSWELL, NM 88203

4131062482139000000
R009819
Owner Analla, Ruben
In Care Of Name DEBRA ANAYA
Owner Address PO BOX 3886
ALBUQUERQUE, NM 87190
UNITED STATES OF AMERICA

4131062496138000000
R035460
Owner Bartlett, Geneva; Gomez, Dominic; Candelaria, Collette D
In Care Of Name DOMINIC GOMEZ
Owner Address 2802 W 4TH ST APT A
ROSWELL, NM 88201
UNITED STATES OF AMERICA

4131062514138000000
R007742
Owner Bartlett, Martin; Bartlett, Genoveva
Owner Address C/O DOMINIC GOMEZ
2802 W 4TH ST APT A
ROSWELL, NM 88201
UNITED STATES OF AMERICA

4131062532146000000
R033474
Owner Delgado, Paul; Delgado, Linda
Owner Address 306 S BROWN RD
ROSWELL, NM 88203

4131062331071000000
R009176
Owner Madison Revocable Living Trust, William Fredrick Jr.
Owner Name MADISON REVOCABLE LIVING TRUST, WILLIAM FREDRICK JR
Owner Address HCR 72 BOX 490
RIBERA, NM 87560

4131062297071000000
R007221
Owner Name POWELL,ANNETTA
Owner Address PO BOX 431
ARTESIA, NM 88210
UNITED STATES OF AMERICA

4130063298045000000
R010917
Owner Name TOLES GROUP/SA, LLC, THE ; PATTERSON 1976 TRUST INVESTMENTS LLC; GRAHAM FAMILY INVESTMENTS, LLC
Owner Address PO BOX 1300
ROSWELL, NM 88202

4131062269086000000
R009409
Owner Name SCHULTZ PROPERTIES LLC
Owner Address 1901 W 4TH ST
ROSWELL, NM 88201

4131062446116000000
R012257
Owner Name CATHOLIC DIOCESE OF LAS CRUCES
Owner Address 1280 MED PARK DRIVE
LAS CRUCES, NM 88005
UNITED STATES OF AMERICA


