



AUC

Alberta Utilities Commission

Wind Power Regulatory Process Review

**Stakeholder Consultation
Summary of Discussion**

September 28, 2012



The Alberta Utilities Commission
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Executive summary

1. After issuing Bulletin 2011-25: *Consultation on wind-power generation regulatory permitting*, the Alberta Utilities Commission consulted with approximately 60 interested stakeholders on December 12 and 13, 2011. The aim of this consultation was to gain a better understanding of the distinguishing features of wind projects relative to other electricity generation development projects, with a view to identifying and addressing any regulatory permitting issues that emerged. The Commission also made subsequent provision for written comments. This discussion paper includes case studies on several projects to assist in assessing opportunities for improved process. A flow chart outlining the activities of participants in the current wind project regulatory process is also included in this discussion paper.

2. Wind projects have distinguishing features relative to other electrical generation. These include:

- An increasingly larger role in Alberta's electricity production mix.
- Geographically dispersed over large areas which have multiple stakeholders.
- Visual profile can be seen by many.
- Rapid evolution of technology.
- Landowner royalty payments.
- Wind power is a variable energy resource.
- Historical concentration in certain geographic areas of the province.
- Widely available resource throughout significant parts of Alberta.
- Wind turbine noise assessments are complex.
- Does not require water during operation.
- No greenhouse-gas emissions during operations.
- Renewable energy is part of Alberta's climate change commitments (37 megatonnes of greenhouse gas reductions from green energy production by 2050).
- Wind is a non-depleting resource.
- Access to wind resource is not covered under the *Surface Rights Act*.

3. Highlights of the discussion paper, key concerns and principles for wind generation are included in this overview.

4. The discussion paper identifies that wind-power generation has some unique aspects that differentiate it from other generation. While many concerns identified by consultation participants are generic for all power plant applications, the discussion paper focuses primarily on the unique aspects of wind-power generation.

Stakeholder key concerns

Flexibility for turbine selection

5. Wind developers' primary concern is the lack of flexibility in turbine technology selection during the regulatory application process, specifically the power plant application in AUC Rule 007: *Applications for Power Plants, Substations, Transmission Lines, and Industrial System Designations*. Alternatives which would provide the ability to modify turbine choice during or after approval with minimal amendments are described in the discussion paper and include approaches such as "buildable area," contingent turbine locations and generic turbine layouts as well as a clearly articulated amendment process.

6. The so-called buildable-area approach is the most flexible concept and perhaps the most noteworthy. The buildable area would be graphically represented as shaded areas on maps rather than by the traditional point location approach for wind turbines. This approach would demonstrate compliance to all relevant setbacks and would entail approvals that would be initially conditional. The buildable-area concept would allow developers to have flexibility to change turbine type, within a specific physical dimension, i.e. maximum turbine height, maximum rotor length, maximum number of turbines, maximum noise level, without requiring an amendment process. The final turbine layout would still require final sign-off with respect to specific turbine information needs from agencies such as NAV Canada, Transport Canada, Alberta Culture, Alberta Environment and Sustainable Resource Development (AESRD), and potentially others. These required sign-offs from agencies would be conditions in the final approval that would need to be released by the AUC prior to construction.

7. Some aspects of the design portion of the buildable-area concept are already standard processes in various jurisdictions in the United States. While the regulatory regimes are not the same as the Alberta model and are often governed by local municipal authorities, some of these jurisdictions are utilizing a staged approval process where certain areas are initially zoned with pre-established approval criteria for wind energy development.

8. The buildable-area approach would not preclude a public hearing under certain circumstances.

Approval process duration

9. Wind developers identified additional areas of concern including a lack of clarity in application requirements, duration of time for initial application review and development of information requests that may be required to complete the application, duplication of information requested that may have already been provided or addressed by other agencies, overlap of responsibilities and information sharing among agencies, and potential for overlapping or inconsistent requirements between the AUC and municipalities. Opportunities to shorten the approval process were also noted by wind developers.

Environmental concerns

10. Environmental groups indicated concerns over development of wind farms on native prairie. They emphasized Alberta Environment and Sustainable Resource Development guidelines which state that native prairie should be avoided. If it is not possible to avoid the native prairie, then the disturbance should be minimized. Any disturbance that cannot be avoided should be remediated.

11. Although regional planning is not within the mandate of the AUC, some participants considered that there was a need for centralized planning with respect to geographic locations of wind farm development. Currently, cumulative impacts are not included in the environmental assessment process for wind farms since the impacts are evaluated on a facility-by-facility basis.

12. Wildlife concerns during wind turbine operations that primarily related to the potential for bird and bat mortality were raised by environmental groups. Bird and bat guidelines are provided by Alberta Environment and Sustainable Resource Development, and information and standards are provided to all wind developers on bat monitoring, measurement and mitigation by the Alberta Bat Action Team.

13. Concerns were also raised by environmental groups regarding reclamation of abandoned wind farms. Currently, there are no regulatory requirements or guidelines for reclamation of wind farms; however some municipalities have a requirement for filing a reclamation plan as part of the application for a municipal development permit. Reclamation is typically part of the lease agreement between a landowner and a wind farm developer.

14. Post-construction compliance monitoring for environmental issues identified by Alberta Environment and Sustainable Resource Development in their sign-off and supported by AUC in the power plant application, appears to be a regulatory gap, where Alberta Environment and Sustainable Resource Development's efforts are restricted to recommendations rather than enforcement. Alberta Environment and Sustainable Resource Development has indicated that they do not complete enforcement with respect to conditions in the AUC permit and licence.

Case studies

15. Case studies were undertaken for three wind farm processes to assess opportunities for improvement. The case studies and internal review found that six factors were key in determining application duration. These included project complexity; the quality of the application, in terms of completeness and accuracy; the number of amendments to applications; the information request process; the number of interventions; and the current AUC workload. Project complexity is likely to increase since current wind farm developments are now larger than those seen in past applications. Clarification of AUC Rule 007 requirements and a refresh of AUC Rule 007 can help improve the quality of applications. A process such as the buildable-area concept to handle amendments or reduce the requirement for amendments would assist in reducing the duration. Streamlining the information request process, with time limits, would ensure timeliness of responses. Coordination and discussion among agencies may assist in reducing additional information requests. Appropriate stakeholder consultation on the part of the developer would reduce the potential number of consultations, and further resource planning within the AUC, may all be helpful in reducing the duration of applications.

Next steps

16. The Commission is seeking feedback on the contents of this discussion paper. For convenience, a number of questions have been identified throughout the discussion paper and are summarized in Section 5. The Commission will review the comments with a view towards updating its procedures. Any contemplated changes to rules will then be addressed through a consultative process.

1 Introduction

1.1 Overview and background

17. The Alberta Utilities Commission (AUC or the Commission) consulted stakeholders in 2011-2012 on the regulatory permitting process for wind-power generation projects in Alberta.

18. Bulletin 2011-25, which initiated the consultation, was issued on November 10, 2011. The consultation was undertaken to gain a better understanding of the unique, distinguishing features of wind power compared to other electricity generation development projects, with the objectives of identifying and evaluating emerging permitting issues and developing principles to guide the wind-permitting process. Generally, this review was focused on large-scale wind farms rather than single-turbine projects.

19. AUC procedures for regulating electric generation are based upon legislation in the *Hydro and Electric Energy Act*. The application requirements are documented in the relevant portions of AUC Rule 007: *Applications for Power Plants, Substations, Transmission Lines, and Industrial System Designations* (AUC Rule 007) and AUC Rule 012: *Noise Control* (AUC Rule 012). In its discussion with stakeholders, the Commission clarified that environmental noise issues were being reviewed through a separate stakeholder consultation that was reviewing and updating AUC Rule 012. Consequently, the review of environmental noise issues would not be duplicated as part of the wind power regulatory consultation. AUC Rule 012 was amended effective April 1, 2012.

20. The Commission circulated a preliminary list of potentially relevant topics and heard perspectives from participating stakeholders in a well-attended consultation held in Calgary on December 12 and 13, 2011. Any future rule revisions would be vetted through another formal AUC consultation. Participants were asked to summarize and provide their perspectives in a written format by December 30, 2011.

1.2 Purpose of this discussion paper

21. The purpose of this discussion paper is to summarize and discuss major issues identified by stakeholders during consultation meetings, solicit stakeholder comments and identify opportunities for improvements to the wind-permitting process. These may ultimately form the basis for changes to AUC Rule 007 and the wind-permitting framework.

22. Three case studies of applications processed by the AUC were chosen and analyzed. These case studies are included in Appendix B. The analyses of these case studies were used to identify issues and strengths in the regulatory process.

1.3 Wind in Alberta

23. Wind is a natural, variable source of energy that is found in abundance within Alberta. In Alberta, wind power development started in the late 1980s. Currently, the majority of applications with the Alberta Electric System Operator (AESO) for interconnections are for large-scale utility wind power facilities.

24. Wind is a non-depleting source of energy. Lands that are presently considered suitable for wind power development will likely always be suitable for continued wind power development, beyond the initial 20 to 25 years of a wind turbine's design life. Wind power production is

different in some ways from oil and gas extraction, and thermal coal or gas electricity generation. It is developed on leased lands, compared with thermal power generation where land is typically purchased for the development. Similar to oil and gas development, wind power development covers a large surface area. Although the footprint of each turbine is relatively small, wind power development also comes with access roads, underground and above-ground power lines, substations and temporary construction areas, therefore, the overall ground disturbance associated with wind power development is moderate. In addition, wind power development needs to be built where the resource exists, unlike natural gas-fired or coal-fired power generating plants. Wind power development is not covered under the *Surface Rights Act*, and has historically been developed in Alberta using option or lease agreements between the developer and landowner.

25. Today, wind power facilities co-exist with oil and gas infrastructure, and have similar noise regulations (AUC Rule 012 and Energy Resources Conservation Board (ERCB) Directive 038: *Noise Control*).

26. Wind power is considered a non-emitting energy source compared with thermal power production, however, in their own way, both types of power generation are considered to have environmental impacts.

27. Wind turbine technology and efficiencies have improved, and their size has increased in the past 10 years. Utility-scale turbines typically have a hub height of 80 metres to 100 metres with rotor diameters spanning from 82 metres to 118 metres, and a power output of up to three megawatts. Towers are typically tubular steel or concrete structures and installation takes approximately two to five days for each turbine after the concrete foundations are complete. New wind power projects in Alberta are typically more than 50 megawatts.

28. The application process for wind power has evolved since the original wind power project installations, and more experience and information is now available about the benefits and consequences of this technology.

2 Principles to follow for structuring permitting process

29. Consultation with stakeholders and participants in the stakeholder meetings helped to clarify principles that responsible agencies, proponents and the public should follow. These principles will guide the Commission's development of more detailed procedures or the refreshment of AUC Rule 007.

30. The principles are:

- 1) The process should be certain, with clear decision criteria at each stage.
- 2) Application and decision process should be applied equally to all fuel types.
- 3) Processes between agencies should be coordinated and avoid duplication.
- 4) Thorough and thoughtful advance planning is required from the applicant. For example, it is important to establish road-sharing rights-of-way for collection systems, to alleviate environmental concerns and minimize disturbance of native prairie.
- 5) Regulatory process should establish reasonable and defined time frames.
- 6) Significant public involvement is essential.

3 Issues raised during consultation meetings

31. Stakeholders identified a number of issues during the two-day consultation conducted by the AUC. These issues primarily reflected the inability of the application process to efficiently accommodate project design and technology changes.

3.1 Major issues in the permitting process

A. Flexibility to update wind farm design with minimal process

32. A key issue identified by wind power developers is the inability of the current regulatory process to accommodate the rapid evolution of turbine technology. The approval process requires developers to choose a wind turbine and negotiate with a vendor too early in the project. This has an important impact on the ability of wind developers to control project timing, mitigate project risk and control project costs.

33. The current AUC application process requires the application to include a specific layout for wind turbines as well as to identify the specific turbine make, model and height. Few wind-power project applications are approved based on the initial application without additional information requirements and process. Typically, amendments to turbine type, and consequently turbine layout, are made during the application process or after the initial approval. This requires a significant amount of additional time for permitting, and adds confusion and complexity to the application process, with the additional consequence of requiring several rounds of stakeholder consultation.

34. During the wind consultation process meetings, the Canadian Wind Energy Association (CanWEA) identified issues associated with project modifications and the requirement to select the specific technology. CanWEA indicated that the current application process does not have a prescribed method for amendments to the project. Currently, both major and minor project modifications are treated equally by the AUC, which results in significant delays. CanWEA suggested the application process should accommodate variations in design specifications. It indicated that its views represented many of its members and suggested that proposed project modifications should be assessed to see if they have a material change and subsequent impact. Only variations that are material should require an amendment. Thresholds should be in place so that the application approval is valid within certain boundaries or constraints such as turbine size, rotor diameter, environmental setbacks (and related criteria such as anti-perching features to discourage birds) and noise. CanWEA suggested that this would allow for a “blanket approval” for the project so that if there were any changes, amendments would not be required if certain criteria were not affected either during the application process or after approval.

35. TransAlta indicated that project amendments within the project boundary should not require an amendment to the application as long as the change in technology still met the noise requirements. All noise impacts would need to meet the requirements of AUC Rule 012.

36. The concept of a blanket approval for a “buildable area” or “buildable envelope” was supported by stakeholders. The buildable area would be defined and approved, and project changes within the approved buildable area would not require an amendment.

37. CanWEA suggested that the application should not be required to specify the turbine and manufacturer. Rather, turbine height, rotor diameter and noise levels at the receptor(s) are the

most important factors, and information about these aspects of the project should be required for the application. CanWEA also recommended that the selected turbine should be able to meet the interconnection requirements set out by the AESO. CanWEA and TransAlta supported the concept of a buildable area and added that for interconnection requirements, the turbine could be swapped if it was electrically the same type of turbine and met AESO technical interconnection standards.

38. CanWEA and TransAlta both indicated that projects should not require amendments to the applications unless the modifications exceed specific criteria.

39. CanWEA indicated that wind turbine technology is improving at a rapid pace. For example, the size, power output, drive mechanism efficiency and capability to control operating modes for noise and power output management have evolved. An ability to change the turbine selection is critical to ensure that wind farm developers do not commit to a turbine in the time frame where it may become obsolete or where an economically more attractive turbine may become available. Acciona Wind Energy Canada Inc. and TransAlta concurred.

40. The current application process requires an amendment with any change in turbine. This can require changes to the wind turbine layout, the generation of additional environmental reports related to siting and noise assessments, and additional consultation, all of which require regulatory review and approval. They also trigger incremental costs and project risk. Developers requested that if the change in turbine location does not violate any constraints, then an additional environmental review by Alberta Environment and Sustainable Resource Development should not be required. This is comparable to a restart on the project design, and adds time and expense to the approval process.

41. Benign Energy and Acciona Wind Energy Canada Inc. also commented that locking into a turbine contract early in the application process could have financial implications by restricting the developers' ability to negotiate prices with vendors. The wind developers questioned why this information is needed by the AUC in the application process.

42. Turbine height, rotor diameter and sound characteristics specific to the turbine make and model are required by the Commission in order to properly capture the specific impacts of the wind farm on the environment, noise levels and wildlife, as well as the ability of the application to meet AESO *Wind Technical Interconnection Requirements 502.1*. Stakeholders suggested that an unspecified turbine could be used for all the required pre-requisite studies, but would have to be a worst-case scenario, to ensure the impacts are properly identified and assessed. As a result of using the worst-case scenario, they considered that changing a turbine to a smaller or quieter turbine, while maintaining similar electrical characteristics, should not require an amendment.

43. Developers indicated that revealing the turbine make and model in the application is a commercial disadvantage. The AUC process does allow an applicant to treat certain aspects of the application as confidential, but utilizing a confidential process introduces another layer of administrative complexity. This use of confidentiality could be used to ensure developers are not commercially disadvantaged as a result of the AUC application. However, even stating the turbine size and rotor length requirement reveals to other developers the likely turbine vendor.

