Mr. Naven read a letter of objection from Marcia Hildebrand (Exhibit 3).

Mr. Naven read a letter of objection from Timothy Tobin (Exhibit 4).

Mr. Naven read a letter of objection from Douglas Barker (Exhibit 5).

Mr. Naven read a letter of objection from Roberta Parks (Exhibit 6).

Mr. Driscoll clarified that this is an existing business located on Washington Street. Mr. Driscoll stated that the City has no record of complaints on file for this business at its current location.

With no further public testimony, public hearing was closed at 2:36 pm.

Commissioner Heard read the Findings of Fact.

Commissioner Barry suggested that some of the Findings of Fact may be problematic due to a lack of data.

Chairperson Wiesehan stated that he tends to agree with Commissioner Barry.

Motion:
Commissioner Martin made a motion to approve with staff recommendations; seconded by Commissioner Heard.

Commissioner Unes stated that a few of the statements in the Findings of Fact are not fulfilled and expressed concern over the lack of neighbors present at the hearing.

Commissioner Heard stated that the subject property is not attached to residential units. Commissioner Heard stated that the banquet hall was open much later than what is being proposed for the new tenet.

Commissioner Barry objected to the request, stating that because the community has put tremendous effort into revitalizing the area for people-friendly uses, not light manufacturing.

Chairperson Wiesehan stated that he cannot support this request because the goal is to attract people to this area through entertainment and residential development.

The motion was denied by viva voce vote 2 to 3.
Yay: Brandon Martin and Eric Heard – 2.
Nay: Mike Wiesehan, Edward Barry, and Richard Unes – 3.

Commissioner Unes stated that any of the three Commissioners that opposed the request have the opportunity to make a new motion to deny.

Commissioner Barry made a motion to deny; seconded by Commissioner Unes.

The motion was approved by viva voce vote 3 to 2.
Yay: Mike Wiesehan, Edward Barry, and Richard Unes – 3.
Nay: Brandon Martin and Eric Heard – 2.

PZ 1180-2023 - *Deferred from January meeting*
Hold a Public Hearing and forward a recommendation to City Council on the request of Jason Hawksworth of Hawk-Attollo LLC, on behalf of Petersen Health System Inc, to obtain a Special Use in a Class R-3 (Single-Family Residential) District for a Solar Utility Facility for the property located at 3901 W Reservoir Blvd (Parcel Identification No. 13-25-177-002), Peoria IL (Council District 4).

Urban Planner, Julia Hertaus, Community Development Department, read the case into the record and summarized the request to obtain a special use for a solar utility facility.

Chairperson Wiesehan asked if all requested documents from the January meeting were received,

Ms. Hertaus said yes.

Jason Hawksworth, petitioner, was present and provided a review of the plan for the subject property.

Based on the glare study, Mr. Hawksworth stated that there will be zero glare impact to the neighboring residents. Mr. Hawksworth stated his objection to the sidewalk requirement.

Commissioner Barry inquired on the missing page from the packet.

Mr. Hawksworth explained that the missing page details the methodology of the glare study.

The Commission requested to see the missing page.

Ms. Hertaus read the contents of the missing page (Exhibit 7).

Chairperson Wiesehan opened the public hearing at 3:13 pm.

Unes asked Paul Kluber if his testimony will be different than his testimony at the January meeting.

Mr. Kluber said yes.

Mr. Kluber recounted his conversation with Ameren in which they stated the power system is old and in need of repair. Mr. Kluber stated that there are multiple examples of anti-reflective coating that have glare (Exhibit 8). Mr. Kluber stated that a height and tree density requirement would mitigate the glare issue.

Carolyn Jarosz objected to the request because she lives in an all-electric unit and Ameren acknowledged that the infrastructure is unreliable and requires updating. Ms. Jarosz suggested updating the infrastructure before starting this project.

Discussion was held between Chairperson Wiesehan and Mr. Kluber regarding Mr. Kluber's conversations with Ameren and how Ameren said they will help update the infrastructure.

Demarcus Hamilton objected to the request because of the impact it will have on the surrounding residents. Mr. Hamilton expressed concern over the view and property values.

Monica Orr objected to the request and provided photos demonstrating how close the solar farm will be to her backyard (Exhibit 9).

Chairperson Wiesehan asked Ms. Orr is there is a drop off from her backyard.

Ms. Orr said yes, but the drop off is small enough that she can walk down it.

Mr. Hawksworth clarified that Ameren repairs are outside of his scope, but they may be responsible for some of the upgrades. Mr. Hawksworth stated that the solar farm will not impact the existing infrastructure because mechanical failures, rather than the movement of electrons, cause power outages.

Chairperson Wiesehan asked for clarification on what he has been told by Ameren.

Mr. Hawksworth stated that there will be no issues according to Ameren, but that Ameren has not yet clarified whether or not upgrades are needed. Upon approval of the special use, further studies with Ameren would need to be completed to know the full scope of any updates needed and what Hawk-Attollo LLC would be responsible for.

Mr. Hawksworth stated that they will plant trees that are tall enough to minimize the glare but not so tall that they obstruct the view.

With no further public testimony, public hearing was closed at 3:35 pm.

Commissioner Heard read the Findings of Fact.

Motion:

Commissioner Unes made motion to deny; seconded by Commissioner Heard.