W 2nd St
W 2nd St
W 2nd St
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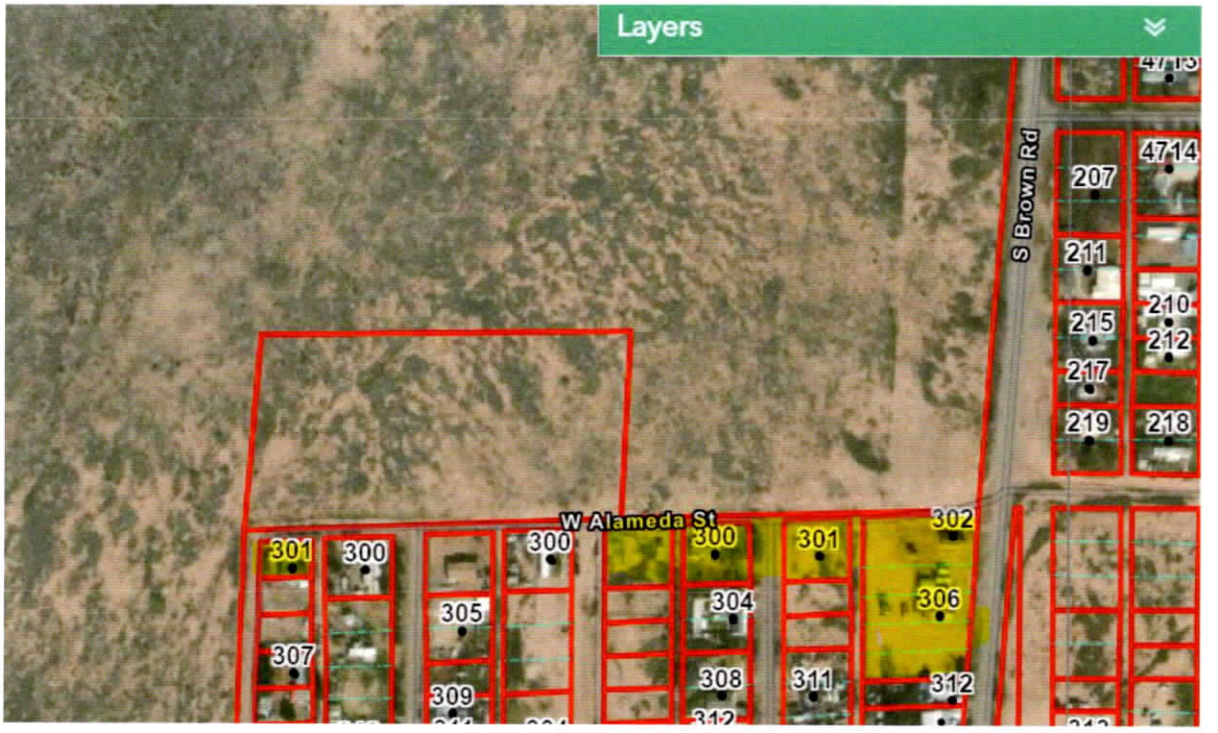
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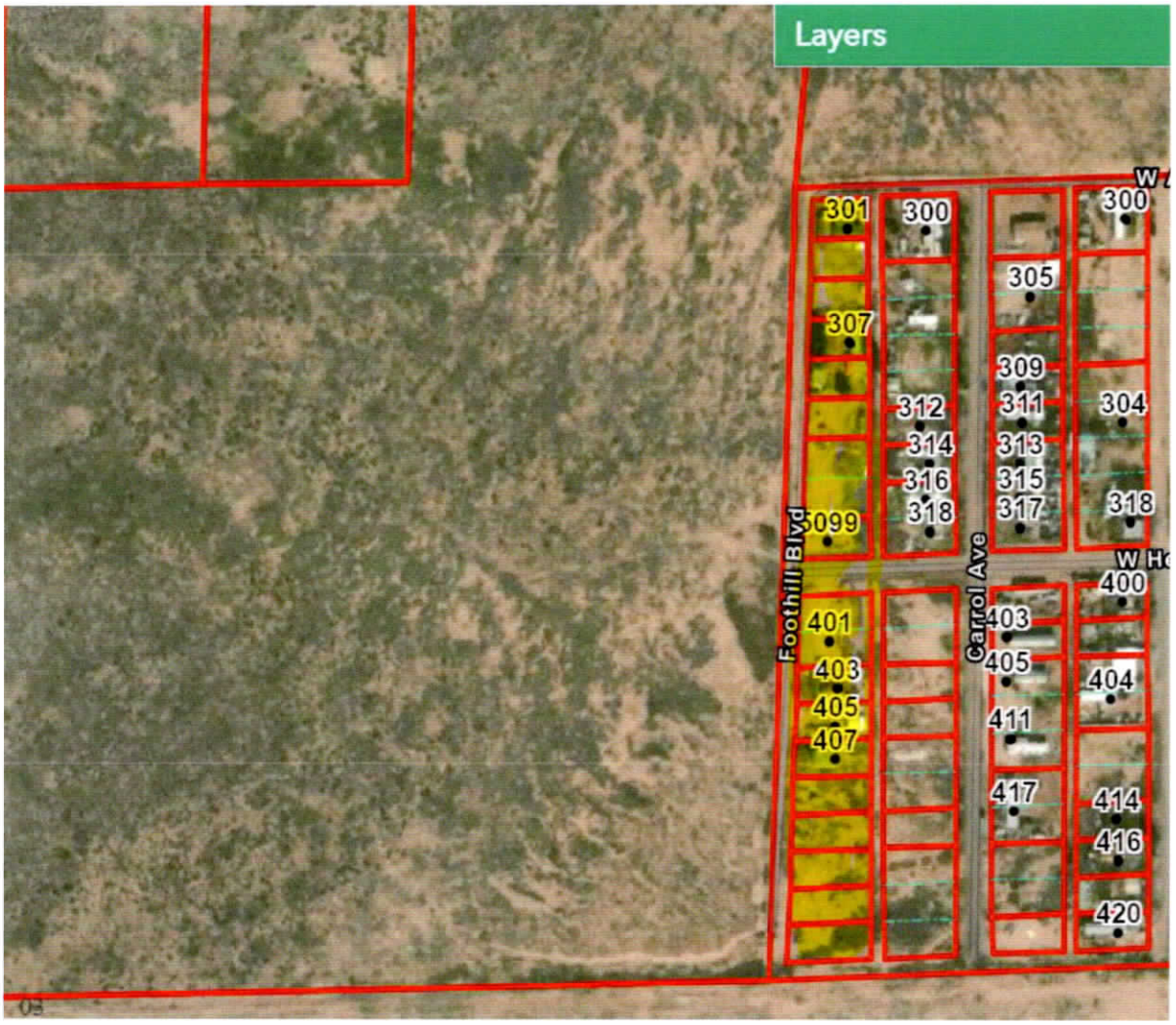
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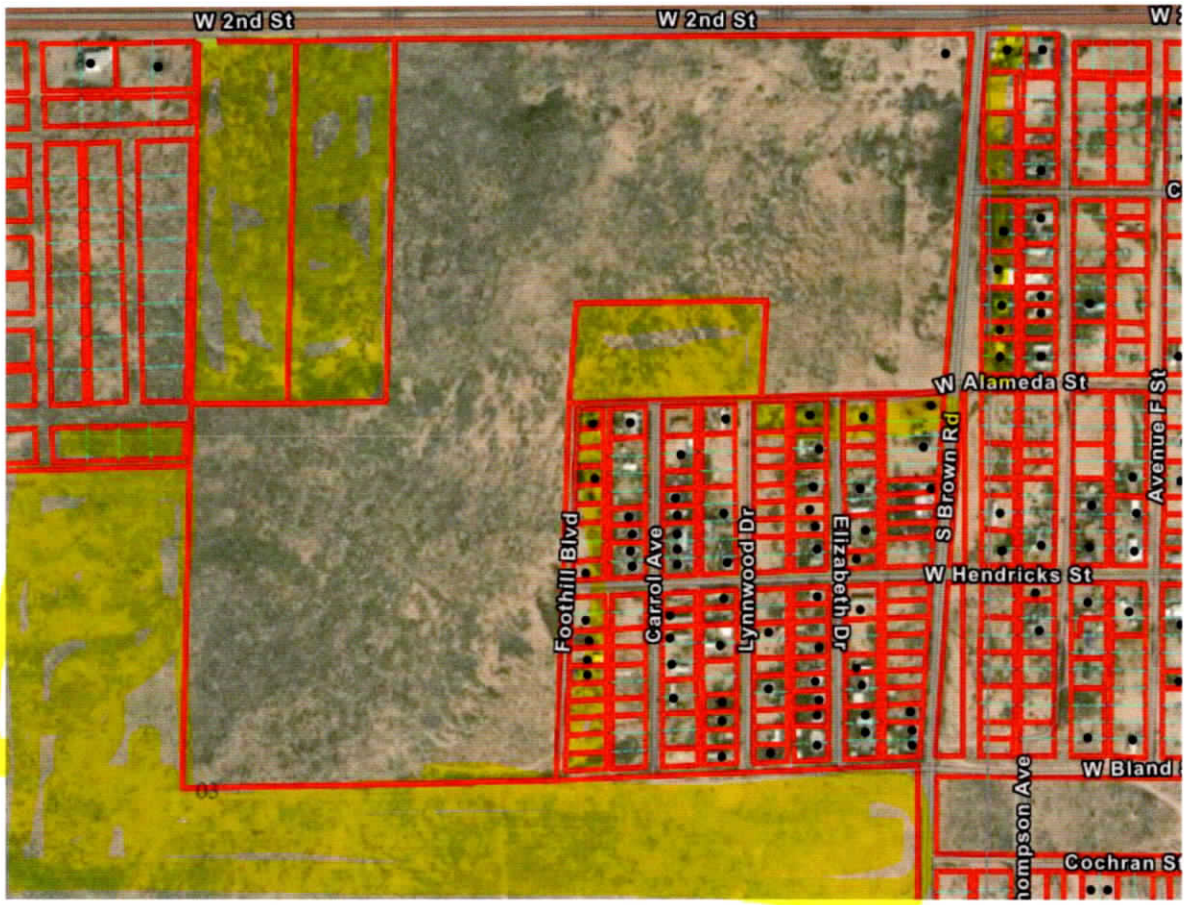
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W 2nd St
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S Brown Rd
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Foothill Blvd
Carrol Ave
Lynnwood Dr
Elizabeth Dr
W Hendricks St
W Bland
Cochran St