Observations

44. As a result of the suggestions by CanWEA and others, a number of alternative approaches might help achieve the goal of a more flexible process for turbine selection. Alternative approaches include:

- a) A generic turbine layout with specific turbine locations selected.
- b) Contingent turbine locations that provisionally identify more than the expected final number of turbine locations.
- c) Flexibility for amending an application during or after approval.
- d) A buildable-area concept and process, with geographic regions for potential turbine locations identified in the application.

45. The first three options are discussed below. Option d) is discussed subsequently.

Existing approaches to manage turbine selection flexibility

46. Applicants currently use three methods to manage turbine flexibility:

- a) Generic layout for turbines – a layout is chosen that is suitable for a suite of turbines with a variety of noise specifications. This means that the layout could be used for any choice of turbine within a selected group. The layout would meet all constraints including environmental constraints, historical resources and municipal bylaws, as well as AUC Rule 012, no matter which turbine is chosen from the developer's preselected suite. All development work would be completed using this layout. Amendments to the layout could be reduced since all turbine locations are suitable for any turbine in the suite of turbines being assessed. This approach, however, has some limitations. The final turbine would be chosen just before completing the final stakeholder consultation and before the application is submitted to the AUC. This could result in an inefficient layout that accommodates the loudest or largest turbine, and a longer collection system than would be required if the layout was optimized for a specific turbine model. The economic impact of these inefficiencies could be detrimental to the project.
- b) Contingent turbine locations – the applicant selects more turbine locations than are required for the project. The specific turbine model is chosen before the final stakeholder consultation and AUC application submission. Because the submitted layout has more turbine locations than required, as the project goes through the information request process with the AUC, the developer can "release" locations before the application is deemed complete, or prior to approval. However, this approach can create some confusion with the regulator since it is unknown which locations are being contemplated for use.
- c) Amendment during the application process or after approval – the AUC currently uses the following processes for amendments:
 - Amendment during the application process – the applicant submits a layout with one turbine choice and amends the layout, and any affected aspects of the application when another turbine is chosen. This can be very confusing for all parties involved, since a significant number of aspects of the wind farm application need to be

changed. The confusion generated can significantly impact the duration of the application process. Minor amendments made during the application process that do not materially impact setbacks or conditions that may have been imposed by the AUC or other agencies may be able to be addressed by the applicant by describing those proposed amendments and discussing why they are considered to be minor. If the proposed amendments during the application process are major, the applicant would need to resubmit the revised project proposals and any impacted review or revised conditions from other agencies. If the amendments are excessively complex or broad in scope, the applicant might consider closing the application and resubmitting a new application.

- Amendment after approval – the applicant receives an approval for a specific turbine, and then requests amendments to the approval conditions. This amendment requires re-filing the relevant information and potentially initiates another round of stakeholder information requirements. Amendments can take three or more months. This process, however, may be less confusing than an amendment initiated during the approval process. Minor amendments that have no adverse environmental impact; do not directly and adversely impact others; do not materially impact setbacks, conditions imposed by other agencies or AUC approval conditions, could be addressed in a simplified letter of enquiry process that is commonly utilized by the AUC to review requests of a minor nature.¹ If the proposed amendments are major, the applicant should submit an application describing the requested approvals including all relevant supporting documentation.

47. The preceding methodologies present advantages and disadvantages and would affect the duration of the permitting process.

Please comment on the merits of the approaches identified above. Are there additional approaches that should be considered?

Buildable area two-stage concept

48. The AUC regulatory process for wind power interconnection is described in AUC Rule 007. It is designed as a one-stage process. The wind power developer must provide in the initial application the final layout of the wind farm, complete with turbine locations, number of turbines, specific turbine make, turbine model, turbine height, rotor diameter and the specific noise impact of the turbine, as well as information about the electrical characteristics of the project, as required for an interconnection study.

49. Option D is a buildable area two-stage process, as suggested by CanWEA. In the buildable area two-stage process, the buildable area would be identified and approved with conditions, along with specified thresholds for turbine size, noise levels and other factors. In the

¹ Alberta Utilities Commission Checklist for Power Plant Facility versus Letter of Enquiry Applications; www.auc.ab.ca/acts-regulations-and-auc-rules/rules/Documents/Rule%20007/Electric%20power%20plant%20letter%20of%20enquiry%20checklist%20April%2021%202011.doc.

second stage of the process another application would be submitted, the conditions would be released and a final approval would be issued. This approach would allow developers to select the most appropriate technology closer to the build date.

50. It was submitted that the traditional Alberta construction schedule for wind farms is two years. Civil engineering design work is completed in the first year and turbine erection is completed in the second year, as shown in Figure 1, below, where T is the turbine selection stage. In an ideal commercial situation for the developer, turbines would be chosen and ordered approximately six months before commencement of civil construction to allow four to six months of design prior to breaking ground. This timing would facilitate selecting the most advanced technology available, allowing extraction of maximum energy from the wind resource as well as providing price competition and certainty to assess if the project can proceed. Assuming a two-year build process, this means that turbines are placed on order a minimum of 24 months before commercial operation, or six months before commencement of construction. If construction were completed in one year, rather than two years, turbines would be chosen 12 months before commercial operation in an ideal commercial situation. A shorter time between turbine selection and the commercial online date is beneficial to the developer.

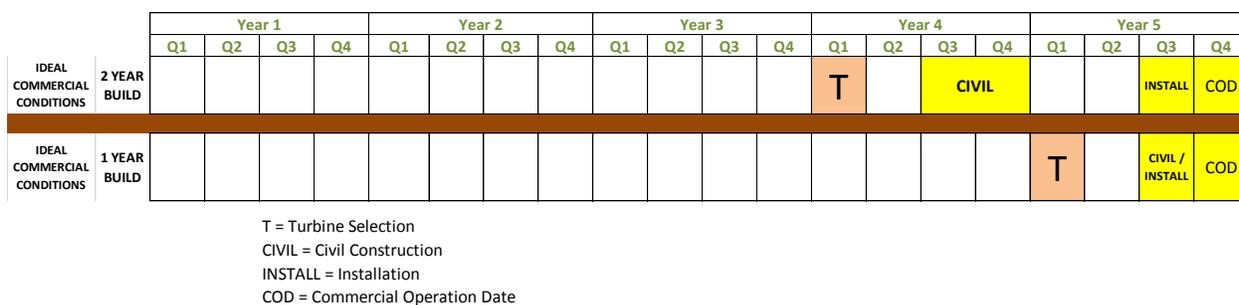


Figure 1: Commercially optimal turbine selection timeframe

Do the preceding and subsequent figures reflect your experiences with permitting timelines?

51. The current regulatory process combines the requirements of AUC Rule 007 for the project application and the AESO’s connection process for the interconnection application. The turbine must be selected 54 months or longer before commercial operation. This is demonstrated in Figure 2, below, where the turbine selection stage (T) is in Year 1 – almost five years prior to commercial operation.² This timing is difficult for the developer since turbine technology is evolving more rapidly than the five-year process allows.

52. The constraint of selecting a turbine four and a half years in advance of installation means that Alberta developers are losing out on about two and a half years of technology development and are subject to unfavorable commercial terms. Newer turbines tend to provide

² Eighteen months is indicated as the time from receipt of an application by the AUC until a decision is issued. Depending upon the complexity, number of information requests, time to deem the application complete and any interventions, this may differ from the target timing identified in AUC Bulletin 2009-25. For example, the target for a non-routine application with objections and a written process is 155 to 200 days after the application is deemed complete. It is noteworthy that the target timeframes are only achievable when all parties participate in a timely manner.

more energy and have better sound characteristics: they are quieter and have more noise control options, better electrical control systems and improved grid friendliness.³ Access to these newer turbines is critical to protect the project economics and reduce the number of turbines required for each project. Typically, to modify the choice of turbine, developers create a different layout for the new turbines, file an amendment to the permit and complete additional stakeholder consultation, interconnection studies and noise impact studies, and obtain sign-off by appropriate regulatory agencies.

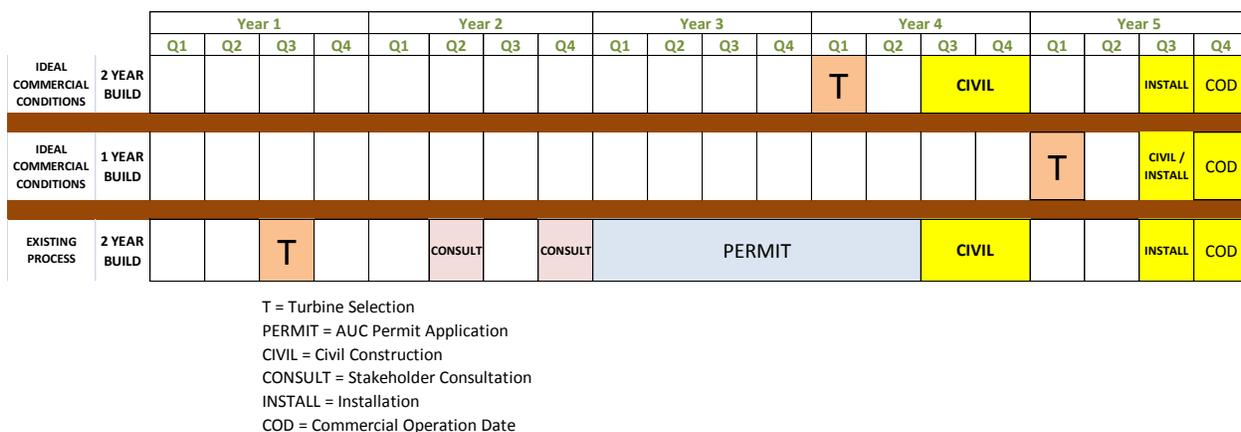


Figure 2: Existing timeframes for AUC application

53. Consultation is critical with landowners who may potentially have turbines on their lands or others nearby. Consultation usually identifies and addresses restricted zones such as wetlands and roadways. As such, in the ideal commercial process, consultation should occur before the turbine model is chosen.

54. Consultation is typically completed in two cycles. The first cycle provides potentially affected landowners with a proposed layout. The second cycle provides landowners with a final layout for their feedback before the application is submitted to the AUC. Since the consultation period is typically in the second and fourth quarters of project year two (Q2 and Q4 in Figure 2, above), the two cycles of consultation tend to be separated in time. Consultation could be completed in one round; however, this would not allow the developer to consider stakeholder feedback in their final design. The second cycle would/could become an information session about what is about to happen, rather than true consultation. After reading through Appendix A of AUC Rule 007, most developers recognize the need to provide stakeholders with the opportunity to respond to the final proposed layout before submitting the application.

55. With the buildable-area concept, the approach to consultation would need to be assessed to ensure that the process is effective and equitable for stakeholders. For example, consultation would begin when the turbine locations are not pinpointed, but rather are identified within zones that incorporate constraints and setbacks. Depending upon the size of the buildable area zones, this should provide a reasonable opportunity for effective consultation, and for directly and adversely affected parties to identify concerns that can be considered in the design of the subsequent layout proposal. Provided that the initial consultation with respect to buildable area regions is effective, consulting a second time with respect to specific turbine locations before

³ Electrical devices are considered grid friendly if they operate in a way that supports power grid stability such as frequency response, voltage response and control systems.

those specific turbine locations are identified in the second-stage application should not impede either the developer or the affected parties.

56. A two-stage approval process may provide more flexibility for the developer, which would ultimately assist in reducing project costs. The proposed two-stage process would use an approval with conditions, and a release of conditions in a final approval before construction and operation. The power plant approval would be based on a buildable area, subject to limits on tower hub height, rotor diameter and sound emissions. Pre-construction approval conditions would be released based on evidence of compliance with the limits committed to in the application. Release of the pre-construction approval conditions would be a prerequisite for construction and operation.

57. Conditions would be identified by each timeframe: pre-construction, construction and post-construction. Pre-construction conditions would need to be released before construction began.

58. Pre-construction – sample pre-construction conditions would require agency sign-offs from:

- NAV Canada on air navigation service.
- Transport Canada on federal transportation policies and programs.
- Alberta Culture on historic resources.
- Alberta Environment and Sustainable Resource Development on wildlife and rare plant surveys and studies.
- AUC on the noise impact assessment compliance with AUC Rule 012.
- Other agencies relevant to the project.

59. Construction – sample construction conditions could include setbacks for ground disturbance during specific timeframes.

60. Post-construction – sample post-construction conditions could include setbacks for ground disturbance during specific timeframes for ongoing maintenance of the wind farm, noise monitoring, wildlife monitoring and other additional environmental field studies, etc.

61. Figure 3, below, shows the timeframes for the buildable area approach for approval with conditions and the release of pre-construction conditions. This allows the turbine selection stage (T) to occur closer to the commercial operation date (COD).

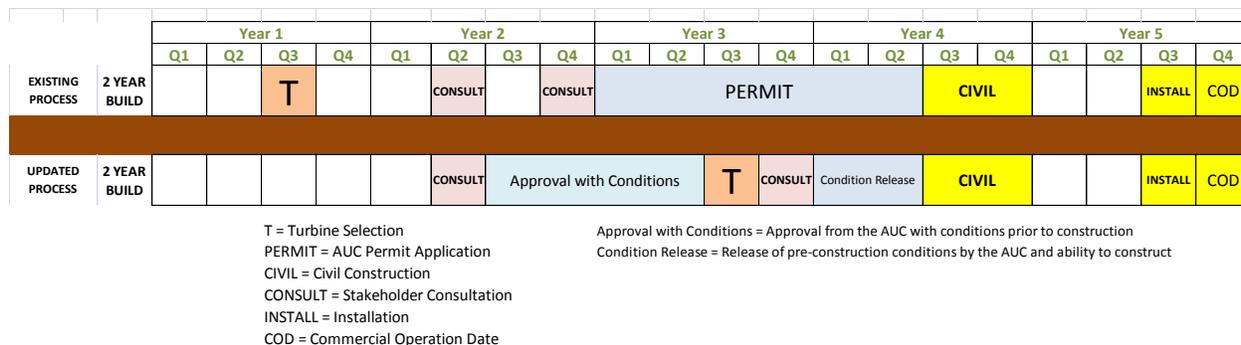


Figure 3: Proposed timelines for two-stage approach for wind farm applications

62. The advantage of the two-stage process for the AUC, agencies, stakeholders and the developer is that specific environmental issues, which tend to require a large number of information requests and hence take a long time, will be settled in the approval, with conditions, before the developer is required to choose a specific turbine. This is expected to reduce the time between turbine selection and the commercial online date, thereby potentially reducing the total duration of the application process from beginning to end while still allowing the AUC sufficient time to ensure that siting constraints are fully vetted.

Comment on the opportunities for landowners who object to the buildable area and second stage application to trigger an AUC hearing.

63. The pre-construction conditions release should be a relatively expeditious process. Agencies that require specifics such as layout, turbine height, diameter and anti-perching features would need to sign-off on the project prior to the conditions release. These agency sign-offs would require specific information on layout and turbines. This should expedite the pre-construction conditions release because the developer not only has the flexibility to select a final turbine that meets the conditions stipulated in the preliminary stage, but will also be able to take advantage of any technological enhancements, as well as secure competitive pricing for the technology.

64. The Municipal District of Pincher Creek expressed its desire that a more flexible process should not create conflict with setback requirements from roads. The buildable-area process achieves this goal. The developer would be required to address road setbacks as they are set out in county bylaws. The developer would clearly articulate this requirement in the list of setbacks used to design the project, and include it in a project constraint list (see project constraints, below, for more information).

Buildable-area wind power approval with conditions

65. The wind power application would include the following information to the AUC along with other information requested in AUC Rule 007:

- Project constraints list.
- Turbine and project characteristics table.
- Buildable area showing temporary setbacks during construction, permanent setbacks for ground disturbance during operations, and permanent setbacks for turbine rotors during operations. This would be provided as a layered PDF file and a GIS shapefile.⁴ Examples of the layered files are shown in Appendix D.