Commissioner Barry stated that he appreciates the additional information, but this is an unideal location and that he remains unconvinced that there will be no detriment to the nearby residents.

Commissioner Unes stated that he would like an agreement with Ameren to determine the upgrades that may be needed.

Commissioner Heard stated that more involvement from Ameren would have created a more complete presentation to determine the impact on nearby residents.

The motion was approved unanimously by viva voce vote 5 to 0.

CITIZENS' OPPORTUNITY TO ADDRESS THE COMMISSION

There were no citizen requests to address the Commission.

ADJOURNMENT

Commissioner Heard made a motion to adjourn; seconded by Commissioner Martin at approximately 3:42 PM.

The motion was approved unanimously by viva voce vote 5 to 0.

Grace Burgener, Development Technician

Exhibit 7

Assumptions

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
The algorithm does not rigorously represent the detailed geometry of a system; detailed features such as gaps between modules, variable height of the PV array, and support structures may impact actual glare results. However, we have validated our models against several systems, including a PV array causing glare to the air-traffic control tower at Manchester-Boston Regional Airport and several sites in Albuquerque, and the tool accurately predicted the occurrence and intensity of glare at different times and days of the year.
Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare. This primarily affects V1 analyses of path receptors.
Random number computations are utilized by various steps of the annual hazard analysis algorithm. Predicted minutes of glare can vary between runs as a result. This limitation primarily affects analyses of Observation Point receptors, including ATCTs. Note that the SGHAT/ ForgeSolar methodology has always relied on an analytical, qualitative approach to accurately determine the overall hazard (i.e. green vs. yellow) of expected glare on an annual basis.
The analysis does not automatically consider obstacles (either man-made or natural) between the observation points and the prescribed solar installation that may obstruct observed glare, such as trees, hills, buildings, etc.
The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
The variable direct normal irradiance (DNI) feature (if selected) scales the user-prescribed peak DNI using a typical clear-day irradiance profile. This profile has a lower DNI in the mornings and evenings and a maximum at solar noon. The scaling uses a clear-day irradiance profile based on a normalized time relative to sunrise, solar noon, and sunset, which are prescribed by a sun-position algorithm and the latitude and longitude obtained from Google maps. The actual DNI on any given day can be affected by cloud cover, atmospheric attenuation, and other environmental factors.
The ocular hazard predicted by the tool depends on a number of environmental, optical, and human factors, which can be uncertain. We provide input fields and typical ranges of values for these factors so that the user can vary these parameters to see if they have an impact on the results. The speed of SGHAT allows expedited sensitivity and parametric analyses.
The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.
Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.
Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
Refer to the Help page at **www.forgesolar.com/help/** for assumptions and limitations not listed here.

Default glare analysis parameters and observer eye characteristics (for reference only):

- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

Exhibit 8, pg. 1

February 12, 2021 Power

Reflecting on Solar Panel Glare and How to Mitigate It

by AXEL OLSON

SHARE

Airline passengers would never want their pilot to be blinded by reflected light as the landing aircraft is approaching the runway. The same concern would apply to air traffic controllers in their tower, directing traffic across an entire airport and in the sky around it. Vision is essential to safety, and unexpected glare can take that away.

While urban legends stress the dangers of laser pointers, solar photovoltaic (PV) arrays can unintentionally pose a more common, persistent and significant safety threat.

Solar energy production has a key role to play in a decarbonized energy economy, but one frequently overlooked aspect of these installations is the impact of the large flat pieces of glass in PV modules reflecting sunlight on their surroundings. One common misconception is that modules with antireflective coating would not have this issue. That coating's primary purpose, however, is to improve module efficiency; it can actually worsen the glare impact on the surrounding area by dispersing the reflected light over a larger area, which in turn takes up more of an observer's field of view.

Exhibit 8, pg. 2

As more solar projects are developed in increasingly urban environments, the overall issue of glare is gaining attention. The most notable codification of these concerns to date has been regarding the effects of reflected light on airport operations.

Mandating Analysis

Solar projects located on or within close proximity of airport property are subject to Federal Aviation Administration (FAA) regulations to mitigate any adverse impacts on pilots and air traffic control towers. Those regulations require a glare analysis, with results to be submitted to the FAA.

The regulations were inspired by an unfortunate situation that played out at Manchester-Boston Regional Airport in New Hampshire. After a project put solar panels atop an airport parking garage, authorities were surprised to find light being reflected into the air traffic control tower. The airport ultimately put tarps over the panels because they were preventing the controllers from doing their work safely. In hindsight, the problem seems obvious, but it simply had not occurred to anyone before then.

One catch to the FAA's parameters: There is no precise definition of what project size or how close is close enough to call for the required study. Within five miles of an airport has emerged as a good rule of thumb to consider the impact of glare, though distance and the size of the installation are somewhat correlated. The bigger the array, the farther it can be from the airfield and still trigger the FAA-required glare analysis.

When a study is needed, there is one highly specialized, commercially available tool. That product by ForgeSolar utilizes the underlying Solar Glare Hazard Analysis Tool that the FAA requires and developed in conjunction with Sandia National Laboratories to assess glare. A properly trained glare specialist can typically run the analysis within a day and obtain preliminary results. If engaged early enough in a project, this can help guide design and technology decisions and avoid costly changes and rework.