CERTIFICATION OF FILING

Required for the recording of all deeds and contracts for property within the unincorporated areas of Chaves County that are outside of official subdivisions

Name of Seller: Rita Schnedar

By signing this certification, the undersigned certifies the filing of this deed does not create a new parcel of land in violation of the Chaves County Subdivision Ordinance.

AFFIDAVIT

STATE OF CALIFORNIA)
) ss
COUNTY OF San Diego)

Comes now Rita Schnedar, and after being first duly sworn, states as follows:

I certify, to the best of my knowledge, that the information provided by me in this certification is true and correct; that I have visited with the Chaves County Planning and Zoning office about any exemption that I am claiming; and that I have the permission of the current owner or legal representative of the property to take this action.

N/A
Company or Organization Represented (when applicable) Address (street)

City, State, ZIP Telephone

SIGNATURE Rita Schnedar
SIGNATURE

SUBSCRIBED AND SWORN to before me this 11th day of Dec, 2012

My commission expires:

12/26/12

Notary Public

State of California
County of San Diego
Subscribed & sworn to (or affirmed) before me this 11th day of Dec, 2012 by Rita Schnedar, proved to me on the basis of satisfactory evidence to be the person(s) who appeared before me

ASH NICKLE
COMM. # 1825273
NOTARY PUBLIC-CALIFORNIA
SAN DIEGO COUNTY
MY COMM. EXP. DEC. 26, 2017

Attachment E

Decommissioning Plan for Roadrunner Solar Project Chaves County, New Mexico

The Roadrunner Solar Project is designed to last 30 years. At the end of the project's operation, structures and foundations will be removed and the land restored as detailed below. When Roadrunner Solar Project has reached the end of its useful life or has been abandoned, as provided below, it will be removed by DG Roadrunner, LLC no more than 150 days after the date of discontinued operations. DG Roadrunner, LLC shall notify the County by certified mail of the proposed date of discontinued operations and plans for removal.

A financial surety bond will be secured by Fidelity or Travelers and will be set aside in the amount of $150,523 available to Chaves County if DG Roadrunner, LLC is unable to commence with decommissioning activities within a reasonable period of time. Chaves County shall receive a copy of the security document.

Decommissioning of the solar PV system shall be implemented in accordance with the Decommissioning Requirements listed below. DG Roadrunner, LLC will be responsible for all of the decommissioning costs and will list Chaves County as having access to the security in the event decommissioning is required. DG Roadrunner, LLC will retain ownership of the project for the life of the solar energy array operations and through decommissioning completion.

Installation will be done with minimal permanent alterations to the land. Upon removal, DG Roadrunner, LLC will restore the project site to pre-construction conditions as is reasonably practical, including removal of structures, foundation, and restoration of soil and vegetation. The system will be dismantled and removed using minimal impact construction equipment and materials will be safely recycled or disposed. During the decommissioning, DG Roadrunner, LLC will use appropriate temporary construction-related erosion and sediment control best management practices (BMP).

Much of the material in a solar project is recyclable; including glass, semiconductor material, steel, aluminum, copper and plastics. The scrap value of the system will offset the removal cost. When the project has reached the end of its operational life, the components and parts will be dismantled and recycled as described below.

Decommissioning requirements:

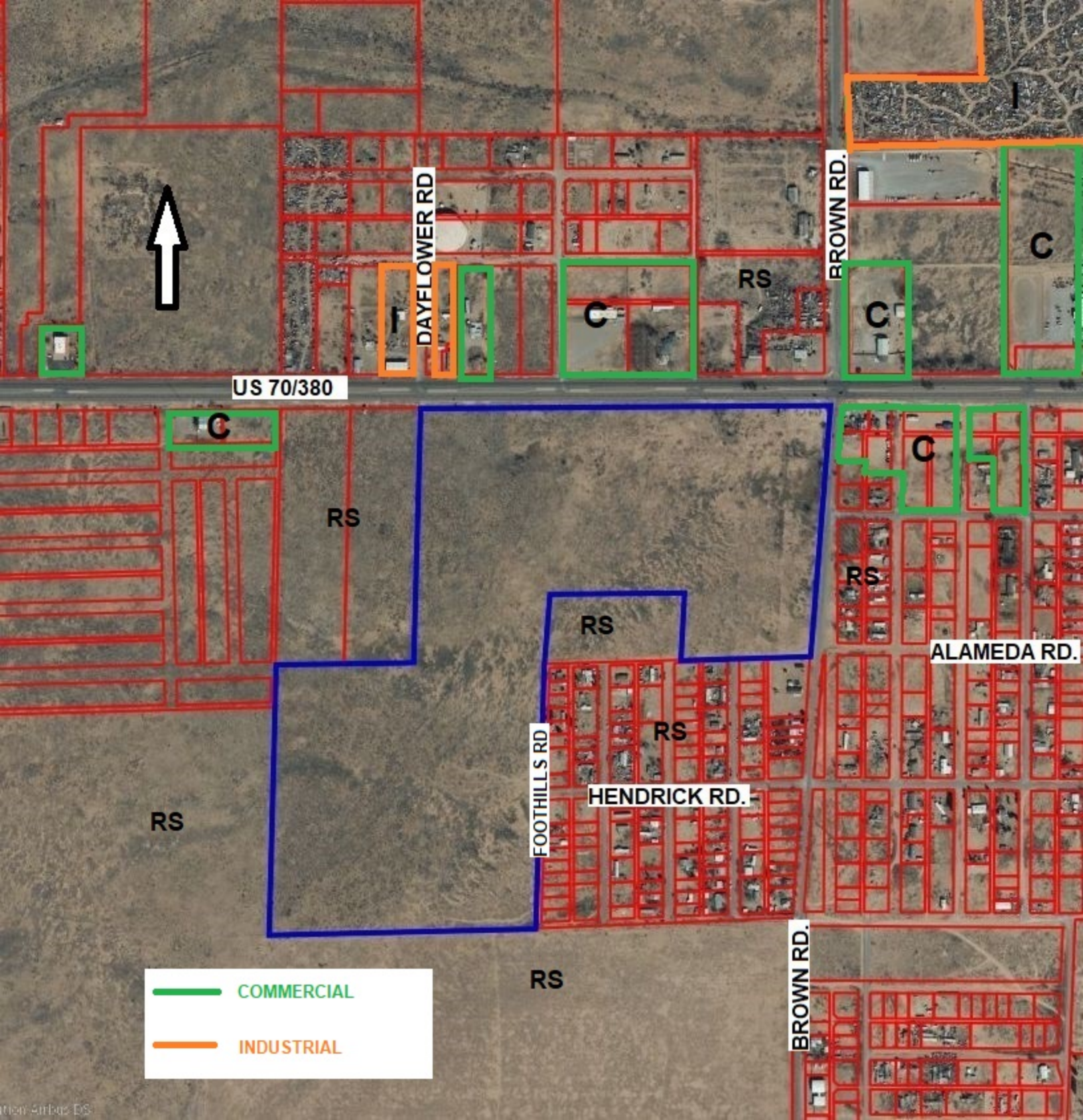
DG Roadrunner, LLC shall:

1. Obtain any permits required for the decommissioning, removal, and legal disposal of the system components prior to the commencement of the decommissioning activities
2. Remove all hazardous materials (if any) and transport them to be disposed of by licensed contractors at an appropriate facility in accordance with rules and regulations
3. Work with utility to disconnect PV array from power grid.
4. Remove transformer, inverters switch gear, power poles and fencing.
5. Break up concrete foundations and recycle materials.
6. Remove modules, DC wiring, junction boxes and steel racking.

7. Pull AC wiring from underground conduits.
8. Excavate and remove all collection cables.
9. Fill in stormwater ponds.
10. Reclaim gravel from access road.
11. Re-grade area to an approximation of the original contours
12. Reseed and mulch distributed areas using a seed mix pre-approved by the County or allow farm owner to re-seed.
13. Recycle gravel, concrete, rebar, fencing, steel piers, steel racking, solar modules, copper and aluminum wiring, inverters, disconnects, switchgear and transformer.

The Project site may be converted to other uses in accordance with applicable land use regulations at the time of decommissioning. There will be very limited grading done to build the project, so only limited grading will be required to restore the land to its original condition. Any soil removed for construction purposes will be relocated on the site or used for landscaping after construction is complete.