Can stakeholders identify any other buildable area requirements?

⁴ Layered files demonstrate multiple additions of features by menu selection where they can be turned on or off. GIS shapefiles can be downloaded from the government of Alberta website.

Buildable-area project constraints

66. The power plant application would require the developer to consider a number of constraints to determine the buildable area for a wind farm. The developer would complete all work to determine any physical constraints and setbacks that the wind farm would need to comply with. Setbacks for constraints consist of the following:

- Temporary setbacks – construction timeframe.
- Permanent setback (operations) – ground disturbance for tower locations, access roads, collection system and substation.
- Permanent setback (operations) – rotor arc.

67. Table 1 shows a list of typical constraints that would need to be considered in the application to the AUC, using the buildable area process. The reference document or regulatory agency providing these constraints is also given in the table below. Identifying these constraints is a regular part of the design process for any wind farm developer. Many of these setbacks are specific, either to the turbine’s total height to blade tip, its hub height, its blade length or its sound emissions.

Table 1. List of typical constraints considered in determining the buildable area

Type of constraint	Specific constraint	Regulating agencies for setback	Reference document for constraints and setbacks	Setback
Environmental – water (Construction and Operational)	Hydrology features	AESRD	www.srd.alberta.ca/FishWildlife/WildlifeLandUseGuidelines/documents/WildlifeGuidelines-AlbertaWindEnergyProjects-Sep19-2011.pdf	Setback to rotor arc, Setback for access roads.
Environmental – species (Construction and Operational)	Species (flora, fauna)	AESRD	www.srd.alberta.ca/FishWildlife/WildlifeLandUseGuidelines/documents/WildlifeGuidelines-AlbertaWindEnergyProjects-Sep19-2011.pdf	Setback to rotor arc, ground disturbance, temporal constraints. Setback for access roads
Property line (Operational)	Physical setback to property lines	Municipality	County bylaws	Setback to tower base location, or rotor arc. Varies by county
Sound level (Operational)	Setback distance from dwellings	AUC	AUC Rule 012 http://www.auc.ab.ca/acts-regulations-and-auc-rules/rules/Documents/Rule012.pdf	Setback for sound
Residences (Operational)	Setback	Some municipalities	County bylaws	Setback to tower. Varies by county
Historical resource (Construction and Operational)	Historical resource, archaeology, paleontology, traditional land use	Alberta Culture	Alberta Culture guidance	Setback to tower location, and access roads

Type of constraint	Specific constraint	Regulating agencies for setback	Reference document for constraints and setbacks	Setback
Radar/communications (Operational)	Broadcast systems, navigational aids systems, mobile systems, point-to-point radio systems, point to multi-point systems, navigational and meteorological radar systems, seismological monitoring	Environment Canada or Department of National Defence, information from Industry Canada Database	Consultation based	Setback to rotor arc or tower location
Transportation (Operational)	Road allowances and highways	Specific county and Alberta Transportation	Alberta Transportation 300 metre requirement and county specific setbacks	Setback to tower location
Transmission line and related equipment (Construction and Operational)	Existing or new Transmission Line	Transmission facility owner	Canadian Electrical Code – Canadian Standards Association	Setback to tower location
Distribution line (Construction and Operational)	Existing or new collection system	Distribution facility owner	Canadian Electrical Code – Canadian Standards Association	Setback to tower location
Oil and gas infrastructure (Construction and Operational)	Wells (active/abandoned), pipelines, facilities.	ERCB	Industry norm and Canadian Electrical Code – Canadian Standards Association	Setback to tower location
Other	Other physical constraints such as slope, irrigation, agricultural considerations. Additional county bylaw constraints. Other as per site specific constraints	Varies	County bylaws, consultation, industry norms or good business practice	Varies

68. The project boundary is defined as the lands leased by the developer that have some portion of the wind farm (turbines, access roads, meteorological (met) towers, collection system, substation, etc.) next to the nearest property line. The buildable area is defined as the lands within the defined project boundary, where turbines and other equipment can be installed without violating any of the constraints shown in Table 1. A developer will use these constraints to determine the buildable area for turbines and other equipment, as well as surface disturbance, by choosing a maximum turbine size (hub height and rotor diameter). This buildable area can subsequently be used for turbines that are smaller in height or rotor diameter, or that have lower sound emission.

69. Developers will provide a comprehensive list of constraints and setbacks used to define the buildable area. Table 2 illustrates how typical constraints are addressed.

Table 2. Illustration and reconciliation of constraints actually used in power plant applications

Constraint	Setback used	Regulatory guidelines	Variance?	Approval for variance and date of sign-off
Wetlands	100 metres to rotor arc	AESRD Guidelines 2011 – 100 metres to rotor	No	N/A
Ferruginous hawk	1,000 metres to rotor arc	AESRD Guidelines 2011 – 1,000 metres to rotor	No	N/A
County property line setback	Blade length plus 10%	County bylaws dated March 2011 - 100 metres required	Yes	Municipal development officer Mr. Smith approved variance on March 12, 2012, see Exhibit X
Etc.				

70. Any variances to the regulatory guidelines must be indicated, as well as the regulatory agency’s sign-off for any variance from the guidelines and the date of sign-off.

71. In order to implement the setbacks, the developer must provide the information listed in Table 3 (example metrics shown).

Table 3. Turbine and project characteristics table used in the power plant application when using the buildable area approach

Project characteristics	Project specifics
Project size	100 megawatts
Turbine maximum hub height	100 metres
Turbine maximum rotor diameter	113 metres
Maximum number of turbines in buildable area	64
Minimum number of turbines in buildable area	43
Maximum sound power level of the turbine ⁵	106 dBA L _{eq}
Associated setback for dwellings given the maximum sound power level of the turbine ⁶	600 metres

Compilation of setback information

72. CanWEA suggested that it would be helpful to have a compilation of the nature and description of required constraints and associated setbacks.

Observations

73. The setbacks used by the developer are typically part of the generator application. These setbacks are determined by regulatory agencies such as Alberta Environment and Sustainable Resource Development and Alberta Culture, as well as by municipalities (see Table 1). Applications that have either incomplete usage of setbacks, unidentified constraints or

⁵ Maximum sound level based on 10-metre height normalized wind speed, calculated to IEC 61400-11 standards.

⁶ A setback distance from a wind turbine using the sound power level can only be useful when a table of predicted sound pressure levels versus distance is used (the predicted sound levels in the table must be worst case, with no sound attenuation factors considered).

incorrectly applied setbacks are more difficult to review. New entrants to the Alberta market may not be aware of the constraints and setbacks required for wind development or how to use these setbacks (in other words, what is measured and whether to apply the setback at the rotor or tower base). A comprehensive list of constraints and setbacks could assist all wind farm developers to ensure that their application is complete, and could therefore speed up the application process. Examples of how to apply the setbacks could help ensure all developers consistently address constraint and setback criteria. A comprehensive sample setback list, as of today, is provided in Appendix G.

Buildable area consideration of dwellings

74. Dwellings need to be identified before the preliminary stage application is submitted. Noise constraints can be integrated into the buildable area by using a physical setback distance as a proxy, as required. For example, of the potential turbines being considered by the developer, the turbine with the highest sound-power level could be utilized to determine the minimum setback distance required. The maximum sound power level of the turbine will be specified by the developer (for example, 106.0 decibels, or dBA), based on the nominal warranted sound level as per the International Electrotechnical Commission (IEC) Standard 61400-II. Each dwelling should have a maximum setback distance based on the maximum turbine sound power level. A smaller setback distance may be appropriate for a quieter wind turbine (for example, sound power 103 dBA), but not for one with a higher sound power level (for example, 106 dBA). Developers must use the maximum setback distance that best fits with the loudest turbine contemplated for the project. The setback used should be shown as illustrated by the example in Table 3. The category “Associated setback for dwellings given the maximum sound power level of the turbine” shows the physical setback that is used as a proxy for the final noise impact assessment.

75. Noise is a key constraint that must be identified in the buildable area. Identification of noise sources and dwellings is required prior to approval with conditions.

76. All existing and permitted energy-related noise sources must be identified and modelled for the cumulative effects of noise, as required in AUC Rule 012. The total noise room for power plant applications is based on the permissible sound level that is derived from Table 1 of AUC Rule 012. Developers must take into account that the assumed ambient daytime and nighttime sound level must be added to the cumulative effects of all existing and permitted energy-related noise sources to arrive at the total cumulative noise level at a dwelling. In typical rural Alberta, the assumed nighttime ambient sound level is 35 dBA and the assumed daytime ambient sound level is 45 dBA. In a simple case where the permissible sound level is determined to be 40 dBA L_{eq} nighttime and 50 dBA L_{eq} daytime, the maximum cumulative noise contribution at a dwelling from energy-related facilities alone could be up to 38.3 dBA nighttime and 48.3 dBA daytime. This setback consideration would affect the available buildable area.

77. The power plant application would need to reflect any existing and permitted energy-related noise sources that are identified at the time of submission.

78. AUC Rule 012 may require some amendments to allow the two-stage buildable area process to accommodate the addition of a new sound receptor or noise source, after the initial application and before final approval, to ensure that developers incorporate changes in their model and application.

Combined constraint layers and resulting buildable area

79. A combination of the constraints and setbacks shown in Table 3 can be used to design a buildable area. The buildable area takes into consideration all physical setbacks for the project, existing constraints and a minimum setback distance from dwellings for noise. The buildable area can be visually represented in the application by using GIS shape files or “clickable” high-resolution layered PDFs. PDF files can be viewed with any PDF compatible viewer.

80. Combined constraint and setback layers include:

- Temporary constraints and setbacks – construction and operations timeframe. Considers ground disturbance and required setbacks during particular seasons or during construction and maintenance.
- Permanent constraints and setbacks (turbines) – operations timeframe. Considers ground disturbance for turbine tower locations and setback distances for noise. The resulting buildable area is where any turbine could be located.
- Permanent constraints (ground disturbance) – operations timeframe. Considers access roads, collection systems and substations.

Visual impact considerations for the buildable area

81. Visual representation of the wind farm is an important aspect of the stakeholder consultation process conducted by the wind farm developer. Stakeholder consultation on the buildable area is required before submitting the AUC application and as part of the application.⁷ The application would include a visual representation of the wind farm that clearly indicates the total envelope of the proposed development being considered by the developer, including the buildable area, the height, location, and visual impacts of the turbines and other infrastructure.

82. The municipalities of Pincher Creek and Cypress County indicated that the visual impacts of wind farms are important. As well, AUC Rule 007 requires power plant applicants to consider the visual impact of a wind farm. This information is currently filed with the AUC, but it is not typically used in the review of the application unless concerns are raised. However, municipalities in which a project is being developed often require a visual representation of the proposed wind farm, and typically require any specific view shed to be identified and, if possible, protected so that the wind farm has minimal visual impact. The cost to develop visual representations and visual impact can be considerable.

Should a viewscape representation of visual impacts be included in the application?

83. The public information package would inform stakeholders about the proposed buildable area for the wind farm, including the proximity of the buildable area and setbacks to existing infrastructure, and environmental constraints.

⁷ AUC Rule 007: *Applications for Power Plants, Substations, Transmission Lines, and Industrial System Designations*; information requirement clause PP42 dealing with power plant applications.

84. The buildable-area concept can accommodate the need for consultation on the visual impact of the project. Scenarios (based on turbine density) that present the minimum impact versus the maximum impact have been used by some jurisdictions to help stakeholders understand the potential visual impact of projects. The minimum impact would comprise the largest turbine model and rotor with the fewest turbines; the maximum impact would comprise the smallest turbine model with the most turbines.

85. The visual impacts of wind turbines and any resultant implications are considerations that are often identified when projects are proposed. Computer simulations or photomontages can be used to demonstrate the impact of a wind farm on a viewscape⁸ from various points of reference. Perceptions of the impacts reflect individual preferences. Certain historic or important viewscales may be designated by provincial authorities or municipalities as protected in land use planning.

86. The Municipality of Pincher Creek requested the AUC to clarify how the effects of wind turbines on visual aesthetics are considered in wind power applications. The AUC deals with visual esthetics on a case-by-case basis.

87. A submission of the buildable area, as well as stakeholder consultation based on the potential impacts, would be used for an approval with conditions. If visual impact is seen as a contentious issue, a condition of the approval could be additional stakeholder consultation regarding the visual impact of the final layout. Preferably, visual impacts should be addressed in the initial consultation and approval process, possibly excluding visual constraints from the buildable area.

Historic resources and the buildable-area concept

88. Historic resources in Alberta are protected. The Historic Resources Management Branch of Alberta Culture requires applicants to obtain a clearance before submitting an application for a proposed development that has potential to impact a significant historic site. A historic resources impact assessment is normally required when a development is proposed for an area with known historic resources or an area that may potentially contain historic resources.

89. A summary of Alberta Culture requirements pertaining to wind power projects is provided in Appendix E.

90. Alberta Culture may issue a clearance, a conditional clearance or no clearance. Currently, it provides a conditional clearance for areas considered to have low archaeological potential or for areas considered to have high archaeological potential that were examined in the field. When consulted on the buildable-area concept, Alberta Culture indicated that it could complete its assessments if applicants were required by a condition incorporated into an initial AUC approval to subsequently identify and review specific turbine locations. This approval condition would need to be complied with before Alberta Culture could issue a clearance.

⁸ Viewscales are those features that provide a range of sight that can be identified as providing a community asset such as but not limited to pleasing vistas, scenes and view that provide a sense of place and character. Views within viewscales include pastoral open space vistas, skylines, ridgelines and peaks.

91. Final development plans for all project elements would be required to remove conditions from the clearance. It is expected that final clearance from the Historic Resources Management Branch of Alberta Culture would be a condition on the power plant approval. This would allow developers to select their turbine and confirm the final layout prior to receiving final clearance. In addition, Alberta Culture would be able to assess all aspects of the wind farm and their potential impact on historic resources, including the collection system, access routes, the operations and maintenance building, permanent meteorological towers⁹ and other facilities associated with the wind power facility.

92. To accommodate the buildable-area concept, a two-stage approach to assessing and protecting historical resources could be developed with Alberta Culture. The location of a buildable area would be determined by the land areas that receive clearance under the *Historic Resources Act*. Some portions of a proposed buildable area may easily obtain clearance, some portions may have prohibited development due to the presence of known protected resources and would be excluded from the buildable area, while other portions of the area may require additional assessment of historic resources to determine if development is appropriate.

93. In a two-stage approval process, areas subject to conditional clearance from Alberta Culture would, as a condition of the AUC's first stage approval, be required to complete historical impact assessments and, if needed, develop a mitigation plan satisfactory to the department. Upon successful completion of that work and receiving *Historic Resources Act* clearance from Alberta Culture, final approval of the buildable area would be considered by the AUC, taking into consideration the results of the *Historic Resources Act* impact assessment. This approach would allow a wind developer to advance an application while an assessment of historic resources simultaneously occurs, without being otherwise delayed for a broader area assessment, or for an assessment based upon an assumed turbine point location that could be subject to a subsequent review process by Alberta Culture. This may result in a more streamlined and effective process than awaiting a complete review and sign-off from Alberta Culture (which could be subject to further adjustment if turbine locations are revised) before the developer submits the initial application. This may also benefit Alberta Culture resource utilization by requiring the Historic Resources Management Branch to focus only once on the final turbine sites, rather than assessing a number of sites that may be subject to revision. An offsetting risk associated with this approach is that certain turbine sites within a buildable area envelope may ultimately be precluded from development upon completion of a detailed review by the Historic Resources Management Branch.

94. Alberta Culture pointed out that the existing language in AUC Rule 007 could be clarified by indicating that a clearance must be granted rather than just applied for. This may be a consideration to avoid duplication of efforts and provide an efficient process.