Mitigating the Risks

In the event a glare study does identify significant impacts from PV glare, solar project developers do have options to mitigate the risk. The first is to select a new location for the arrays that is farther away from runways and airport traffic control towers. Naturally, this is not a popular choice.

A second option is to alter the choice of tracking technology. Typical utility-scale solar PV farms are built using single-axis tracking with backtracking, enabling the panels to rotate during the day and follow the sun through the sky while reducing row-to-row shading at dawn and dusk. Unfortunately, the increased production from backtracking algorithms, which are increasingly being utilized in single-axis tracking installations, also positions the modules to reflect more glare into the surrounding area with an increased incident angle of reflection during those hours. There are numerous tracking considerations and scenarios that factor into a project's development, but the selection and control of the technology do offer some possibilities for reducing impacts, depending on the position of the solar PV farm in relation to the airport.

The third option is called suboptimal positioning. Fixed-tilt arrays in North America are generally faced due south, with the north edge tilted up to maximize solar exposure. By

production.

By sacrificing perhaps 5%-10% of annual energy production with suboptimal positioning, it might be possible to achieve FAA compliance without changing the project location or tracking technology utilized. No one wants to sacrifice performance, but that may be preferable to accepting that a project cannot be built on the intended site. An optimization analysis can go deeper than the glare study, identifying at what point an installation would be compliant if some operational parameters were adjusted and what the anticipated impact on the annual energy production would be.

Withstanding the Glare

The potential of solar power is helping drive rapid growth in installations. As remote greenfield sites become harder to secure, these installations will increasingly encroach upon population centers. Airports have been among the first to discover the risks of reflected light, but they are not alone.

Other ground-level observers, such as residential developers or roadway planners, may raise objections to glare from solar panels. Solar project developers need to be aware of their options. Glare and optimization analyses can help in identifying and mitigating impacts, but finding acceptable and allowable parameters for surrounding-area impacts is heavily dependent upon the local authorities having jurisdiction. Unlike the FAA regulations, these localized scenarios are not uniform and are rarely codified as of yet.

Having an integrated engineer-procure-construct (EPC) partner working on a solar installation can position projects for success by coordinating permitting measures and identifying risks such as glare early in the process, when it is easier and less costly to make any necessary adjustments.

Interest in solar is high, but the changing marketplace is complicating the development of utility-scale solar farms. Having an integrated EPC contractor can help avoid common pitfalls in solar construction projects.

Power

by AXEL OLSON

Axel Olson is a technical advisory consultant at 1898 & Co., part of Burns & McDonnell. With bachelor's and master's degrees in electrical engineering, he has aided clients with assessment of glint and glare from solar photovoltaic sites. He also has experience with interconnection applications, energy production estimation studies, cable partial discharge testing, due diligence evaluations of proposed projects, and renewable energy generation design and planning.

Exhibit 8, pg. 5

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Solar Photovoltaic Development – Glint and Glare Guidance

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October, 2018 – Second edition

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EXECUTIVE SUMMARY

Overview and Purpose

The purpose of this guidance document is to provide solar photovoltaic (PV) developers, planners and stakeholders with an assessment process for determining the effects of glint and glare (solar reflections) upon receptors surrounding a proposed solar PV development.

Glint and glare is a relatively new planning consideration thus there is little formal guidance regarding the issue. This guidance document has therefore been produced to bridge this knowledge gap pertaining to the assessment of glint and glare. The aim is to produce a standardised assessment process for developers, planners and stakeholders to reduce the element of risk associated with glint and glare.

The guidance presented is based on the following:

- Reviews of existing guidance in a variety of areas;
- Glint and glare assessment experience and industry knowledge;
- An overview of available solar reflection studies.

This guidance document is based on knowledge initially gained through analysis within the UK and Irish markets however the methodologies are deemed applicable, and have been used, for worldwide solar PV development.

Key Receptors

Glint and glare can significantly affect nearby receptors under particular conditions. The key receptors with respect to glint and glare are residents in surrounding dwellings, road users, train infrastructure (including train drivers), and aviation infrastructure (including pilots and air traffic controllers). Other receptors do exist, however this guidance considers the four most common receptor types.

Modelling Requirements

A geometric glint and glare assessment model must include the following:

- The Earth's orbit around the Sun;
- The Earth's rotation;
- The Earth's orientation;
- The location of the solar PV development including the reflector (solar panel) area;
- The reflector's 3D orientation including azimuth angle of the solar panel (the orientation of the solar panels relative to north and the solar panel elevation angle;
- Local topography including receptor and panel heights above mean sea level.

For increased accuracy, the model should account for the following:

- Terrain at the visible horizon;
- Local time zone and daylight savings times;
- Consideration of sunrise and sunset times;
- Determine which solar panels create the solar reflection within the solar PV development;
- Azimuth range of the Sun[1] when a solar reflection is geometrically possible;
- Vertical elevation range of the Sun when a solar reflection is geometrically possible;
- High-resolution analysis i.e. undertaking multiple geometric calculations within the given solar PV development area. For example, at intervals of between 1 and 20 metres;
- The intensity[2] of any solar reflection produced.

Assessment Inputs – Receptors

The following paragraphs set out the key distances for identifying receptors and the height data which should be included.

