AUC
Alberta Utilities Commission

Aura Power Renewables Ltd.

Fox Coulee Solar Project

August 13, 2019

Alberta Utilities Commission
Decision 23951-D01-2019
Aura Power Renewables Ltd.
Fox Coulee Solar Project
Proceeding 23951
Applications 23951-A001 and 23951-A002

August 13, 2019

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Contents

List of figures

1 Decision summary

1. In this decision, the Alberta Utilities Commission considers whether to approve applications from Aura Power Renewables Ltd. to construct and operate a solar power plant designated as the Fox Coulee Solar Project, and to interconnect the power plant to the ATCO Electric Ltd. electric distribution system (the project). The power plant would consist primarily of solar photovoltaic panels and would include lithium-ion battery storage units.

2. For the reasons outlined in this decision, the Commission finds that approval of the project is in the public interest having regard to the social, economic and other effects of the project, including its effects on the environment.

2 Introduction

2.1 Project description

3. Aura Power Renewables Ltd. filed a facility application with the Commission for approval to construct and operate a 75-megawatt (MW) solar power plant with battery storage in Starland County, north of the town of Drumheller. Aura also filed an application for an order to connect the power plant to three of ATCO Electric Ltd.'s distribution feeder lines originating from the Michichi Creek 802S Substation. The applications, filed pursuant to Section 11 of the *Hydro and Electric Energy Act*, were registered on October 2, 2019, as applications 23951-A001 and 23951-A002.

4. The proposed power plant would consist of approximately 271,000 solar photovoltaic modules mounted on fixed tilt racks, and up to 60 inverter transformer units with a nominal rating of 2,500 kilovolt amperes each. Aura stated that the power plant would also include 30 lithium-ion battery cell modules placed adjacent to the inverter transformer units. Aura confirmed that the maximum output capacity from the solar panels and batteries, individually or in combination, would not exceed 75 MW.[1]

5. The proposed power plant would be sited on approximately 380 acres of privately-owned cultivated land in Starland County, approximately four kilometres north of the town of Drumheller in the south half and northeast quarter of Section 28, and the southeast quarter of Section 33, in Township 29, Range 20, west of the Fourth Meridian. Aura stated that it selected the site based on a number of factors, including that the land was cultivated, the site's proximity to the Michichi Creek 802S Substation, and the topography.

[1] Exhibit 23951-X0065, Information Request, PDF page 3.

6. Aura stated that the applications were initially prepared and submitted on the basis of generic equipment because at the time of filing, Aura had not finalized the specific make and model of the solar photovoltaic panels, inverters/transformer stations and battery units. Aura expects to finalize the equipment for the project at least six months before construction is scheduled to begin, and confirmed that it will update its facility application once the selections are made. Aura added that if a different model of solar photovoltaic panel, inverter/transformer station unit or battery unit is selected, it will inform stakeholders and the Commission of any changes to the predicted environmental, land or noise impacts of the project that result from the equipment selection process.[2]

7. Aura stated that it will install underground feeder lines to connect the power plant to the existing ATCO Electric distribution feeder lines located in the south half and northeast quarter of Section 28, and the southeast quarter of Section 33, Township 29, Range 20, west of the Fourth Meridian. Aura provided a feasibility study conducted by ATCO Electric that concluded the interconnection could be accomplished. ATCO Electric confirmed that it had no outstanding concerns with the proposed interconnection.

8. Aura plans to begin construction in the fall of 2019, with an anticipated completion date in the fall of 2020.

2.2 Procedural background

9. Before the Commission issued a notice of application, statements of intent to participate were filed in the proceeding by area landowners and residents, pilots and other users of the Drumheller airport,[3] and two workers at an industrial facility located near the project. The Commission decided that a hearing would be required and issued a notice of hearing for the project in accordance with Section 7 of Rule 001: *Rules of Practice.* The Commission provided the notice of hearing to stakeholders identified by Aura in its application, and it advertised the notice in the Drumheller Mail. An information session was held by AUC staff in Drumheller on December 5, 2018.

10. The Commission ultimately received 32 statements of intent to participate from 36 individuals who had formed the Solar Opposition Participants group (SOP). The Commission also received statements of intent to participate from Howell Mayhew Engineering Inc. and the Alberta Wilderness Association. The Commission granted standing to all of the SOP members except the two industrial facility workers. It did not grant standing to Howell Mayhew Engineering Inc. or the Alberta Wilderness Association.[4]

11. Aura and the SOP each filed expert evidence that included reports addressing the potential for solar glint and glare from the power plant. The Commission reviewed these reports and requested that the expert witnesses for both parties prepare a joint expert witness statement that identified where the experts' respective views relating to the intensity, duration and health effects of solar glint and glare likely to be caused by the project either coincided or differed.[5] The

[2] Exhibit 23951-X0065, Information Request, PDF page 3.

[3] The evidence in this proceeding referred to the airport south of the project lands as the Drumheller Regional Airport, the Drumheller Municipal Airport and the Drumheller Airport. For consistency, this decision report will use the term Drumheller airport in reference to that facility.

[4] Exhibit 23951-X0067, AUC letter – Ruling on standing

[5] Exhibit 23951-X0102, Ruling on request to file late evidence and direction to file joint experts' statement.

Commission also requested that the authors of the joint statement be prepared to sit together in the hearing as a joint witness panel and respond to questions about the joint statement.

12. A public hearing commenced on March 5, 2019, in the town of Drumheller, Alberta and concluded on March 7, 2019.

13. After the close of hearing, the Town of Drumheller (Drumheller) filed a letter stating that it had not been made aware of the oral hearing and that it had substantial safety concerns with the project that it wanted to provide directly to the Commission.[6] The Commission allowed Drumheller, as the legal owner of the Drumheller airport, to file a written submission, which Drumheller filed on April 24, 2019. The Commission also allowed Aura to file a response to Drumheller's submission, which Aura filed on May 1, 2019.

14. By letter dated May 31, 2019, the Commission advised the parties that it required additional information about: the extent to which Aura's proposal to site solar panels north of the Drumheller airport might pose a hazard to aircraft in distress during takeoff or landing; whether any such hazard could be mitigated; and what emergency response would be possible if an aircraft were forced to land in the solar panel array.[7] Aura, the SOP and Drumheller each filed a submission responding to the Commission's request, and Aura and the SOP each filed a reply to the other's submission.

3 Legislative scheme

15. The Commission is considering this application under sections 11 and 18 of the *Hydro and Electric Energy Act.* These sections make it clear that no person can construct or operate a power plant or connect a power plant to the interconnected Alberta system without the Commission's approval. As noted above, Aura's power plant application incorporates battery storage. This proceeding marks the first occasion on which the Commission has had to decide upon a power plant application that incudes a battery storage component.

16. Neither the legislative scheme, nor the Commission's rules specifically address battery storage. However, because the storage component of the project was included in the application as a component of the power plant application, the Commission has considered the implications of the battery storage component in that context.

17. In accordance with Section 17 of the *Alberta Utilities Commission Act*, the Commission must assess whether the project, including the battery storage component of the power plant, is in the public interest, having regard to its social, economic and other effects, including its effects on the environment.

18. The Commission considers that the public interest will be largely met if an application complies with existing regulatory standards, and the project's public benefits outweigh its negative impacts.[8] The Commission must take into account the purposes of the *Hydro and Electric Energy Act* and the *Electric Utilities Act*,[9] and cannot consider the need for

[6] Exhibit 23951-X0127, Letter to AUC RE – Hearing for Proposed Fox Coulee Solar Array.
[7] Exhibit 23951-X0133, AUC letter – Request for additional information and notice of further process.
[8] EUB Decision 2001-111: EPCOR Generation Inc. and EPCOR Power Development Corporation 490-MW Coal-Fired Power Plant, Application No. 2001173, December 21, 2001, page 4.
[9] *Hydro and Electric Energy Act*, RSA 2000 c H-16, ss 2, 3.

the project or whether it is the subject of a renewable electricity support agreement under the *Renewable Electricity Act*. The Commission must also determine whether an applicant has met the requirements of Rule 007: *Applications for Power Plants, Substations, Transmission Lines, Industrial System Designations and Hydro Developments* and Rule 012: *Noise Control.* An applicant must also obtain all approvals required by other applicable provincial or federal legislation.

4 Project consultation

19. Rule 007 requires an applicant to conduct a participant involvement program that provides information about the project, in particular to parties whose rights may be directly and adversely affected by it.

20. Rule 007 also requires that public notification of a proposed power plant be provided to all occupants, residents and landowners within 2,000 metres from the edge of the plant site boundary, and for major power plant applications, the applicant should consider including populated areas just outside that limit. An applicant must also provide personal consultation to all occupants, residents and landowners within 800 metres of the plant site boundary.

4.1 Views of the applicant

21. Aura retained Peters Energy Solutions Inc. (PESI) to implement the participant involvement program for the project on Aura's behalf. PESI stated that Aura's internal policies recognize that effective engagement throughout a project's life cycle is crucial to its success, but particularly in the early stage of development. PESI stated that Aura initiated the participant involvement program in accordance with Rule 007, in November 2017.

22. PESI submitted that the objective of the participant involvement program was to identify, engage and communicate with stakeholders that may be affected by the project, and to provide enough information to allow stakeholders to raise questions or concerns during face-to-face meetings, phone calls or through electronic communication.[10]

23. PESI stated that it identified stakeholders within 2,000 metres of the project and mailed out project-specific information packages to these stakeholders. A newspaper advertisement was printed in the Drumheller Mail on January 10, 2018, and an open house was held at the Munson and Area Community Hall on January 18, 2018.

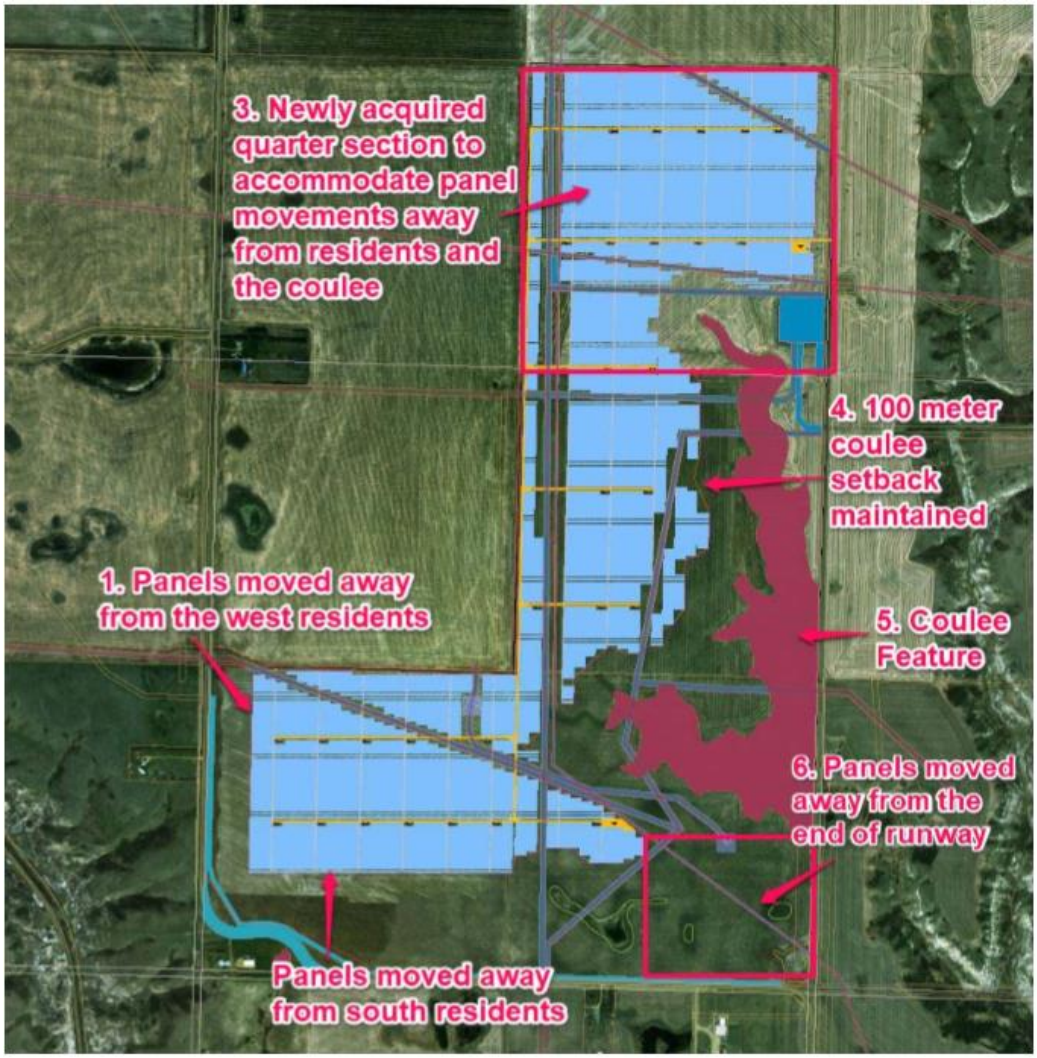
24. PESI also identified 20 residents or landowners located within 800 metres of the project. PESI stated it had face-to-face meetings with 14 of these stakeholders, each of whom were hand-delivered an information package. Of the six remaining landowners, PESI stated that two were consulted by telephone and received the information package by registered mail. PESI stated that as the four other landowners could not be reached for consultation by telephone or by visiting their locations, PESI sent information packages by registered mail. Two of the landowners accepted the mailouts; the remaining two mailouts were returned and PESI was not able to reach those landowners.

[10] Exhibit 23951-X0059, Public Engagement, PDF page 2.

25. PESI stated that through the participant involvement program, Aura obtained feedback that included questions and concerns about airport safety, visual impacts, noise levels, construction activity, vegetation control, impacts on property values, employment and contract work opportunities, project operation, the interconnection and the proximity of solar panels to the airport. Aura also received feedback from Alberta Environment and Parks (AEP) regarding the project's setback from nearby coulees.

26. Aura stated that it attempted to address concerns raised during the participant involvement program about the proximity of the project to the airport and nearby residences by acquiring an additional quarter section of land from the original lessor of the project lands and completing an amended design of the project, which would become the design that Aura filed in its application (the applied-for design).[11] Figure 2 of Aura's reply evidence,[12] shown below, depicts the applied-for design, which removed panels close to the airport and to residences west and south of the project, and added panels on the newly acquired quarter section to the northeast.

Figure 1. Aura's redesign of the project[13]



[11] Exhibit 23951-X0106, Appendix A – Aura Reply Evidence, page 7.
[12] Exhibit 23951-X0106, Appendix A – Aura Reply Evidence, page 8.
[13] Exhibit 23951-X0106, Appendix A – Aura Reply Evidence, Figure 2, page 8.

27. Aura stated that it would incur the following additional costs as a result of the applied-for design:

- acquisition costs of an additional quarter section of land
- an additional year of wildlife and environment studies
- redesigning the panel and inverter placements
- greater distance to the interconnection point
- restricted access throughout the property as a result of longer access roads
- increased fencing required.

28. Victor Beda, senior project manager for PESI, testified that:

> Aura went beyond the basic requirements of AUC Rule 007 and held a public open house in Munson, Alberta. Members of the community were welcome to come at their own convenience and to view project-specific information on large printed poster boards. Aura further gave a radio interview on a local station to describe the project proposal and to reach the broader public. Aura contacted the local newspaper and conducted multiple interviews to keep the community informed of solar developments in Alberta.
>
> …
>
> In wanting to be a good neighbour, Aura went above and beyond the 800-metre consultation radius and further consulted with users of the Drumheller Municipal Airport. Aura took consultation very seriously in every step of this process, and should this project be approved, looks forward to maintaining a good relationship with all of its neighbours.[14]

29. PESI stated that information packages were also sent to multiple industry contacts identified within 800 metres of the project boundary, but the "Fox Coulee airport"[15] was the only one that expressed concerns. These concerns related to safety in the event of a forced landing, fire mitigation close to the hangar and the effects of dust on engine turbines. PESI stated that in addition to redesigning the array to relocate panels on the south and east side of the project site, Aura committed to following all applicable county rules regarding fire mitigation and to having a dust control program in place during construction.

30. PESI stated that Aura met informally in November 2017 with two representatives from Starland County, for initial introductions and to discuss the details of the project and the proposed location. On June 7, 2018, PESI met again with representatives from Starland County, and shared a project update as well as information about the status of the project. Aura met with

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[14] Transcript, Volume 1, pages 24-25, lines 10-24.

[15] Transcript, Volume 2, page 453, lines 5-11: Colin Murray, one of the SOP members, stated that in 1981 his father incorporated a business under the name Fox Coulee Aviation, and that the company was currently owned by SOP members Brian Kinniburgh and Mark Kinniburgh. The Commission understands PESI's reference to Fox Coulee Airport to be a reference to Fox Coulee Aviation, based on Mr. Murray's evidence and the fact that in most of its evidence PESI referred to the airport facilities and lands as the Drumheller Airport or Drumheller Municipal Airport, owned by the Town of Drumheller and operated under the direction of the Drumheller Airport Commission.

Starland County administration at their offices in Morrin on September 5, 2018, to share updates and receive consultation regarding the municipal development permit process.

31. PESI submitted that on May 14, 2018, Aura had a meeting with representatives from Drumheller at the town's offices, during which a progress update was shared and Aura described the work it had completed, recent layout changes, feasibility studies and the remaining path towards filing applications with the Commission. PESI stated that the meeting focused on addressing the airport operator's concerns. PESI submitted that Drumheller expressed satisfaction with the new setbacks that increased the distance between the panels and the north takeoff area and that Drumheller stated it would review the information with the Drumheller Airport Commission at a later date. PESI acknowledged that Drumheller initially provided a letter supporting the project but later retracted that support in a letter that identified additional concerns Drumheller shared with the Drumheller Airport Commission. These concerns included glare, aviation concerns with regard to air traffic, obstacles on approach or departure path, and the United States' Federal Aviation Administration (FAA) guidelines. PESI indicated that Aura addressed the Drumheller Airport Commission's concerns in a letter emailed on September 13, 2018.

4.2 Views of the SOP

32. Some of the SOP members stated that they had not been contacted by Aura, and others submitted that Aura's answers to their questions or concerns were blanket generic responses, insufficient, unsatisfactory or their questions were not answered at all. The SOP argued that while Aura attempted to engage the community in its participant involvement program, the level of engagement was insufficient and did not allow them to make informed decisions about the project or how it would affect them.[16] SOP member Anton Keller stated:

> I had many further questions and concerns about the project and Mr. Beda told me that he would e-mail me more information about the project. I provided my business card to Mr. Beda with my contact information. To date, I have not heard or received anything further from Mr. Beda or from Aura Power and have many outstanding concerns that have not been addressed.[17]

33. Peter Cardamone, who owns land adjacent to the project and is a pilot, stated that Aura's public consultation and stakeholder relations were less than acceptable and it appeared to him that Aura was more concerned with getting regulatory approval than being a good neighbour or doing what was ethically correct. He added that he was concerned that Aura had rushed the application process without completing its due diligence and tasks to ensure safety and compliance.[18]

34. The SOP submitted that Aura designed the panel array to meet AEP's request for greater setbacks from the coulees and not to address concerns about the safe operation of the Drumheller airport. The SOP stated there was a lack of consultation with members of the Drumheller airport and individual hangar owners, even though Aura recognized that the safe operation of the airport was an issue of concern. The SOP argued that several of its members who are pilots and own hangars at the Drumheller airport were not personally consulted even though they are occupants

[16] Transcript, Volume 3, page 580, lines 14-23.
[17] Exhibit 23951-X0076, A1 – Submissions of SOP members, PDF page 81.
[18] Transcript, Volume 2, page 412, lines 12-19.

within 800 metres of the project, and that Aura did not provide any justification for the lack of consultation with these pilots.[19]

35. The SOP stated that it had informed Aura of its safety concerns during the participant involvement program, particularly regarding grass fires and plane crashes or forced landings, and had asked Aura to develop an emergency response plan to address these concerns. The SOP acknowledged that an emergency response plan is not a requirement under Rule 007. However, the SOP stated that it was worrisome that Aura would rely on the absence of a requirement for an emergency response under Rule 007 as a reason for not attempting to address the emergency response concerns that SOP members had raised from the beginning of the consultation process. The SOP submitted that a good neighbour would have initiated consultation with the applicable fire chiefs, fire departments and municipal government to develop a plan that addressed its concerns. The SOP noted that the local firefighting department is a volunteer unit with no training or capacity to fight fires within a solar power plant.[20]

4.3 Commission findings

36. Rule 007 requires that a participant involvement program be conducted before a facility application is filed with the Commission. It is a fundamental component of any facility application and applicants must fulfill the public notification and consultation requirements under Rule 007, without exception.

37. In Decision 2011-436, the Commission made the following comments about effective public consultation under Rule 007:

> … In the Commission's view, effective consultation achieves three purposes. First, it allows parties to understand the nature of a proposed project. Second, it allows the applicant and the intervener to identify areas of concern. Third, it provides a reasonable opportunity for the parties to engage in meaningful dialogue and discussion with the goal of eliminating or mitigating to an acceptable degree the affected parties concerns about the project. If done well, a consultation program will improve the application and help to resolve disputes between the applicant and affected parties outside of the context of the hearing room.[21]

38. The Commission acknowledges that an effective participant involvement program may not resolve all public concerns. There may be situations where an individual considers that the applicant's consultation efforts were insufficient or superficial, at least in relation to that person's own concerns or interests. The respective views of the applicant and the SOP summarized above demonstrate that perceptions of the quality and effectiveness of a given public consultation process can be quite different.

39. Rule 007 prescribes the basic requirements that must be included in the design of a participant involvement program, and it is relatively straightforward for the Commission to decide whether a given program includes these requirements. The bigger challenge for the Commission when it assesses the adequacy of a participant involvement program is to measure the extent to which an applicant engaged with stakeholders with the full commitment "that

[19] Transcript, Volume 3, page 579, lines 3-24.
[20] Transcript, Volume 3, page 618, lines 2-16.
[21] Decision 2011-436: AltaLink Management Ltd. and EPCOR Distribution & Transmission Inc. – Heartland Transmission Project, Proceeding 457, Application 1606609, November 1, 2011, page 57, paragraph 283.

effective communications take place among stakeholders (the public, local authorities, agencies, industry and government) so that concerns may be raised, properly addressed, and if possible, resolved."[22]

40. The Commission finds that the participant involvement program designed by PESI and Aura met the requirements of Rule 007 in the following ways:

- project-specific mail-outs to stakeholders were distributed
- personal and phone consultations were conducted with stakeholders within 800 metres of the project area, except where reasonable efforts to contact stakeholders were not successful
- an open house was held
- a project website was established
- a radio interview was conducted
- efforts were made to address landowner and other stakeholder concerns as they arose, including through the acquisition of additional land and redesign of the panel array

41. Despite some concern that Aura may not have conducted its participant involvement program using its very best efforts (based on the evidence of multiple SOP members who indicated the same or similar frustrations with Aura's engagement and follow-up during the program), the Commission is nevertheless satisfied that Aura's participant involvement program met the purpose of consultation. That is through the above measures and Aura's participant involvement program as a whole, parties were provided sufficient information to understand the nature of the project, identify areas of concerns and had a reasonable opportunity to engage in dialogue with the goal of eliminating or minimizing those concerns.