[illegible]	[illegible]
Remove Racking Wiring	$6,148
Remove Panels	$6,125
Dismantle Racks	$30,875
Remove Electrical Equipment	$4,625
Breakup and Remove Concrete Pads or Ballasts	$3,750
Remove Racks	$19,500
Remove Cable	$16,250
Remove Ground Screws and Power Poles	$34,625
Remove Fence	$12,375
Grading	$10,000
Seed Disturbed Areas	$625
Truck to Recycling Center	$5,625
Current Total	$150,523
Total After 30 Years (2.5% Inflation Rate)	$315,731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US 70/380
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ALAMEDA RD.
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FOOTHILLS RD
HENDRICK RD.
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BROWN RD.
COMMERCIAL
INDUSTRIAL

ARTICLE 25

SPECIAL USE PERMITS

Section 25.1 Granting Special Use Permits

A Special Use Permit shall be bound and limited to the parcel(s) of land described in the application and to the land owner/petitioner of the property stated in the application and as stated in the Certificate of Zoning. A Special Use Permit is nontransferable in location or ownership including the name change of a company, LLC, corporation, trust, and/or partnership. So as not to misperceive, confuse and misapprehend prospective owners, a real estate contract shall be construed as a change in ownership and as such shall require a new Special Use Permit application and process.

1. It is the purpose of this article to establish criteria for those uses listed as special uses in Section 25.2 of this Ordinance, and similar uses, as determined by the Planning Director, and to specify the expiration date as appropriate for approval of such uses. It is recognized that these uses which, because of their unique characteristics, cannot be properly addressed without consideration in each case of the impact of those uses upon neighboring land and of the public need for the particular use at the particular location. Special uses shall require issuance of a Zoning Certificate by the ETZ Commission.

Each zoning district lists special uses that, because of their special impact or unique characteristics, can have a substantial adverse impact upon or be incompatible with other uses of land. This impact often cannot be determined in advance of the use being proposed for a particular location. Such uses may be allowed to locate within given districts only through the review process of the special use permit and under the controls, limitations and regulations of such permits. This article establishes general and specific development standards for special uses and provides for a review process which will evaluate the location, scale, compatibility with rural character and development characteristics of such uses and their impact on adjacent properties and the county as a whole, to the end that such uses may be approved, modified, or disapproved fairly and objectively.

Upon the filing of a complete application for a Special Use Permit per the requirements contained in Article 2, Section 2.5 of this Ordinance, the application shall be scheduled for a public hearing before the ETZ Commission. Public notice of the hearing shall be issued as provided for in Article 2, Section 2.5 of this Ordinance. The ETZ Commission may grant approval of special use permits, grant approval with conditions of approval, or deny an application if the characteristics of the intended use would create an incompatible or hazardous condition. The ETZ Commission shall not use a Special Use Permit to alter or reduce the zoning requirements of the zone in which the proposed land use is to locate.

2. Prior to granting any Special Use Permit, the Commission shall hold a public hearing and shall determine that:

a. The granting of the Special Use Permit will not be injurious to the public health, safety, morals, and general welfare of the community.
b. The use or value of the area adjacent to the property included in the Special Use Permit will not be affected in a substantially adverse manner.
c. The site for the proposed Special Use Permit is suitable for that use, and the surrounding properties are compatible with that use.
d. That the grant of the Special Use Permit would be within the spirit, intent, purpose, and general plan of this Ordinance.

3. The ETZ Commission, upon receiving a properly filed application or petition, may permit and authorize a Special Use Permit when the following requirements have been met:

a. The proposed use will not endanger the public health or safety;

b. The proposed use at the proposed location will not be unreasonably detrimental to the economic welfare of the county, and that it will not create excessive public cost for facilities and services by finding that:

1. The proposed use will be adequately serviced by adequate existing facilities such as highways, roads, police and fire protection, irrigation and drainage structures, refuse disposal, water and sewers/septic systems, and schools; or

2. The applicant shall provide such facilities; or

3. The proposed use will be of sufficient economic benefit to offset additional public costs or economic detriment;

c. The proposed use will not generate significant nuisance conditions such as noise, dust, glare, vibration;

d. The proposed use meets all required conditions and standards set forth in the zoning district where it proposes to locate;

e. The location and character of the proposed use is compatible and consistent with the character of the area in which it is to be located, and will ensure compatibility with existing neighboring land uses; and

f. The proposed use is in conformance with the Chaves County Comprehensive Plan.