Rare plant studies and the buildable-area concept

95. Rare plant studies are required if there will be any ground disturbance on native prairie. Rare plant studies are typically completed within a short timeframe in the summer. The studies are typically only done when a final layout is available, as they are quite exhaustive and expensive if large areas are tackled or changes occur. Not all landscapes will trigger this level of study, which is determined by Alberta Environment and Sustainable Resource Development,

⁹ Meteorological towers are used to collect wind speed data at frequent intervals to assess the wind resource available at a location.

since cultivated lands are not usually a concern. A developer could choose from two approaches to complete all required rare plant studies:

- a) The developer could complete rare plant studies on all buildable lands in appropriate landscapes and receive an Alberta Environment and Sustainable Resource Development approval prior to AUC application submission. This alternative would be expensive and time consuming for large buildable areas.
- b) Alternatively, the developer could delay the rare plant study until after turbine model selection and near-final layout is complete. In this case, the developer would receive an approval with pre-construction conditions. This approach would require an Alberta Environment and Sustainable Resource Development sign-off on the layout that includes conditions for setbacks for rare plants on any lands that are potentially disturbed in the development, construction or operation of the wind farm. Construction could not start until Alberta Environment and Sustainable Resource Development provides this sign-off and the AUC provides pre-construction conditions release. This alternative may be efficient even if rare plants are identified in certain portions of the buildable area, as other portions of the buildable area may not contain rare plants and, therefore, would be non-problematic for development.

Buildable-area pre-construction conditions release after approval with conditions

96. If the developer utilizes the buildable-area approach, the developer would acquire any permits that require specific turbine locations after the preliminary stage approval, and upon selection of the specific turbine and final layout. These permits would then be submitted to the AUC to release the pre-construction conditions, thereby allowing the developer the flexibility to delay the final turbine selection.

Buildable-area specific turbine approvals

97. The overall facility approval process requires sign-off from multiple agencies that require specific turbine locations to be identified before they can provide sign-off (see list below). Final AUC approval would be contingent upon the developer consulting with these agencies and establishing final locations (including turbine height and rotor diameter) of turbines. In addition, the final approval would require a thorough noise impact assessment to ensure that the final turbine model that is selected complies with AUC Rule 012.

98. The pre-construction conditions release would require developers to identify specific turbines, specific locations, infrastructure layout (roads, collectors and permanent meteorological towers), temporary disturbances such as temporary construction laydown areas (where towers are assembled and prepared for installation), and a complete and compliant final noise impact study. Any additional noise sources that may have been identified or permitted subsequent to the initial application, as well as existing noise sources, need to be considered in the final noise impact assessment. The final noise impact assessment must be provided by the wind farm developer for review by the AUC before the AUC will grant approval of the turbine locations. The turbine locations must be within the approved buildable area that was identified in stage one of the approval process.

99. Specific requirements for condition release include:

- NAV Canada approval respecting air navigation service.
- Transport Canada approval respecting federal transportation policies and programs.
- Alberta Culture sign-off on archaeological and historic resources studies with the layout showing appropriate setbacks from any archaeological or historic resources.
- Wildlife surveys and studies with a layout showing appropriate setbacks included in the final design. Sign-off required from local biologist for Alberta Environment and Sustainable Resource Development Fish and Wildlife.
- Alberta Environment and Sustainable Resource Development sign-off for rare plants studies with the layout showing appropriate setbacks.
- AUC approval of final layout of turbines.
- AUC approval of a noise impact assessment demonstrating compliance with AUC Rule 012.

Duration of the power plant buildable-area approval with conditions

100. The power plant approval would stay in effect for approximately 36 months from the date of approval with pre-construction conditions to the release of all these conditions by the AUC. The suggested 36-month timeframe would allow sufficient time for the applicant to engineer the project and for interconnecting transmission facilities to be designed and constructed. Typically, wildlife and environmental studies are valid for a 24-month period. The 36-month period for the approval to remain in effect is longer than the lifespan of wildlife and environmental studies, but allows for the realities of transmission availability and construction timeframes. The specific timeframe could be recommended by Alberta Environment and Sustainable Resource Development to ensure the environmental studies remain valid.

101. If the developer is unable to advance the project within the approved timeframe, the developer may need to undertake all requirements again, including potential fieldwork for wildlife assessment, to resubmit an application to the AUC. Delays in the applicant satisfying pre-construction conditions would require an updated buildable area and resubmission.

Duration of the power plant second stage approval after removal of pre-construction conditions

102. The power plant approval would remain valid for a suggested duration of approximately 48 months after removal of all of the pre-construction conditions and the second stage approval. This duration would be determined by the complexity of the project, since more complex projects may require a longer construction time. The applicant may also request a specific duration period for the approval. The project would be required to be constructed and operational within this timeframe. The applicant could request extensions, which would be determined by the Commission on a case-by-case basis.

Are 36-month and 48-month time periods for buildable-area approvals to remain in effect reasonable?

Implications of the buildable area on the Alberta Electric System Operator process

Alberta Electric System Operator connection process

103. The AESO [connection process](#) for customer interconnection involves formal stages and “gates” for each step, as described in the summary that follows. Key activities take place in each stage and projects must meet all of the requirements within each stage to complete the corresponding gate.

Summary of the AESO connection process:

Stage	Stage description
Stage 0	Identify project (expected duration of approximately two weeks) – initiation and identification stage of the connection process
Stage 1	Connection study scope (expected duration of approximately eight weeks) – scoping stage of the project
Stage 2	Connection proposal (expected duration of approximately 14 weeks, with a maximum duration of 12 months) – connection studies are completed and connection proposal is finalized
Stage 3	Needs identification document and facility application (expected duration of approximately 32 weeks, with a maximum duration of 16 months) – the needs identification document and facility application are completed
Stage 4	File application and AUC approval (expected duration of approximately 24 weeks) – needs identification document and facility application are filed with the AUC
Stage 5	Construction of transmission facilities commences (expected duration of approximately 16 weeks)
Stage 6	Project is energized

Stage 0

104. In this stage, the applicant submits a system access service request to the AESO. The applicant resolves any data deficiencies, and the project is created and added to the project list. Before Stage 0 can be completed and the application can pass through Gate 0, the AESO must receive the completed system access service request.

Stage 1

105. Before Stage 1 can be completed and the application can pass through Gate 1, the following steps must be completed: the connection plan, connection study scope, Stage 1 project data update package (PDUP), non-disclosure agreement, and construction commitment agreement/construction commitment agreement waiver or delegation must be signed with the transmission facility owner for costs related to completion of the connection proposal.

106. The project data update package at Stage 1 must represent a typical or estimated level of technical data. According to the AESO, “Where customer equipment is not yet ordered, the customer must estimate data representing their project to a level of accuracy adequate for the Connection Study.”¹⁰ The technical data can be generic, typical or “best guess.”¹¹ The AESO notes that in all cases, the data submitted should be at the highest level of accuracy available at that time. (This stage addresses the first AESO requirement to identify or select a turbine, although there is still an understanding that there will be some uncertainty in the selection process at this stage compared to later stages.)

¹⁰ AESO *Project Data Update Package – Instruction Manual (PDUP – IM)* Retrieved 7 May 2012; http://www.aeso.ca/downloads/PDUP-IM_R2_Merged.pdf.

¹¹ AESO *Project Data Update Package – Instruction Manual (PDUP – IM)* Retrieved 7 May 2012; http://www.aeso.ca/downloads/PDUP-IM_R2_Merged.pdf.

Stage 2

107. During Stage 2 of the AESO connection process, the applicant is expected to identify the specific turbine that is being used as part of the Stage 2 project data update package. At Stage 2, this information needs to represent a manufacturers' level of technical data for the model of equipment being ordered. The AESO notes that the Stage 2 project data update package uses this information so that the project can be accurately represented and other customers can rely on the information to conduct their studies. This requirement allows an interconnection proposal to be completed. The developer cannot advance to Stage 3 without submitting this information. If the developer has exceeded nine months for Stage 2, or has failed to specify a turbine model within this timeframe, they are required to restart at Stage 0. Alternatively, the developer can continue with a best-guess turbine choice and revise the dynamic studies at a later date in Stage 3, for an additional cost of approximately \$50,000 for revision of the dynamic studies.

108. While the AESO process specifies that a specific turbine must be identified at Stage 2, the buildable-area concept in the AUC process would not require a specific turbine to be specified until later in the process, corresponding to AESO Stage 4. The AESO process is generally flexible in that turbines can be changed simply by updating the information with the AESO. If this change is made, the AESO technical connection studies are updated either at the AESO's cost or the applicant's cost. If the AUC implements the buildable-area concept, there would be some delinking in timing between the AUC and the AESO processes used to specify a turbine. If developers were concerned with this delinking or the potential increase in total development costs, they could recommend that the AESO review and potentially defer its timing for a specific turbine, or the developer could continue with a tentative specification and amend it with the AESO prior to construction. Either option would not be expected to directly affect or impede the AUC's facility approval process if it adopts the buildable-area concept.

Stage 3

109. Stage 3 of the AESO connection process requires the applicant to submit an AUC power plant application and reconfirm the turbine choice at least six months before submission to the AUC. Dynamic studies for the needs identification document and consultation for the facilities application must be completed in time for a concurrent submission of the power plant application, the needs identification document and the facility application. A Stage 3 project data update package must be submitted to document any data parameters that have changed from the Stage 2 submission. Again, the AESO is looking for a manufacturers' level of accuracy, which other customer projects and system projects can rely on to conduct their studies.

110. A developer could potentially proceed with a best-guess turbine at this stage. The Stage 5 project data update package would then be updated to reflect the actual as-built equipment and test data. According to the AESO instruction manual, "the modeling data provided must be consistent with actual measurements, tests or surveys of the physical equipment as-built, and must be accompanied by the appropriate test reports, nameplates, final drawings and engineering documents."¹²

¹² AESO *Project Data Update Package – Instruction Manual (PDUP – IM)* Retrieved 7 May 2012; http://www.aeso.ca/downloads/PDUP-IM_R2_Merged.pdf.

111. The AUC power plant application, according to AUC Rule 007, no longer requires a connection proposal as part of clause PP39 dealing with power plant applications. The April 21, 2009 edition of AUC Rule 007 (version three) requires the following:

- An electrical single-line diagram obtained from the Independent System Operator (ISO) or sanctioned by the ISO showing the transmission development plan for the interconnection.
- A map with one or more conceptual layouts showing possible routes and general land locations for facilities that would be used to interconnect the power plant to the Alberta Interconnected Electric System.

112. The initial draft of AUC Rule 007 (version 1) required the following:

- Area transmission system load flow studies obtained from ISO or sanctioned by ISO to show transmission system adequacy to support the new power plant.
- Cost estimates for the interconnection and the required system upgrades.
- Draft functional specifications for system upgrades for system access and components for generator connection.
- The applicant's contribution, if any, toward the capital cost of the interconnection.

113. This requirement was eliminated in version two of AUC Rule 007, on March 24, 2009, since this is included in the needs identification document. Since this time, some applicants have continued providing the information as part of clause PP39, even though it is not required.

114. In the current AUC Rule 007, clause PP28 requires applicants to “provide details of the power generating equipment and associated facilities, such as make, model and nominal capacity.”¹³

115. The buildable-area method would require a modification to clause PP28 in AUC Rule 007 to defer the details of the turbine selection to the second stage application.

116. As part of the AESO Stage 3 connection process, the power plant application may be filed coincident with filing the needs identification document and facility application with the AUC. An updated project data update package, with information about the specific turbine, is required by the AESO at the beginning of this stage so that the most up-to-date connection proposal can be completed and submitted as part of the needs identification document application.

117. Stage 3 has a maximum allowable time of 16 months, and AESO customers who have not filed their power plant application with the AUC within the 16 months are required to restart at Stage 0. Once applicants complete Stage 3, they are added to the AESO project queue. This queue is used by the AESO to implement remedial action schemes during the operational phase of the project.

¹³ AUC Rule 007; www.auc.ab.ca/acts-regulations-and-auc-rules/rules/Documents/Rule007.pdf.

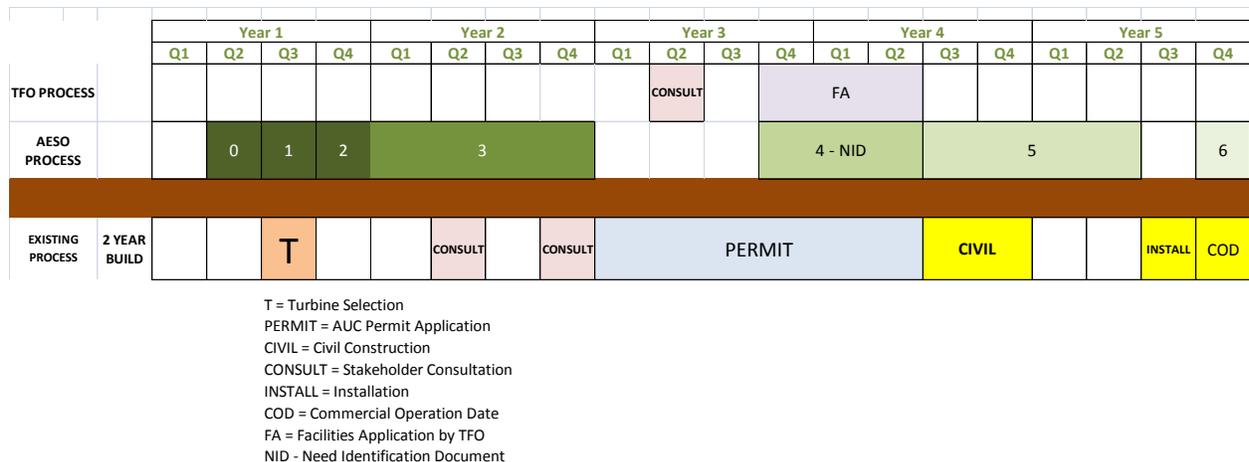


Figure 4: Existing AESO process and existing AUC process timelines

Timing interdependencies

118. The power plant application, the needs identification document application and the transmission facility connection application are interdependent, but the power plant application drives the other applications. Generally, the owner of the power plant will seek approval of the plant before applying for the AESO needs identification document application and the associated transmission facility owner-connection application, in order to provide a cost control opportunity. However, it is possible that all of the applications could be submitted and advanced concurrently. The advantages for the developer could include a more focused public consultation and the potential to consolidate consultation processes, as well as the potential for obtaining simultaneous approvals more quickly.

119. AUC Rule 007 identifies that where a new and significant transmission facility is required, the AESO normally prepares the needs identification document application. Smaller-scale transmission facility interconnection proposals may be submitted to the AUC as stand-alone facility applications separate from the needs identification document application, or jointly with the needs identification document application.

120. The needs identification document requires specific turbines to be selected so that load flow studies, stability studies, reactive power studies, and other necessary studies can be conducted as part of the needs identification document. Consequently, the buildable-area process, with flexibility to defer the selection of turbines, may work more effectively if the needs identification document application is made subsequent to approval of the power plant application.

AESO Stage 2 connection proposal

121. The AESO connection proposal (with its embedded studies) is a key part of the needs identification document application and is primarily completed to determine four important elements associated with a wind farm. These include:

- Potential for remedial action scheme – determined by the size of the wind farm, rather than the type of turbine.

- Potential for dynamic remedial action scheme, or dynamic remedial action scheme – determined by the type of turbine control system.
- Requirement for dynamic VAR support (DVAR) – determined by the type of turbine. It is known prior to the interconnection studies whether or not dynamic VAR support is required. Some turbines have DVAR built into the turbine, and others require additional and external DVAR support and control systems. The size of the DVAR is determined by the size of the wind farm.
- Development of functional specifications – to ensure that the wind farm meets the technical interconnection requirements issued by the AESO rule *Wind Aggregated Generating Facilities Technical Requirements* 502.1.

122. Project size is an important factor for determining the remedial action scheme and the size of DVAR required. The electrical and control system characteristics of the turbine determine the need for DVAR. The specific turbine type is required to determine the dynamic remedial action scheme requirements.