5 Project location

42. The project, proposed to be located on 380 acres of privately-owned cultivated land, would be directly north of the Drumheller airport and the lands immediately east and west of the project include steep coulees. Taken together, these features and the presence of a number of residences near the project and the Drumheller airport pose some unique challenges for locating the project within the parcel of land that Aura selected. Many of these challenges, including safety, environmental and noise impacts of the project, are addressed in greater detail in other sections of this decision.

5.1 Views of the applicant

43. Aura stated that it selected the project site based on the land being previously cultivated and disturbed, and because the land was large enough for the project. Aura submitted that it had

[22] Rule 007: Applications for Power Plants, Substations, Transmission Lines, Industrial System Designations and Hydro Developments, Appendix A1 – Participant involvement program guidelines, page 47.

specifically proposed and designed the project to have as little impact as possible on surrounding landscapes, wildlife, wildlife habitat and people.

44. As well, Aura stated that it located the project in proximity to a pre-existing electrical distribution network in order to minimize the need to build new transmission or distribution infrastructure, consistent with Aura's goal of minimizing disturbance. When asked about the possibility of finding a different site that had a pre-existing distribution network, Aura indicated that there may be other pre-existing electrical distribution networks but that it was unable to find any such location that had suitable substation capacity.

45. As part of its application, Aura submitted an environmental evaluation of the project, and a renewable energy referral report issued by AEP-Wildlife Management (the project's referral report), which found that the project presents a low risk to wildlife and wildlife habitat. The project's predicted environmental effects are discussed in greater detail in the environmental section, below.

5.2 Views of the SOP

46. The SOP members raised concerns with the project's location because of its close proximity to homes, its proximity to and position directly north of the Drumheller airport and because it would take prime agricultural lands out of production. Dave Burroughs stated that two other solar projects had been proposed near his father's estate, east of Highway 9, and he was told by each of those proponents that they had considered the land on which the project is proposed to be sited but decided that the area was too populated and too close to the airport.[23]

47. Mr. Cardamone stated that 100 per cent of the local pilots and hangar owners signed a petition against the project, and that every resident "from the bottom of the airport hill right up to Munson"[24] signed a petition against the project. He concluded that 100 per cent of people in the vicinity of the project did not want the project at the location proposed by Aura.[25]

48. The SOP also argued that the location proposed was a bad choice for a project of this magnitude due to its proximity to two coulees, the Drumheller airport and a nearby Bitcoin mine, which is an existing source of noise. It emphasized that Drumheller and Starland County, the local administrators in the area, are opposed to the project, which the SOP stated "speaks volumes" about the appropriateness of the project site.[26]

49. With respect to the concern that the project would be located on cultivated land that was traditionally used for agriculture, Mr. Murray stated:

> We're taking a great producing cropland out of the equation, and I have a huge concern about that, because that will push -- we always hear about the shortage of food. Why are we taking food off people's tables to create power? I think food is a way more important source than power.[27]

[23] Exhibit 23951-X0076, A1 - Submissions of SOP members, PDF page 44.
[24] Transcript Volume 3, page 469, lines 13-14.
[25] Transcript, Volume 3, page 469, lines 7-16.
[26] Transcript, Volume 3, page 572, lines 3-16.
[27] Transcript Volume 2, page 444, line 24 and page 445, line 7.

5.3 Views of Drumheller

50. Drumheller identified that it manages and operates the Drumheller airport, which is directly adjacent to the project site. It stated that it has concerns about the scope and size of the project, which in its view is several times larger than any other solar project operating in Alberta.

51. Drumheller also stated that operations in the airspace around the airport pose the highest risk for aircraft and the project would be an unwanted additional distraction that negatively affects aircraft safety. It cited thermal activity above the project, radio interference, lack of transparent communication with Transport Canada and NAV CANADA, forced landings in the project site and lack of site access for firefighters as its additional concerns. Drumheller concluded by stating that it is not against solar projects but is concerned about the effects of this project on aircraft safety. It added that "if this installation [power plant] was not a direct extension of the main Drumheller runway, we would support this project as well."[28]

5.4 The easement - views of both parties

52. Both Aura and the SOP filed a copy of an easement agreement made in 1968 between the then owner of the project lands and Drumheller. The easement agreement is registered as instrument 316KQ on the title to the portion of the project lands that is north of the Drumheller airport's north-south runway within the southeast quarter of Section 28, Township 29, Range 20, west of the Fourth Meridian (the easement). Aura and the SOP characterized the easement as creating an airport safety protection zone to address safety concerns relating to the nearby Drumheller airport.

53. In summary, Aura stated that while the project site is on land that had been included in the easement, it had taken the easement into consideration when designing the layout and had situated the solar panels a substantial distance from the easement lands.[29]

54. Aura refuted the SOP's claims that the airport safety protection zone is larger than, or was intended to be larger than the 8.10 acres specified in the easement. Aura submitted that

the fact that additional lands were originally contemplated but not ultimately included in the easement is further indication that Drumheller considered the 8.10-acre easement area to be sufficient to properly address any safety concerns. Aura added that the existence and annual maintenance of the easement indicates that Drumheller had previously turned its mind to airport operations and found the measures established in the easement to be sufficient.

55. The SOP submitted that the project contravened the terms of the easement because the project's solar panels would interfere with the operation of the Drumheller airport and Aura did not get written consent from Drumheller to place solar panels on the project lands. The SOP provided a handwritten drawing that indicated Drumheller was considering including several sections of land in the area as part of an airport protection zone, in connection with a process to have the Drumheller airport certified by the Minister of Transportation.[30] The SOP argued that

[28] Exhibit 23951-X0131, Letter of response to AUC and AURA.
[29] Exhibit 23951-X0153, Aura-Additional Evidence Reply, PDF page 6.
[30] Exhibit 23951-X0141, 2019 06 25 SOP Evidence re AUC May 31 Request, pages 12-13.

these facts establish that a more extensive airport protection zone is needed to properly address the safety concerns of pilots and other airport users.

5.5 Commission findings

56. The issues concerning the proposed location for the project relate primarily to the potential effects of the project on adjacent land and land-users (and on the use of the airspace above the project site). For example, the steep coulees to the east and west of the project pose no real hazard to the project itself, however, their presence in combination with the project raises safety concerns for those residing near the project and for pilots using the Drumheller airport. The Commission addresses safety concerns associated with the project in Section 6, below. In this section, the Commission considers general land-use issues including the SOP's argument that the project land is agricultural land that should not be taken out of production and that the proposed siting of the project contravenes the easement.

57. Concerning the argument that the project land is agricultural land that should not be taken out of production, the Commission notes that the project would be located on privately-owned land and that Aura stated it has secured the right to use the land for the project. The Commission considers that in the absence of legal or government policy restrictions that affect a private landowner's ability to take agricultural land out of production, that choice remains with the landowner and should not be upset by the Commission unless it is clearly demonstrated that the public interest requires the Commission to intervene in the decision.

58. No evidence was offered in this proceeding to indicate that provincial or municipal laws or policies prohibit the project from being constructed and operated on the lands selected by Aura. There was also no evidence about the historical and current agricultural productivity of the project lands or about the resulting effects if the lands were no longer used for agriculture. There is therefore no basis upon which to conclude that the proposed change in land use is contrary to provincial or municipal laws or policies or that an adverse social or economic effect would result from a change of the land's use from agricultural to electric power generation.

59. The Commission acknowledges the SOP's assertion that the terms of the easement apply to a larger parcel of land than that identified in the easement, including at least all of the southeast quarter of Section 28, Township 29, Range 20, west of the Fourth Meridian and that the project contravenes the easement. However, these assertions are inconsistent with the plain language of the easement. That document clearly describes the easement lands as follows:

> The Easterly Five Hundred and Sixty (560) Feet of the Southerly Six Hundred and Thirty Feet (630) of the said South East Quarter of Section Twenty-eight (28), Containing Eight and Ten One Hundredths (8.10) acres more or less.[31]

60. The stated purpose of the easement is to allow aircraft to overfly the easement lands "at any height" without obstruction, and to allow Drumheller access to the easement lands for repair and maintenance purposes that are consistent with the terms of the easement. The most salient terms of the easement are:

> THE GRANTOR FURTHER AGREES that neither he nor his servants, agents, or assigns shall at any time plant trees or shrubs, or construct any building or structure on the [easement] land without first obtaining the written consent of [Drumheller] and the

[31] Exhibit 23951-X0147, Appendix F - Easement SE28, PDF page 7.

> Grantor further agrees to refrain from any act, and to allow no act that will in any way interfere with the use of the [easement] lands in connection with the operation of the said proposed airport.[32]

61. The Commission is satisfied that no portion of the solar panel array or any other element of the project that would be considered a building or structure is proposed to be located on the 8.10 acres that comprise the easement lands. In addition, based on the available evidence, it does not appear to the Commission that any other element of the project that might interfere with aircraft operations "at any height" would be located on the easement lands. However, if Aura were to install its perimeter fence on the easement lands, Aura would have to consider whether that is permitted under the 316KQ easement agreement and whether Drumheller's consent is required under the easement.

62. From a general land-use perspective, the Commission accepts Aura's evidence that it selected the project site to limit the environmental impacts of the project, and to limit the amount of new infrastructure required to connect the project to the Alberta Interconnected Electric System (by locating the project close to existing electric distribution lines and a substation with existing capacity). The Commission finds that these considerations favour the site's selection for the project.

6 Safety concerns

63. Many of the issues raised by the SOP members related to safety concerns, including emergency response planning, fire risk, solar glare and the safe operation of aircraft using the Drumheller airport. These issues have been a significant, but not the sole focus of the Commission's assessment of whether the project is in the public interest, and are addressed in the sections that follow.

6.1 Emergency response planning and fire prevention and response

6.1.1 Views of the applicant

64. Aura did not provide an emergency response plan when it filed its applications with the Commission. It noted during the hearing that Rule 007 does not require an applicant to submit an emergency response plan to the Commission. Aura stated that a plan was typically required during the municipal district application process for a project and it would be premature to develop one before that time because the fire authority could change or new plans could be formulated to more effectively fight fires at the project's location. Aura acknowledged that having an emergency response plan is important and it committed to providing an emergency response plan that includes a fire protection plan, to stakeholders prior to construction.[33]

65. Aura stated that consultation with emergency responders regarding emergency response has not been conducted but that it will conduct such consultation after it applies for a municipal development permit. It noted that Starland County Bylaw 1125 requires Aura to obtain an AUC approval before Aura can apply for a municipal permit.

[32] Exhibit 23951-X0147, Appendix F - Easement SE28, PDF page 9.
[33] Exhibit 23951-X0126, Aura Commitments to Stakeholders.

66. Aura addressed the potential for a fire at the project by stating that there is no requirement for the project to operate using flammable materials, and that neither the solar panels nor the racking is flammable. Aura added that it will have a vegetation control plan in place that will mitigate the effects of fires, and it will also have small-scale fire-fighting equipment on-site.

67. Aura submitted that one of the most effective fire prevention plans is scheduled, periodic maintenance of vegetation. Aura stated that it intends to have that program in place prior to construction. However, it reiterated that the effectiveness of any vegetation control plan would have to be determined in consultation with the Munson Fire Department.

68. Aura intends for the project to operate autonomously without a dedicated operator on-site. When asked about security and maintenance, Aura stated that it had not decided the exact details of security or remote camera monitoring but there "was a possibility" it would have internal remote monitoring cameras on-site and automated alarms that would detect damage to the fence or errors within the array.[34] Aura stated it will have security sweeps done periodically, likely once or twice each day.

69. Aura filed a draft emergency response plan after the close of the hearing.[35] Aura indicated that it will finalize the details of its emergency response plan prior to construction, and that it is committed to consulting with the local fire department, local authorities, and other stakeholders when it develops the project-specific emergency response plan.

6.1.2 Views of the SOP

70. The SOP questioned the increased risk of fire with the project and the problems emergency responders would have fighting a fire within the power plant. SOP members were concerned about landowner safety in the event of a fire, and about the safety of emergency responders.

71. Terena Kleinschroth and Colin Murray stated their understanding that solar panels have a very high fire risk and that a fire in the project would release dangerous toxic chemicals into the air. They also stated that they only have one way off their property, which is towards the project site, and that a fire on the site moving toward their property could trap them there.

72. Mr. Murray testified that he had spoken to the Munson Fire Department chief, Steven Wannstrom, who advised Mr. Murray that he did not have a plan for fighting a fire in the solar power plant. The chief added that his ability to fight that fire would be limited and that firefighters are instructed not to spray water on solar panels due to the risk of electrocution.[36]

73. The SOP provided a letter from Mr. Wannstrom, in which he stated his concerns about the Munson Fire Department responding to any emergencies at the project location and the potential for the project to be in the path of outgoing or incoming aircraft. Mr. Wannstrom stated that it would not be safe for his firefighters to enter an accident scene within the project because he understands that even in an emergency, the solar panels could not be powered down except by placing a dark tarp on them. Mr. Wannstrom questioned whether a vegetation control plan had been developed to address the build up of dead vegetation under the solar panels that would pose

[34] Transcript, Volume 2, page 236, line 25.
[35] Exhibit 23951-X0139, Aura Additional Evidence Appendices, PDF pages 32-49.
[36] Transcript, Volume 2, page 442, lines 3-9.

a fire hazard. Mr. Wannstrom concluded that in the event of a fire, emergency responders would respond in a defensive manner that worked to ensure the fire did not leave the project site. He stated that the fire department would expect the project owner to have a fire suppression plan in place.[37]

74. Peter and Debbie Cardamone stated that their residence, which is adjacent to the project site, backs onto a large coulee and they would have limited ability to escape a fire at the power plant and could end up trapped on their property. They stated this is one of their main concerns with the project and that Aura has not done anything to address that concern. During the hearing, Mrs. Cardamone indicated that neither PESI nor Aura made it a priority to develop any sort of emergency response plan in an effort to calm their fears. The Cardamones added that local emergency responders are not yet properly equipped or trained to deal with a fire in a fenced and energized area and that medical aid would have difficulty accessing an accident site within the project boundary. They noted that both the Drumheller and Munson fire departments are volunteer fire departments and so response time is also a concern for them.[38]

75. Colin Jensen, who is a pilot and a volunteer firefighter, stated that a massive amount of vegetation in the form of completely uncontrollable weeds will grow and die under the solar panels, providing a source of fuel for a huge fire that could consume the solar panels, batteries and inverters. He also stated that no municipality would allow firefighters to go into the project site to try to put the fire out, and so it would smoulder and burn and be an environmental disaster.

76. The SOP members were also concerned about the added fire risk at the Drumheller airport. Mark Kinniburgh stated that his company's hangar houses well over a million dollars in equipment and would be the first affected if a fire occurred at the airport. Mr. Murray added that the Drumheller airport has two fuel stations and aircraft that are stored full of fuel, and that a fire from the solar site that reached the airport grounds would be catastrophic.

77. The SOP acknowledged the draft emergency response plan filed by Aura after the close of the hearing. However, the SOP members' reply submission raised concerns about Aura's commitment to develop the final plan in consultation with the local fire department, noting that the Munson Fire Department would not be the only one responding to a fire. The SOP stated that Drumheller Emergency Management Services, the Drumheller Fire Department and the Morin Fire Department would also be potential responders. The SOP submitted that Aura should provide first responder training to all emergency responders in the area and ensure that training is available for the entire life of the project because the departments are constantly getting new members.[39]

78. The SOP argued it is imperative that Aura develop a site-specific emergency response plan that considers the peculiar environment of the project site. It stated the plan must be developed in consultation with the local fire chiefs, the Drumheller airport, Drumheller and the SOP members. It requested that such an emergency plan be filed with the Commission, and that these plan requirements be included as a condition of any approval issued for the project.

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37 Exhibit 23951-X0077, A2 - Submissions of SOP members, PDF page 87.
38 Exhibit 23951-X0076, A1 - Submissions of SOP members, PDF page 4.
39 Exhibit 23951-X0151, 2019 07 15 SOP Group Reply Submissions (Post Hearing), PDF pages 21-22.

6.1.3 Views of Drumheller

79. Drumheller expressed concern that firefighters would be unable to respond to a crash within the energized and fenced project site. It added that a crash within this area would most likely start a fire that could not be battled.[40]

80. In response to the Commission's request for additional information, Drumheller stated that as the airport operator it must have an appropriate emergency response plan in place that would provide emergency responders with access to the project site to defend against fire or attend to plane crash victims.[41]

6.1.4 Commission findings

81. The topography surrounding the project site is unique. The project site is bounded on the east and west by steep coulees, with some of the SOP members residing on properties on relatively narrow parcels of land that sit between the top of a coulee and the project site boundary. Road access to and from these residences is limited and some residents, for example Peter and Debbie Cardamone, have recourse to a single road out of the area that travels along the project boundary. The unique topography of the area limits egress opportunities for these residents and for Aura personnel at the project site in the event of a fire at or near the project. It also could prevent or delay emergency responders from getting access to the site.

82. The presence of substantial fuel supplies at the Drumheller airport immediately south of the project further complicates emergency response planning for the area by increasing the need for a timely and planned response. While the Commission accepts Aura's assertion that the power plant equipment itself does not represent a fire hazard, the available evidence supports that a fire that starts in or moves into the solar panel array would be difficult for firefighters to access. The Commission also accepts the Munson fire chief's statement that he and his firefighters currently have no plan to fight a fire within the solar panel array and would only work to stop the fire from spreading beyond the project site.

83. Having regard to the foregoing, Commission finds that the SOP members and Drumheller have valid concerns about fire hazards in the project area. These concerns were exacerbated by Aura's failure to prepare (until after the close of the hearing), a preliminary emergency response plan that acknowledged and included measures to better ensure the SOP members' safety in the event of a fire or other hazardous conditions at or near the project.

84. While Rule 007 may not require an emergency response plan at the time of application, and leaving aside whether Aura's approach to emergency response planning was consistent with industry practice, the unique topography surrounding the project site as well as the numerous and specific concerns expressed by stakeholders throughout the participant involvement program and during the regulatory process, warranted a more deliberate, active and timely approach to emergency response planning by Aura than was demonstrated here.

85. The Commission is not prepared to unconditionally approve the project in the absence of a finalized emergency response plan that accounts for area residents, and those using the

[40] Exhibit 23951-X0131, Letter of response to AUC and AURA.
[41] Exhibit 23951-X0148, Response to AUC correspondence from June 6, 2019.

Drumheller airport. Consequently, should it decide to approve the project, the Commission would impose the following as conditions of approval:

a. Aura shall develop and finalize a site-specific emergency response plan in consultation with: (i) all local fire departments and other emergency responders that would respond to an emergency at the project; and (ii) Starland County, Drumheller, the Drumheller Airport Commission and any other provincial or municipal authorities that Aura or local fire departments identify as having an active role in responding to a fire or other emergency at the project's location. This plan must include measures that address airport safety as well as the safety of residents adjacent to the project lands, including notification to those residents of an actual or developing emergency, identification of points of access to the project site for emergency responders and access routes within the site. Aura must provide the SOP members with an opportunity to participate in the development of the plan. Aura must also provide a copy of its finalized emergency response plan to the Commission, Drumheller and to any SOP member, landowner or resident with 2,000 metres of the project who requests a copy. Aura can redact the personal information of a resident or other member of the public from the copies of the plan that are provided to SOP members, landowners or residents. Aura must file its finalized emergency response plan, and confirmation that the SOP members had the opportunity to participate in its development, with the Commission no later than three months before construction of the project would commence.

b. Prior to finalizing the emergency response plan, Aura shall conduct at least one emergency response exercise and give representatives of Drumheller airport and SOP members an opportunity to participate in or observe the exercise.

86. The Commission acknowledges the concerns of the SOP members and the chief of the Munson Fire Department that emergency first responders may not be adequately prepared for or trained to respond to a fire within a solar power plant. As such, should it decide to approve the project, the Commission would expect Aura to consult with local fire departments and first responders to determine whether specific or unique training is required to respond to a fire or other emergency at the project's location and to consider any reasonable requests to provide such training.

87. Aura indicated that the power plant would be unmanned most of the time, with regularly-scheduled maintenance and security sweeps taking place on a daily or twice-daily basis and remote monitoring "possibly" being installed. The limited human presence at the project site makes it more difficult for Aura to identify an emergency situation and initiate a response at an early stage. In view of this and the unique safety issues associated with the project site as described above, should the project be approved, the Commission would impose the following as a condition of approval:

c. To ensure that hazardous or potentially hazardous situations are identified as soon as possible, Aura shall install and use a reliable system of remote monitoring.

6.2 Solar glint and glare

88. The parties addressed the potential for solar glint and glare from the project on residences and roadways as well as on users of the Drumheller airport. Section 6.2.1 summarizes the submissions of the parties concerning the former; the submissions concerning the potential for

glint and glare at the Drumheller airport and its effects on aviation are summarized in Section 6.2.2 below.

6.2.1 The potential for solar glint and glare on residences and roads

6.2.1.1 Views of the applicant

89. Aura stated that although Rule 007 does not require it to provide a solar glint and glare study as part of a power plant application, it did so in response to stakeholder concerns. Aura retained Green Cat Renewables Canada Corporation (Green Cat) to assess the potential for glint and glare from the project. Cameron Sutherland from Green Cat testified on solar glint and glare, as part of Aura's witness panel.

90. Green Cat's report[42] provided an overview of solar glint and glare, which can be summarized as follows. Depending on the construction and design of a photovoltaic panel, a portion of the sunlight striking the panel may be reflected off the surface of the panel. This reflected light is described as glint or glare. Glint or specular reflection can been described as a direct reflection of sunlight off a surface. Glare or diffuse reflection can be described as a continuous but less intense reflection of dispersed light. A solar panel's energy output is proportional to the amount of sunlight that it captures. Solar panels are therefore designed to absorb as much sunlight as possible; nevertheless, most panels still reflect a small percentage of sunlight. The amount of light that is reflected from a given solar panel will vary at any given time depending on the tilt angle of the solar panel and the angle at which sunlight strikes the panel. Solar glare is divided into a continuum of grades, namely: green-grade glare, yellow-grade glare and red-grade glare. These grades indicate the likelihood that an observer would experience an after-image, which is an image of glare that lingers in a person's field of view after they are no longer exposed to the glare. Green-grade glare has low potential for an observer to experience an after-image; yellow-grade glare has the potential for an observer to experience an after-image for a moment or longer period of time but with no permanent effect or vision damage; and exposure to red-grade glare can result in a permanent after-image and therefore permanent vision damage.