Dwellings within approximately 1km of a proposed solar PV development that may have a view of the PV panels should be assessed. Terrain heights and an additional height to account for the solar panel and eye level within the relevant floor of the dwelling should also be considered.

Roads within approximately 1km of a proposed solar PV development that may have a view of the PV panels should be assessed. Terrain heights and an additional height to account for the solar panel and eye level of a road user should also be considered.

Railway infrastructure within approximately 100m of a proposed solar PV development that may have a view of the PV panels should be assessed. Terrain heights and an additional height to account for the solar panel and eye level of a train driver or the height of a railway signal should also be considered. Include an assessment of railway signals that utilise incandescent bulb[3] technology and/or where no hood is attached.

Aviation receptors out to 30km[4] from a proposed PV development should be considered to determine the requirement for assessment, if any. The typical receptors include the Air Traffic Control (ATC) tower and a 2-mile approach path for the relevant runway approaches. Additional receptors may be included where a solar reflection may be deemed a hazard to safety e.g. helipad approaches and the visual manoeuvring area (VMA).

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[1] The azimuth range is the angle between the Sun and North, measured clockwise around the receptor's horizon. The Sun azimuth range shows the location of the Sun when a geometric solar reflection is possible. Therefore, it is possible to determine whether the Sun and the solar reflection are both likely to be visible to a receptor.
[2] In W/cm^2 at the retina, for example.
[3] Non-LED.
[4] Aviation stakeholders can and have requested a glint and glare assessment beyond 30km.

Exhibit 8, pg. 8

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Assessment process

6.5 The following process should be used for modelling glint and glare for the identified dwelling receptors:

1. Define the solar PV development panel area;
2. Undertake geometric calculations, as outlined within Section 4 of this guidance;
3. Produce a solar reflection chart to determine whether a solar reflection is geometrically possible, and if so at what time/duration;
4. Assess the results of the geometric glint and glare assessment in the context of the following:
   a. Sun location relative to the solar panels;
   b. Location of the reflecting solar panels relative to the dwelling;
   c. Existing screening;
   d. Proposed screening;
5. Determine whether a solar reflection is significant;
6. Consider mitigation, if required.

Discussion of significant effects

6.6 There are many solar PV developments where solar reflections are geometrically possible and visible from surrounding dwellings. Experiencing a solar reflection does not, however, guarantee a significant effect requiring mitigation will occur. Assuming the solar PV development is visible from a window of a room occupied during daylight hours, the duration of time for which a solar reflection could last is considered to be the most significant characteristic.

6.7 Other factors that could be considered when determining whether a solar reflection is significant include:

- Whether the solar reflection is incident to direct sunlight and the location;
- Whether the dwelling has a window facing the solar PV development;
- The room within the dwellings from which a solar reflection may be visible i.e. is it occupied for a long period during daylight hours;
- The time of day when a solar reflection is geometrically possible.

6.8 The duration of time for which a solar reflection is possible is considered to be the overall defining characteristic when determining whether mitigation is required. Defining a minimum duration for effects to become significant is, however, subjective. For static receptors, the length of time for which a solar reflection is geometrically possible and visible will determine its significance upon residential amenity. Therefore, it is appropriate to choose a duration

Exhibit 8, pg. 9

beyond which solar reflections become significant and where mitigation is required. Applying a strictly scientific approach is difficult however because:

- Most models generally show a worst-case scenario of glint and glare, often predicting solar reflections for a much greater length of time than will be experienced in reality;
- The scenario in which glint and glare occurs will vary for each dwelling;
- The effects of glint and glare are subjective and the significance will vary from person to person.

6.9 In order to quantify and determine where a significant impact is expected, previous glint and glare assessment experience has been drawn upon as well as a review of existing guidance with respect to light based environmental impacts, these include:

- Previous glint and glare assessment experience;
- Shadow flicker guidance for wind turbines[24]. Guidance has been produced which sets durations beyond which a significant impact on residential amenity is expected and mitigation is required.

Previous experience of glint and glare dwelling assessments

6.10 It is common for dwellings to be located within 1km of a proposed solar PV development. Assessment experience means that typical results for proposed ground mounted solar PV developments[25] are known. It is common for solar reflections to be possible in the mid-morning (~06:00-08:00GMT) and again in the early evening (~17:00-19:00GMT). There are many examples of dwellings located where a solar reflection is geometrically possible however, a solar reflection could only ever be significant where the solar reflection is visible from the dwelling. Assuming a solar reflection is geometrically possible and the reflecting solar panels are visible, a solar reflection would be experienced when the following conditions are met:

1. An observer is located at a point within the dwelling where a solar reflection is possible e.g. located at a kitchen window at the time of the day when a solar reflection is geometrically possible;
2. The weather at the particular time of the day when a solar reflection is geometrically possible is clear and sunny.

6.11 The likelihood of these conditions being met varies both person to person and geographically based on local climate conditions. However, it illustrates that a predicted

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[24] Shadow flicker, like glint and glare, is considered a detrimental effect created through the manipulation of sunlight. Therefore the guidance has been used for comparative purposes.
[25] At typical solar panel azimuth and inclinations. Defined as panel elevation angle 15-30 degrees and south facing in the UK and Ireland.

geometric solar reflection does not guarantee a visible solar reflection when considering real world conditions.