123. The AESO has indicated that it is satisfied with its current process, which requires a wind farm developer to completely specify the turbine manufacturer and model including the associated electrical specifications. Its process is flexible and allows a developer to change the turbine, which would trigger an update of the AESO electrical studies. Depending upon the circumstances, either the developer or the AESO would be responsible for picking up the costs associated with updating the studies. As mentioned earlier in this discussion paper, third party costs for these studies are typically approximately \$50,000 for a dynamic study when a turbine is modified in Stage 2 or Stage 3.

124. The AESO is concerned primarily with the electrical output of the wind farm, which may not change significantly, or at all, as a result of a change in turbine vendor. The AESO is also concerned with the technical specifications of the turbines, largely with respect to the control and stability issues associated with connecting the generation to the electrical system. This is more significant in areas of the province where the transmission system is constrained and susceptible to overloading or instability. Consequently, the AESO is more focused on the connection to the integrated electrical system than it is on the specific details of the wind farm, which are of importance for the AUC. As a result, the buildable-area concept is of more interest for the AUC application process than for the AESO process, because the siting details are more relevant in the AUC process.

125. Currently, there are a number of projects that are in the AESO connection project list that requested connection based on the historical connection process, where queue position was very important. These projects may exceed the maximum timeframes within the current AESO process, however, they can reapply and possibly reuse existing studies, or pay for additional studies to be completed.

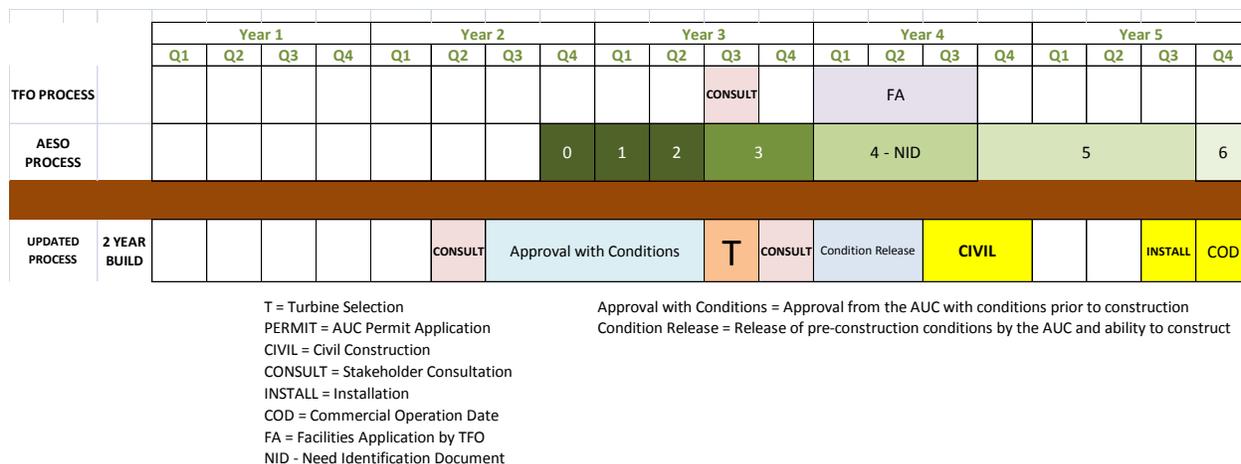


Figure 5: Timelines for two-stage process for AUC and AESO

Interplay between buildable area and the Alberta Electric System Operator connection process

126. The benefit of using the AUC approval with conditions for the AESO connection process may include:

- Customers can complete a power plant application and receive an approval with conditions, prior to entering into the AESO connection process, and therefore delay their turbine choice.
- A more mature project entering the AESO connection process would be expected to require fewer revisions and fewer dynamic studies during the AESO connection process, with the potential for lower costs.
- More mature projects entering the AESO connection process would be expected to provide the system operator with a higher level of accuracy and certainty, which other customer projects and system projects can rely on for conducting their own studies.
- Having relatively mature projects entering the AESO connection process has the potential to reduce the number of projects that would need to be considered in any connection study. Potentially, only customers who complete the approval with conditions would be considered in the connection study. This could reduce the number of expected remedial action schemes required to be designed and built, and reduce the cost of interconnection for participants for remedial action schemes that may not be implemented.
- The process for AESO interconnection could potentially be expedited, since there would be fewer amendments resulting from turbine changes.

127. Figure 6, below, shows the information that is required for the buildable-area, conditional approval process.

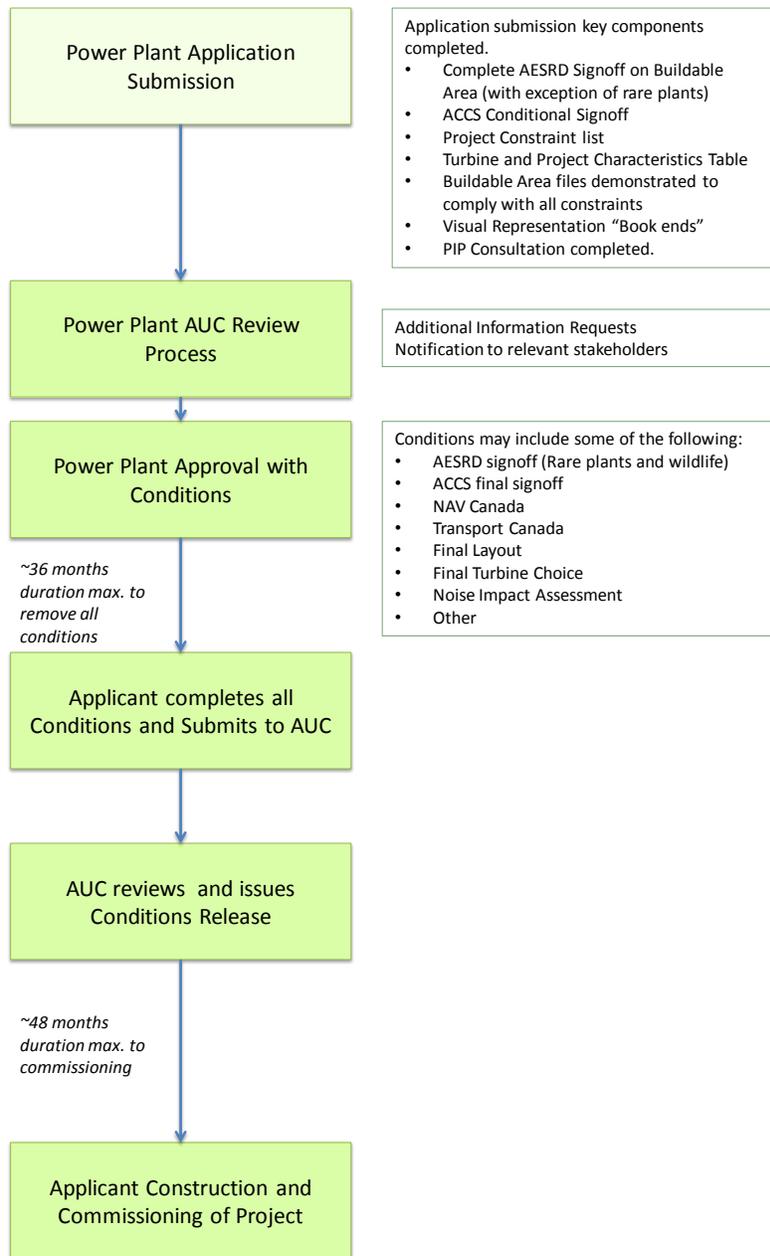


Figure 6: Conditional approval – buildable-area process

128. The buildable-area process allows for a conditional approval by the AUC, with the conditions being released after evidence of compliance is submitted to the AUC. This process allows for flexibility in turbine choice, allows for significant vetting of the project for environmental and stakeholder concerns, and potentially reduces the permitting duration.

129. Some aspects of the design portion of the buildable-area concept are already standard processes in various jurisdictions in the United States. While those regulatory regimes are not the same as the Alberta model and are often governed by local municipal authorities, some of these jurisdictions are using a staged approval process. Certain regions are initially zoned with pre-established approval criteria for wind energy development. The approach of these municipalities or counties takes the appearance of a regional planning philosophy that facilitates wind farm economic development in certain areas. The proactive nature of the zoning is oftentimes a vehicle for regional economic development. Once the established criteria are met (for example, setback requirements including residences, watersheds and sensitive areas; visual impact zones for scenic development; economic development criteria; future projected land use initiatives; strength of wind resources; and decommissioning requirements), subsequent approval of specific wind turbine locations is expected to be more expeditious. The initial zoning approval is understood to provide the wind developer with some enhanced level of expectation that the project would be approved if the specific locations selected for the wind turbines conform to the requirements and conditions of the zoning bylaws.

<p>If the buildable-area concept is implemented, are further changes to the AESO processes necessary?</p>

B. Agency coordination issues

Define and summarize roles for all involved agencies

130. Wind developers must interface with many agencies, the municipality and landowners during the development of a wind farm and the submission of an application to the AUC. These agencies each have specific requirements and independent timelines. Presently, these timelines are at times in conflict. An overall timeframe and process for wind power development, rather than a patchwork of regulatory requirements, would help guide the process. A streamlined process was identified during the stakeholder process session as potentially beneficial.

131. CanWEA recommended that the provincial energy strategy needs to be part of the overall context for AUC approvals. The Commission observes that the Alberta government has committed to reduce greenhouse gas emissions to 14 per cent below 2005 levels while maintaining economic growth. The government has also forecast to generate 37 megatonnes per year of reductions of greenhouse gases, a portion of which is associated with producing renewable energy.

132. Some projects can and have triggered a federal environmental review process in addition to the provincial review, as a result of accessing federal financial assistance through the now-defunct EcoEnergy production incentive. The federal government's environmental assessment

process is applied whenever a federal authority has a specified decision-making responsibility in relation to a project, also known as a “trigger” for an environmental assessment. Environmental reviews by the Canadian Environmental Assessment Agency are triggered when a federal authority:

- Proposes a project.
- Provides financial assistance to a proponent to enable a project to be carried out.
- Sells, leases, or otherwise transfers control or administration of federal land to enable a project to be carried out.
- Provides a license, permit or an approval that is listed in the *Law List Regulations* that enables a project to be carried out.¹⁴

133. In addition to the power plant application, the transmission facility owner must also complete similar work with regard to environmental assessments. Currently, the environmental assessment work completed by the developer for the project and that of the transmission route completed by the facility owner are completed independently. Discussion with developers indicated that transmission facility owners prefer not to receive environmental assessment data from developers, and have a preference to complete their work independently.

134. During the two-day consultation meeting, it was suggested that defining the role for all agencies and how they interact would be helpful for all parties. Increased coordination between different regulatory agencies would help reduce the duplication of work.

135. There may also be opportunities for facility owners such as wind developers and transmission facility owners to coordinate efforts with increased efficiency. For example, it may be efficient for the transmission facility owner to potentially use any environmental studies completed by the wind farm developer to help develop the transmission facilities application associated with that particular wind farm developer, when prudent to do so.

136. Following is a summary of the roles of the provincial, federal and municipal agencies associated with wind farm development. The required permits associated with each agency are listed in Table 4, below.

Roles of provincial agencies

137. Alberta Utilities Commission (AUC) – regulates electric facilities including wind-powered generation under two main acts, the *Alberta Utilities Commission Act* and the *Hydro and Electric Energy Act*. The AUC is responsible for making timely decisions on the siting, construction, alteration, operation and decommissioning of wind-powered generation facilities. The Commission must consider, in addition to any other matters it may or must take into account, whether the approval of a wind-powered project is in the public interest, having regard to the social and economic effects of the project and the effects of the project on the environment. Applications for wind –powered generation must comply with the AUC’s Rule 007 which sets out the requirements for wind and other power plant applications as well as for transmission facilities.

138. Alberta Electric System Operator (AESO) – responsible for the safe, reliable and economic planning and operation of the Alberta Interconnected Electric System. The AESO

¹⁴ *Canadian Environmental Assessment Act*, SC 1992, c. 37, Section 5.

administers the interconnection process for all applications seeking to connect to the transmission grid, including wind-power generators.

139. Alberta Environment and Sustainable Resource Development (AESRD) – provides guidance on protecting bats, birds and other species or conservation concerns when locating a wind turbine on public or private land in Alberta. The Fish and Wildlife Division has issued Wildlife Guidelines for Alberta Wind Energy Projects, September 2011.¹⁵

140. Alberta Culture – manages Alberta’s historic resources. Wind farm developers need to consult with the ministry about the need to conduct a site-specific historic resource impact assessment in order to obtain a *Historical Resources Act* clearance as part of the approval process.

141. Alberta Tourism, Parks and Recreation – manages a network of Alberta’s provincial parks and other protected areas to care for important ecological areas. Alberta Tourism, Parks and Recreation indicated that dispositions allowing development of electrical facilities are permitted in provincial parks, natural areas, heritage rangelands and provincial recreation areas but only where there is an existing commitment – for example an existing electrical transmission line.

142. Alberta Transportation – maintains all provincial highways. Wind developers wishing to locate turbines within 300 metres of a provincial highway must seek permission from Alberta Transportation. Alberta Transportation monitors, controls and issues permits for the movement of oversize and overweight vehicles. Any wind power developer will require permits to move the equipment to the project.

Roles of federal agencies

143. Aboriginal Affairs and Northern Development Canada – the federal ministry responsible for policies relating to First Nations, Inuit and Métis. Aboriginal Affairs and Northern Development Canada also manages the resources and federal lands, including land and subsurface leases and resource royalties. The ministry is only involved if a wind farm development is on First Nations lands. First Nations near wind farm developments are part of the consultation process.

144. Canadian Standards Association (CSA) – a not-for-profit membership-based association serving business, industry, government and consumers in Canada and the global marketplace. CSA works to develop standards as well as to help people understand standards. All wind turbines sold or installed in Canada must meet CSA standards.

145. Canadian Wildlife Services – a branch of Environment Canada that is responsible for the protection and management of migratory birds and nationally important wildlife habitats, species at risk, research on nationally important wildlife issues, control of international trade in endangered species, and international wildlife-related treaties for Canada. Wildlife management in Canada is a responsibility shared by the federal, and the provincial and territorial governments. Canadian Wildlife Services is also responsible for Canada’s national wildlife

¹⁵ Government of Alberta *Wildlife Guidelines for Alberta Wind Energy Projects*; www.srd.alberta.ca/FishWildlife/WildlifeLandUseGuidelines/documents/WildlifeGuidelines-AlbertaWindEnergyProjects-Sep19-2011.pdf.

areas, which are federally protected natural areas. Canadian Wildlife Services works with Alberta Environment and Sustainable Resource Development on species at risk for any wind farm developments and other generation types.

146. Meteorological Service of Canada – a division of Environment Canada, which primarily provides public meteorological information, and weather forecasts and warnings of severe weather and other environmental hazards. The Meteorological Service of Canada owns and operates weather radar stations in Alberta and across Canada. Any project within 80 kilometres of a radar station should consult with the Meteorological Service of Canada to determine any potential impact.

147. Environment Canada – a federal ministry with a mandate to preserve and enhance the quality of the natural environment, including water, air, soil, flora and fauna, to conserve renewable resources and to conserve and protect water resources. Environment Canada administers a variety of statutes relevant to wind turbine development, including the *Species at Risk Act* and the *Migratory Birds Act*. It administers the *Canadian Environmental Assessment Act* where development is proposed for federal lands or if it will use federal funds.

148. Department of Fisheries and Oceans – along with its special operating agency, the Canadian Coast Guard, the Department of Fisheries and Oceans delivers programs and services that support sustainable use and development of Canada's waterways and aquatic resources. The Department of Fisheries and Oceans administers requirements under the *Fisheries Act* to manage and protect Canada's fisheries resources in all territorial seas and inland waters. The Department of Fisheries and Oceans also administers the *Navigable Waters Protection Act* to ensure public access to and efficient use of Canada's water ways.

149. Transport Canada – responsible for federal transportation policies and programs. It ensures that air, marine, road and rail transportation are safe, secure, efficient and environmentally responsible.