91. In response to an information request from the SOP, Green Cat provided information on potential glare impacts at five residences and four roadways in the area. Green Cat identified that the most affected residence in the area of the project could be subject to as much as 4,170 minutes of yellow-grade glare per year, and the most affected roadway, Highway 9, could be subject to as much as 255 minutes of yellow-grade glare per year.[43] Mr. Sutherland stated that glare is considered to affect motorists only when it is within 50 degrees of their peripheral vision on either side of the direction of travel.

92. Aura indicated that measures to mitigate solar glint and glare include using visual screening such as fencing and using anti-reflective coatings where appropriate. During the hearing, Mr. Sutherland stated that he would expect the solar panels sold for projects of this nature to come with anti-reflective coatings, but they may not come with additional specialty coatings that enhance anti-reflectivity.[44] Aura's witness, Mr. Beda, confirmed that the solar panels used in the project would have a standard anti-reflective coating to minimize solar glare.

[42] Exhibit 23951-X0063, Glare Study.
[43] Exhibit 23951-X0070, Aura Power - SOP IR responses, page 22.
[44] Transcript, Volume 1, page 85.

He added that his understanding was the anti-reflective coating would last for the lifespan of the project.[45]

93. When questioned about the differences in anti-reflective coatings available for the project and the ability to apply an enhanced anti-reflective coating post-construction, Mr. Sutherland responded that to his knowledge it would be difficult to retrofit such coatings and it would be preferable to construct the project with panels that incorporate the specialty coating.

94. When asked whether a person being distracted by glare is something that should be accounted for when assessing glare impacts, Mr. Sutherland stated that should be the case in principle, but because Alberta and Canada do not have defined guidance on how to interpret the results of a glare assessment, he is reluctant to draw that kind of conclusion.

6.2.1.2 Views of the SOP expert witnesses

95. The SOP retained Solas Energy Consulting Inc. (Solas) to provide a solar glare analysis of the project. Paula McGarrigle and Leonard Olien of Solas testified at the hearing.

96. Solas stated that it conducted its analysis using GlareGuage, which is the same modelling software that was used by Green Cat, and Solas matched Green Cat's input parameters as best it could. Solas assessed the potential for solar glare at a number of area residences and on four roadways.

97. Solas stated that cloud cover might diffuse sunlight, thereby lessening the impact of reflections from solar panels and providing a variable source of glare mitigation. Solas also stated that the GlareGuage model assumes clear skies occur every day of the year, resulting in predicted glare durations that are higher than observers are likely to experience. Solas explained that it adjusted the predicted annual duration of yellow-grade glare at each observation point it studied to account for the potential for cloudy days. It stated that in the adjusted case, findings of yellow-grade glare were reduced by an average of 48 per cent.[46]

98. Solas concluded that the project would not produce any red-grade glare, but yellow-grade glare could occur at five residences and several area roadways. Solas stated that the most affected residence could be subjected to as much as 3,749 minutes of yellow-grade glare per year.

99. The Solas report stated that the most affected roadway, Range Road 203, could be subjected to as much as 14,464 minutes of yellow-grade glare per year, which Solas reduced to 7,299 minutes to account for typical annual cloud cover.[47] Solas stated the glare would be present between February and October for up to 68 minutes each day, occurring between 5 p.m. and 6:40 p.m. standard time, and that although the glare would look much dimmer than the sun, it would appear larger. Solas concluded that glare from the project was expected to have a low potential to result in hazardous conditions at Range Road 203. However, during the hearing, Ms. McGarrigle stated that she had visited Range Road 203 and noted that the project lands and the roadway had very similar elevations. She revised her assessment and stated that the total

[45] Transcript, Volume 2, page 286.
[46] Exhibit 23951-X0080, page 39.
[47] Exhibit 23951-X0080, page 41.

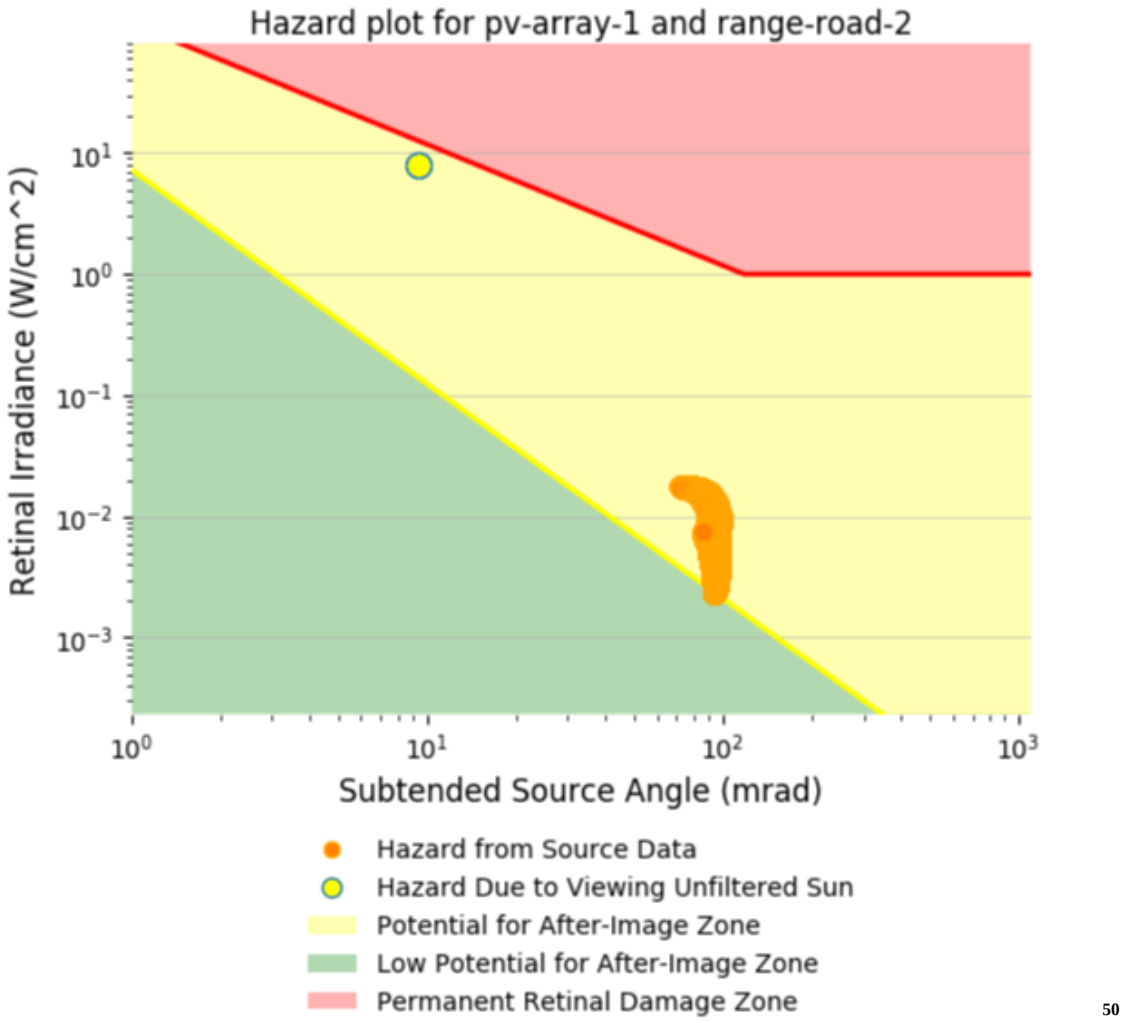
annual glare along Range Road 203 would be less than 14,000 minutes, but she did not specify how much less.

100. Mr. Olien further explained the glare effect on Range Road 203 as follows:

> So that number of 68 minutes means that for up to 68 minutes a day, there will be some glare along some portion of that roadway. So there may not be 68 minutes at every point or even some -- most points may have less than 68 minutes, but that -- at some point along that roadway, there will be glare for up to 68 minutes a day.[48]

101. Figure 17 of the Solas report, shown below, plots the glare hazard on Range Road 203 east of the project according to the size of the glare spot (subtended source angle), brightness of the glare (retinal irradiance), and the glare level (green, yellow, and red zones). Solas stated that glare from the project at that location would be 470 times dimmer than staring at the sun but would appear up to 11 times bigger than the perceived diameter of the sun.[49]

Figure 2. Glare hazard on Range Road 203



[50]

[48] Transcript, Volume 2, page 370.
[49] Exhibit 23951-X0080, pages 36-37.
[50] Exhibit 23951-X0080, Figure 17, page 37.

102. Figure 14 of the Solas report provided a glare hazard plot for the main floor of a residence west of the project. Similar to Figure 17, the plot showed that the predicted yellow-grade glare hazard would be much closer to the green-grade glare zone than the predicted hazard from viewing the unfiltered sun. Solas stated that glare from the project at the residence would be 410 times dimmer than staring at the sun but would appear up to 10 times bigger than the perceived diameter of the sun.[51]

103. Ms. McGarrigle confirmed that obstacles such as fencing or tree screens could change glare impacts. She stated that tree screening was capable of diffusing light passing through it to the point that the light could be considered green-grade solar glare. Mr. Olien added that trees can break up one very large glare spot into many smaller glare spots that have a much lower impact on the observer.

104. During the hearing, Ms. McGarrigle responded to a question about the effect of yellow-grade glare on people as follows:

> We all experience yellow grade glare every day in our lives. In fact, some of us like looking at it -- glare from a sunset from across a lake, and it's quite enjoyable, although glare can also be hazardous. And there are a number of influencing factors that affect whether or not glare is a hazard or not.
>
> …
>
> And the impact of that glare is really about what are you doing at the time. So there's some influencing factors. For example, the complexity of a task that you're doing at that time. My understanding is that some of the -- some of the readings -- or some of the papers on this also identify that the age of an observer also may be an impact, seasonality, the brightness of the environment experienced prior to experiencing the glare, and also the well being of an observer. That when an observer is in a positive mood and is healthy and well rested, they are less sensitive to glare, but there's many factors that affect glare and the impact on the person. So you can't say that all yellow glare is bad or that all yellow glare is fine. The answer is it depends.[52]

105. When asked about the extent to which yellow-grade glare may pose a health and safety risk to humans, Ms. McGarrigle responded that the GlareGuage software identifies the irradiance level of glare (how intense it is and how long it is), but does not do anything more than categorize it as red, yellow or green. She added that she is not trained to address human health effects of glare, including potential impacts on an individual who is exposed to solar glare for a prolonged period of time.

6.2.1.3 Statement of the joint expert witness panel

106. As previously stated in this decision, the Commission requested that Green Cat and Solas confer in advance of the hearing and prepare a joint written statement that identified where their respective views relating to the intensity, duration and health effects of solar glint and glare likely to be caused by the project either coincided or differed. A joint statement on glare was

[51] Exhibit 23951-X0080, pages 33-34.
[52] Transcript, Volume 2, pages 364-365.

filed,[53] and two witnesses from each of Green Cat and Solas were questioned together on the joint statement during the hearing.[54]

107. The joint expert statement listed 19 points of agreement between Green Cat and Solas, and one point of disagreement. The points of agreement included the following:

- Alberta and Canada have no regulatory requirements associated with glare analysis, methodology, or standards to assess the significance of glare in the context of a solar facility.

- Solar modules in 2019 typically have anti-reflective coatings and therefore have a reflectivity typically of two per cent rather than up to 10 per cent without the anti-reflective coatings.

- No glare is predicted for the two flight paths FP1 (Northbound) and FP2 (Southbound) of the Drumheller airport.

- It is reasonable to assume that over the life of the project, the probable annual average glare duration of yellow glare will be reduced by approximately 48 per cent due to times without bright sunshine relative to the number of minutes presented in the respective consultant reports.

- The use of ground-based screening (e.g., solid fencing or evergreen trees/shrubs) can be an effective method of reducing or eliminating potential glare impacts at ground-based receptors depending on the location, height and opacity of the screening.

- Neither glare expert is qualified to comment on how glare may affect airport operations or flights, or on the potential health impacts associated with glare.

6.2.2 The potential for solar glint and glare at the Drumheller airport

6.2.2.1 Views of the applicant

108. Aura addressed the potential for glint and glare at buildings located at the Drumheller airport, on the north-south runway and on the east-west runway.

109. Green Cat's report analyzed glint and glare effects at the Drumheller airport, focusing on a two-mile approach path towards the north-south airport runway. The report stated that Aura's design process attempted to keep solar panels as far from the runway as feasible. According to Green Cat, "This has resulted in a separation distance of 683m from the end of the runway to the nearest solar PV panel, and no panels directly in line with the runway, on a north to south axis, within 2km of the nearest point on the runway which mitigates flight path glare impacts to zero."[55]

53 Exhibit 23951-X0109, GCR Solas Joint Statement on Glint and Glare.
54 Transcript, Volume 3, beginning on page 508. The Green Cat witnesses were C. MacLennan and C. Sutherland, and the Solas witnesses were P. McGarrigle and L. Olien.
55 Exhibit 23951-X0063, Glare Study, PDF page 20.

110. Green Cat concluded there was a potential for as much as 366 minutes per year of yellow-grade glare at an observation point centrally located within the buildings of the Drumheller airport. It stated this glare would occur between 6 and 7 p.m. during the months of May to August, and would be a low level of retinal irradiance from the same direction as the low level sun. In Green Cat's view, "Given the low level of retinal irradiance experienced by the observation point, and that this would also result in same viewing direction as the low level sun, posing a greater threat to retinal damage, no significant impacts were considered likely."[56]

111. Green Cat noted that as there is no air traffic control tower at the Drumheller airport, there is no concern about the impact of glare on controllers. Green Cat considered the expected impact of glare from the project on the Drumheller airport, or its aviation activity, to be negligible and concluded that the project does not pose a threat to the safety and operations of the Drumheller airport or receptors at that location.[57]

112. In further support of its conclusion, Green Cat's report referred to solar power plants located adjacent to major airports in Birmingham and Tucson.[58] Green Cat stated there have been no reported aircraft accidents as a result of glare from solar panels. Mr. Sutherland's opinion was that photovoltaic developments and aviation activities can safely co-exist, although possibly not in every situation as there could be a safety concern under some conditions.

113. Green Cat stated there is a shortage of guidance, policy or regulation on the siting of solar panels near airfields. It also stated that the most relevant technical guidance available is the United States' Federal Aviation Administration's (FAA) Interim Policy, FAA Review of Solar Energy System Projects on Federally Obligated Airports (FAA Interim Policy). Green Cat's report summarized the two substantive criteria from that policy that must be met by solar energy systems proposed for airport property, as follows:

- no yellow glare (potential for after-image) for any flight path from threshold to two miles
- no glare of any kind for air traffic control towers at cab height[59]

114. Mr. Sutherland commented on the FAA Interim Policy, stating:

> The FAA guidance is -- these are guidelines from the U.S. and they are also interim guidelines. So although the wording used here is policy, this is an interim policy from a different jurisdiction to Alberta or to Canada. And you will also note that, although it's slightly ambiguously worded in the FAA's guidance, their guidance is trying to protect from adverse glare situations where solar panels are located on airport property. And, of course, the proposed solar farm here is not located on airport property.[60]

115. To address the potential for glare impacts on users of the east-west air strip, Aura filed an Aviation Evaluation Report as Appendix E to its reply evidence.[61] The report was prepared by Claude Saint-Martin, who participated in the hearing as a member of Aura's witness panel and was designated to address air safety and navigation issues. Aura stated that Mr. Saint-Martin is a

[56] Exhibit 23951-X0063, Glare Study, PDF page 20.
[57] Exhibit 23951-X0063, Glare Study, PDF page 20.
[58] Exhibit 23951-X0063, Glare Study, PDF page 19.
[59] Exhibit 23951-X0063, Glare Study, PDF page 15.
[60] Transcript, Volume 1, page 90.
[61] Exhibit 23951-X0106, Appendix A – Aura Reply Evidence, PDF pages 94-98.

consultant in aviation operation efficiency who has vast piloting experience with both military and commercial aircraft, and experience with small, single- and twin-engine aircraft.

116. During the hearing, Mr. Saint-Martin addressed glint and glare impacts on the east-west strip. He stated that weather events requiring pilots to use that strip, such as strong north-south crosswinds, were uncommon in the area and would favour the strip being used in the range of 23 per cent of the time. He added that clear skies in which glare conditions would arise occur in the area 90 per cent of the time. He therefore concluded that conditions in which the east-west strip would be in use and potentially subject to solar glare would exist 20 per cent of the time.

117. Mr. Saint-Martin noted the Solas report indicated that yellow-grade glare varies from 780 to 810 times dimmer than staring directly at the sun. He stated that many airports have runways oriented east-west, and pilots must contend with sunrise and sunset conditions that would be much more severe than glare from the panels. He added that the Solas report indicated glare would affect pilots using the east-west strip for 10 minutes between 6:30 a.m. and 7 a.m. standard time when landing eastbound, and for six minutes between 6:18 p.m. and 6:32 p.m. standard time when landing westbound. He submitted that a pilot could very reasonably execute a standard overshoot manoeuvre, fly another circuit and safely return once the glare event disappeared.

118. Mr. Saint-Martin also noted that glare from the project would not be aligned with the east-west flight path but would occur at angles varying from 10 to 18 degrees when landing east to west, and 16 to 21 degrees when landing west to east. Mr. Saint-Martin stated that in his experience, when you have glare or lights that are angled from the direct field of vision, it is relatively easy to manoeuvre and land an aircraft.

119. Mr. Saint-Martin stated that light airplanes using grass runways, such as the east-west strip, typically approach at speeds of 70 miles per hour or less, which means that glare from the panels would disappear 38 seconds before landing westbound or 76 seconds before landing eastbound. He considered that this was more than enough time to adjust any approach path deviations caused by a glare situation.

6.2.2.2 Views of the SOP expert witnesses

105. In its original report, Solas assessed the potential for solar glare at the Drumheller airport and the flight path along the north-south runway. Solas concluded that the project would not produce any red-grade glare, and it would not produce any glare along the north-south flight path. However, yellow-grade glare could occur at the Drumheller airport for pedestrians and pilots taxing between hangers and the runway. It stated that an observer at the Drumheller airport could be subjected to as much as 31 minutes of yellow-grade glare per year, which it characterized as minimal with a low potential to result in hazardous conditions.[62]

120. Solas filed a supplemental glare analysis report in which it considered the potential for glare at the east-west strip after it reviewed the SOP members' written evidence that identified the strip. Ms. McGarrigle stated that although she did not verify the strip with either the airport

[62] Exhibit 23951-X0080, PDF page 46.

authority or NAV CANADA, she did review wind rows for the area and considered that east-west landings were likely, and as such the information about the strip was credible.[63]

121. In its supplementary report,[64] Solas stated that the project would not produce any red-grade glare along either of the flight paths for the east-west strip, but that there is a potential for as much as 992 minutes per year of yellow-grade glare along the eastbound descent to the strip. It stated that this glare could occur from April to August, for up to 10 minutes each day at approximately 6:45 a.m. standard time, and would be visible to pilots when they are 2.4 to 3.3 kilometres from the landing threshold. The intensity of this solar glare would be 780 times dimmer than staring at the sun, but would appear to be up to eight times bigger than the perceived diameter of the sun.

122. Solas also opined that there was a potential for as much as 522 minutes per year of yellow-grade glare along the westbound descent. It added that this glare could occur from late April to August, for up to six minutes each day at approximately 6:20 p.m. standard time, and would be visible to pilots when they are 1.2 to 3.3 kilometres from the landing threshold. The intensity of this solar glare would be 810 times dimmer than staring at the sun, but would appear to be up to eight times bigger than the perceived diameter of the sun.

123. Solas's supplementary report initially concluded that the project no longer complied with the criteria set out the FAA Interim Policy, which prohibited any yellow-grade glare along a flight landing path for two miles from landing threshold. However, during the hearing Ms. McGarrigle clarified that she had very recently learned that the FAA rescinded the policy in April 2018 and now requires that the results of a glare assessment be provided to the FAA for its review and approval.[65]

124. Ms. McGarrigle addressed potential mitigation for glare along the east-west flight path and stated that moving the solar panels to reduce glare along the flight paths was a potential option. However, she determined that glare could not be reduced by modifying the azimuth and tilt angles of the solar panels. Ms. McGarrigle also stated that visual screening would not be sufficient to mitigate glare for pilots using the east-west landing strip.

6.2.2.3 Views of the SOP

125. The SOP members expressed concern about solar glare affecting them at their residences and places of business, but their main focus was the potential for glare from the project to affect pilots and hangar owners using the Drumheller airport.

126. Many of the SOP members are pilots, and those members indicated that they rely on visual sighting during landing and takeoff from the Drumheller airport. In their view, any interference with a pilot's vision or any after-image caused by yellow-grade glare, however brief, could compromise a pilot's ability to perform a safe landing or takeoff maneuver. They stated this was a significant safety concern for pilots and their passengers.

127. The SOP stated that it is standard practice for aerodromes to use visual separation as a way to separate aircraft in the air and on the ground. Being able to see the ground clearly and to

[63] Transcript, Volume 2, page 351.
[64] Exhibit 23951-X0103, Solas Supplemental Glare Report FEB2019.
[65] Transcript, Volume 2, page 303.

see other aircraft or obstructions on the ground is therefore important for the safety of the pilots, hangar owners, and residents of the project area.[66]

128. Dr. Bob Graham, who owns a hanger at the Drumheller airport and is a pilot, stated that a pilot subjected to glare could experience a temporary period of reduced vision during which he could easily miss another aircraft in the area. He also stated that an airport is the place where the risk of collision is highest, and he questioned why a glare risk would be permitted near an airport.[67]

129. Mr. Murray commented on the safety risks from solar glare for both motorists and pilots. He stated that he has a big concern with glare on roadways. He gave the example that if glare got into his eyes he may not see another vehicle on the roadway and an accident could occur if he pulled onto the roadway in front of that vehicle.[68] Mr. Murray estimated that on average there are 15 to 20 flights in and out of the Drumheller airport each day, which amounts to 7,000 to 8,000 flights per year. He stated that these flights include crop sprayers, government aircraft, flight schools, the RCMP and other air transport vehicles.[69]

130. Both Mr. Murray and Mrs. Cardamone indicated that STARS helicopters use the Drumheller airport. Mrs. Cardamone stated that nobody gets to choose when an emergency takes place and if glare issues arise during a STARS flight, it would not be safe.