SOLAR PANEL GLARE

By Mike Watson
(https://www.pagerpower.com/news/author/mike/)

July 2, 2020

0 2

0 Shares

Overview

Solar Panel Glare occurs even though it is not expected because solar panels are designed to absorb sunlight, rather than reflect it. Solar Panel Glare is greater than expected because panels are good at absorbing light perpendicular to them but much less effective when the light is at a low angle.

Pager Power's assessments (https://www.pagerpower.com/what-we-do/glint-glare/) can predict the timing and intensity of solar glare for solar PV installations near airports, railways, highways and dwellings.

What is solar panel glare?

Exhibit 8, pg. 12

Solar Panel Glare occurs when an observer sees a direct reflection of the sun caused by a specular (mirror-like) reflection from the surface of one or more solar panels.

(https://twitter.c url=https://www.pagerpo panel-glare/)

Figure 1: Solar Panel Glare

What information is required for assessments?

When assessing solar panel glare (/news/overview-pager-powers-glint-glare-charts/) accurately it is important to know:

1. Location of the solar panels
2. Location of the observer
3. Azimuth and elevation angle of the solar panels
4. Optical characteristic of the panels

Do anti-reflective coatings stop solar panel glare?

Exhibit 8, pg. 13

Whilst it is often claimed that anti-reflective coatings prevent harmful glare in reality they reduce glare levels – but often not when the sun is at a low angle when direct solar reflections are most likely.

How does solar panel glare compare with glare from other sources?

Other sources of glare include:

1. Direct exposure to the sun
2. Reflections from water
3. Reflections from windows and glass
4. Reflections from highly polished steel
5. Reflection from wet paved surfaces

The intensity of solar panel glare is often less than the intensity of the above – however the size of the solar development can mean that solar panel glare can be deemed unacceptable.

Can solar panel glare be mitigated?

The most effective ways of reducing solar panel glare are:

1. Choosing a panel with a rougher surface
2. Reorienting the panels

3. Shielding the panels so they cannot be seen
4. Changing the panel layout to reduce visibility

What is typically included in a Glint and Glare assessment?

Glint and Glare assessments typically determine the times at which solar panel glare will occur. They also predict the intensity of glare in accordance with US Federal Aviation Administration guidance.

Download our glint and glare guidance document (https://www.pagerpower.com/wp-content/uploads/2020/02/Pager_Power_Glint_and_Glare_Guidance_2020.p which includes a standardised methodology for PV developers, planners and stakeholders to follow.

Conclusion

Solar panel glare is a common occurrence which is not fully mitigated by anti-reflective coatings. Pager Power can predict glint and glare effects on airports, railways, highways and dwellings. There are a number of mitigation options available to solar developers.

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thumbnail.png&description=Solar+Panel+Glare)

More by Mike Watson (https://www.pagerpower.com/news/author/mike/)