150. Department of National Defence – charged with the protection of Canada's national security, Canadian interests within the nation and abroad, and the oversight of military and civilian elements. Any wind farms that are within 80 kilometres of a Department of National Defence facility should consult with the Department of National Defence to determine if there is any potential impact.

151. NAV Canada – a private sector corporation that owns and operates Canada's civil air navigation service. NAV Canada coordinates the safe and efficient movement of aircraft in domestic and international airspace assigned to Canadian control.

152. Royal Canadian Mounted Police – provides policing services to all of Canada at the federal level as well as in many regions within Alberta. Any wind farm developments that could potentially interfere with the Royal Canadian Mounted Police telecommunications are required to consult with the Royal Canadian Mounted Police.

Table 4. Responsible agencies and permits for the wind farm development process (February 2012)

Federal permits/approvals			
Level	Department/ permit	Applicable act	Comments and link
Federal	Transport Canada /Canadian Coast Guard	Navigable Waters Protection Act	Only if watercourses within the proposed project area are considered navigable, then Transport Canada needs to be notified. www.tc.gc.ca/marinesafety/oep/nwpp/menu.htm
Federal	Transport Canada; Aviation Safety; Aeronautical Obstruction Clearance Permit	Canadian Aviation Regulations (CARs)	Clearance on location of structures that may pose a hazard to aviation - Flight Path www.tc.gc.ca/civilaviation/publications/tp14371/aga/6-0.htm
Federal	Transport Canada; Aviation Safety; Aeronautical; Lighting Permit	Canadian Aviation Regulations (CARs)	Must include layout diagram with land height and contour, reference points and scale. To determine airport interference as well as lighting and marking requirements. www.tc.gc.ca/civilaviation/publications/tp14371/aga/6-0.htm
Federal	NAV Canada, Land Use Department, Land Use Submission Approval	Civil Air Navigation Services Commercialization Act	NAV Canada is responsible for ensuring the integrity of Air Navigation Services infrastructures. NAV Canada Land Use Proposal Submission Form must contain geographic coordinates in NAD83. This information is required for NAV Canada to complete a comprehensive assessment on potential adverse impacts on NAV Canada's systems and services. navcanada.ca/NavCanada.asp?Language=en&Content=ContentDefinitionFiles\Services\LandUseProgram\default.xml
Federal	Fisheries and Oceans Canada	Fisheries Act	Only if there are any triggers for the transmission facility owner. laws.justice.gc.ca/en/F-14/index.html
Federal	Aboriginal Affairs and Northern Development Canada	Indian Act Section 28(2) permit	Only required if the project is on First Nations lands. Permit is to "occupy, use or otherwise exercise rights on reserve land."
Federal	Canadian Wildlife Services	Species at Risk Act	Have to be considered, if a federal environmental assessment is required. On a provincial basis it recommended to list those species observed in the project area that are listed under the <i>Species at Risk Act</i> for the information of the AUC. www.sararegistry.gc.ca/approach/act/default_e.cfm
Federal stakeholder			
Federal	Department of National Defence – radio communications and ATC radars	Department of National Defence	Radio communications www.airforce.forces.gc.ca/8wing/squadron/atess_turbines_e.asp ATC Radars www.airforce.forces.gc.ca/8wing/squadron/atess_e.asp
Federal	Industry Canada		Radio communications listings spectrum.ic.gc.ca/tafl/tafindxe.html
Federal	Royal Canadian Mounted Police – radio communications		Royal Canadian Mounted Police Manager, Radio Spectrum Management Section

Federal	Environment Canada	Canadian Environmental Assessment Act	Environment Canada can be triggered for any one of five triggers that result in a Comprehensive Environmental Assessment.
Federal	Environment Canada – weather radar	Environment Canada – weather radar	Website: weatheroffice.ec.gc.ca/radar/index_e.html
Federal	CSA certification	CSA International	www.csa-international.org/ Turbines must meet CSA standards
Provincial permits/approvals			
Provincial	Alberta Utilities Commission permit to construct and license to operate	Hydro and Electric Energy Act, the Electric Utilities Act, and AUC Rule 007: Applications for Power Plants, Substations, Transmission Lines, and Industrial System Designations	The construction and operation of all proposed new electrical facilities and amendments to existing electrical facilities must be approved by the AUC. Electrical Utilities Act: www.qp.alberta.ca/574.cfm?page=E05P1.cfm&leg_type=Acts&isbncln=9780779744824 Hydro and Electric Energy Act: www.qp.alberta.ca/574.cfm?page=H16.cfm&leg_type=Acts&isbncln=9780779730209
Provincial	Alberta Utilities Commission	AUC Rule 012: Noise Control	All electrical facilities must comply with AUC Rule 012: <i>Noise Control</i> . http://www.auc.ab.ca/acts-regulations-and-auc-rules/rules/Documents/Rule012.pdfw
Provincial	Transmission Facility Owner Interconnection Agreement	Electric Utilities Act, the Alberta Electric System Operator Tariff, TFO tariff	Terms and conditions under which the transmission facility owner has authorization to physically interconnect the facility.
Provincial	Transmission Facility Owner Construction Commitment Agreement	Electric Utilities Act, the Alberta Electric System Operator Tariff	Agreement that outlines the scope, cost and payment terms of the transmission facilities to be constructed.
Provincial	Distribution Facilities Owner Sec. 101 sign-off	Electric Utilities Act	The distribution facility owner of the service area the project is located in has to provide approval for a project to directly sell electricity into the transmission system (<25 kV).
Provincial	Alberta Electric System Operator (AESO) System Access Service Agreement	Electric Utilities Act, AESO Tariff	Every project (load or generation) has to apply with the AESO for System Access. The AESO manages all projects in their “Interconnection Process”. www.aeso.ca/downloads/STS_Template.pdf www.aeso.ca/downloads/DTS_Template.pdf www.aeso.ca/8602.html
Provincial	Alberta Electric System Operator Pool Participation Agreement (AESO)	Electric Utilities Act, AESO Tariff	All electrical power in Alberta is traded in the Alberta Power Pool. All market participants need to sign the Pool Participant Agreement. www.aeso.ca/downloads/Appendix_1_-_ISO_Rules_September_17-09.pdf

Provincial	Alberta Utilities Commission connection order	Hydro and Electric Energy Act	The AUC issues the permit and licence to construct and operate electric facilities, and eventually issues a connection order per Section 18 of the <i>Hydro and Electric Energy Act</i> . www.qp.alberta.ca/574.cfm?page=H16.cfm&leg_type=Acts&isbncIn=9780779730209
Provincial	Alberta Culture	Development permit	Required if area is designated under the <i>Wilderness Areas, Ecological Reserves, Natural Areas and Heritage Rangelands Act</i> , recreation or public lands etc. Usually required as a precursor to the AUC approval.
Provincial	Alberta Culture Historical resources overview	Historical Resources Act	Identification of archaeological and sites of historical importance in a historic resources impact assessment to identify the necessary setbacks. www.qp.alberta.ca/574.cfm?page=h09.cfm&leg_type=Acts&isbncIn=9780779726837
Provincial	Alberta Environment and Sustainable Resource Development-Fish and Wildlife (AESRD)	Wildlife Guidelines for Alberta Wind Energy Projects (AESRD 2006) (AESRD 2011), AUC Rule 007	The AUC has per Rule 007 assigned AESRD with the authority to assess and sign-off on the environmental impacts and mitigation measures of electrical facility development. The AESRD sign-off is required as input to the project for the AUC application and/or Environment Canada. www.srd.alberta.ca/ManagingPrograms/FishWildlifeManagement/documents/inventoryguide/Wildlife_Guidelines_for_Alberta_Wind_Energy_Projects_April52006.pdf www.srd.alberta.ca/FishWildlife/WildlifeLandUseGuidelines/documents/WildlifeGuidelines-AlbertaWindEnergyProjects-Sep19-2011.pdf
Provincial	AESRD- ABAT – Alberta Bat Action Team, bats and wind turbines – pre-siting and pre-construction survey protocols	ABAT	AESRD recommends that the ABAT protocols are followed to assess the potential impact of electrical facilities on bat species. www.srd.alberta.ca/ManagingPrograms/FishWildlifeManagement/AlbertaBatActionTeam/Default.aspx
Provincial	Alberta Transportation Alberta Transport Permit	Public Highways Development Act	Alberta Transportation has to approve any development within 300 metres of a numbered highway. www.qp.alberta.ca/574.cfm?page=P38.cfm&leg_type=Acts&isbncIn=9780779744985
Provincial	Alberta Transportation Special Move Permit: Overweight	Public Highways Development Act	Usually an obligation of the transportation company and also depends on seasonal constraints. www.transportation.alberta.ca/520.htm
Municipal permits			
Municipal	County rezoning permit, Land use re-classification for Wind Energy Facility District, and County permit, development permit to construct	Specific county bylaws	Land use re-classification for Wind Energy Facility District. Varies by county as to the specific process
	Stakeholders and consultation requirements		Landowners, occupants, residents, mineral rights owners, pipeline owners, neighboring communities, oil and gas facility owners. (All are determined for each project.) Consultation requirements stipulated by AUC Rule 007, as well as county requirements.

Clarify AUC application needs

153. Comments were received in the wind consultation process respecting the level of detail provided in AUC Rule 007. In some areas, such as dealing with environmental issues and the role of Alberta Environment and Sustainable Resource Development, some participants considered the level of detail in AUC Rule 007 to be too general. In other cases, such as connections to the transmission system, some participants considered that the level of detail is excessive or otherwise lacks explanation as to why it is required, and that it might duplicate activities already addressed by the AESO. For example, in Section 5.1.2 of AUC Rule 007 dealing with transmission connections, there is a significant amount of technical information that may have been addressed in the AESO processes.

154. AUC Rule 007 currently specifies that final siting adjustments to relocate a turbine more than 50 metres from an applied-for and approved location require a reapplication for approval. As discussed earlier in this discussion paper, some applicants would prefer greater flexibility to make layout changes such as relocating turbines or changing turbine specifications without reapplying to the AUC. Conversely, some municipalities were concerned that such siting relocations could have an impact on other infrastructure developments such as roads. The buildable-area approach could reconcile all constraints, environmental and municipal, to ensure that the final layout is compliant with the constraints identified, although this would require procedural updates to AUC Rule 007, or the introduction of a rule for wind-generation power plants.

155. The AUC expects to conduct a thorough review process and update of AUC Rule 007 in the future.

Compliance monitoring

156. The purpose of compliance monitoring for wind generation facilities is to ensure that approved facilities are installed and operated in accordance with AUC issued decisions, permits and licences. Compliance may be monitored through self reporting by facility owners, field surveillance by the AUC and complaint investigation.

157. The typical focus of compliance monitoring includes the construction of the facilities in the approved locations, and operation in accordance with specified noise, safety, wildlife and environmental constraints.

158. The AUC expects to develop a compliance monitoring program for all facilities it regulates, including wind power and other power generation types. AUC compliance monitoring programs will need to coordinate activities with other regulatory agencies, such as the Energy Resources Conservation Board and National Energy Board, where noise levels from AUC-regulated facilities are affected by noise from other facilities such as upstream oil and gas or pipeline facilities.

Role of Alberta Environment and Sustainable Resource Development respecting compliance monitoring

159. During the consultation, participants commented on the role of agencies during the development, construction and operations time frame to ensure or enforce any conditions or constraints placed on the wind farm.

160. It was suggested by one participant that the AUC's reliance on Alberta Environment and Sustainable Resource Development sign-off in regard to wildlife matters is not consistent with its legislative obligations to consider environmental aspects such as wildlife and the ecosystem, as well as economic aspects.

161. When asked if there are unique approaches to compliance monitoring for wind turbines, the Fish and Wildlife Division representative indicated that the division requires post-construction wildlife monitoring for particular species. The length of monitoring is stipulated according to the species of concern and the location of the project. Environmental groups suggested that it is best for government ministries and agencies to coordinate their compliance monitoring and make best use of existing data.

162. The Fish and Wildlife Division representative indicated that the ministry is a resource manager and not a regulator, so it does not monitor or enforce applicants' commitments or AUC conditions pertaining to wildlife protection. To help address concerns expressed about the overlapping of AUC and Fish and Wildlife Division jurisdictions for wildlife matters, the representative suggested that the ministry would be willing to review draft information requests pertaining to wildlife issues before the Commission submits them to the applicant.

163. The representative also indicated that the Fish and Wildlife Division currently does not audit or review any of the conditions applied with its approvals. The division ensures that any surveys and monitoring are done appropriately and submitted into the wildlife database. The division does not enforce wildlife mitigation that may have been included as a condition in an AUC approval. As well, Fish and Wildlife does not ensure that post-construction monitoring is completed. This is currently done on an honour system.

Observations

164. There appears to be a regulatory gap with respect to post-construction monitoring and enforcement of wildlife mitigation conditions in approvals.

165. In conjunction with recommendations from the Fish and Wildlife Division of Alberta Environment and Sustainable Resource Development, AUC wind farm approvals often address monitoring and mitigation requirements for land impacts as well as impacts to birds, bats and other wildlife. For example, elevated cut-in speeds during certain seasons or conditions for wind turbines near bat habitats may be stipulated by Fish and Wildlife to reduce the risk of bat mortality. The primary responsibility for monitoring compliance with conditions identified by Fish and Wildlife to address wildlife and wildlife habitat concerns ought to reside with that agency, although the Commission has authority to cancel or suspend the wind turbine approval if it considers that conditions specified in the AUC approvals are not adequately met. It would be appropriate that Fish and Wildlife would advise the AUC if its monitoring identifies significant construction or operational concerns that it is unable to directly reconcile with the facility owner.

166. The AUC understands that the Fish and Wildlife Division may be constrained in its capacity for project-specific monitoring, and that it uses an adaptive management process¹⁶ for reducing impacts on wildlife.

Agency overlap and associated streamlining opportunities

167. A number of agency overlap concerns and streamlining opportunities were identified including:

- Post-construction monitoring and enforcement of wildlife mitigation conditions in approvals.
- Duplication of information requests by the AUC and agencies such as Alberta Environment and Sustainable Resource Development.
- Overlap between the AESO and the AUC.
- Multiple applications to multiple agencies.
- Applications from one agency may be administered as a prerequisite process, blocking simultaneous applications and lengthening the overall process (e.g. historical resources clearance, timing of rare plant studies).

168. Participants indicated that the permitting process appears to take a considerable length of time, thereby consuming resources and money. The Livingstone Landowner Group cautioned that while proponents want efficiencies, issues must not be overlooked and unique circumstances must be assessed.

169. Some comments were made during the consultation regarding the use of a one-window application. A one-window application process can take different forms; however, the underlying goals are to avoid duplication and overlap, eliminate inconsistent requirements between agencies and to reduce unnecessary delays. The outcome of a one-window process can be designed to result in a single point of initial contact with multiple agency decisions or it can be designed for a single all-encompassing decision.

170. While some participants saw an opportunity for efficiency with centralized coordination, other wind developers cited examples such as British Columbia's one-window system, which they indicated to be an evolving process. To this point in time, the complete benefits expected in that jurisdiction have not been realized and timelines have been longer than anticipated.

171. The current AUC Rule 007 process is generally efficient for the AUC process; however it is not a one-window process. Developers must still comply with each agency's requirements, and must provide evidence of agency sign-off in the AUC application.

Observations

172. The legislative framework in Alberta is directionally evolving toward a one-window approach. For example, the government of Alberta has indicated that it is developing legislation for a single regulator for the upstream oil and gas industry. At the federal level, a major projects

¹⁶ Adaptive management process is a structured, iterative process of robust decision-making in situations where there is uncertainty, with an aim to reducing uncertainty over time via system monitoring. In this way, decision making simultaneously meets one or more resource management objectives and, either passively or actively, accrues information needed to improve future management.

management office has been established to provide a single point of entry into the federal regulatory process for major resource projects. The office works with federal departments and agencies to ensure early engagement between regulators and project applicants.