4. In permitting such uses the ETZ Commission may impose, in addition to the regulations specified herein, such conditions as it deems necessary to protect the best interests of the surrounding property or neighborhood or the county as a whole. These conditions may include, but are not limited to, the following:

a. Increasing the required lot size, setback or yard dimensions;

b. Limiting the height of buildings or structures;

c. Controlling the number and location of vehicular access points;

d. Requiring the dedication of additional rights-of-way for future public roadway improvements;

e. Requiring the designation of public use easements;

f. Increasing or decreasing the number of required off-street parking and/or loading spaces as well as designating the location, screening, drainage, surfacing or other improvement of a parking area;

g. Limiting the number, size, height, shape, location and lighting of signs;

h. Requiring or limiting view-obscuring fencing, landscaping or other facilities to protect adjacent or nearby properties;

i. Designating sites for and/or the size of open space or recreational areas;

j. Requiring site reclamation upon discontinuance of the use and/or expiration or revocation of the Special Use Permit;

k. Limiting hours and size of operation;

l. Controlling the siting of the use and/or structures on the property;

m. Requiring mitigation measures to effectively reduce the potential for land use conflicts with agricultural lands and adjacent residential lands, such as: landscape buffers, special setbacks, screening, and/or site design criteria using physical features, such as rock outcrops, ravines, and roads.

A Special Use Permit shall become void one (1) years after approval or such other time period as established by the ETZ Commission if the use is not completely developed. Failure to begin such action within the time limit specified shall void approval of the Zoning Certificate for the special use.

5. A Special Use Permit may be revoked or limited by the ETZ Commission if any one (1) of the following findings can be made:

a. That one or more of the conditions of approval of the Special Use Permit have not been met;

b. That the Special Use Permit was obtained by misrepresentation or fraud;

c. That the use for which the Special Use Permit was granted has ceased or was suspended for twelve (12) or more consecutive calendar months;

d. That the actual or permitted use is in violation of any statute, ordinance, law, or regulation; or

e. That the use permitted by the Special Use Permit is detrimental to the public health, safety or welfare, or constitutes a nuisance.

f. Change in property ownership or site location.

The ETZ Commission's decision is subject to appeal in accordance with the provisions of Article 2 of this Ordinance.

Section 25.2 Use Regulations A special use permit **shall be required** for the following uses:

1. Airports* or landing fields.
2. Cemeteries and mausoleums
3. Commercial communications transmitter antennas or towers provided they are at least 100 feet from any public way.
4. Community buildings or recreation fields.
5. Electric substations, gas regulator or pump/booster stations, and well and water pumping stations in any district, provided that in any residential district or commercial district, the site shall be developed and maintained in conformance with the general character and appearance of the district. Such development shall include landscaping and suitable screening in the form of a wall, or solid fence and compact evergreen shrub.

6. Extraction of gravel, sand or other raw materials, provided that a satisfactory guarantee be posted with the Commission assuring that the land be left in such a condition that all faces, slopes, edges, or spoil piles have a maximum slope 2½ feet horizontal to one (1) foot vertical.

7. Hospitals, clinics*, and institutions
8. Night clubs*
9. Nursery schools, day nurseries, child care centers, pre-kindergartens, and other special and similar private schools in an Industrial District as an accessory or function for employees, provided that adequate safety from loud noises and other industrial dangers are supplied and there is at least 100 square feet of open play for each child enrolled. Each play area shall be screened with a suitable wall, fence, or evergreen shrub.

10. Parking lots adjacent to, across the street from, or across the alley from the Commercial District, or a Business District.

11. Penal institutions
12. Poultry hatcheries, poultry production, dairying and any similar activities.
13. Private clubs or lodges
14. Railroad tracks, yards, and similar railroad facilities
15. State licensed or state operated family or group care residences for homeless, the criminal offender, or alcohol or drug abusers that function as a transition from institution to community.
16. Substance abuse treatment facilities.
17. Temporary commercial amusements or recreational developments
18. Multigenerational housing as a second dwelling unit in a residential district, with a yearly review by Staff.
19. Day Care Home-Group in a residential district.
20. Workforce Camps