0 COMMENTS

Leave a reply

Your email address will not be published. Required fields are marked *

Exhibit 9, pg. 1

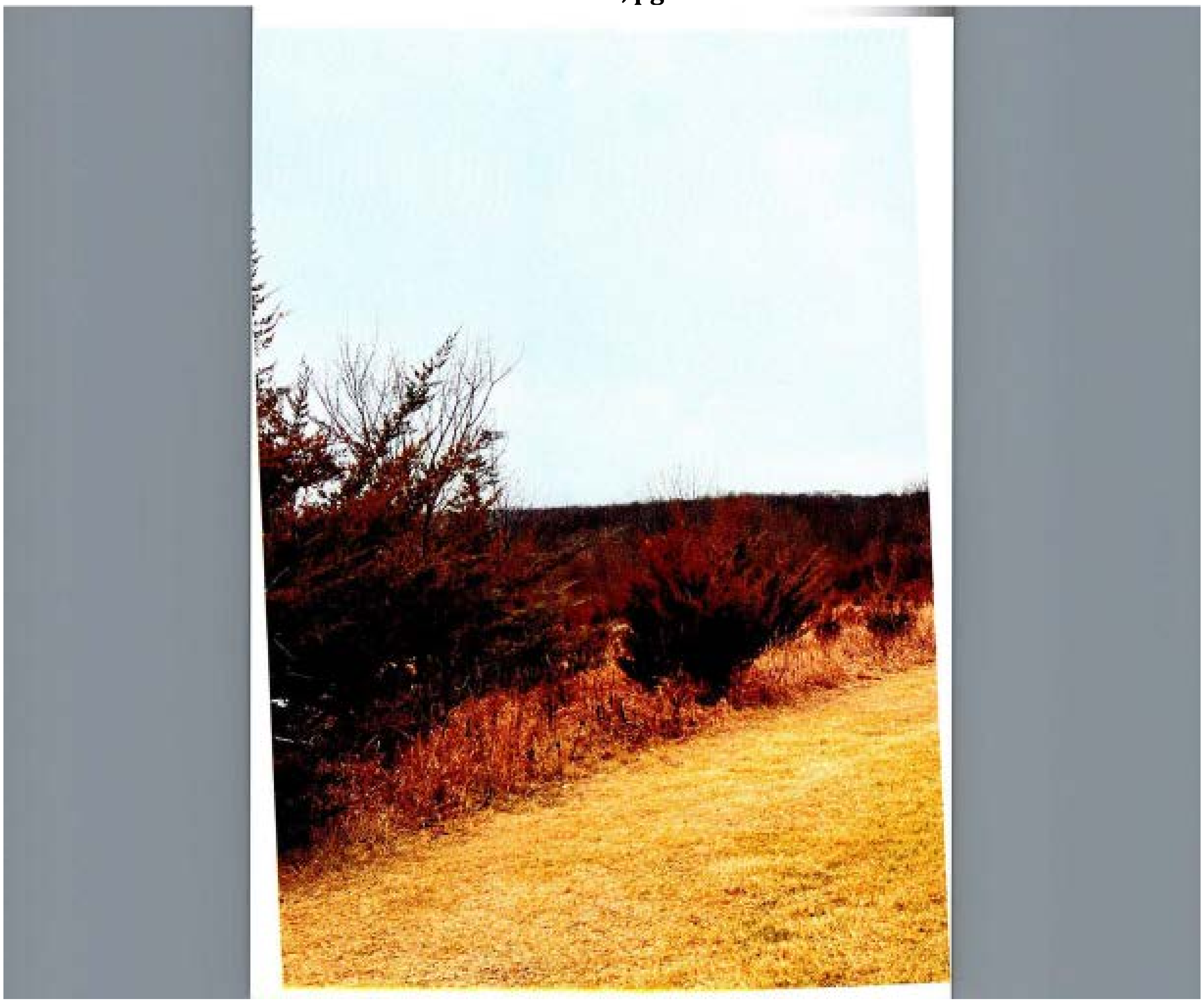