131. The SOP indicated that the majority of pilots using the airport are recreational flyers and not commercial pilots with extensive experience. Mr. Cardamone addressed the significance of solar glare to recreational pilots by stating:

> Mr. Saint-Martin can belittle our strip and our glare, but tasks easy and simple to him can be difficult and possibly fatal for less-experienced pilots. 20 percent of the time for potential glare is 20 percent too much, when it could be zero. Any added glare is added risk. The glare studies only discuss final approaches and takeoffs, as per the FAA guidelines. Why won't anyone talk to me about glare overtop of the 300,000 panels?
>
> …
>
> Most of our pilots are farmers, businessmen, and students. We're not trained professionals and we're not always on the top of our game, like Mr. Saint-Martin. With over 400 acres, 270,000 panels, there is a large area that will likely have direct glare, regardless of direction [or] what you're flying.[70]

132. The SOP members stated that Aura's glint and glare assessment focused on the main north-south runway of the Drumheller airport and did not address the east-west "crosswind" strip that pilots may favour using during crosswind conditions. SOP members Gordon Denzler, Colin Murray, Dave Burroughs, Peter Cardamone, Roy Smith, Dave Dedul, Dr. Bob Graham, Colin Jensen and Albert Jensen each gave evidence about the existence and use of the east-west

66 Exhibit 23951-X0075, 2019 01 30 SOP Group Submissions, page 10.
67 Transcript, Volume 2, page 430.
68 Transcript, Volume 2, page 441.
69 Transcript, Volume 3, page 476.
70 Transcript, Volume 2, pages 410-411.

strip. The SOP's written submission included an aerial photograph that the SOP stated showed the east-west strip as an area that was cleared of snow.[71]

133. The SOP responded to the examples given in the Green Cat report of solar panels being located at major airports by noting that those solar panel arrays were much smaller than the project.

134. In its argument, the SOP addressed the changes to the FAA guidelines that the Green Cat and Solas witnesses outlined when they gave evidence as the joint expert witness panel. The SOP submitted that the 2018 FAA guidelines require Aura to send its project proposal to the FAA, for the FAA's review and assessment of whether yellow-grade glare from the project meets FAA thresholds. The SOP indicated that neither Transport Canada nor NAV CANADA have provided an official response stating that the project does not pose a hazard to aviation.[72]

135. The SOP asserted that no amount of glare should be permitted on the east-west strip, and the project must be moved to ensure this. The SOP requested that any approval issued by the Commission include a condition that requires Aura to take all measures to ensure that pilots using the east-west strip are not subject to any glare.

6.2.3 Commission findings

136. Beginning with the potential effect of solar glare from the project on aviation activities, the Aura and the SOP expert witnesses concluded in their respective reports that there is no potential that aircraft on the flight paths extending north and south from the Drumheller airport's main runway would be subject to any glare from the project. Green Cat and Solas witnesses confirmed this conclusion in the joint expert witness statement filed in this proceeding. The Commission accepts the analysis and conclusions of these expert witnesses, and on the basis of their evidence, finds that pilots using the Drumheller airport's main (north-south) runway are not expected to be affected by solar glare from the project.

137. Although Aura questioned the east-west strip's existence and asked the SOP for clarification about the strip's registration status with NAV CANADA, the Commission is persuaded by the evidence of nine SOP members who confirmed they were aware of or had used the east-west strip at the Drumheller airport, and finds that the strip exists and is in active use.

138. Only Solas assessed the potential for glare on the east-west strip. Solas predicted that the potential for yellow-grade glare from the project along the eastbound approach to the east-west strip is limited to 10 minutes each morning during a five-month period, and that the glare intensity would be 780 times dimmer than staring at the sun. Solas also predicted that the potential for yellow-grade glare along the westbound approach to the east-west strip is limited to six minutes each evening during a period of slightly less than five months, and that the glare intensity would be 810 times dimmer than staring at the sun.

139. The Commission accepts Solas's analysis and conclusions, and finds that there is a potential for yellow-grade glare to be present along portions of the east-west strip flight paths, as described in the preceding paragraph. The Commission also accepts Solas's conclusion that changing the azimuth and tilt of the solar panels would not mitigate the glare, nor would any

[71] Exhibit 23951-X0076, PDF page 79; Exhibit 23951-X0077, PDF page 125.
[72] Transcript, Volume 3, pages 610-611.

kind of screening. The Commission must therefore consider whether this potential for yellow-grade glare to affect users of the east-west strip poses an unacceptable safety risk.

140. Green Cat and Solas each stated there was no guidance, policy or regulation in Canada that addresses the siting of solar panels near airfields. Both experts initially identified the FAA Interim Policy as providing guidance, however, they subsequently confirmed that that policy is no longer in effect. Solas stated that the FAA's current policy requires that information about the predicted impacts of glare from a solar project on airport operations be provided to the FAA for its review and approval. Green Cat noted that the FAA is an American regulator whose requirements do not apply in Canada, and in any case the FAA's requirements apply to solar projects that are located on airport property. Green Cat stated that the project would not be located on airport property, and Aura confirmed that both NAV CANADA and Transport Canada reviewed the details of the project and did not raise concerns about solar glare.

141. The Commission is not convinced that any of the FAA requirements or guidance should be applied in this proceeding to assess the acceptability of solar glare effects on users of the east-west strip. Although the FAA policy documents were filed on the record, no witness was able to address how the FAA interprets or applies the guidance contained in the rescinded FAA Interim Policy or in the current policy. The Commission is also not convinced that the FAA requirements were intended to apply or should be applied to the east-west strip at the Drumheller airport that is used occasionally by small aircraft, sometimes by choice and sometimes due to crosswind conditions.

142. In the absence of applicable regulatory requirements or guidance, the Commission has considered the available evidence, including that of Mr. Saint-Martin and that of the SOP pilots in deciding whether the yellow-grade glare predicted along the east-west flight path poses an unacceptable safety risk. Based on the evidence and reasons that follow, the Commission is satisfied that the potential for yellow-grade glare on the east-west strip is a limited risk that can be reasonably mitigated.

143. The evidence establishes that the north-south runway is the primary and only registered runway at the Drumheller airport (that is, the only runway at the Drumheller airport identified in the Canada Flight Supplement and therefore the only runway that pilots unfamiliar with the airport would be aware of). In contrast, although available in emergency or crosswind conditions, the east-west strip is primarily used on an occasional and largely discretionary basis by local and other pilots familiar with the Drumheller airport.

144. Further, according to Solas's evidence, the period during which a pilot may be exposed to glare on the east-west strip is of short duration: a few minutes in the morning and in the evening during five months of the year. In addition, the predicted intensity of the solar glare ranges between 780 and 810 times dimmer than staring at the sun. When depicted on a hazard plot the glare appears just above the boundary between green-grade and yellow-grade glare, which indicates there would only be a slight risk of temporary after-image.[73] The Commission accepts the evidence of Mr. Saint-Martin that more experienced or skilled pilots would likely be able to deal with the added distraction of such solar glare and would likely be able to complete takeoff

[73] Exhibit 23951-X0103, Solas Supplemental Glare Report FEB2019, pages 10 and 14.

and landing manoeuvres during the predicted glare conditions without any additional risk of mishap.

145. The Commission acknowledges the distinction highlighted by certain of the SOP pilots between recreational and commercial pilots. Nevertheless, the Commission accepts the evidence of Mr. Saint-Martin that solar glare can be managed to some degree by the pilots themselves. For example, Mr. Saint-Martin testified that on most days a pilot will have the main north-south runway available for use. On days with crosswinds, which Mr. Saint-Martin estimated would be 23 per cent of the time, during those five months of the year when yellow-glare may occur on the east-west strip, a pilot can delay taking off or landing for the 10 minutes or less needed for glare conditions to end. If glare is encountered in the course of a landing, a pilot can overshoot and manoeuvre back to the strip when glare conditions have ended. Because the vast majority of pilots likely to use the east-west air strip are local pilots who are familiar with and regular users of the Drumheller airport, the Commission is satisfied that the type of self-management described by Mr. Saint-Martin is a reasonable means by which to mitigate any potential risk associated with glare on the east-west strip.

146. Should the project be approved, the Commission would encourage the Drumheller airport to consider as another possible mitigation, whether there are means by which it might advise pilots of the potential for solar glare when using the east-west strip during those five months of the year when yellow-glare may occur.

147. Concerning the potential for glare at buildings located at the airport, Green Cat predicted that 366 minutes of yellow-grade glare would occur at a central point within the buildings associated with the Drumheller airport. Green Cat expected this glare to be present between 6 p.m. and 7 p.m., beginning in mid-May and ending in early August and expressed the opinion that the impact of this glare on the airport or activity there would be negligible.[74] Solas provided a similar assessment, stating that pedestrians at the airport and pilots using the east-west aircraft taxi road (between hangars and the runway) would be expected to see minimal amounts of yellow-grade glare from the project for very short durations. Solas concluded that glare from the project would have a very low potential to result in hazardous conditions at these locations.[75]

148. On the basis of the above evidence, the Commission finds that the effect of solar glare at the buildings of the Drumheller airport, on pedestrians at the airport and on pilots using the east-west aircraft taxi road (between hangars and the runway) is expected to be minimal and would not pose a safety hazard to those activities and individuals.

149. The SOP members also cited glare impacts at residences as a concern but they did not provide any specific information about how the residents or their activities may be affected. The predicted annual duration of low intensity yellow-grade glare from the project at the most affected residence was predicted by Solas to be approximately 62 hours. The Commission considers that low intensity yellow-grade glare of such duration at a residence may pose an occasional nuisance for occupants but would not normally pose a safety hazard, and by definition, it would not pose a health hazard. The Commission accepts that visual screening, including fencing and trees, can reduce the impact of solar glare. The Commission notes that

[74] Exhibit 23951-23951-X0063, Glare Study, PDF page 18.

[75] Exhibit 23951-X0080, G - Evidence of Paula McGarrigle - Glare Report, page 41.

Aura stated the project would have a perimeter fence and that Aura also committed to implementing visual mitigation that could include tree screening.

150. Notwithstanding its conclusion that there is minimal potential for nuisance from solar glare at residences in proximity to the project, should the project be approved, the Commission expects Aura to promptly investigate any requests or concerns from residents about solar glare from the project affecting their use or enjoyment of their property, and to consult with those residents and consider any reasonable requests for screening or other mitigation to reduce or eliminate solar glare at the residence.

151. The evidence of Green Cat and Solas on the potential for glare on roadways establishes the potential for yellow-grade glare on area roadways of limited duration and relatively low intensity (470 times dimmer than the sun). Ms. McGarrigle and Mr. Olien indicated that tree screening can mitigate solar glare by diffusing light and by breaking a very large glare spot into many smaller glare spots. Based on all of the foregoing, the Commission finds that yellow-grade glare from the project does not pose an unacceptable risk to roadway users. However, should the project be approved, the Commission expects Aura to investigate any concerns from motorists or municipal and provincial authorities about solar glare from the project creating hazardous conditions on public roads in the area, and to consider implementing reasonable mitigation measures including any measures recommended by municipal and provincial authorities having jurisdiction over roads in the area.

152. The Commission's findings above on the impacts of solar glare from the project take into account Aura's statement that the project's solar panels will include standard anti-reflective coating. Consequently, should it decide to approve the project, the Commission would impose the following as conditions of approval:

d. Aura shall use a standard anti-reflective coating for the solar panels used in the project. If Aura determines that it cannot or will not use such panels, it must notify the Commission immediately and provide the specifications of the panels Aura intends to use.

e. Aura shall file a report with the Commission detailing any complaints or concerns it receives or is made aware of about solar glare from the project during its first year of operation as well as Aura's response. Aura shall file this report no later than 13 months after the project becomes operational.

6.3 Emergency landings

153. The project lands are located directly north of the north-south runway at the Drumheller airport. The SOP members expressed two main concerns related to aviation safety and impacts on pilots using the airport. One concern was with solar glare from the project, (addressed in Section 6.2 above), the other concern related to the possibility of pilots being forced to land in the project area due to aircraft malfunctions or other emergency conditions. The area in which a pilot would be forced to land their aircraft in the event of an emergency will be referred to as a forced landing area.

154. As previously noted, given the significance of the emergency landing issue and the Commission's conclusion that there was insufficient evidence on the record to allow for its proper consideration, the Commission established additional process following the conclusion of the hearing by which it solicited additional evidence, including expert evidence, specific to this

issue. The original submissions of the parties and those received in response to the Commission's request following the hearing are summarized below.

6.3.1 Views of the applicant

155. Aura stated that the solar panels nearest to the Drumheller airport's main runway are situated 2,067 metres away for aircraft travelling directly north, and 660 metres away for aircraft travelling northwest. Aura submitted five examples of other airports that operated without a forced landing area: three in Alberta and one in each of Ontario and Quebec. For reference, Aura superimposed the layout of the project on aerial photographs of those other airports, approximately where the project would be located in relationship to the Drumheller airport. Aura concluded that none of those other airports had a forced landing area.[76]

156. When asked if Transport Canada or NAV CANADA had expressed any concerns about the separation between the project and the Drumheller airport, Aura stated that those conversations did not occur but that the boundary of the project, along with a map, was provided to NAV CANADA as part of Aura's application and that no concerns were raised.[77] Aura further noted a letter from NAV CANADA, filed as part of Aura's application to the Commission, stating that NAV CANADA had no objections to the project as submitted.

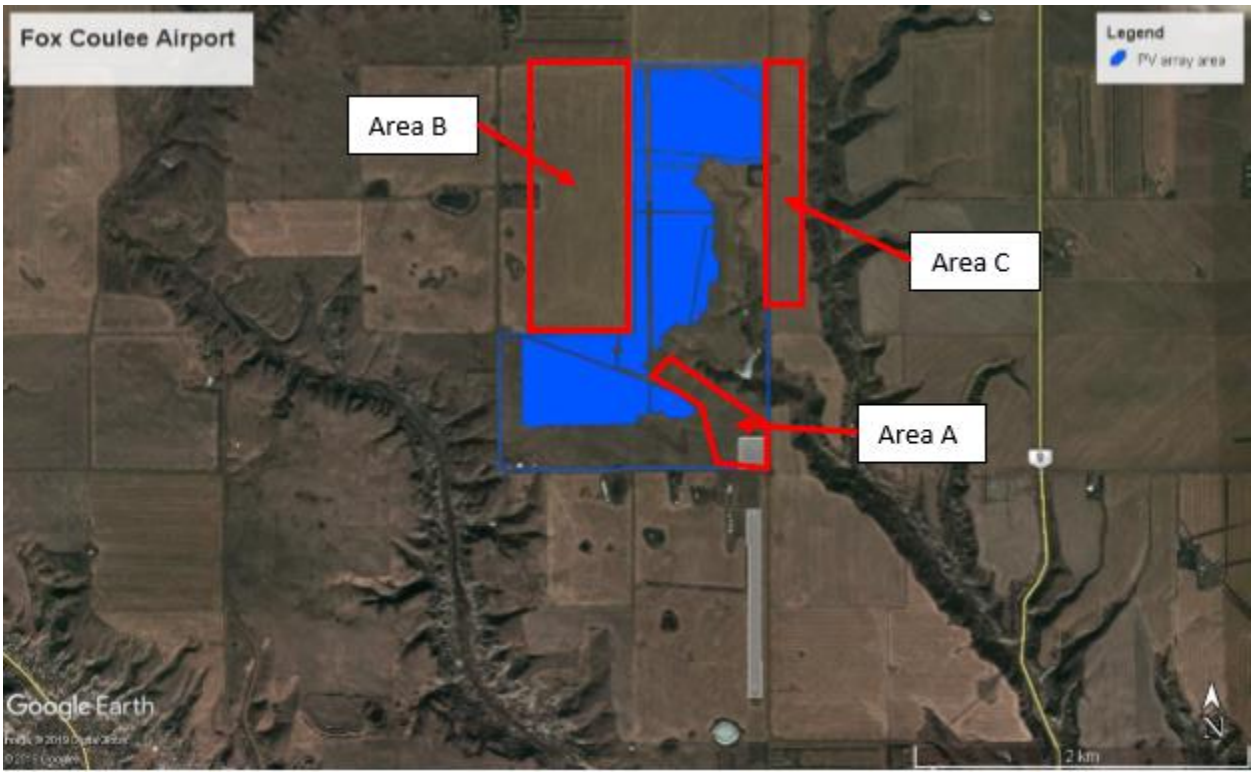
157. Aura also highlighted the Aeronautical Assessment Form for Obstacle Evaluation that it provided to Transport Canada and filed as part of its application to the Commission. That form was returned to Aura, signed by a civil aviation inspector on behalf of Transport Canada. The form indicated that Transport Canada does not require marking or lighting for the project, and stated: "[c]ompletion of this form does not constitute authorization for construction or replace other approvals or permits."[78]

158. In response to the Commission's request for additional information after the hearing, Aura filed a second report prepared by Mr. Saint-Martin that addressed concerns about the availability of a forced landing area for pilots. Mr. Saint-Martin's report cited statistics of engine failure and rates of emergency landings, and he calculated that there would be one engine-related accident for every 148,000 hours of flight time based on all types of aircraft. He added that the accident rate for privately-owned aircraft is greater than other kinds of aircraft but the Transportation Safety Board did not provide the information needed to calculate an accident rate for private aircraft. Mr. Saint-Martin clarified that statistics for engine failure rates are based on all phases of flight, and not only takeoff and landings, and he considered that it was a conservative estimate.

159. Mr. Saint-Martin stated that the project would reduce the options available to pilots in the event of a forced landing during takeoff or landing at the Drumheller airport, but added that depending on the altitude at which the engine failure occurs, some options would still be available to a pilot in case of an unforeseen maneuver. The options he identified are shown in the figure below.

[76] Exhibit 23951-X0139, Aura Additional Evidence Appendices, PDF pages 3-8.
[77] Transcript, Volume 2, page 299, lines 8-15.
[78] Exhibit 23951-X0139, Aura Additional Evidence Appendices, PDF pages 18-19.

Figure 3. Mr. Saint-Martin's options for forced landings at Drumheller airport



160. Mr. Saint-Martin stated that Area A provided a forced landing option for failures at low altitude, and that Area B and Area C were options for failures at higher altitudes. He noted that Area C, although an option, would be less favourable due to the close proximity of a power line. Mr. Saint-Martin concluded that using assumed performance parameters, Area A would be a good option for a pilot suffering an engine failure at up to 200 feet in altitude, but to use Area B a pilot would have to reach 350 feet or higher.[79]

161. Mr. Saint-Martin stated that at an average climb rate of 500 feet per minute, an 18-second gap existed where the pilot would not have an acceptable forced landing opportunity. He submitted that this short period of time combined with the low probability of engine failure results in a very low level of risk.[80] He also stated that the gliding distance of an aircraft without power can be reduced by pilot technique but it cannot be stretched, and that an aircraft with an engine failure between 200 and 350 feet could shorten its gliding distance and use Area A.

162. Mr. Saint-Martin's overall conclusion was that the project would not meaningfully affect the options available to a pilot if an engine failure occurred during takeoff.

163. With respect to emergency landings, Mr. Saint-Martin stated that Area B and Area C are good options for pilots dealing with a lack of engine power because they are located in the same direction as the runway and are close to its centerline. Mr. Saint-Martin also stated that the absence of the solar panel array would not reduce the risk in that case because the coulee is the

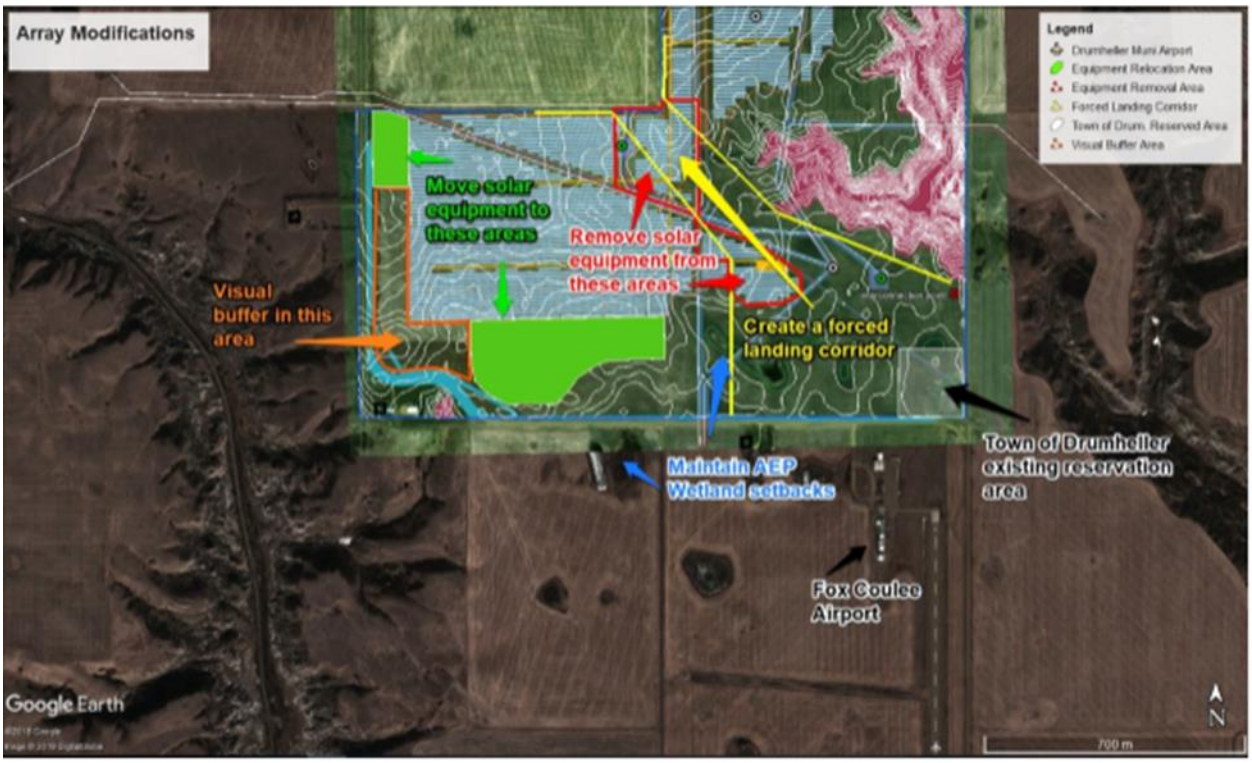
[79] Exhibit 23951-X0139, Aura Additional Evidence Appendices, PDF page 21.
[80] Exhibit 23951-X0139, Aura Additional Evidence Appendices, PDF page 21.

most important obstacle to reaching the runway and there are no solar panels between the coulee and the runway.[81]

164. Mr. Saint-Martin stated that informing pilots of the presence of the solar panel array by publishing the information in the Canada Flight Supplement was one possible mitigation measure. He added that pilots are required by regulation to study the information about any airport from which they are planning to operate.