173. While the current legislative structure for AUC-regulated projects does not include provision for a one-window approach, governments are moving in that direction in many sectors. Opportunities to facilitate cooperative and non-duplicative approaches among agencies will continue to be explored by the AUC.

Are there other agency overlap and coordination issues that have not been identified?

How might the AUC and other government agencies effectively address overlap and streamlining opportunities?

Roles of municipal agencies

174. The Municipal District of Pincher Creek noted that any issues that spill over beyond the developers' approved boundaries become issues for the local municipality. The municipality also emphasized that while sign-off from Alberta Environment and Sustainable Resource Development is required with respect to wildlife considerations, sign-off from municipalities is not required by the AUC despite the significant wind turbine-related issues that municipalities must often address.

175. On occasion, there is perceived overlap between the role of agencies and counties with regard to information requests directed to the applicants, or with respect to administration of regulation. For example, some municipalities, such as Pincher Creek, would like to regulate noise levels from wind farms, and some desire a more stringent standard than what is provided by AUC Rule 012.

176. Developers indicated that this lack of clarity is confusing for them. CanWEA recommended that it would be appropriate to reinforce that municipalities are stakeholders, not regulators. The role of the municipality was described by some consultation participants as confusing, because at times municipal bylaws give the perception that the municipality is the overall regulator. Municipal representatives indicated that municipalities administer bylaws that restrict the development and operation of wind turbines, and those bylaws must also be complied with.

177. The division of responsibility for regulatory responsibility between the AUC and municipalities is discussed in the *Municipal Government Act*, as follows:

619(1) A licence, permit, approval or other authorization granted by the NRCB, ERCB, AEUB or AUC prevails, in accordance with this section, over any statutory plan, land use bylaw, subdivision decision or development decision by a subdivision authority, development authority, subdivision and development appeal board,

or the Municipal Government Board or any other authorization under this Part.

(2) When an application is received by a municipality for a statutory plan amendment, land use bylaw amendment, subdivision approval, development permit or other authorization under this Part and the application is consistent with a licence, permit, approval or other authorization granted by the NRCB, ERCB, AEUB or AUC, the municipality must approve the application to the extent that it complies with the licence, permit, approval or other authorization granted under subsection (1).

...

(4) If a municipality that is considering an application under subsection (2) holds a hearing, the hearing may not address matters already decided by the NRCB, ERCB, AEUB or AUC except as necessary to determine whether an amendment to a statutory plan or land use bylaw is required.

(5) If a municipality does not approve an application under subsection (2) to amend a statutory plan or land use bylaw or the municipality does not comply with subsection (3), the applicant may appeal to the Municipal Government Board by filing with the Board

- (a) a notice of appeal, and
- (b) a statutory declaration stating why mediation was unsuccessful or why the applicant believes that the municipality was unwilling to attempt to use mediation.

...

620 A condition of a licence, permit, approval or other authorization granted pursuant to an enactment by the Lieutenant Governor in Council, a Minister, a Provincial agency or Crown-controlled organization as defined in the *Financial Administration Act* or a delegated person as defined in Schedule 10 to the *Government Organization Act* prevails over any condition of a development permit that conflicts with it.

178. Municipal approvals can also be issued either before or after the AUC permit.

179. The Livingstone Landowner Group considered that municipalities are well positioned to gather local input; therefore, it recommended that the role of municipalities should be elevated.

Observations

180. The AUC has had dialogue with municipalities such as Pincher Creek that have mature land use practices and procedures for wind development, with a view to more effectively

coordinate AUC and municipal roles and activities. Other municipalities, such as the County of Forty Mile, have compiled concise and helpful wind farm land use information.¹⁷

181. There may be an opportunity to capture the perspectives of the municipalities because of their unique positioning and knowledge of the region in which the wind farm is proposed. The Municipality of Pincher Creek commented that the only way they find out that an application has been filed with the AUC is to keep checking the AUC website. The municipality recommended that the AUC keep the municipalities better informed of the status of wind farm applications, particularly the receipt of an application.

Should wind farm developers advise the municipality of the status of approvals or should the AUC develop a specific process to advise the municipality of receipt of an application?

182. There could be merit in considering a process where wind developers would have a choice of submitting applications for small-scale wind generation projects (for example less than 10 megawatts) to either the local municipality or the AUC for approval. This concept would entail an expectation of consistent administration and coordination, incorporating some standardized factors such as noise constraints, environmental constraints and other regulatory body pre-approvals. An appeal mechanism to the AUC could be provided. Wind developers might find that this type of arrangement could be convenient and potentially expeditious. Municipalities might similarly find that the process could facilitate more municipal influence in the approval by incorporating their specific knowledge of local perspectives, as recommended by the Livingston Landowner Group. However, unless the legislation is changed, approval by the municipality would be inconsistent with Section 11 of the *Hydro and Electric Energy Act*, which requires Commission approval for the construction and operation of a power plant. Therefore this concept does not appear to be currently feasible unless there is a legislative change.

Should the municipalities have enhanced regulatory authority for small-scale wind generation projects?

C. Public engagement

183. A wind power proponent must conduct a participant involvement program (consultation) with the public and those persons whose rights may be directly and adversely affected by approval of the project, in order to meet the application requirements of the AUC's Rule 007. There are two basic components to consultation. First, interested persons must be notified of the proposed project by the proponent and provided with thorough and meaningful information about it. Second, the proponent must engage interested persons in two way genuine discussions about the project, its potential impacts and how avoidance or mitigation of these impacts may be incorporated into the project.

¹⁷ County of Forty Mile No. 8 Land Use By-Law; <http://40mile.ca/wp-content/uploads/2010/11/LAND-USE-BY-LAW-September-2009.pdf>.

Notification and consultation

184. Project-specific information packages must be provided to all occupants, residents and landowners within 2,000 metres of the edge of the proposed site boundary. Any occupant, resident or landowner within 800 metres of the proposed site boundary must be personally consulted, including face-to-face visits or telephone conversations. Open houses may also be held. In addition, applicants should also consider consulting potential participants in any populated areas just outside of these boundaries.

185. The information packages must contain the following details: the applicant's name and contact information; a site-specific map of all proposed facilities, including the power plant and all substations and transmission lines; a discussion of potential restrictions on future land developments; a description of potential on-site equipment; a proposed project schedule for the AUC application, start-up and construction details; and an AUC brochure describing the application process.

186. The CanWEA document *Best Practices for Community Engagement and Public Consultation* addresses wind energy developments and may be helpful for wind developers.¹⁸

187. The AUC encourages potentially affected parties to participate in the initial public consultation process. All unresolved objections or concerns should be identified in the application by the proponent

188. Upon receipt of the application, the AUC notifies all parties that may be directly and adversely affected by the development. The notice describes how interested parties can participate in the regulatory process, and is typically published in local newspapers and sent by ordinary mail to those persons who reside or own land within two kilometres of the project. If no objections are received the Commission may approve the proposed project without a hearing. If there are objections, the Commission then decides whether it will conduct a public hearing to consider the application. This depends on whether a person who has objected has standing. Only those persons whose rights may be directly and adversely affected by the approval of a wind farm application, have the legal right to a public hearing. This is discussed further below. If the Commission decides to conduct a hearing, a notice of hearing is issued by ordinary mail and newspaper advertisement. Parties who wish to participate in a proceeding must file their submission with the Commission within the time frame set out in the notices for the application and hearing.

Intervener standing

189. The test for standing is set out in Section 9 of the *Alberta Utilities Commission Act* which states that if it appears to the Commission that its decision or order on an application may directly and adversely affect the rights of a person, the Commission must hold a hearing. There must be a direct connection between the activity approved by the Commission and the negative impact on a person's rights. Generally, the Commission will grant a person standing if that person resides within a two-kilometre radius of the project, but in law the geographical distance from the project may in some cases exceed two kilometres.

¹⁸ CanWEA *Best Practices for Community Engagement and Public Consultation*;
www.canwea.ca/pdf/canwea-communityengagement-report-e-final-web.pdf.

190. If a person is granted standing to participate in a hearing, that person may be eligible for costs that are incurred in order to participate. Section 22 of the *Alberta Utilities Commission Act* provides that persons who have an interest in and are in actual occupation of or entitled to occupy land that is or may be directly and adversely affected by a decision of the Commission, may claim the legal, consultant and other costs that they incur. These are called local intervener costs and in the ordinary course the project proponent is directed by the Commission to pay the costs, after the Commission has reviewed and approved them. AUC Rule 009: *Rules on Local Intervener Costs* sets out the local intervener cost regime.

191. The Livingstone Landowner Group stated that standing must not be so narrow that it excludes genuine interest groups with meaningful and informed input. The Alberta Wilderness Association and Environmental Law Center recommended that organizations with expertise and genuine public interest should be granted standing, and that the criteria for directly affected parties should be expanded beyond two kilometres. The Environmental Law Center further stated that organizations should be given standing before the Commission to argue matters of public interest that are material to the proceeding, but would not otherwise be considered. The Municipal District of Pincher Creek observed that municipalities do not have standing in the AUC process, but require standing for issues such as road setbacks.

192. The determination of standing and the associated cost recovery are important considerations for the AUC. Parties who are considering whether or not to become involved in the review of an application should consult with legal counsel for an opinion, if they are unsure about their standing, or simply file a submission to the AUC when a notice of application is provided.

Observations

193. A party that wishes to participate in an AUC proceeding or to obtain funding to cover the costs of participating in a proceeding must demonstrate that he or she has a right or interest that may be directly and adversely affected by a proposed project. The Commission considers every request for standing on its own merits and assesses standing to trigger a hearing in accordance with Section 9(2) of the *Alberta Utilities Commission Act*:

- (2) If it appears to the Commission that its decision or order on an application may directly and adversely affect the rights of a person, the Commission shall
 - (a) give notice of the application in accordance with the Commission rules,
 - (b) give the person a reasonable opportunity of learning the facts bearing on the application as presented to the Commission by the applicant and other parties to the application, and
 - (c) hold a hearing.

194. Pursuant to this legislation, the Commission will hold a hearing if it appears to the Commission that its decision on an application may directly and adversely affect the rights of a person. The test set out in this section is whether a person seeking intervener status has shown that they have legally recognized rights and that those rights may be directly and adversely affected by a decision of the Commission on an application. This is a two-part test; the first part is a legal one, and the second is a factual one. The legal test asks whether the claimed right or

interest being asserted by the person is one known to the law. The factual part asks whether the Commission has information which shows that the application before the Commission may directly and adversely affect those interests or rights. This part of the test requires a weighing of the evidence and a consideration of whether that evidence establishes a sufficient location or connection between the proposed project and the right asserted.

195. The right to the use and enjoyment of property and the right not to be deprived thereof is a key consideration.

196. Once a hearing has been triggered by someone with standing, the AUC practice has been to allow others who do not have standing to make submissions respecting their positions. The full participatory rights (leading evidence, cross-examination and argument) may not be given to these parties, rather, they are usually asked to make a summary statement of their concerns. There is no entitlement to ask for costs, either.

197. AUC Rule 009: *Rules on Local Intervener Costs* prescribes the rules for funding local interveners. Parties that wish to participate in the hearing and be eligible for funding must be considered local interveners by the Commission. The *Alberta Utilities Commission Act* defines a local intervener as:

- ... a person or group or association of persons who, in the opinion of the Commission,
- (a) has an interest in, and
 - (b) is in actual occupation of or is entitled to occupy land that is or may be directly and adversely affected by a decision or order of the Commission in or as a result of a hearing or other proceeding of the Commission on an application to construct or operate a hydro development, power plant or transmission line under the *Hydro and Electric Energy Act* or a gas utility pipeline under the *Gas Utilities Act*, but unless otherwise authorized by the Commission does not include a person or group or association of persons whose business interest may include a hydro development, power plant or transmission line or a gas utility pipeline.¹⁹

198. A local intervener who intends to participate in a hearing or other AUC proceeding may request funding for cost recovery. In order to qualify for cost recovery, the intervener must demonstrate how the Commission's decision on the application will directly and adversely affect them and their interest in the land. The Commission may award an advance of funds if the local intervener demonstrates a need for financial assistance to address the issues relevant to the proceeding. The Commission may award costs if it is of the opinion that: the person or persons who made the submission have demonstrated that they have rights that may be directly or adversely affected by the Commission's decision on the application; the costs are reasonable and directly and necessarily related to the hearing or other proceeding; and, the local intervener acted responsibly in the hearing or other proceeding and contributed to a better understanding of the issues before the Commission.

199. Generally, the operator or project applicant is required to pay the costs awarded to a local intervener. While there is no fixed maximum amount for these costs, in order to control the costs, the Commission may request the applicant to file a budget for costs in a proceeding and establish a maximum hourly rate; may require that the applicant has an opportunity to comment on the

¹⁹ Alberta Utilities Commission Act, Section 22(1), page 14.

costs requested; and must be of the opinion that the costs are reasonable, directly related and responsible and that they contribute to a better understanding of the issues.

Is the current cost regime effective given the experience of participants to date?

Should the public policy or statute be amended regarding cost recovery?

Meetings with the AUC for application and process clarification

200. Participants indicated that the regulatory process would be more timely and effective if they could meet with the AUC before submitting their application. Reasons identified for these meetings included establishing application requirements and procedural rules prior to submission of an application, providing a project overview at the time of an application, identifying information gaps in applications, establishing procedural dates, clarifying technical requirements, reducing initial information requests, reducing or eliminating multiple rounds of information requests, and identifying available information already filed or addressed with other agencies such as Alberta Environment and Sustainable Resource Development and the AESO. It was suggested that some meetings might include participation by multiple agencies. Participants recommended that meetings would not be attended by the public, but would be transparent and discussion-minutes could be made publicly available on the application record.

Observations

201. The AUC understands that such meetings would be utilized to complete the application record, and would be attended by AUC staff rather than by Commission members. Commission members are the decision makers respecting applications filed with the AUC. Meeting minutes forming part of the public record would be appropriate.

202. Caution must be exercised with any meeting process that involves facility proponents and a specific project, either before or after an application is filed, to avoid any perceptions of bias, predisposition or favoritism of the applicant over parties who may have concerns about the application. In the event that efforts to streamline an application process result in a process that is not viewed by all participants as transparent, those efforts could lead to subsequent review or appeal and add unintended procedural delays.

203. Consultation participants suggested that potential bias concerns could be mitigated by the AUC's creation of a centralized advocacy group of experienced front office staff, separate from staff that process applications. The advocacy group could work with applicants to assist them in assembling a complete application. While this is an interesting consideration, it would be impractical to dedicate such resources in the AUC office for that type of service. The AUC is a relatively small organization, and dedicating personnel with the required experience to a function that is subject to peaks and valleys of time and resource commitments would be expected to be inefficient. This function could be most effectively achieved by applicants' engagement of experienced consultants.

204. However, meetings with an agenda to discuss and clarify generic AUC requirements would be acceptable. Also acceptable would be meetings that discuss the availability of information that has been filed with other agencies and the status of any assessments by those agencies. While the AUC is committed to delivering innovative and efficient regulatory solutions, it must be fair, open and transparent in its regulatory processes. Because of the potential risk of prejudice, or perceived risk of prejudice, to other parties, the AUC is reluctant to extend the scope of meetings to acquire specific information bridging potential gaps in the application. Instead, the AUC considers that this information can be best acquired in a more formal written process.

205. Performance standards for processing facility applications were issued in Bulletin 2009-25.²⁰ One of the provisions addressed in that bulletin was that a letter would be sent to applicants within 15 days of receipt of an application indicating the anticipated procedural schedule for the application. It was contemplated that initial process could include some assessment of the degree of completeness of the application.

206. Once a decision has been issued for an application, it is acceptable for AUC staff to meet with parties that have construction or operational concerns, to investigate and endeavour to reconcile issues between the project developer and a complainant to their mutual satisfaction.