Exhibit 9, pg. 2

Exhibit 9, pg. 3

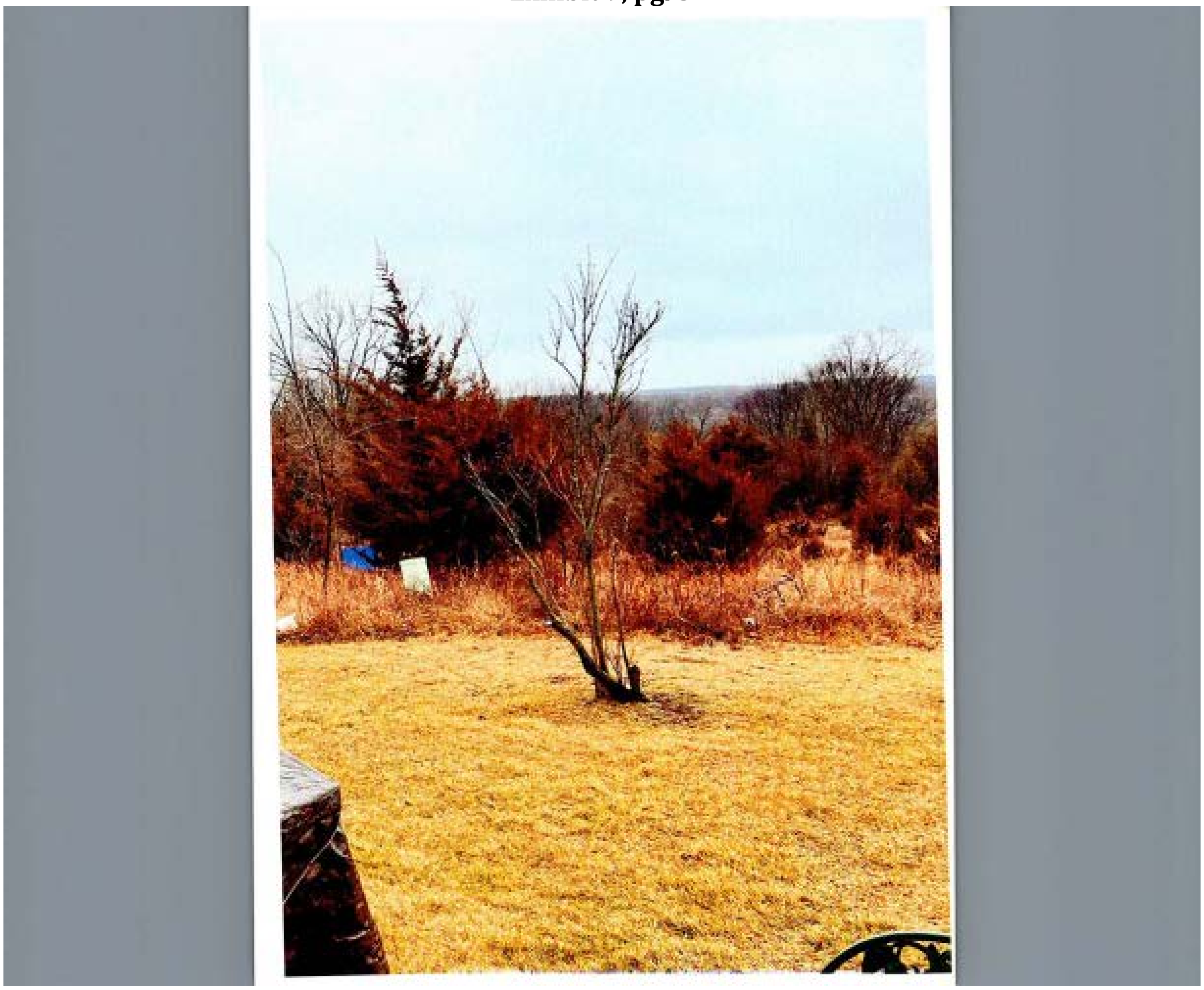

Exhibit 9, pg. 4

Exhibit 9, pg. 5

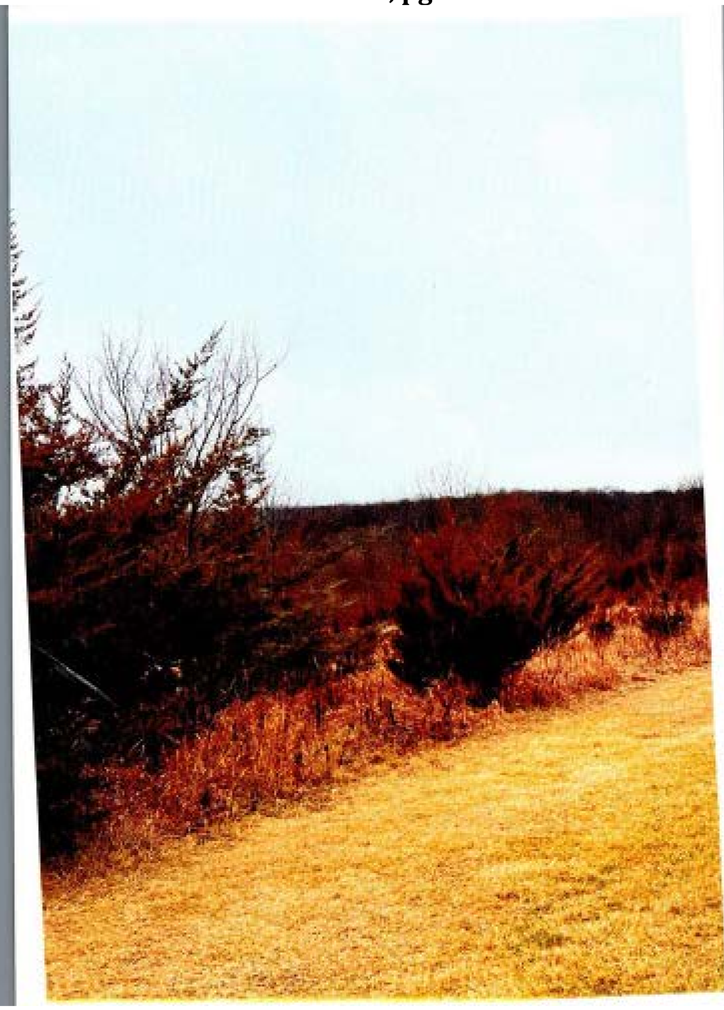