165. The second mitigation option Mr. Saint-Martin identified was the revised project configuration that appears below. Mr. Saint-Martin stated that, although not required by regulation, the revised configuration would create a forced landing corridor approximately 450 feet wide, which he indicated was six times wider than the Drumheller airport's main runway.[82]

Figure 4. Revised project configuration



166. Aura stated that it evaluated the project's design and found there were no forced landing area alternatives within the project's current footprint. Aura stated this was due to limitations from AEP concerning setbacks from coulees and wetlands, additional setbacks from pipeline rights-of-way, wellsites and roads, and a buffer area that Aura had developed between the project boundary and the landowners to the west of the project.

[81] Exhibit 23951-X0139, Aura Additional Evidence Appendices PDF page 21.
[82] Exhibit 23951-X0139, Aura Additional Evidence Appendices, PDF page 23.

167. Aura stated that the revised project configuration for the project, which it developed with Mr. Saint-Martin, was not ideal because:

- It reduced the visual buffers between the project and the roads to the south and west of the project, and between the project and the Murray/Kleinschroth property, the Cardamone property and the Burroughs property.
- It increased cabling and operational costs due to the project being more spread out.
- Additional access points would be required, with additional traffic expected on the south side of the project. It could also require a gravel access road to link the north and south segments on either side of the forced landing corridor.
- It could result in minor changes to the glare and noise impacts of the project.
- There was no guarantee that the corridor would remain free of other structures that were outside of the Commission's jurisdiction.

168. Aura did not specifically submit an amendment to its application, however it stated that if the Commission found that altering the project layout was essential, changing the configuration of the solar panel array as proposed in the revised project configuration was a viable but suboptimal option.

169. Aura's written submission replying to the SOP's and Drumheller's additional information argued that the expert information provided in response to the Commission's information request supported Aura's position that the project would not pose a notable hazard to users of the Drumheller airport, and that the project, as designed, was consistent with safe airport operations. Aura emphasized that all the reliable expert evidence agreed on this point and confirmed that the project and the Drumheller airport can safely coexist.[83]

6.3.1.1 Views of the SOP

170. The SOP members expressed concern that in the event of an engine failure, a pilot would be forced to land within the project boundary and possibly within the solar panel array. Dr. Graham stated that a pilot having engine trouble cannot pick a place to land and must resort to the best possible place. He stated that the presence of a nearby power line meant that a forced landing would have to be close to the project. He stated that the solar panels should be at least a mile away from either side of the landing to ensure pilot safety in the event of a forced landing.[84]

171. Colin Jensen stated:

> The most -- biggest concern is obviously safety, the same as everyone else has said. You have engine failure, taking off, going on 3, 4, landing and -- like you said, 104 feet per second you're travelling at, roughly in a single engine. There's no time to really come up with a plan because there's a power line and the coulee. So you're more or less going to be a human shish kabob landing in all that metal and plastic and concrete.

[83] Exhibit 23951-X0153, Aura - Additional Evidence Reply, PDF page 2.
[84] Exhibit 23951-X0076, A1 - Submissions of SOP members, PDF page 28.

> There's just -- there's going to be no chance at all of survival, where as before, it's just a nice flat field and it's perfect and safe and it makes you happy and proud to be part of the airport around Drumheller because it is a safe and scenic and beautiful airport to be a part of.[85]

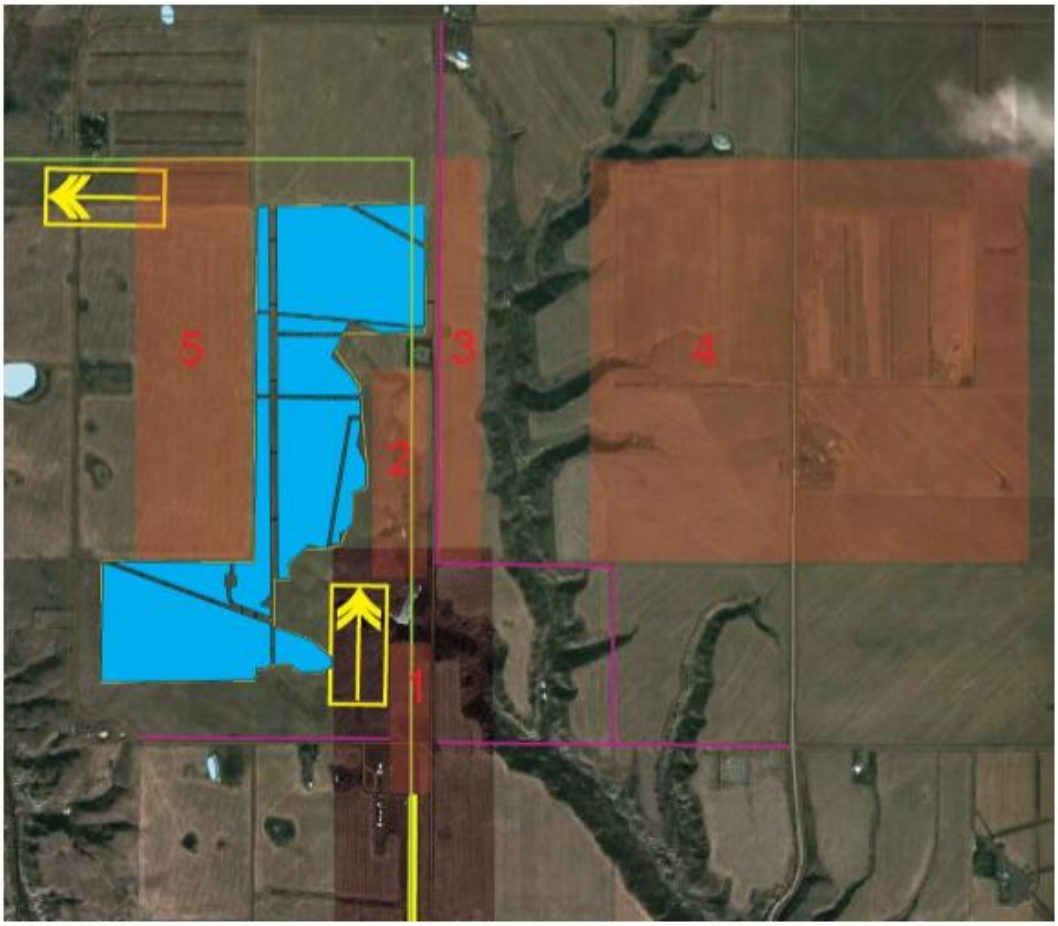
172. When asked about provisions at other airports for emergency landings, Mr. Cardamone responded that in the prairies pilots have many choices. He indicated that pilots are fortunate that there are fields and flat ground everywhere and not a lot of trees. Mr. Cardamone also stated that although he appreciates that Aura had changed its original project design to move some solar panels away from the Drumheller airport, the panels are still too close to the airport to alleviate his concerns about emergency landings within the project boundary. Gordon Denzler, who is a pilot, added that he would prefer to see a clear path all the way through the project that was totally open and had no obstructions. He estimated that the clear path should be a little wider than the width of a DC-3 airplane.

173. In response to the Commission's request for additional information about emergency landings and pilot safety, the SOP filed a report prepared by JetPro Consultants Inc. (JetPro). JetPro stated that the most critical and potentially risky phase of flight occurs during the takeoff and initial climb, during which the aircraft is at a low speed and a high-power setting. It added that during this phase of flight, aircraft are relatively low to the ground and moving slowly. Accordingly, forced landing options are limited to areas immediate to the aircraft because the aircraft glide range is so restricted.[86]

174. JetPro stated that landing within the solar panel array would be hazardous due to the non-frangible solid structures present; however, if the project were constructed there would still be adequate forced landing areas north of the airport. It identified five such areas, depicted in the figure below.[87]

[85] Transcript, Volume 2, pages 431-432, lines 16-5.
[86] Exhibit 23951-X0142, Appendix A - JetPro Report, page 10.
[87] Exhibit 23951-X0142, Appendix A - JetPro Report, Figure 6 on page 11.

Figure 5. JetPro forced landing areas at Drumheller airport



175. JetPro stated that the Drumheller airport does not have a local air traffic control unit, and that Transport Canada procedures for uncontrolled aerodromes include a standard traffic pattern that is based on visual flight. JetPro stated that air traffic at the Drumheller airport follows a standard left-hand traffic pattern, and calculated that on approach to landing aircraft would overfly the project for approximately 14 seconds, and departing aircraft would overfly the project for approximately 16 seconds.

176. JetPro concluded that the applied-for design of the project was reasonable from a flight safety perspective, given the limited amount of time an aircraft overflies the solar panel array and the numerous forced landing field options adjacent to the aerodrome. JetPro also stated that in its opinion, any elevated risks from the solar panel array could be mitigated by implementing a right-hand traffic pattern and by offsetting the traffic pattern five degrees to the northeast, which would avoid aircraft flying over the solar panel array.

177. The SOP members disagreed with some of JetPro's conclusions, in particular with its assessment of the five forced landing options. The SOP stated that JetPro's recommended mitigation measures were not plausible and the landing options would create more risk rather than reduce or eliminate the risk to pilots. The SOP also noted that JetPro did not conduct a field visit to validate the landing zones. The SOP submitted that its members are residents of the area and are pilots who frequently use the Drumheller airport.

178. Mr. Cardamone commented on all the proposed landing areas stating that Options 2 and 3 were not viable due to the proximity of coulees, an existing power line and pressurized natural gas liquid vessels at a nearby oil and gas facility. Mr. Cardamone stated that Option 1 would be viable for pilots just after takeoff, but once they reached a high enough altitude it would no longer be viable. Mr. Cardamone stated that Options 4 and 5 would be viable only if a pilot could reach an altitude high enough to glide to these areas. Mr. Cardamone noted that Option 4 would require a pilot to glide over a coulee and Option 5 would require a pilot to glide over the solar panel array. Mr. Cardamone concluded that these options may not be possible, and that in most low-level engine failure situations, the only choice the pilot will have will be what is directly in front of them, with a possibility of a quick slight turn."[88]

179. The SOP members also disagreed with JetPro's suggestion that the circuit path of the north-south runway be realigned five degrees to the northeast. Mark Kinniburgh stated that offsetting the departure track five degrees would aim his aerial spray planes directly at a power line that was one-half mile to the northeast. He added it was doubtful that his aircraft could clear that power line safely when the aircraft were fully loaded, and so JetPro's suggestion was not an option for his pilots.[89]

180. Roger Church, who is also a pilot, stated that it would be unreasonable to adjust the circuit pattern, adding that is only done for pre-existing physical and noise obstructions. Mr. Church also stated that changing the circuit would set a negative precedent.[90] He and Mark Kinniburgh further stated that changing the circuit path would negatively affect other landowners and businesses with increased noise.

181. The SOP commented on the second report from Mr. Saint-Martin that Aura filed in response to the Commission's request for additional information.[91] The SOP members challenged the assumptions Mr. Saint-Martin made about the speed and capabilities of aircraft using the Drumheller airport, noting that a wide variety of airplanes and recreational pilots used the airport. They also questioned Mr. Saint-Martin's conclusions about engine failure statistics.

182. Mark Kinniburgh stated that he strongly disagreed with Mr. Saint-Martin's statement that pilots would not have a forced landing option for only 18 seconds on each takeoff. Mark Kinniburgh stated that the validity of that statement depends on a number of variables, including aircraft gross weight, the strength and direction of prevailing wind, where the aircraft rotates, climb rate and ground speed, where and at what altitude the emergency occurs, as well as pilot skill which Mark Kinniburgh stated was the most unknown variable. He also questioned Mr. Saint-Martin's description of the takeoff phase of flight for standard light aircraft, indicating that the performance parameters of the spray planes that he and his father, Brian Kinniburgh, fly are very different from what Mr. Saint-Martin assumed in his second report.

183. In response to Aura's examples of other airports that do not have forced landing areas available, the SOP members stated that in all of those other locations, and at most other airport locations around the world, there is immediate access to landing sites for first responders and those responders do not face a risk of being electrocuted. The SOP requested that the

88 Exhibit 23951-X0141, 2019 06 25 SOP Evidence re AUC May 31 Request, PDF pages 5-6.
89 Exhibit 23951-X0141, 2019 06 25 SOP Evidence re AUC May 31 Request, PDF pages 6-7.
90 Exhibit 23951-X0141, 2019 06 25 SOP Evidence re AUC May 31 Request, page 7.
91 Exhibit 23951-X0151, 2019 07 15 SOP Group Reply Submissions (Post Hearing).

Commission consider the specific features and surrounding land use of the Drumheller airport when deciding Aura's application.

184. The SOP also commented on the revised project configuration, as depicted in Mr. Saint-Martin's second report. The SOP submitted that the reconfigured array increases the risks to the adjacent landowners in the area. The Cardamones stated that any benefits from the forced landing corridor would be offset by the increased risk of adjacent landowners being trapped by fire, as the buffer zone to the project along the roadway—their escape route—would no longer exist.

185. The Cardamones also stated that the reconfiguration would locate panels, inverters and associated equipment closer to both their residence and the Kleinschroth/Murray residence, which would invalidate Aura's noise, glare and wildlife assessments (contrary to Aura's assertion that the changes would be immaterial). The Cardamones added that the solar panel array would be closer to the pond that collects water for use on their property, and would increase the need for visual barriers on the east side of their property, on the north and east sides of the Dalton property and northwest of the Burroughs' property.[92]

186. Mark Kinniburgh indicated that it was absurd for Aura to compare the risks associated with developments adjoining other airports to the specific hazards, in this case, of placing a large solar panel array near the Drumheller airport, and in particular the risk that results if first responders do not have site access. Mark Kinniburgh submitted that the amended site layout proposed by Aura did nothing to mitigate aviation risk but did negatively impact nearby property owners. He stated that "[t]hat the proposed changes are directly aimed at the two families instrumental in creating the SOP group is, of course, coincidental."[93]

187. The SOP stated that NAV CANADA's approval and Transport Canada's evaluation did not appear to consider the issues of emergency landings, and neither of those approvals conclude that the project would not interfere with the operation of the Drumheller airport. The SOP also stated that the approvals do not consider emergency or forced landings, or the safety implications from glare from the project, and the SOP submitted that the Commission should give no deference to the approvals.[94]

188. The SOP submitted that in the absence of specific regulations regarding design and placement of solar installations near an airport, the Commission should address the safety implications that the proposed project currently places on pilots at the Drumheller airport, as it is in the public interest to do so.[95]

6.3.1.2 Views of Drumheller

189. Drumheller stated that its number one priority and concern was safety. Drumheller stated:

> As Solar is relatively new in our country there are minimal regulations in place and Common Sense is needed. Where does an aircraft land with an engine failure over this area?

[92] Exhibit 23951-X0151, 2019 07 15 SOP Group Reply Submissions (Post Hearing), PDF pages 9-10.
[93] Exhibit 23951-X0151, 2019 07 15 SOP Group Reply Submissions (Post Hearing), PDF page 9.
[94] Exhibit 23951-X0151, 2019 07 15 SOP Group Reply Submissions (Post Hearing), PDF pages 3-4.
[95] Exhibit 23951-X0151, 2019 07 15 SOP Group Reply Submissions (Post Hearing), PDF page 6.

> We all have a responsibility to ensure this project does not endanger the aviation traffic. What can be done in the event of an emergency? Aura has not addressed this.
>
> We need to be diligent with this, if the AUC panel wants to allow this project to proceed then they must be held accountable when a disaster does occur.
>
> Should the AUC choose to approve this solar project at this location, let the record state that, the Town of Drumheller are Strongly Opposed to it for the Safety of the aviation traffic, the first responders, and the public. The risk is too great and is totally avoidable.[96]

6.3.2 Existing regulations and guidelines

190. In its letter to the parties requesting additional information, the Commission asked the parties to identify and file any documents that provide guidance on land use in proximity to airports similar to the Drumheller airport, (but not Transport Canada's *TP 1247E Land Use in the Vicinity of Aerodromes* (TP1247) which had already been filed in the proceeding). Each of the parties filed or referred to regulations or other guidance in its response to the Commission.

6.3.2.1 Views of the applicant

191. Aura stated that the Drumheller airport is not classified as a certified aerodrome but is a registered aerodrome with the identification CEG4.[97] Mr. Saint-Martin stated that Transport Canada's *Aerodrome Standards and Recommended Practices*, 5th edition (TP312), provides recommendations for separation distance, safety zones, setbacks, protection or obstacle free zones surrounding runways, but does not specifically address the installation of solar panels in the vicinity of airports. He submitted that the project's solar panel array would not conflict with any of the recommendations in TP312. He also stated that he was not aware of any runway design that included obstacle-free forced landing areas as a design requirement, or of any regulatory body in Canada denying the construction of a structure in order to expand an obstacle-free forced landing area beyond the recommendations made by Transport Canada.

192. Mr. Saint-Martin stated he also reviewed *Canadian Aviation Regulations Standard 621 – Obstruction Marking and Lighting*. He determined that neither it nor TP1247 addresses the installation of solar panels in the vicinity of airports.

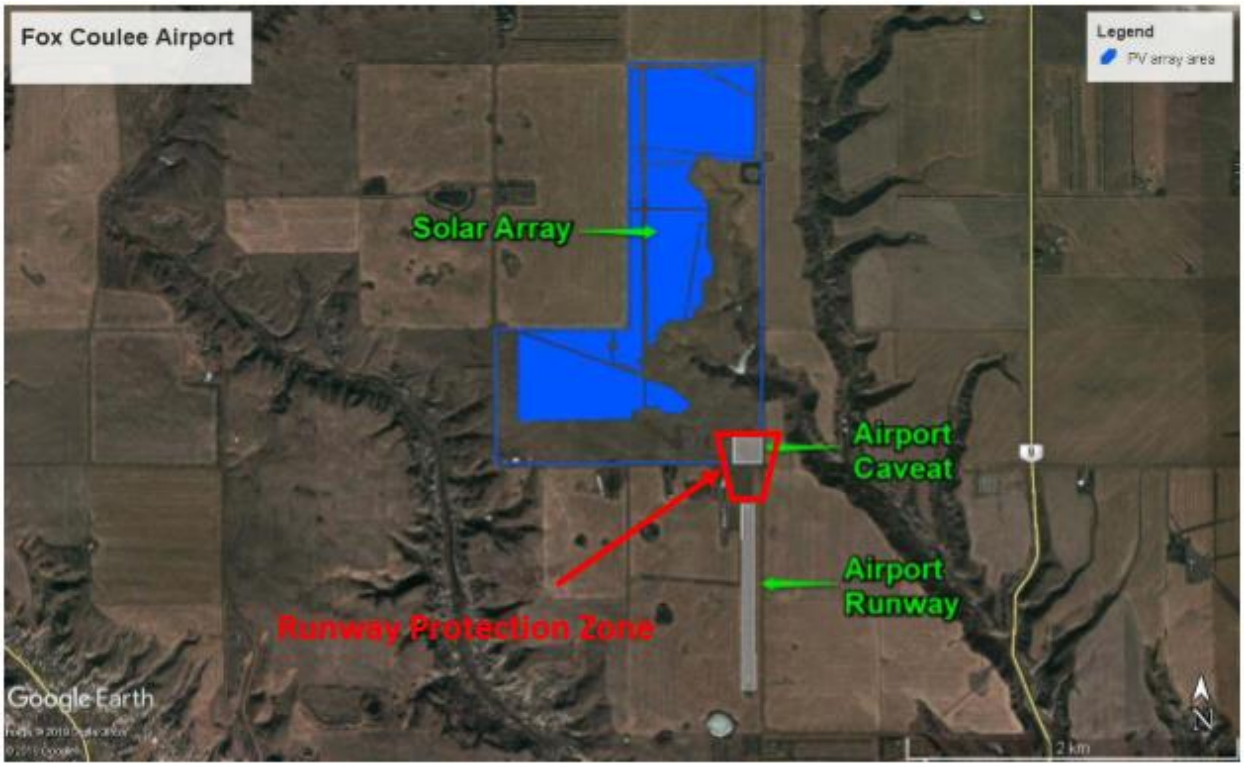
193. Aura stated that it received clearance from both Transport Canada and NAV CANADA, the bodies who administer the *Canadian Aviation Regulations* and TP1247.

194. In response to the interveners' statements that the project does not comply with recommendations in FAA Advisory Circular 150/5300-13 concerning runway protection zones, Mr. Saint-Martin provided his calculation of the Drumheller airport's runway protection zone to demonstrate that the project does comply. Mr. Saint-Martin stated the size of the runway protection zone is dependant on the length of the runway and the minimum visibility. Using this information for the Drumheller airport, Mr. Saint-Martin calculated the dimensions of the runway protection zone as 1,000 feet (305 metres) in length, with an inner and outer width of 500 (153 metres) and 700 feet (213 metres). Mr. Saint-Martin concluded that none of the

[96] Exhibit 23951-X0148, Response to AUC correspondence from June 6, 2019, page 3.
[97] Exhibit 23951-X0095, Information Request Response: Round 2, page 19.

project's solar panels would be located within the runway protection zone for the Drumheller airport.[98] His depiction of the Drumheller airport's runway protection zone is shown below.[99]

Figure 6. Drumheller airport's runway protection zone



6.3.2.2 Views of the SOP and Drumheller

195. The SOP and Drumheller each submitted that the project would not comply with sections 301.8 or 302.10 of the *Canadian Aviation Regulations*, SOR/96-433 (CAR), both of which prohibit hazardous makers, signs, lights or signals being knowingly displayed in the vicinity of an aerodrome or airport. Section 301.8 states:

> No person shall: (g) knowingly display at or in the vicinity of an aerodrome a marker, marking, sign, light or signal that is likely to be hazardous to aviation safety by causing glare or by causing confusion with or preventing clear visual perception of a marker, marking, sign, light or signal that is required under this Subpart;[100]

196. The SOP also stated that the project did not comply with the following requirement in Section 3.2.1.11 of TP312:

> The runway end safety area is free of objects, including equipment and installations, other than visual aids, instrument landing system (ILS) localizer and monitoring antennas, associated mounting structures, and fencing, required to be there by function and satisfying the frangibility requirements for all elements above grade.[101]

[98] Exhibit 23951-X0154, pages 1-2.
[99] Exhibit 23951-X0154, Aura - Additional Evidence Reply – Appendix 1 and 2, PDF page 6.
[100] Exhibit 23951-X0144, Appendix C - Canadian Aviation Regulations, PDF page 60.
[101] Exhibit 23951-X0141, 2019 06 25 SOP Evidence re AUC May 31 Request, pages 10-11.

197. The SOP submitted that portions of the project could be within the runway-end safety area and would infringe upon the setbacks defined in Section 3.2.1.11 of TP312.[102]

198. Drumheller cited Section 302.201 of the CAR, which addresses emergency plans developed by airport operators, however it did not submit argument related to that provision. Drumheller also cited the runway protection zone requirements under FAA guidance documents, and stated that the project does not meet FAA guidelines that recommend solar panel arrays not be located in runway protection zones and require project owners to demonstrate that glare will not affect aircraft.[103]

6.3.3 Commission findings

6.3.3.1 Existing regulations and guidance

199. Section 694(6) of the *Municipal Government Act* authorizes the Lieutenant-Governor in Council to make general airport vicinity protection area regulations. A regulation made under that authority would permit a municipality to define the land in the vicinity of an airport that will be subject to the regulation. It would also prescribe how the municipality is to manage the use and development of land in the vicinity of an airport and would regulate the control, use and development of land in the vicinity of an airport. The Commission notes that the *Drumheller Airport Vicinity Protection Area Regulation*, AR 218/92 was repealed on December 31, 1998, pursuant to Section 1(e) of the *Airport Vicinity Protection Area Repeal Regulation*, AR 92/98. No party indicated that an airport vicinity protection area regulation is in effect for the Drumheller airport.

200. As discussed previously in this decision, the FAA Interim Policy on solar power projects at airports was rescinded in April 2018, and the Commission has determined that there is no FAA policy on solar power projects at airports that applies in Canada. The Commission also observes that there appear to be no existing Canadian regulations or guidance from recognized aviation authorities in Canada on the siting of solar power projects near airports.

201. Aura and the interveners offered submissions about more general recommendations and guidance concerning land use, development and activities near airports, in the context of the safety risks to aircraft. The Commission has considered those submissions and for the reasons that follow, has determined that the project does not appear to contravene any of the recommendations or guidance identified by the parties.

202. The SOP and Drumheller argued that the project would not comply with the provisions of the CAR that prohibit certain markings or lighting in the vicinity of airports. The Commission notes that these prohibitions apply to a person who "knowingly displays" a marker, marking, sign, light or signal that is likely to be hazardous to aviation safety by causing glare or confusion with an airport marker required by law. The Commission finds there is no evidence that the project includes a marker, marking, sign, light or signal that Aura knowingly intends to display. The Commission notes that Transport Canada and NAV CANADA each reviewed and accepted Aura's project proposal, and that Transport Canada's acceptance explicitly acknowledged there would be no lighting or painting associated with the project.

[102] Exhibit 23951-X0141, 2019 06 25 SOP Evidence re AUC May 31 Request, page 11.
[103] Exhibit 23951-0148, Response to AUC correspondence from June 6, 2019.

203. The Commission also considered the possibility that the arguments of the SOP and Drumheller asserting the project's non-compliance with the CAR may be based on the potential for solar glare from the project. However, the Commission found in Section 6.2 that solar glare will not affect the Drumheller airport's main north-south runway and that solar glare from the project that is expected to affect the east-west runway flight paths will be low in intensity, of limited duration, and not likely to result in an after-image for pilots. In the Commission's view, this limited amount of low intensity solar glare does not represent a light or signal that is knowingly displayed by Aura, and would not pose an unacceptable safety risk to pilots or be confused with an airport marker.

204. Upon review, the excerpt provided by Drumheller on Section 302.201 of the CAR imposes an obligation on the operator of an airport to develop and maintain an emergency plan in accordance with the regulation. The Commission also notes that such a plan is to be developed by the operator "after consultation with a representative sample of the air operators that use the airport and with community organizations that may be of assistance during emergency operations at the airport or in its vicinity." The Commission expects that if the project is constructed, the operators of the Drumheller airport will consider Aura to be one of the community organizations that could assist the airport in an emergency, and will accordingly develop its emergency plan in consultation with Aura, among others. As discussed in Section 6.1 of this decision, should the project be approved, Aura would be directed to consult Drumheller and the Drumheller Airport Commission in the development of its emergency response plan for the project prior to construction. The Commission finds no contravention of Section 302.201 of the CAR.

205. All of the parties' submissions addressed the required runway protection zone under FAA Advisory Circular 150/5300-13. The SOP did not describe what it considered to be the size and configuration of Drumheller airport's runway protection zone. The SOP inferred, however, that the runway protection zone was large enough to encompass portions of the project's solar panel array or other equipment associated with the project. Drumheller's submission stated that solar equipment is not recommended in the runway protection zone, and it argued that the project does not meet the FAA guidelines.

206. Mr. Saint-Martin explained how a runway protection zone is calculated under the FAA Advisory Circular 150/5300-13. He also submitted a depiction of the Drumheller airport's runway protection zone that shows the runway protection zone is comparable in size and location to the easement area (discussed in Section 5.4), although the runway protection zone is slightly wider from east to west at its most northerly extent. In the absence of contrary evidence, the Commission accepts Mr. Saint-Martin's calculation and depiction of the runway protection zone and on the basis of that depiction, finds that no part of the project's solar panel array or other structures or equipment would be located within the runway protection zone. The project therefore appears to comply with the guidance in the FAA's Advisory Circular. The Commission also finds that no party has demonstrated that any part of the project would be located in a runway-end safety area or other area that TP312 requires or recommends be kept clear of objects.

207. In summary, after considering the additional information submitted by the parties, the Commission concludes that the project appears to comply with the regulations and other guidance identified by the parties as relating to land use, development, and activities in proximity to airports or aerodromes.

6.3.3.2 Forced landing area

208. The regulations and other guidance submitted by the parties do not identify a legal requirement for Aura to expand the forced landing area beyond that currently provided for. However, the Commission does not consider that to be determinative of this issue as there appears to be little clear guidance from aviation authorities about how to assess and manage the risk that adjacent land development and activities (particularly solar facilities) may pose to aircraft in distress. The Commission has therefore considered: (i) whether the evidence concerning demonstrated practices at airports, including the Drumheller airport, establishes a standard of practice and an acceptable risk threshold; and (ii) whether the weight of evidence allows for a reasoned conclusion about the acceptability of the risk presented by the project. Before detailing its conclusions on these points, the Commission first addresses two arguments advanced by Aura.

209. The Commission rejects Aura's argument that the assessments and approvals issued by NAV CANADA and Transport Canada, referred to in paragraphs 156 and 157 above, offer evidence that those agencies have concluded that the separation between the project and the Drumheller airport poses no, or an acceptable level of risk, to aircraft in the event of emergency landings. The letter from NAV CANADA expressly states that its assessment is limited to the impact of the proposed physical structure on the air navigation system and installations and the letter from Transport Canada is specific to marking or lighting for the project.[104]

210. The Commission also rejects Aura's argument that the 316KQ easement agreement between Drumheller and the (then) landowner of Section 28, Township 29, Range 20, west of the Fourth Meridian, demonstrates that the 8.10-acre easement lands constitute what is reasonably required by pilots in the event of an emergency. The 316KQ easement agreement was negotiated between the landowner and Drumheller as a private exchange of property rights. The Commission is only prepared to infer that the easement reflects the size and location of the easement lands the landowner was prepared to grant to Drumheller in exchange for the consideration that Drumheller was prepared to give for the easement rights to that parcel. The Commission will not infer from that agreement that in 1969, or now, the easement lands represent the full extent of the land north of the airport that is required to address the safety concerns of the Drumheller airport and pilots operating there.

211. From an industry practice perspective, Mr. Saint-Martin provided five examples of Canadian airports that did not have forced landing areas adjacent to the airport property. He added that he was not aware of any runway design practices that incorporated a forced landing area beyond the airport lands. Mr. Cardamone stated that pilots on the prairies were fortunate to have flat, treeless fields available near airports in case of emergency landings. These examples, while helpful to the Commission, do not establish whether there is an established practice of providing forced landing areas on privately-owned lands adjacent to airports, nor do they identify what the industry considers an acceptable risk threshold. The Commission has therefore focused on the evidence specific to the risk the project poses to pilots who are forced to make an emergency landing in the vicinity of the project.

212. Aura and the SOP's respective experts each filed reports that, in summary, concluded that the applied-for design is reasonable from a flight safety perspective; the flight safety of aircraft departing, arriving and flying in the traffic pattern have not been compromised; and that while

[104] Exhibit 23951-X0139, Aura Additional Evidence Appendices, PDF page 17.

some forced landing areas north of the airport will no longer be available, the existence of the project will not meaningfully affect the options available to a pilot as there remain adequate forced landing areas that could be used in the event of an emergency.[105] With respect to the latter, both experts identified similar (but not identical) emergency landing areas generally available to pilots whose aircraft malfunctioned during takeoff or landing, although both experts acknowledged that a small risk remained that a pilot would be forced to make an emergency landing within the solar panel array.

213. More specifically, Mr. Saint-Martin stated that at an average climb rate of 500 feet per minute, an 18-second gap existed where a pilot would not have an acceptable forced landing opportunity. JetPro similarly calculated that aircraft on approach to landing would overfly the project for approximately 14 seconds and departing aircraft would overfly the project for approximately 16 seconds.

214. The SOP members, many of whom are pilots with extensive experience operating from the Drumheller airport, challenged the assumptions used by both experts and their respective conclusions. The SOP stated that Mr. Saint-Martin's 18-second gap was based assumptions about an aircraft's speed and capabilities that would not apply to many of the airplanes using the Drumheller airport, for example Mark Kinniburgh's fully loaded aerial sprayers. The SOP also questioned whether the experts accounted for features that made some of the proposed landing areas less viable, such as power lines, the coulees, and natural gas storage vessels at a nearby oil and gas facility. For example, Mr. Cardamone acknowledged that JetPro's landing Option 1 was a realistic option if engine failure occurred just as a pilot became airborne or passed the threshold, but he added that a few more seconds into the flight would put the aircraft too far down the flight path to be able to land safely. Mr. Cardamone also listed a number of concerns with each of JetPro's other four landing area options.

215. The Commission acknowledges the concerns of the SOP members with the expert evidence, however, for the following reasons the Commission affords it considerable weight.

216. Both experts have significant, relevant expertise. Mr. Saint-Martin is a pilot with a masters degree in mechanical engineering and more than 8,000 hours of flying time that includes commercial and single-engine planes. He is currently an accredited pilot examiner for Transport Canada and an aviation consultant. Mr. Graham, who authored the report on behalf of JetPro, is also a pilot. He has 2,500 hours of flight time that includes single-engine planes. He also holds a degree in aeronautical engineering, was an instructor in flight procedure design and has previously offered expert evidence in Commission proceedings on proposed wind turbines and transmission lines proposed to be located in the proximity of airports.

217. Each of these experts offered a detailed and comprehensive analysis in support of their opinions and significantly, they concurred in their conclusions. While the Commission accepts that the assumptions relied on by the experts may not apply to all the aircraft using the Drumheller airport, the Commission considers that the assumptions relied on nevertheless provide a representative case upon which the experts reasonably based their respective assessments. The Commission is also satisfied, based on the content of each of their respective reports, that the experts were reasonably aware of the unique topography of the area and of the

[105] Exhibit 23951-X0142, Appendix A - JetPro Report, PDF page 2; Exhibit 23951-X0139, Aura Additional Evidence Appendices, PDF page 20.

additional challenges presented by existing facilities and other physical features notwithstanding that neither conducted a site visit.

218. Also significant to the Commission is the fact that the JetPro evidence is adverse to the position taken by the SOP in this proceeding notwithstanding that it was sponsored by that group. As obviously independent evidence, the JetPro opinion is reasonably afforded considerable weight.

219. For all of the above reasons, the Commission accepts and relies on the opinions of Mr. Saint-Martin and JetPro, and more specifically, their common conclusion that while the project presents an incremental risk in circumstances of an emergency landing when compared to the current undeveloped state of the land north of the Drumheller airport, the applied-for design is nevertheless reasonable from a flight safety perspective and retains adequate and acceptable forced landing areas that could be used in the event of an emergency.

220. The Commission notes that both experts identified possible mitigation measures that could be implemented to minimize the incremental risk presented by the solar panels in circumstances of an emergency landing. JetPro suggested that the Drumheller airport change to a right-hand traffic circuit. In the Commission's view, this suggestion would fundamentally affect the airport's operations and is therefore a matter best left to the consideration of the Drumheller airport's owner and operators.

221. However, the Commission considers reasonable and supports Mr. Saint-Martin's recommendation that details of the project be published in the Canada Flight Supplement. Consequently, should it decide to approve the project, the Commission would impose the following as a condition of approval:

f. Aura shall provide any required information about the project to the Town of Drumheller and Transport Canada to prepare a publication in the Canada Flight Supplement as recommended in Mr. Saint-Martin's report.

222. Given its conclusion that the applied-for design is reasonable from a flight safety perspective, it is not strictly necessary for the Commission to comment on the reconfigured site layout proposed by Mr. Saint-Martin and Aura in its response to the Commission's request for additional information.[106] Nevertheless, the Commission observes that while Aura's reconfigured solar panel array creates an emergency landing corridor through the array, similar to what Mr. Denzler recommended, it also adds solar panels in the west and south setback areas that were established to address the safety concerns of residents on those sides, in particular the Cardamones and Ms. Kleinschroth and Mr. Murray. In the Commission's view, Aura's reconfiguration would potentially benefit pilots at the expense of the residents that Aura previously acknowledged would be affected if solar panels were placed near their homes. This is not an accommodation the Commission would have been prepared to consider because it trades one impact for another.

[106] Exhibit 23951-X0139, Aura Additional Evidence Appendices, Figure 1 on PDF page 30.

7 Residential impacts

7.1 Visual impacts and mitigation

7.1.1 Views of the applicant

223. Aura acknowledged the potential for the project to negatively affect some SOP members' views of the area surrounding their homes, particularly the Cardamones and Ms. Kleinschroth and Mr. Murray. In its reply evidence, Aura submitted a rendering of the visual impacts from the project superimposed on the images provided by the Cardamones depicting the existing views from their home. At the hearing, Aura asserted that these renderings are a worst-case scenario. Aura added:

> Aura is in discussions with the stakeholders right now to try to finalize or decide on what's an appropriate visual mitigation measure. So with no visual mitigations applied, this is a conservative estimate of what we think it would look like.
>
> …
>
> Aura did engage in discussions with these two stakeholders in particular about visual mitigation through the use of either dirt berms or vegetation. No decisions were finalized. However, Aura is still in discussions, and Aura does commit to continuing these discussions provided that the project is approved. Aura will continue to talk with these two stakeholders, both the Murrays and also the Cardamones, about visual mitigations.[107]

224. Aura confirmed that it will commit to implementing visual mitigation at the Cardamones' property through offset evergreen trees, provided that it is technically feasible to do so. When questioned by the SOP about the feasibility of such mitigation measures, Aura stated that that decision will be made in consultation with a professional agrologist. Aura added that if evergreen trees are not viable at the Cardamones' location, another mitigation method will have to be discovered in consultation with the agrologist.[108]

225. At the conclusion of the hearing, Aura filed a list of the commitments it made to stakeholders throughout the engagement process for the project.[109] The list, which Aura stated is not exhaustive and will be updated through the life of the project, includes the following commitments:

- Provide a viewscape mitigation plan to Mr. and Mrs. Cardamone in consultation with an agrologist, which may incorporate two offset rows of evergreen trees.
- Provide a viewscape/potential berm mitigation plan to Colin Murray in consultation with an agrologist.

226. Aura stated that if other SOP members request visual mitigation, Aura will conduct an assessment to determine the appropriate mitigation for the situation.[110]

[107] Transcript, Volume 1, page 49 lines 2-7; page 50, lines 6-14.
[108] Transcript, Volume 1, page 199, lines 7-12.
[109] Exhibit 23951-X0126, Aura Commitments to Stakeholders.
[110] Transcript, Volume 1, page 200, lines 1-11.

7.1.2 Views of the SOP

227. The SOP expressed concerns about adverse visual aesthetics and unwanted visual burden from the project. They asserted that the project will destroy the rural character of the area.

228. The Cardamones and Mr. Murray both stated that visual impacts from the project are a concern for them because they live adjacent to the project site. Mr. Cardamone stated that from the beginning of the consultation process he identified the visual effect of the project as a concern, but none of his concerns have been resolved. He clarified that although visual mitigation had been discussed and verbal commitments made, he has nothing in writing from Aura.[111]

229. Dave Burroughs stated that the project will be across the road and he will be able to see it from his bathroom, bedroom, kitchen and dining room windows, and when he is on the east and west sides of his property.[112]

230. Bruce Thompson stated that his property is on the north side of the project and his view will be of the steel structures supporting the solar panels, not the shiny glass panels. He requested a condition that his view of the project be blocked with trees or something else that does not interfere with his scenic view.[113]

231. Nick Dalton stated that although screening is a good idea, he knows from experience that trees are hard to keep alive in the area. He requested that a condition be imposed requiring Aura to maintain screening trees over the life of the project.[114]

232. The SOP submitted that if the project is approved, the Commission should include as a condition of approval that Aura work with the Cardamones, Ms. Kleinschroth and Mr. Murray and any other SOP members in close proximity to the project who request visual enhancements, to develop an effective and aesthetically pleasing visual barrier that would reduce the visual effects of the project on them.[115]

7.1.3 Commission findings

233. Aura's visual simulations provide only limited assistance in assessing the visual effects of the project on the Cardamones and other residents. However, Aura acknowledged that the landscape views of residents near the project would be affected. Aura proposed screening to mitigate these effects, which the Commission notes is the same mitigation measure proposed for limiting the nuisance effect of solar glare on residents.

234. The Commission finds that Aura's commitment to identify and implement tree screening or other suitable screening for the Cardamones and Ms. Kleinschroth and Mr. Murray, in consultation with an agrologist, is an acceptable approach to mitigate the visual effects of the project. During the hearing, Aura indicated that if other SOP members requested, it would conduct an assessment to determine the appropriate visual mitigation for their respective

[111] Transcript, Volume 2, page 406, lines 1-8.
[112] Transcript, Volume 3, page 464, lines 2-6.
[113] Transcript, Volume 2, page 389, lines 3-12.
[114] Exhibit 23951-X0151, 2019 07 15 SOP Group Reply Submissions (Post Hearing), page 13.
[115] Transcript, Volume 3, page 577, lines 5-12.

situations. Consequently, should it decide to approve the project, the Commission would impose the following as conditions of approval:

g. Aura shall conduct a visual mitigation assessment for any resident located within 800 metres of the project boundary who requests an assessment or visual mitigation. Aura shall ensure that any tree screening is developed with input from an agrologist, in order to better ensure that mitigation measures are feasible, will be durable, and relatively simple to maintain over the life of the project.

h. Aura shall take reasonable measures to ensure that any visual mitigation measures implemented for the project, including tree screening developed in consultation with the agrologist, are maintained throughout the lifespan of the project.

7.2 Vegetation, weed and dust control and overland water flows

7.2.1 Views of the applicant

235. Aura acknowledged that vegetation and weed control were identified as stakeholder concerns during public consultation for the project and stated that vegetation and weed control will be critical in reducing the risk of fire within the project boundary. When asked by the SOP about Aura's intended weed control methods, Aura stated:

> There's a number of different methods for controlling vegetation. Mechanical mowing is quite common at other solar facilities, but there is also effective vegetation control through grazing, which is also something that Aura Power is open to partnering with another livestock -- livestock participant.[116]

236. Aura also stated that it will plant a non-invasive grass seed on the project lands and develop a weed management plan in consultation with Starland County. Aura confirmed that it will communicate its vegetation control plan to local fire authorities and stakeholders before project construction commences.

237. Concerning dust control, Aura committed to use appropriate dust mitigation techniques and tools to control dust from the project. It gave the example of using water trucks to periodically douse roads, but added that Aura is not at the stage of finalizing dust control measures. It confirmed that it is open to discussing the matter with Starland County.[117]

238. In response to the Cardamones' concerns about overland water flow being disrupted by the project, Aura stated it does not intend to strip any vegetation from the land or perform any major grading, except where roadways and inverters are being placed. It added that the solar panels will be mounted on a friction pile post that is pushed into the ground. Aura does not expect these installations to disrupt overland water flow. Nevertheless, Aura stated that it can install small-scale culverts through some of the project's access roadways to prevent water from pooling on the site, and it committed to doing so if required to preserve overland water flows as much as practicable.

[116] Transcript, Volume 1, page 217, line 21 to page 218, line 21.
[117] Transcript, Volume 2, page 245, lines 9-14.

7.2.2 Views of the SOP

239. SOP members, including Dave Burroughs and Wendy Braun, expressed concern that weeds growing underneath and around the solar panels may spread to their farmland and they would be responsible for the additional costs of dealing with those weeds.

240. The SOP also expressed concern that weeds could become fuel for a fire that starts on or moves onto the project site. This was emphasized by Colin Jensen, a volunteer firefighter, who stated that weeds that grow and die under the solar panels would provide a fuel source for a huge fire.

241. Bruce Thompson, who lives north of the project site, stated that the dust control problem would be significant for him if the project proceeds. This is because Starland County does not allow large equipment on the Drumheller airport road. As a result, the roads near him would be the only way in or out of the project for huge equipment and construction trucks.

242. The SOP submitted that if the project is approved, it should be a condition of approval that Aura file with the Commission a complete and detailed dust control and vegetation plan that is developed with input from the SOP members.

243. The Cardamones expressed concern about the potential disruption of overland water flow. They stated that they have a dugout on their land to capture water that runs off the project site and they use that water for shelter beds and landscaping. Mrs. Cardamone stated:

> We chose that location largely because of the scenery and because of the dugout, the dugout available for supplying water for us to establish shelterbelts and landscape and to maintain those. With that being said, the surface runoff water that comes from the proposed project site is crucial for us sustaining our existing trees, shelterbelt, and our landscaping.[118]

7.2.3 Commission findings

244. Aura committed to develop a vegetation control plan in order to reduce the risk of uncontrolled vegetation growth on the project lands and to prevent the spread of weeds to adjacent properties. Consequently, should it decide to approve the project, the Commission would impose the following as a condition of approval:

i. Aura shall develop a vegetation control plan specific to the project that is designed to prevent the build up of growth on the project lands and to limit the spread of weeds from the project. The plan must comply with the *Weed Control Act* and any applicable bylaws of Starland County. Before project construction commences, Aura must provide a copy of the plan to the Commission, Starland County, Drumheller and local fire authorities no later than three months before construction of the project would commence.