Exhibit 9, pg. 6

Exhibit 9, pg. 7

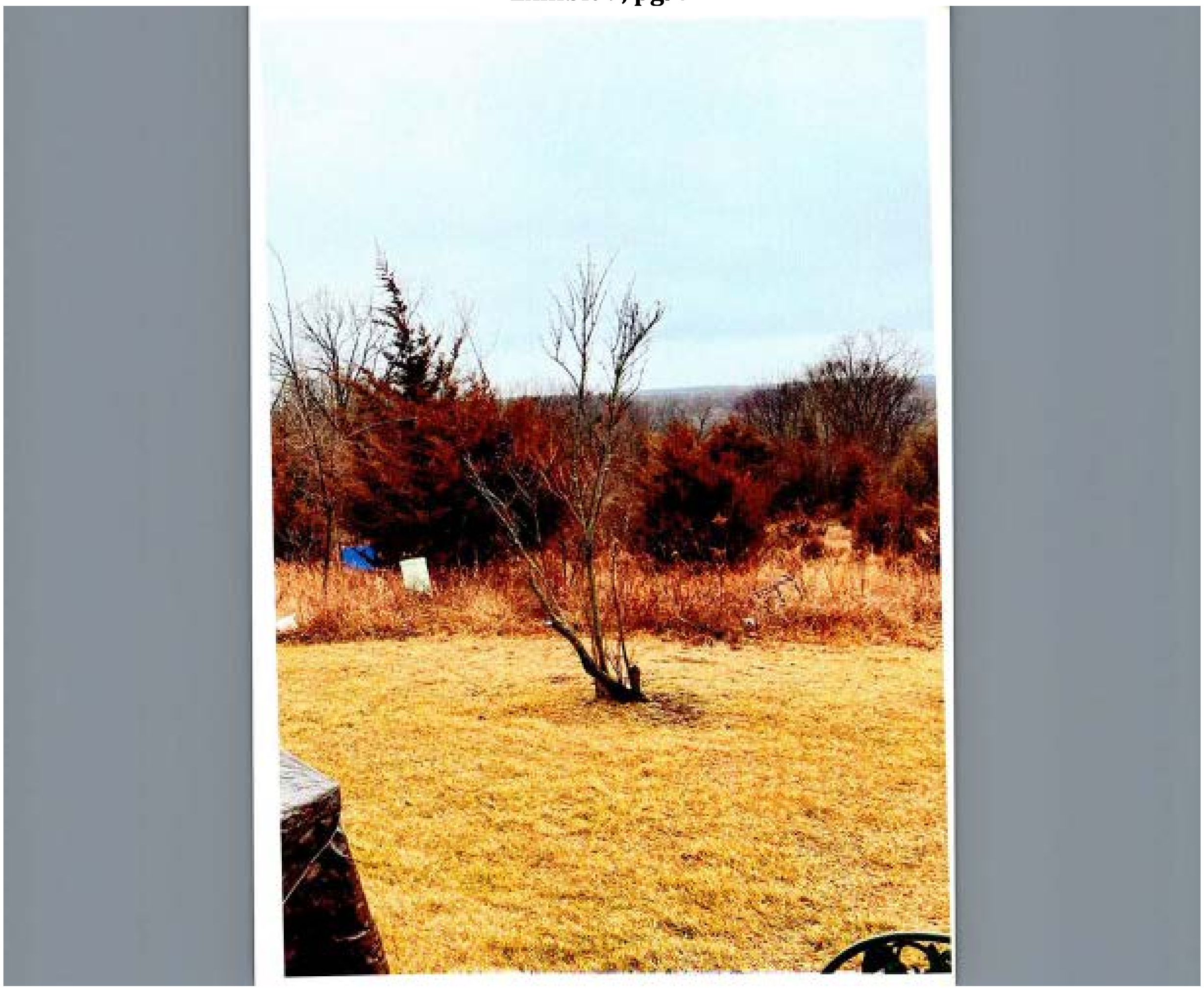

Exhibit 9, pg. 8

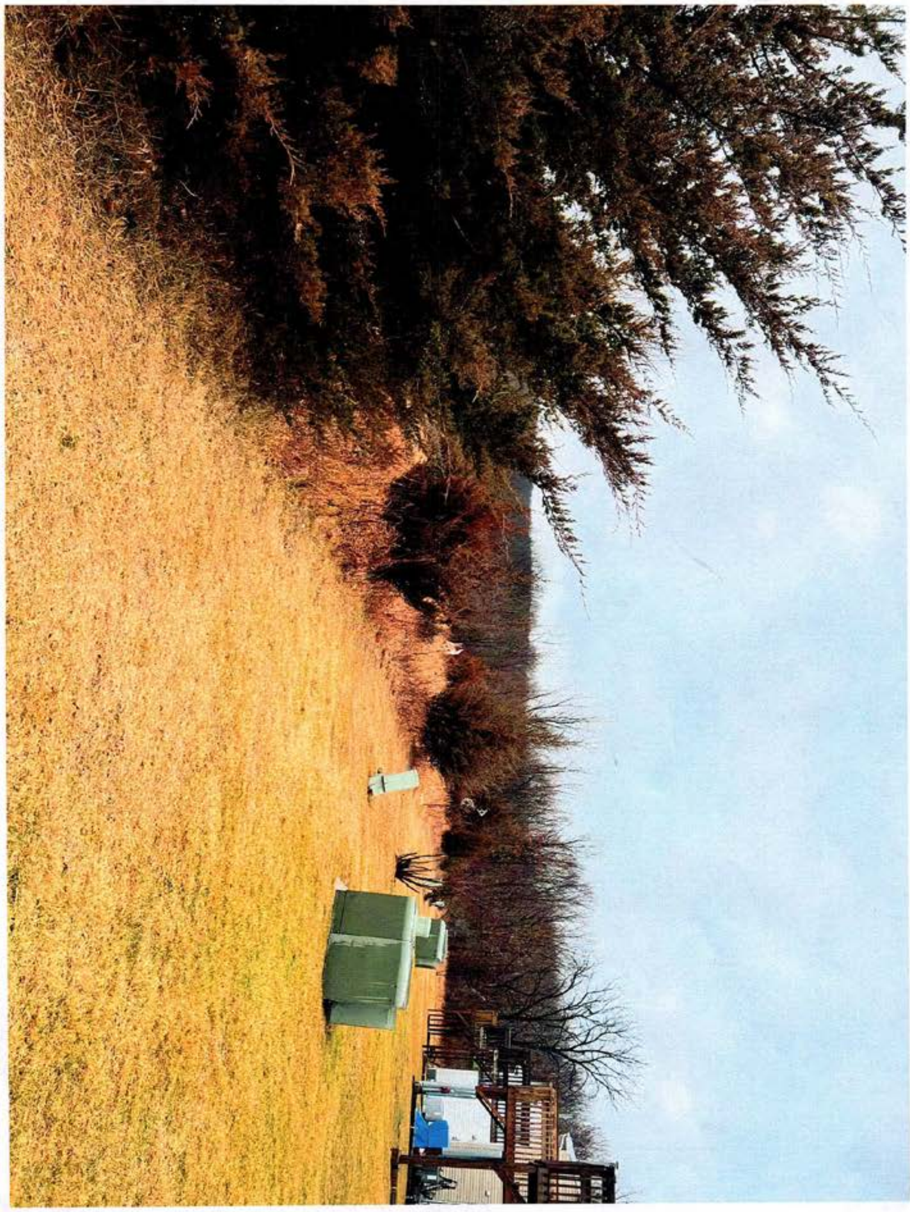

Exhibit 9, pg. 9