245. In the absence of evidence to the contrary, the Commission accepts Aura's assertion that the project's solar panels are not expected to restrict the overland flow of water from the project site to the Cardamones' property. However, the Commission considers that surface grading for access roads could reduce overland flow patterns towards the Cardamones' property, if not

[118] Transcript, Volume 2, page 414, lines 4-7.

properly managed. Therefore, should the project be approved, the Commission would impose the following as a condition of approval:

j. Aura shall install small-scale culverts on project access roads where required to maintain established overland water flows across the project lands.

246. The Commission acknowledges Mr. Thompson's concerns about the spread of dust from roadways on and off the project site during project construction, as well as Aura's commitment to implement dust control measures. Therefore, should the project be approved, the Commission would impose the following as a condition of approval:

k. Aura shall develop a dust control plan in consultation with Starland County. Aura must also promptly investigate any complaints from the public about dust from the project site or dust from vehicle traffic associated with the project, and advise the complainant orally or in writing of Aura's response to the complaint.

7.3 Property devaluation

7.3.1 Views of the applicant

247. Aura stated that it was unable to identify any evidence showing that the project will negatively affect property values. Aura argued:

> The AUC has previously found that it will not accept evidence from lay witnesses on property evaluation; for example, in an AUC Decision 2011-436 -- which Commissioner Michaud you were a part of that decision -- regarding an application to construct and operate the Heartland 12S substation.
>
> …
>
> It should be noted that in that proceeding, that additional expert evidence involving expert witnesses was tendered. That is not the case in the current proceeding. As such, where the SOP has not adduced any expert evidence regarding property valuation, this issue should hold little weight in the Panel's deliberations.[119]

7.3.2 Views of the SOP

248. The SOP members asserted that the project will adversely affect property values. Mr. Cardamone stated that a lack of articles substantiating their concerns does not mean that devaluation would not occur. He stated:

> Our country appeal will be diminished. We will now be beside an industrial wasteland from what we've seen with other solar panels. I know if I'm out looking for an acreage and I have the choice between living beside a grain field or a solar panel, I know which one I'll choose.[120]

249. Nick Dalton expressed concern that if he subdivides his land into two or more parcels, the project could affect the selling price of those parcels and the number of willing buyers.

[119] Transcript, Volume 3, page 558, line 2 to page 559, line 5.
[120] Transcript, Volume 2, page 406, lines 9-16.

250. The SOP argued:

> We don't have studies on property devaluation in front of you. But you heard the members of SOP speak to their concerns about the impacts of their property devaluation. Those are valid concerns and we urge the Commission to take that into consideration when making their decision. You have heard from the SOP members that had there been that solar panel park there, or that farm there, they would not have purchased that property.[121]

7.3.2 Commission findings

251. Although the Commission acknowledges the property valuation concerns raised by the SOP members, the Commission has previously commented on the evidence required to substantiate such concerns:

> Property valuation is a complex and technical issue that requires specialized knowledge and expertise, and several expert witnesses appeared at the hearing to address this issue. While the Commission can take into account the fact that the lay witnesses were concerned about losing value on their property and the fact that these concerns caused them stress, it could not give any weight to their opinion evidence on how much value their property may lose unless they were able to establish that they possessed the skill, knowledge and experience necessary to establish themselves as an expert. In such a case, the value and weight of that evidence would have to be considered in light of the independence of the source of the information and the opinion itself, as discussed below.[122]

252. The Commission remains of the view that concerns over property value impacts require specialized expertise and evidence in order for the Commission to conclude that a given project will have an adverse effect on land and property values. No such evidence was filed in this proceeding.

8 Noise impacts

8.1 Views of the applicant

253. Aura retained Green Cat to conduct a noise impact assessment (NIA) for the project, as required by Rule 012. The cumulative sound level was calculated as the sum of the assumed ambient sound levels, the predicted noise contribution from third-party energy-related facilities including a number of oil and gas facilities as well as the Michichi Creek 802S Substation, and the noise contribution from the project. Ambient sound levels were assumed to be 45 dBA daytime and 35 dBA nighttime, as specified by Rule 012.[123] The results of the NIA showed that the most affected receptors would have a predicted cumulative sound level of 45 dBA during the daytime and 38 dBA during the nighttime. Aura stated that these predicted cumulative sound levels are below the permitted sound levels (PSLs) set by Rule 012. In the NIA, for all affected

[121] Transcript, Volume 3, page 623, lines 8-17.
[122] AUC Decision 2011-436: AltaLink Management Ltd. and EPCOR Distribution & Transmission Inc. Heartland Transmission Project, November 1, 2011, page 16.
[123] According to AUC Rule 012: *Noise Control*, daytime is defined as 7 a.m. to 10 p.m. and nighttime is defined as 10 p.m. to 7 a.m.

receptors, the PSLs were established as 50 A-weighted decibels (dBA) during the daytime, and 40 dBA during the nighttime.

254. In response to questions from the SOP, Aura stated that it would not commit to post-construction monitoring, as recommended by the SOP's expert James Farquharson, because the project is predicted to comply with Rule 012. Aura stated that in the event of a noise complaint, it will conduct monitoring to prove compliance.[124]

255. In response to the SOP's concerns, Green Cat provided a technical memo[125] in which it re-modelled the project with land topography more realistic to the area. This analysis showed that the cumulative sound levels were reduced at all receptors.[126] Green Cat also confirmed that it had calculated the sound levels at receptors using a source height of two metres for third-party facilities and 1.2 metres for project equipment, and found that there would be no significant change in the cumulative sound level predicted at receptors.[127] With respect to the residences that were missing from the NIA, Green Cat included two additional receptors in its technical memo that showed compliance with the PSL at those receptors.[128]

256. At the hearing, Green Cat responded to the SOP's observation that the Bitcoin mining operation near the project was not considered in the NIA and explained that the Bitcoin mining operation had not been constructed when the NIA was conducted. Green Cat stated that inclusion of the Bitcoin mine would not change the results of the NIA in any event because its inclusion would result in an increase in the ambient sound level, and by extension, of the PSL for the project area.[129]

8.2 Views of the SOP

257. The SOP raised concerns about the NIA and questioned whether the noise impacts had been adequately considered.[130] The SOP disagreed with the assumptions made by Green Cat about the land topography of the study area and Green Cat's identification of third-party energy-related facilities. Additionally, the SOP noted that some residences were not included in the NIA as receptors and the NIA did not account for the Bitcoin mining operation near the Michichi Creek 802S Substation.

258. The SOP retained Mr. Farquharson, of FDI Acoustics Ltd. to evaluate the NIA provided by Green Cat. In his report, Mr. Farquharson disagreed with a number of assumptions made by Green Cat and asserted that these assumptions could have an impact on the cumulative sound level predictions at receptors. More particularly, Mr. Farquharson expressed the view that the topography that Green Cat selected for the assessment did not realistically account for the coulees in the area. Mr. Farquharson stated that depressions in the topography between a source and receiver could result in less ground level attenuation in comparison to flat topography, and a higher sound level contribution would therefore be expected at the receptor.[131]

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124 Transcript, Volume 2, page 258, line 23 to page 259, line 14.
125 Exhibit 23951-X0106, Aura Reply Evidence, Appendix A – Noise Technical Memo, PDF page 100.
126 Exhibit 23951-X0106, Aura Reply Evidence, Appendix A – Noise Technical Memo, PDF page 105.
127 Exhibit 23951-X0106, Aura Reply Evidence, Appendix A – Noise Technical Memo, PDF page 106.
128 Exhibit 23951-X0106, Aura Reply Evidence, Appendix A – Noise Technical Memo, PDF page 104.
129 Transcript, Volume 1, page 192, line 5 to page 193, line 9.
130 Exhibit 23951-X0075, SOP Group Submissions, PDF pages 8 and 9.
131 Exhibit 23951-X0078.01, Evidence of James Farquharson, PDF page 8.

259. Mr. Farquharson also challenged the assumptions made by Green Cat concerning the source heights selected for the third-party facilities, and for the project equipment. He stated that the noise model inappropriately used a source height of one metre for the third-party facilities, and a source height of zero metres for the project equipment. Mr. Farquharson suggested that the primary sound sources of the project, which are inverter/transformer units, would be at the height of their cabinets or enclosures, and that the source heights for some of the third-party facilities should be higher than one metre.[132]

260. Mr. Farquharson recommended that a post-construction noise survey be conducted to confirm the results of the NIA if the project is approved.[133]

8.3 Commission findings

261. For the reasons that follow, the Commission finds that the NIA meets the requirements of Rule 012, (the project is expected to comply with the PSLs at affected receptors), and a condition requiring a post-construction comprehensive sound level survey is not warranted.

262. The Commission is satisfied that Green Cat has reasonably included noise receptors that would potentially be affected by the project and has demonstrated noise compliance at these receptors in the NIA and in the technical memo (which included the two receptors initially missed).

263. Although Mr. Farquharson offered valid submissions concerning details potentially affecting the accuracy of the NIA, Green Cat's technical memo shows that the project will comply with Rule 012 after accounting for these details.

264. The Commission also acknowledges but cannot accept the submissions of the SOP based on the NIA's failure to consider the Bitcoin mining operation. A Bitcoin mining operation is a non-energy-related facility. Therefore, in accordance with Rule 012, the noise contribution from the Bitcoin mining operation located within the project study area is considered part of the assumed ambient sound levels.[134] Because the PSL is set with reference to the assumed ambient sound levels (i.e., the PSL is typically 5 dBA higher than the assumed ambient sound levels), the Commission agrees with Green Cat that inclusion of the Bitcoin mining operation in the NIA would likely have resulted in the applicable PSLs being higher than 40 dBA for the nighttime period. Stated another way, inclusion of the Bitcoin mining operation in the NIA would have resulted in noise compliance margins greater than those presented in the NIA. As such, the Commission finds that including the Bitcoin mining operation in the NIA would not have changed the NIA's prediction that cumulative sound levels from the project will comply with applicable PSLs at all receptors.

265. With respect to the suggested requirement for a post-construction comprehensive sound level survey, the compliance margins with the nighttime PSL at affected receptors are no more than 2.0 dB, and the predicted noise contributions from the project at affected receptors are not greater than 24 dBA. This is more than 10 dBA below the assumed nighttime ambient sound levels of 35 dBA. As such, the project is predicted to be compliant with the PSLs and not a major

[132] Exhibit 23951-X0078.01, Evidence of James Farquharson, PDF page 5.
[133] Exhibit 23951-X0078.01, Evidence of James Farquharson, PDF page 9.
[134] AUC Rule 012: *Noise Control*, Appendix 8, PDF page 73.

noise contributor at affected receptors. Based on the above analysis, the Commission is satisfied that a post-construction comprehensive sound level survey would not be required.

9 Environmental impacts

9.1 Views of the applicant

266. Aura retained Jason Day from Sagebrush Planning Ltd. to conduct an environmental evaluation and vegetation analysis for the project (the environmental evaluation).[135] It retained Lisa Burt from Ensifera Biological Consulting to provide a Wildlife Assessment Report for the project (the wildlife assessment).[136] Mr. Day and Ms. Burt also testified at the hearing as part of Aura's witness panel. Additionally, Aura filed an AEP Renewable energy referral report for the project (the project's referral report).[137]

267. The environmental evaluation described the environmental components present in the project area, the project's potential effects on these components, mitigation measures to avoid or reduce the project's predicted adverse environmental effects and any monitoring proposed to evaluate the efficacy of those measures.

268. With respect to siting, and the general environmental effects of the project, Aura stated that: the project is sited entirely on cultivated cropland, and no wetlands or treed areas are located within the project area; wetland boundaries and distances from project components were delineated using desktop data supplemented by field visits;[138] the project will have no effect on groundwater or air quality, and it does not have a zone of influence in any environmentally sensitive areas (ESAs).[139] The environmental evaluation found that the greatest overall negative effects of the project would be associated with impacts to soil as a result of compaction of roads and bird mortality due to the potential of collisions with project components.

269. Aura asserted that the potential effects on wildlife and wildlife habitat are also expected to be low. Aura noted that the project avoids special access zones, key wildlife and biodiversity zones, grizzly bear zones, critical wildlife habitat, named lakes, permanent watercourses, valley breaks, native prairie, prairie parkland, and eastern slope regions.[140]

270. The project's referral report stated that pre-construction wildlife surveys would have to be conducted to confirm that no sensitive species would be affected by construction. Ms. Burt stated that she conducted wildlife surveys for the proposed project in consultation with AEP[141] and found several species of birds in the area of the project; however, she did not identify any sensitive species nesting within the project boundary.[142] Ms. Burt acknowledged that some of her surveys were conducted from adjacent roadways because she did not have permission to enter coulees on private property.[143] However, she stated that using binoculars and a spotting scope, she was able to analyze the coulees for which she did not have access. Ms. Burt also stated that

135 Exhibit 23951-X0006, Environmental Evaluation.
136 Exhibit 23951-X0017, Wildlife Assessment Report.
137 Exhibit 23951-X0020, Alberta Environment and Parks Referral Report.
138 Exhibit 23951-X0006, Vegetation Assessment, PDF page 29.
139 Exhibit 23951-X0006, Environmental Evaluation, PDF page 7.
140 Transcript, Volume 1, page 20, lines 9-254.
141 Transcript, Volume 1, page 56, lines 14-20.
142 Exhibit 23951-X0017, Wildlife Assessment, PDF page 9.
143 Transcript, Volume 1, page 57 lines 8-14.

the coulees in question were not likely habitats for sensitive species, and as such, additional surveys were not required by AEP.[144]

271. Aura highlighted that the project's referral report concluded that the project posed an overall low risk to wildlife and wildlife habitat. AEP noted in that report that no wildlife setbacks were identified within or near the project area and that Aura committed to appropriate mitigations to reduce wildlife disturbance. AEP also noted that Aura has committed to maintain current wildlife surveys throughout project construction, and to consult and work with AEP if new wildlife features or issues are identified.

272. Aura noted that following its submission, in 2018, of information to AEP detailing changes to the project layout, the results of supplementary wildlife surveys and proposed mitigation to reduce effects to wildlife and wildlife habitat, AEP issued an addendum letter. In the addendum letter, which was filed with the Commission on February 2, 2019, AEP confirmed that its assessment of the project's risk to wildlife and wildlife habitat had not changed.[145]

273. Aura submitted a construction and operation mitigation plan and a post-construction monitoring plan that set out detailed mitigation measures to be implemented to reduce the potential environmental effects of the project.[146] More specifically, Aura proposed several mitigations to reduce the project's indirect effects on wildlife and wildlife habitat, including additional field work and studies where required, restricted construction activities and times, and post-construction monitoring.[147] Aura also committed to operational adaptive management strategies related to avian impacts and other wildlife disturbances related to project operations. If excessive wildlife mortalities are found during post-construction monitoring, Aura committed to implement bird deterrents, remove unnecessary lighting, and to adopt any additional mitigation measures required following consultation with AEP.[148]

274. In response to concerns raised by Cliff Wallis on behalf of the SOP concerning wildlife survey methodology, Aura stated that wildlife surveys were conducted in 2017 and 2018, in accordance with the *Wildlife Directive for Alberta Solar Energy Projects* (2017).[149] Aura also asserted that survey requirements and methodologies were based on feedback provided by AEP during project-specific consultation and were approved by AEP.[150]

275. Responding to Mr. Wallis' evidence concerning wetlands, Aura submitted that under Alberta's wetland policy, ephemeral wetlands are excluded from the scope of wetland replacement. The wetland policy states that activities impacting these water bodies remain subject to the *Water Act* and wetland delineation directive if they affect water management. Aura submitted that the project has not been sited within the 100-metre buffer for any Class 2 or higher wetlands. Aura concluded that it has complied with all requirements related to wetland protection and no further action is required.

144 Transcript, Volume 1, page 57, lines 8-14.
145 Exhibit 23951-X0087, AEP Referral Letter Addendum.
146 Exhibit 23951-X0017, Wildlife Assessment Report, PDF page 5.
147 Exhibit 23951-X0015, Construction and Operation Mitigation Plan, PDF page 11-19.
148 Exhibit 23951-X0020, Alberta Environment and Parks Referral Report, PDF page 8.
149 Exhibit 23951-X0020, Alberta Environment and Parks Referral Report, PDF page 6.
150 Transcript, Volume 3, page 93.

276. In response to concerns raised by Mr. Wallis regarding ESAs, Aura stated that there would be no ESAs within the project footprint and that the concerns raised by Mr. Wallis would be addressed in the recurring surveys that are required by AEP. The recurring surveys would include sharp-tailed grouse, prairie falcon, and wetlands in the project area.[151] Aura noted that Mr. Wallis stated in his report, "I find no compelling information, subject to additional 2018 studies, from a biodiversity perspective that would suggest the facility is improperly sited. There are some minor issues related to ephemeral temporary wetlands and watercourses as well as sharp-tailed grouse that may need to be further checked, but I believe those can take place during pre-construction surveys".[152] Aura further stated that Mr. Wallis noted in his oral evidence that "[o]verall severity of impact for wetland and wildlife is likely to be low.'" Aura submitted that there is no evidence to challenge the conclusion that the environmental impact of the project would be low.[153]

9.2 Views of the SOP

277. The SOP members expressed a number of concerns with the project's potential effects on wetlands, proximity to ESAs, and inadequate survey coverage. They submitted that the project is sited in an area that has a large amount of migratory birds and questioned the adequacy of protection for wildlife species and the environment.[154]

278. The SOP members submitted that the surveys Ms. Burt conducted from the highway could have missed species within the coulees that were not visible from that location. Several members of the SOP referred to coulees near their homes that would not be visible from the highway from which Ms. Burt's surveys were conducted.[155]

279. The SOP retained Cliff Wallis, a professional biologist with Cottonwood Consultants Ltd., to file evidence and testify on its behalf as an expert on environmental matters. Mr. Wallis filed a report discussing the project's environmental impacts and potential mitigation measures. Mr. Wallis highlighted concerns with the project's proximity to ESAs and potential impacts to bird species in the area.

280. Mr. Wallis raised concerns about the proximity of the project to ESAs classified at national, regional and local significance levels. Mr. Wallis submitted that the proximity of the project to ESAs could result in wildlife interacting with the project, including birds moving from those ESAs to the project area.[156] These ESAs include native grasslands, raptors, ungulates, waterfowl, marsh birds, shorebirds, species of conservation/management concern and wetlands.[157]

281. Concerning bird species, Mr. Wallis recommended that if the Commission approves the project, conditions should be imposed requiring additional surveys for sensitive species, including sharp-tailed grouse and that those surveys should be repeated every five years if the project was not constructed.[158] Mr. Wallis also recommended that additional field work be done

[151] Transcript, Volume 3, pages 93-98.
[152] Exhibit 23951-X0072, Evidence of Cliff Wallis.
[153] Transcript, Volume 2, page 88, lines 17-23.
[154] Exhibit 23951-X0075, SOP Group Submissions, PDF Page 9-10.
[155] Transcript, Volume 1, page 59 lines 17-21
[156] Transcript, Volume 2, page 88, lines 17-23.
[157] Exhibit 23951-X0072, Evidence of Cliff Wallis, PDF Page 2.
[158] Transcript, Volume 2, page 323 line 2 to page 324, line 5

to confirm all nest sites for sensitive raptor species are identified within a one-kilometre setback from the coulees east and west of the project site.[159] Mr. Wallis argued that the project would result in the alienation of habitat for species of management concern such as the long-billed curlew.[160] He submitted that mitigation in the form of compensation should be considered based on the presence of long-billed curlew in the project area, and that this measure could include securing easements on native grassland areas.[161]

282. Mr. Wallis noted that while the project has largely avoided native grasslands, the existence of water bodies and wetlands are still of concern. He submitted that while 100-metre setbacks have been maintained on Class 2 and 3 wetlands, there are ephemeral water bodies and temporary wetlands that are intersected by the project's infrastructure. Mr. Wallis noted that AEP's *Wildlife Directive for Alberta Solar Energy Projects* indicates that solar proponents should avoid temporary water bodies and watercourses. Although AEP does not require a 100-metre setback for ephemeral or temporary wetlands, Mr. Wallis argued that it is a best management practice.[162]

283. Mr. Wallis emphasized the importance of delineating ephemeral water bodies and watercourses and temporary wetlands within the project area, and submitted that additional field surveys would be required and should include a review of historical aerial photography for delineating wetlands.[163] Mr. Wallis stated that if the Commission approves the project, it should impose conditions requiring additional mitigation measures for the potential ephemeral water bodies or temporary wetland areas, such as monitoring and documentation of monitoring data to better understand impacts.[164]

284. Mr. Wallis concluded that additional mitigation measures deemed necessary by AEP should also be a requirement of any project approval.[165] Mr. Wallis stated, "the overall severity of impact for wetlands and wildlife is likely to be low. There is still uncertainty, though, due to a lack of experience with solar power facilities in Alberta."[166]

9.3 Project reclamation - views of both parties

285. The SOP also raised concerns about project reclamation. They questioned whether sufficient funding for reclamation and decommissioning was in place in the event that Aura went bankrupt and abandoned the project. They also questioned the environmental impacts of the solar panels at the end of their useful life, and noted that the panels would not be biodegradable. The SOP submitted that if the project is approved, the Commission should include as a condition of approval a requirement that an adequate reclamation plan be developed, that covers AEP's requirements and includes a financial plan for meeting Aura's reclamation obligations.[167]

159 Transcript, Volume 3, pages 122-129.
160 Transcript, Volume 2, page 88, lines 3-12.
161 Transcript, Volume 2, page 91 line 22 to page 92 line 2.
162 Transcript, Volume 3, pages 122-129.
163 Exhibit 23951-X0075, SOP Group Submissions, PDF page 10.
164 Transcript, Volume 2, page 327, lines 17-25
165 Exhibit 23951-X0072, Evidence of Cliff Wallis, PDF page 30.
166 Transcript, Volume 2, page 312, lines 13-16.
167 Transcript, Volume 3, pages 164-165.

286. Aura acknowledged its statutory obligation to decommission and reclaim the project in accordance to the *Environmental Protection and Enhancement Act* and the *Conservation and Reclamation Directive for Renewable Energy Operations*. It stated that it will finalize this plan once it receives Commission approval for the project.[168] Aura also noted that the capital value of the equipment used in the project could be used to fund the reclamation.[169]

287. With respect to the removal and recycling of the equipment for the project, Aura stated that it is familiar with several companies that focus on recycling solar panels but that these companies are based in Europe and the United Kingdom. It stated that at the time of decommissioning it could use these companies if no suitable North American recycler could be found.[170]

9.4 Commission findings

288. The Commission acknowledges the concerns raised by the SOP about the sufficiency of the surveys conducted on behalf of Aura but finds that the environmental evaluation and wildlife assessment were adequate, noting in particular that the evaluation and assessment were approved by and performed in consultation with AEP.

289. With respect to siting and the general environmental effects of the project, the Commission notes AEP's correspondence indicating that all coulee breaks and all Class 2 and higher wetlands will be avoided by at least 100 metres and finds that the siting of nearly all of the proposed facilities on cultivated land, and not on native vegetation or wetlands, significantly mitigates the project's environmental effects. This finding is supported by the environmental evaluation and by the evidence of Mr. Wallis who, as noted earlier, stated:

> "I find no compelling information, subject to additional 2018 studies, from a biodiversity perspective that would suggest the facility is improperly sited. There are some minor issues related to ephemeral temporary wetlands and watercourses as well as sharp-tailed grouse that may need to be further checked, but I believe those can take place during pre-construction surveys".[171]

290. Concerning the project's potential effects on wild life and wildlife habitat, the Commission considered all the evidence on the record of this proceeding including: the wildlife assessment; the evidence of Mr. Wallis that the "[o]verall severity of impact for wetland and wildlife is likely to be low"; AEP's conclusion that the project poses an overall low risk to wildlife and wildlife habitat; the commitments made by Aura; the mitigation and monitoring plans established by Aura in consultation with AEP; and the project's adherence to applicable regulatory standards, directives and guidelines, including AEP's post-construction wildlife requirements set out in the *Wildlife Directive for Alberta Solar Energy Projects*.

291. The Commission is satisfied that with diligent application of Aura's mitigation measures, construction and post-construction monitoring, implementation of any additional mitigation measures as directed by AEP, and implementation of the Commission's conditions in the event the project is approved (detailed in the next paragraph), the potential adverse environmental

[168] Exhibit 23951-X0095, Aura-AUC Information Response II, PDF page 18.
[169] Transcript, Volume 2, page 9, lines 1-24.
[170] Exhibit 23951-X0125, Responses to Undertakings by Aura, PDF page 1.
[171] Exhibit 23951-X0072, Evidence of Cliff Wallis.

effects, including those on wildlife and wildlife habitat, from the siting, construction and operation of the project's facilities can be adequately mitigated.

292. Consequently, should it decide to approve the project, the Commission would impose the following as conditions of approval:

l. The siting, construction and operation of the project's infrastructure will meet all of AEP's recommended minimum setbacks from wetlands, watercourses and wildlife species-at-risk habitat features for the project, unless AEP has agreed to a reduced setback and/or alternative mitigation.

m. Aura must abide by the project-specific recommendations pertaining to post-construction mitigation and monitoring, as outlined in the project's referral report and implement any additional mitigation as directed by AEP.

n. After the project is operational, Aura must abide by all of the requirements and commitments outlined in the project's referral report, as well as the final version of its post-construction wildlife monitoring and mitigation plan as reviewed and accepted by AEP.

o. After the project is operational, Aura shall carry out site-specific post-construction monitoring surveys in the manner and for the period recommended by AEP in the project's referral report. Aura shall submit to the Commission and AEP an annual report summarizing the results of these surveys and all related correspondence from AEP.

p. All post-construction monitoring must be conducted by an experienced wildlife biologist, as defined in the *Wildlife Directive for Alberta Solar Energy Projects*.

q. In conducting its post-construction wildlife monitoring program, an approval holder shall use an AEP-approved fatality estimator to calculate the corrected mortality rates for birds. The approval holder must notify AEP of any carcasses of species of management concern upon discovery and must abide by any AEP requirements to implement new mitigation measures to prevent or reduce further mortalities.

293. Concerning reclamation, the Commission notes that the *Conservation and Reclamation Regulation* was recently amended to specifically address the reclamation of solar projects in Alberta. The effect of these amendments is that "renewable energy operations," which include solar projects, are now expressly subject to the reclamation obligations set out in Section 137 of the *Environmental Protection and Enhancement Act*. Operators of renewable energy operations are now required to obtain a reclamation certificate at the project's end of life. The reclamation process is managed by AEP pursuant to the *Conservation and Reclamation Directive for Renewable Energy Operations*, which provides more detailed information on conservation and reclamation planning and reclamation certificate requirements for renewable energy operators in Alberta. Aura has acknowledged its statutory obligations under the *Environmental Protection and Enhancement Act* and the *Conservation and Reclamation Regulation*, to properly reclaim the project and obtain a reclamation certificate at the project's end of life.

10 Battery storage

10.1 Battery storage units

294. Aura indicated that the project would include up to 30 batteries for the purpose of energy storage. The batteries would consist of lithium-ion cells contained in module units that would be installed in racks housed within specially modified steel containers. These containers would be internally bunded and have integrated isolation, fire suppression and temperature control systems.[172]

295. Aura stated that although it has not yet finalized the exact model of batteries for the project, its intention currently is to use a BYD model ESS Lithium Ion Battery Energy Storage System, and it expects that the battery storage units would be provided in a standard ISO 668 specification container with a maximum length of 16.2 metres. The batteries would have a storage capacity of 2.5 megawatt hours (MWh) per container, with a total storage capacity of 75 MWh.[173]

296. Aura confirmed that the total output capacity of the project would be limited to 75 MW, including both the solar panel array and battery storage. Aura added that when the batteries were being charged the total output would be less than 75 MW.[174]

10.2 Battery operation and decommissioning

297. Aura stated that its strategy for operating the battery system is subject to change based on detailed analysis, the extant regulatory environment and the evolution of new opportunities. However, it currently anticipates up to 1.5 full charge and discharge cycles per day.[175] Aura added that although the operational plan for the batteries is subject to further development, the batteries would likely be used to supplement the solar power plant during times of low solar production, as well as mitigating transmission curtailment and performing grid balancing services required by the Alberta Electric System Operator (AESO).[176]

298. Aura confirmed that the batteries would be charged exclusively with power generated by the project's photovoltaic panels. Aura stated that it does not have a load service agreement with ATCO Electric and will not draw power from the grid to charge the batteries.[177]

299. Aura provided information showing the predicted degradation of the battery units over time.[178] The graph indicates that a battery cell's state of health can reduce faster depending on a number of factors, including state of charge, depth of discharge and the number of charging and discharging cycles per day. It noted that it is possible that a battery cell would have to be replaced within the project's lifespan because it could no longer provide the desired or an acceptable percentage of storage capacity.[179] Aura confirmed that batteries will be removed from the project site and recycled at their end of life. It stated that this would be a key requirement of

[172] Exhibit 23951-X0095, Information Request Response: Round 2, page 4.
[173] Exhibit 23951-X0065, PDF page 1.
[174] Exhibit 23951-X0095, PDF page 6.
[175] Exhibit 23951-X0065, PDF page 2.
[176] Exhibit 23951-X0095, PDF page 2.
[177] Transcript, Volume 2, PDF page 282, lines 18-21.
[178] Exhibit 23951-X0095, PDF page 2.
[179] Transcript, Volume 2, page 279, lines 1-12.

any competitive tender process to select the battery energy storage system supplier.[180] When asked about decommissioning and cell replacement, Aura confirmed that it will identify an appropriate battery cell recycler.[181]

300. The SOP raised concerns about fire risk and management, emergency response, noise and environmental impacts. Most of these concerns related to the project as a whole however, some related to the presence and operation of the proposed battery storage.

301. In response to SOP's battery-related concerns, Aura stated that the project's batteries would be designed with control systems to maintain internal temperature, integrated fire detection and suppression systems, an alarm system, isolation switches and embedded battery management, monitoring and control systems.[182] The battery control systems would be designed to monitor the batteries and would be capable of signaling an automated shutdown to disconnect and de-energize a cell-bank or rack from the external direct-current bus. Additionally, information on the overall status of the battery system would also be provided in real time, enabling an operator to de-energize some or all of the system.[183]

302. Aura also stated that the battery cells would have no liquid components, which would reduce the risk of a chemical leak from the batteries. Aura confirmed at the hearing that it would incorporate the batteries into its emergency response plan, and that the plan would be specific to the chemical composition of the batteries it selects. Aura reiterated that the batteries had containment built into the units.[184]

303. The NIA filed by Green Cat accounted for the battery storage units and found that the project would be in compliance with Rule 012. The report detailed the specific sound power levels of the proposed equipment. The report stated that "the unit has a sound power level of no more than 78 dB measured at 1 m[etre] from the source."[185] For reference, the report also found the sound power level from the inverters and transformers to be 89 dB, measured at one metre from the source.

10.3 Commission findings

304. As noted above, in this decision the Commission is considering, for the first time, a proposal to incorporate battery storage into a proposed power plant. The Commission has therefore considered the effects of the project's battery storage system in the context of Aura's intended use of energy storage as part of its proposed power plant. The Commission relies upon Aura's evidence that the batteries would be charged exclusively with power generated by the project's photovoltaic panels and that the stored electricity would be used to supplement low solar production, as well as to mitigate transmission curtailment and perform grid balancing services required by the AESO. The Commission observes that no interested party or the AESO raised concerns regarding the economic impacts of Aura's proposal to incorporate a battery storage component into its power plant.

[180] Exhibit 23951-X0095, PDF page 4.
[181] Transcript, Volume 2, page 280, lines 2-12.
[182] Exhibit 23951-X0065, PDF page 1.
[183] Exhibit 23951-X0095, PDF page 2.
[184] Transcript, Volume 2, page 280, line 17 to page 281, line 2.
[185] Exhibit 23951-X0064.

305. As previously stated, there are no existing market rules or regulations governing the operation of battery storage systems in Alberta, although the Commission understands that the AESO may be in the process of developing such rules. Aura would be bound by any such rules.

306. Notwithstanding the lack of legislation or rules specific to the incorporation of battery storage into a power plant, the *Electric Utilities Act* and the *Hydro and Electric Energy Act* provide direction to the Commission on their respective purposes. Both acts promote the economic orderly and efficient development and operation of generating units in Alberta. Further, Section 5 of the *Electric Utilities Act* lists the following as purposes of that act:

- To provide rules so that an efficient market for electricity based on fair and open competition can develop in which neither the market nor the structure of the Alberta electric industry is distorted by unfair advantages of government-owned participants or any other participant.

- To continue a flexible framework so that decisions of the electric industry about the need for and investment in generation of electricity are guided by competitive market forces.

- To provide for a framework so that the Alberta electric industry can, where necessary, be effectively regulated in a manner that minimizes the cost of regulation and provides incentives for efficiency.

307. In the Commission's view, no party, including the applicant, filed any evidence on the record to suggest that approving the power plant with a battery storage component would be inconsistent with the stated purposes of the *Hydro and Electric Energy Act* or the *Electric Utilities Act.* Further, no party filed any evidence of negative economic effects specifically associated with the inclusion of a battery storage component as a part of the power plant.

308. From a social and environmental perspective, the evidence indicates that the battery cells do not have liquid components, and the modules have several control systems to prevent leaks or reactions within the cells. The Commission expects that the control systems and fire suppression systems within the battery storage units would limit the risk of a potential fire or reaction within the unit. The control systems would also alert Aura personnel of an emergency situation. The Commission accepts that the control systems in place for the batteries, along with Aura's overall safety precautions and protections described in this decision, together with the conditions that would be imposed in the event the project is approved, adequately limit the risk of a fire or other safety hazard related to the operation of the battery storage units.

309. Battery energy storage is a new technology and there are potential environmental concerns related to the replacement and recycling of degraded battery cells. The Commission notes Aura's intention to use a battery supplier that has a recycling plan as well as its evidence that the useful life of individual battery cells likely would be less than the project's lifespan, meaning that Aura would replace degraded cells with new cells during the project's

operating life. The Commission considers that the improper disposal of battery cells could result in significant adverse environmental effects. Consequently, should it decide to approve the project, the Commission would impose the following as a condition of approval:

r. Aura shall confirm that it has selected a battery supplier that has a recycling or disposal program that accepts used cells and recycles or disposes of them in accordance with applicable environmental protection laws and established best practices. Aura must submit such confirmation when it finalizes its selection of the batteries for the project, no later than three months before construction of the project would commence.

11 Interconnection

11.1 Project interconnection

310. Aura applied to construct underground feeder lines that would connect the project to the Michichi Creek 802S Substation through three of ATCO Electric's existing feeder lines. Aura submitted a feasibility study that was conducted by ATCO Electric, and provided confirmation that ATCO Electric had no concerns about the interconnection.

311. ATCO Electric's feasibility study concluded that the substation could accept the interconnection, however, upgrades to ATCO Electric's existing feeder lines may be required. Aura confirmed that it would incorporate any recommendations or requirements identified in the feasibility study or through further discussions with ATCO Electric. Aura also confirmed that it would pay the costs of any upgrades required for the interconnection, which ATCO estimated to be approximately $1.5 million.[186]

312. Aura stated that the project was at the second stage of the connection process with the AESO, and that the AESO was reviewing network studies.[187] When asked if the AESO intended to consider the project as generation, load or a combination of those, Aura stated that it did not have any indication from the AESO about how the AESO intended to categorize the project. Aura added that discussions with the AESO had not yet progressed to that point.[188]

11.2 Commission findings

313. The Commission finds that Aura's application to connect the project meets the technical requirements of Rule 007. Rule 007 requires minimal information for a connection order application if the project is to be connected at voltage less than 69 kilovolts.

[186] Transcript, Volume 2, page 281, lines 22-25.
[187] Transcript, Volume 2, page 283, lines 7-10.
[188] Transcript, Volume 2, page 283, lines 11-19.

12 Finalized equipment and design

314. The Commission's review of the application, and associated findings, are based on Aura's submission of generic equipment. The Commission's findings, particularly those with respect to the effects of the project, may change dependent on Aura's final equipment selection. Accordingly, should the project be approved, the Commission would impose the following as a condition of approval:

s. Once Aura has made its final selection of equipment for the project, it must file a letter with the Commission that identifies the make, model, and quantity of the equipment and include an updated site plan if the equipment layout has changed, as well as confirmation of the nameplate and storage capacity of the battery storage units (in MW and MWh respectively). The letter must also confirm that the finalized design of the project will not increase the land, noise, glare and environmental impacts beyond those described in the materials submitted by Aura in support of the present application and approved by the Commission. The letter is to be filed no later than three months before construction of the project would commence.

13 Conclusion

315. For the reasons and subject to all of the conditions outlined in this decision (which have been listed in Appendix C), the Commission finds that Aura has satisfied the requirements of Rule 007 and Rule 012 and that in accordance with Section 17 of the *Alberta Utilities Commission Act*, approval of the project and the interconnection is in the public interest having regard to the social, economic, and other effects of the project, including its effect on the environment.

14 Decision

316. Pursuant to Section 11 of the *Hydro and Electric Energy Act*, the Commission approves the application and grants Aura the approval set out in Appendix 1 – Fox Coulee Solar Project – Power Plant Approval 23951-D02-2019 – August 13, 2019 (Appendix 1 will be distributed separately).

317. Pursuant to Section 18 of the *Hydro and Electric Energy Act*, the Commission approves the interconnection and grants Aura the connection order set out in Appendix 2 – Fox Coulee Solar Project – Order 23951-D03-2019 – August 13, 2019 (Appendix 2 will be distributed separately).

Dated on August 13, 2019.

Alberta Utilities Commission

(original signed by)

Carolyn Hutniak
Panel Chair

(original signed by)

Anne Michaud
Vice-Chair

(original signed by)

Patrick Brennan
Acting Commission Member

Appendix A – Proceeding participants

Name of organization (abbreviation) **Company name of counsel or representative**
Aura Power Renewables Ltd. (Aura) Martin Ignasiak Danielle Chu
Solar Opposition Participants (SOP) Ifeoma Okoye Heather Beyko
Town of Drumheller (Drumheller)

Alberta Utilities Commission

Commission panel
- Carolyn Hutniak, Panel Chair
- Anne Michaud, Vice-Chair
- Patrick Brennan, Acting Commission Member

Commission staff
- G. Perkins (Commission counsel)
- A. Van Horne
- T. McCusker
- H. Ritchie
- J. Yu

Appendix B – Oral hearing – registered appearances

Name of organization (abbreviation) Name of counsel or representative	Witnesses
Aura Power Renewables Ltd. (Aura) Martin Ignasiak Danielle Chu	C. Sutherland V. Beda M. Dawson J. Day L. Burt C. Saint-Martin C. MacLennan
Solar Opposition Participants Expert Witnesses (SOP) Ifeoma Okoye Heather Beyko	C. Wallis J. Farquharson P. McGarrigle L. Olien
Solar Opposition Participants (SOP) Ifeoma Okoye Heather Beyko	D. Burroughs B. Thompson G. Denzler P. Cardamone D. Cardamone R. Smith D. Dedul B. Graham C. Jensen A. Jensen C. Murray
Joint Expert Witness Panel Martin Ignasiak Ifeoma Okoye	C. Sutherland C. MacLennan P. McGarrigle L. Olien

Appendix C – Summary of Commission conditions of approval

This section is intended to provide a summary of all conditions of approval for the convenience of readers. The conditions have been split into those requiring follow-up information to be submitted to the Commission, and those that do not. In the event of any difference between the directions and conditions in this section and those in the main body of the decision, the wording in the main body of the decision shall prevail.

The following are conditions of Decision 23951-D01-2019 that require follow-up with the Commission, and will be tracked as conditions of Power Plant Approval 23951-D02-2019 using the AUC's eFiling System:

- Aura shall develop and finalize a site-specific emergency response plan in consultation with: (i) all local fire departments and other emergency responders that would respond to an emergency at the project; and (ii) Starland County, Drumheller, the Drumheller Airport Commission and any other provincial or municipal authorities that Aura or local fire departments identify as having an active role in responding to a fire or other emergency at the project's location. This plan must include measures that address airport safety as well as the safety of residents adjacent to the project lands, including notification to those residents of an actual or developing emergency, identification of points of access to the project site for emergency responders and access routes within the site. Aura must provide the SOP members with an opportunity to participate in the development of the plan. Aura must also provide a copy of its finalized emergency response plan to the Commission, Drumheller and to any SOP member, landowner or resident with 2,000 metres of the project who requests a copy. Aura can redact the personal information of a resident or other member of the public from the copies of the plan that are provided to SOP members, landowners or residents. Aura must file its finalized emergency response plan, and confirmation that the SOP members had the opportunity to participate in its development, with the Commission no later than three months before construction of the project would commence.

- Aura shall file a report with the Commission detailing any complaints or concerns it receives or is made aware of about solar glare from the project during its first year of operation as well as Aura's response. Aura shall file this report no later than 13 months after the project becomes operational.

- Aura shall develop a vegetation control plan specific to the project that is designed to prevent the build up of growth on the project lands and to limit the spread of weeds from the project. The plan must comply with the *Weed Control Act* and any applicable bylaws of Starland County. Before project construction commences, Aura must provide a copy of the plan to the Commission, Starland County, Drumheller and local fire authorities no later than three months before construction of the project would commence.

- After the project is operational, Aura shall carry out site-specific post-construction monitoring surveys in the manner and for the period recommended by AEP in the project's referral report. Aura shall submit to the Commission and AEP an annual report summarizing the results of these surveys and all related correspondence from AEP.

- Aura shall confirm that it has selected a battery supplier that has a recycling or disposal program that accepts used cells and recycles or disposes of them in accordance with applicable environmental protection laws and established best practices. Aura must submit such confirmation when it finalizes its selection of the batteries for the project, no later than three months before construction of the project would commence.

- Once Aura has made its final selection of equipment for the project, it must file a letter with the Commission that identifies the make, model, and quantity of the equipment and include an updated site plan if the equipment layout has changed, as well as confirmation of the nameplate and storage capacity of the battery storage units (in MW and MWh respectively). The letter must also confirm that the finalized design of the project will not increase the land, noise, glare and environmental impacts beyond those described in the materials submitted by Aura in support of the present application and approved by the Commission. The letter is to be filed no later than three months before construction of the project would commence.

The following are conditions of Decision 23951-D01-2019 that do not require follow-up with the Commission:

- Prior to finalizing the emergency response plan, Aura shall conduct at least one emergency response exercise and give representatives of Drumheller airport and SOP members an opportunity to participate in or observe the exercise.

- To ensure that hazardous or potentially hazardous situations are identified as soon as possible, Aura shall install and use a reliable system of remote monitoring.

- Aura shall use a standard anti-reflective coating for the solar panels used in the project. If Aura determines that it cannot or will not use such panels, it must notify the Commission immediately and provide the specifications of the panels Aura intends to use.

- Aura shall provide any required information about the project to the Town of Drumheller and Transport Canada to prepare a publication in the Canada Flight Supplement as recommended in Mr. Saint-Martin's report.

- Aura shall conduct a visual mitigation assessment for any resident located within 800 metres of the project boundary who requests an assessment or visual mitigation. Aura shall ensure that any tree screening is developed with input from an agrologist, in order to better ensure that mitigation measures are feasible, will be durable, and relatively simple to maintain over the life of the project.

- Aura shall take reasonable measures to ensure that any visual mitigation measures implemented for the project, including tree screening developed in consultation with the agrologist, are maintained throughout the lifespan of the project.

- Aura shall install small-scale culverts on project access roads where required to maintain established overland water flows across the project lands.

- Aura shall develop a dust control plan in consultation with Starland County. Aura must also promptly investigate any complaints from the public about dust from the project site or dust from vehicle traffic associated with the project, and advise the complainant orally or in writing of Aura's response to the complaint.

- The siting, construction and operation of the project's infrastructure will meet all of AEP's recommended minimum setbacks from wetlands, watercourses and wildlife species-at-risk habitat features for the project, unless AEP has agreed to a reduced setback and/or alternative mitigation.

- Aura must abide by the project-specific recommendations pertaining to post-construction mitigation and monitoring, as outlined in the project's referral report and implement any additional mitigation as directed by AEP.

- After the project is operational, Aura must abide by all of the requirements and commitments outlined in the project's referral report, as well as the final version of its post-construction wildlife monitoring and mitigation plan as reviewed and accepted by AEP.

- All post-construction monitoring must be conducted by an experienced wildlife biologist, as defined in the *Wildlife Directive for Alberta Solar Energy Projects*.

- In conducting its post-construction wildlife monitoring program, an approval holder shall use an AEP-approved fatality estimator to calculate the corrected mortality rates for birds. The approval holder must notify AEP of any carcasses of species of management concern upon discovery and must abide by any AEP requirements to implement new mitigation measures to prevent or reduce further mortalities.