D. Transmission considerations and linkages

207. The Commission asked the consultation participants whether the application for transmission facilities development associated with wind projects should be jointly considered or linked with the generation application. The majority of participants considered that the application processes should not be linked, or should be linked only for minor aspects.

208. TransAlta did not feel the process should be linked. Its representative stated that often, the construction of wind farms is held up due to uncertainty about the availability of transmission lines and consequently, adequate transmission capacity. Streamlining the needs identification document and facility application for transmission would help wind developers. TransAlta also objected to the information requests related to interconnection that have been asked at the power plant application stage, particularly since AUC Rule 007 does not specifically require this information.

209. AltaLink also stated that wind farms might not want the applications linked because a hearing on transmission facilities would delay the power plant approval. ENMAX, Boreas Regulatory Solutions and Energy Consulting Inc. also commented that in the case of interventions, it might be difficult to identify which application was being contended.

210. The Livingstone Landowner Group supported linking the projects but also stated that people in general do not like transmission lines. AltaLink stated that to streamline the process, open houses and a joint noise impact assessment to simultaneously assess the substation and wind farm could be conducted together. TransAlta stated that often, the same landowners are affected by the wind turbine placement and the transmission system for interconnection, and there is an opportunity to coordinate consultation on both aspects of the project simultaneously; however, better communication is needed in order to ensure the correct concerns are heard. Currently, the *Transmission Regulation* requires that new generators interconnecting to the

²⁰ Bulletin 2009-25: Performance Standards for Processing Facility Applications, October 8, 2009.

Alberta Interconnected Electric System pay contributions. This policy, referred to as the Generator System Contribution Policy is administered by the AESO.

Observations

211. The application process is flexible enough to accommodate applications that are linked or independent as requested by the applicants.

212. As discussed earlier in the discussion paper there is also flexibility to file the AESO needs identification document and transmission facility interconnection proposals as stand-alone or joint applications.

E. Distribution facilities

213. Participants discussed the issue of access to municipally managed rights-of-way. Rights-of-way are owned by the province of Alberta and are administered by the municipalities. Distribution facility owners and municipal utilities tend to have access to the rights-of-way for infrastructure. This preferential access may force wind developers to construct on native prairie using negotiated lease agreements, rather than using public rights-of-way.

214. FortisAlberta indicated that it would like to be involved in the process from the beginning so that issues with the collector system, such as locating in a road allowance, can be addressed early on.

3.2 Issues regarding specific permitting considerations

F. Noise

215. The AUC addresses noise requirements in AUC Rule 012, which is updated as required incorporating public participation.

216. As indicated in Bulletin [2012-01](#),²¹ the AUC has undertaken additional stakeholder consultation respecting wind masking or the situation where the background noise from the wind at the location of the receptor is equal to or greater than the noise from the wind turbines. Results from that consultation process may result in further AUC Rule 012 updates relevant to wind turbine generation.

217. The Energy Resources Conservation Board regulates the upstream oil and gas industry and utilized its Directive 038 in a similar fashion to AUC Rule 012. Participants identified that the Energy Resources Conservation Board and AUC noise rules need to be compatible. The Energy Resources Conservation Board and AUC endeavour to coordinate updates and strive for consistency between their rules. Nonetheless, this goal may not always be achieved in lockstep as the needs may evolve with different timing.

Impacts of low-frequency noise

218. One aspect of noise that is subject to varying opinions is the impact of low-frequency noise, or what some refer to as infrasound. Infrasound is sound that occurs at a frequency below that generally considered detectable by human hearing.

²¹ Bulletin 2012-01: Additional Stakeholder consultation on AUC Rule 012: Noise Control, February 6, 2012.

219. AUC Rule 012 contains provisions to consider low-frequency noise using C-weighted sound levels rather than A-weighted levels that are more commonly used as matching audible human hearing.

220. One study suggests that low-frequency noise, at levels that may be inaudible to most people, may cause health impacts such as dizziness, nausea, sleep disturbance, panic attacks, annoyance and stress in certain individuals. The study recommends setbacks from turbines of 1.5 to two kilometres or more.²² Other reports disagree that low frequency noise from wind turbines is problematic.²³ Still other studies suggest that the audible wind-turbine blade noise, the “swoosh-swoosh” sound of moving turbine blades, is a cause of annoyance.

221. A study on wind farms by the Oregon Health Authority concludes that long-term stress from real or perceived environmental threats can increase risks for cardiovascular disease, endocrine disorders, reduced immune function, mental illness and other negative health effects.²⁴ The Oregon Health Authority study suggests that community conflict over controversial facility siting or environmental decisions may contribute to or exacerbate this stress, and thus increase risks of these negative health effects. To alleviate this potential conflict, the study recommends effective public participation and community consultation that involves local communities, decision-makers, developers and other stakeholders.

222. Recommendations made by HGC Engineering to the Ontario Ministry of the Environment in December 2010 indicate that while infrasound from wind turbines is not expected to be heard by humans or pose an issue for human health, some aspects of infrasound are not unanimously accepted by technical and medical practitioners. Because of the public apprehension associated with infrasound, the report to the Ontario government recommends developing measurement procedures that could be used to quantify the sound levels.²⁵

223. In response to the concerns expressed about adverse health impacts, the American and Canadian wind energy associations (AWEA and CanWEA) established an international panel of medical doctors, audiologists and acoustical professionals from the United Kingdom, United States, Denmark and Canada to conduct a review of the literature with regard to the conflicting information. Each panel member contributed a unique expertise in audiology,

²² Wind Turbine Syndrome and the Brain, Nina Pierpoint, MD, PhD, November 15, 2010.
<http://docs.wind-watch.org/WTSbrain-BW.pdf>

²³ Pederson, C. S., “An analysis of low frequency noise from large wind turbines,” *Wind Turbine Noise 2009*, Aalborg, Denmark, June 2009.
Leventhal, G., “How the mythology of low frequency noise from wind turbines may have gotten started,” *Wind Turbine Noise 2005*, Berlin, Germany, October 2005.
Sondergaard, B., Hoffmeyer, D., “Low Frequency Noise from Wind Turbines,” *Proceedings from Wind Turbine Noise 2007*, Lyon, France, Sept. 21, 2007.
Van den Berg, G. P., “Do wind turbines produce significant low frequency sound levels,” 11th International Meeting on Low Frequency Noise and Vibration and its Control, Maastricht, Netherlands, August 2004.
O’Neal, R. D. et al., “Low frequency noise and infrasound from wind turbines,” *Noise Control Engineering Journal*, J.59 (2), March-April 2011.

²⁴ Strategic Health Impact Assessment on Wind Energy Development in Oregon;
<http://public.health.oregon.gov/HealthyEnvironments/TrackingAssessment/HealthImpactAssessment/Document/s/Oregon%20Wind%20Energy%20HIA%20Public%20comment.pdf>

²⁵ Low Frequency Noise and Infrasound Associated with Wind Turbine Generator Systems A Literature Review;
www.ene.gov.on.ca/stdprodconsume/groups/lr/@ene/@resources/documents/resource/stdprod_092086.pdf

acoustics, otolaryngology, occupational and environmental medicine, and public health. The panel reached consensus on the following conclusions:

- There is no evidence that the audible or sub-audible sounds emitted by wind turbines have any direct adverse physiological effects.
- The ground-borne vibrations from wind turbines are too weak to be detected by, or to affect, humans.
- The sounds emitted by wind turbines are not unique. There is no reason to believe, based on the levels and frequencies of the sounds and the panel's experience with sound exposures in occupational settings, that the sounds from wind turbines could plausibly have direct adverse health consequences.²⁶

Should the AUC look at more fully developing procedures for measuring low frequency noise?

Noise compliance monitoring

224. AUC approvals have required the developer or operator to conduct post-construction comprehensive noise monitoring at selected dwellings, where it was determined that the margin of error for compliance with the permissible sound level was questionable. Typically, the threshold for post-construction compliance monitoring is at dwellings within a one to two-decibel tolerance of the thresholds specified in AUC Rule 012.

225. One consultation participant recommended that the AUC requirement for operators to conduct compliance monitoring, if predictions are within one decibel of the permissible sound level, should be removed, or at least modified so that the operator is only required to check locations within 0.5 decibels. Alternatively, the requirement could be changed to require testing at only the receptor that has the highest predicted noise level.

Observations

226. Wind turbine sound monitoring is complex. Wind turbine sound is propagated in a manner that creates monitoring complexities in comparison with traditional ground level noise sources. Unlike other noise sources, where ground level wind conditions affect only sound propagation and not the sound level of the source, for wind farms, the wind speed at hub height affects both the sound level of the source and the sound propagation.²⁷ The wind turbine sound levels can vary with hub-height wind speeds. Wind turbine sound levels increase as the turbine speed increases, until the sound power output reaches a maximum. After that it remains relatively constant, or for some turbines may even decline. At the same time as the turbine sound level increases with hub-height wind speed, the ambient noise generated from the wind at ground level in nearby grass and trees may increase even more rapidly as a result of the rustling noise.²⁸

²⁶ Wind Turbine Sound and Health Effects – An Expert Panel Review;

www.canwea.ca/pdf/talkwind/Wind_Turbine_Sound_and_Health_Effects.pdf

²⁷ Ziliani, Roberto "The estimation of noise levels in residual areas surrounding an operating wind farm." *Noise Control Engineering Journal*. 59.1 (2011): 23-29.

²⁸ Ziliani, Roberto. "The estimation of noise levels in residual areas surrounding an operating wind farm." *Noise Control Engineering Journal*. 59.1 (2011): 23-29.

However, during some nighttime conditions with stable atmospheric conditions, the wind speed at the ground level may be low while the wind speed at the hub height may be considerable.

227. In contrast with traditional noise monitoring that can be conducted under calm ground-level wind conditions, wind turbines do not generate any significant noise when the wind is calm at hub height. During high wind conditions at hub height, when the turbines are generating at maximum output, the noise associated with the wind alone, excluding any turbine contribution, has the potential to significantly exceed the traditional permitted sound levels at ground level. Differences in the wind speed at the turbine hub height in comparison to the wind speed at the ground level, where noise receptors are located, further convolutes the accuracy of data interpretation and may create variable results.²⁹ Additional layers of complexity arise from multiple turbine sound sources, adjacent wind farms and potential errors in assumptions related to the ambient sound baseline.

228. An additional monitoring complexity is with respect to calibration and equipment accuracy used to measure the sound levels, which may be in the order of plus or minus two decibels.

229. Consideration of all the variables and complexities may make compliance testing, reporting and monitoring to absolute or exact guidelines impractical. Some latitude may be required to allow discretion to interpret the results and to deviate from 100 per cent compliance, particularly if the number of nuisance noise complaints is low. Some studies suggest that compliance with the mean sound level 95 per cent of the time is a reasonable target.³⁰

230. For comparison, industrial and thermal power facilities will typically generate the same noise every day and every hour. Whereas, sound produced by wind power facilities will vary by season, and time of day depending on the wind speeds and wind direction, and will therefore not be constant.

231. In addition to the actual variation in sound levels, the revenue sharing arrangements between wind developers and participating landowners affects the number of complaints in response to wind turbine sound, in contrast to other industrial or thermal power generation facilities.

232. Sound levels that exceed the permissible sound levels set out by AUC Rule 012, for any power generation type, may become problematic and create complaints at dwellings or receptors outside the boundaries of the project. Landowner agreements are essential for wind development projects, as access to the wind resource is not protected through a *Surface Rights Act*. Revenue-receiving recipients may accept higher levels of wind power output and associated noise than they might otherwise accept.

²⁹ National Association of Regulatory Utility Commissioners *Assessing Sound Emissions from Proposed Wind Farms & Measuring the Performance of Completed Projects*, October 2011, page 10; www.naruc.org/Grants/Documents/Final%20full%20MN%20SERCAT%20rep%20with%20NARUC%20cover%20Hessler.pdf.

³⁰ NARUC *Assessing Sound Emissions from Proposed Wind Farms & Measuring the Performance of Completed Projects*, October 2011; www.naruc.org/Grants/Documents/Final%20full%20MN%20SERCAT%20rep%20with%20NARUC%20cover%20Hessler.pdf.

233. When selecting the locations of wind turbines, an applicant must limit the cumulative noise levels at all dwellings that are situated at or within a 1.5-kilometre radius of the facility's property line, to the permissible sound level determined in AUC Rule 012. If there are no dwellings within 1.5 kilometres of the facility's property line, then the permissible sound level of 40 dBA L_{eq} nighttime is applicable.³¹

234. The Municipal District of Pincher Creek has decided to caveat titles of land that may be potentially affected by a wind farm, but are located outside the boundaries of the project. The caveat shows that a wind farm has been approved in the region and, for example, potential noise impacts may exist. According to the municipality, this registration is intended to simply notify parties that a wind farm has been approved, since historically, many wind farms in the region have been approved, but not built.

235. Wind turbine control systems can effectively mitigate sound levels that are resulting in complaints or are over the requirements of AUC Rule 012. The blade pitch on a turbine can be adjusted to control and optimize the blade action. The blade pitch can also be adjusted to address noise by setting it to provide lower levels of power output, with a corresponding reduced noise output. Alternatively, the turbines can be shut off. Some turbine manufacturers may be able to utilize various electronic operating and control modes to limit the turbine speed and control noise. While electronic turbine control technology has evolved to allow automatic turbine adjustments under certain monitored conditions, the process may not necessarily respond to the actual noise experienced at a specific receptor, unless monitoring equipment has been installed at the receptor to communicate in real-time with the turbine control system. If actual cumulative sound levels exceed predicted levels or the requirements of AUC Rule 012, developers may be faced with reduced revenue or incremental costs to reduce power output and noise.

Should the AUC rely on the frequency and severity of noise complaints before taking measures to otherwise curtail wind generation?
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Duration of approval and related impacts

236. There is often a significant time period of five or more years between the time a wind development is approved by the AUC, and the construction and operation of the wind generation facilities. The time lag may arise from a lack of available transmission facilities, congestion on existing transmission facilities, market conditions that are considered unfavourable by the wind farm developer, delays in obtaining suitable financing or other commercial or competitive factors.

237. The approval granted to construct and operate a wind generation facility generally includes an expiry date, typically in the range of one to four years from the date of approval. An expiry date may be important for competitive reasons with other generation projects, and it may be useful for landowners to know the practical duration of an approval. Other types of generation, such as hydroelectric, gas or coal-fired plants, also include an expiry date in the approval. Extensions to the construction approval date may be applied for and will be reviewed by the AUC.

³¹ AUC Rule 012, clause 2.1(1).

238. Turbines in a wind farm create noise that must comply with AUC Rule 012. Approval of the noise levels associated with the first approved energy-related facility in an area must be incorporated into the cumulative effect or noise impact assessment of the second proposed energy-related facility, and so on, even if the first facility or a subsequent facility is not immediately constructed. This may be particularly significant in areas of the province with a high wind resource, where developers are competing to obtain early approval, even if they are not necessarily approaching readiness to construct.

239. Municipalities may also have concerns with their ability to effectively plan land use, or to plan potential revenue generation, when the approved development does not advance within a reasonable timeframe, which some municipalities suggest may be a maximum of five years after approval. Some participants expressed concerns that approval of wind generation facilities with an associated noise impact assessment may lead to creating a queue or sterilizing an area for potential adjacent wind developers. It was suggested by one wind developer that project construction ought to materially commence within 24 months of AUC approval of the project and the availability of transmission capacity. Other participants were not concerned.

240. Some participants emphasized that timing delays create uncertainty in the permitting process thereby increasing the difficulty of obtaining project financing, increasing the funding interest rate and hence increasing overall project costs. Therefore, timing delays may cause regulatory uncertainty and decrease the financial viability of capital-intensive projects.

241. Some participants agreed that where construction of a wind farm is delayed due to unavailable transmission facilities, no action to limit the permit and licence term would be appropriate. The representative from Alberta Environment and Sustainable Resource Development, Fish and Wildlife Division disagreed, suggesting a finite approval period was warranted. The representative indicated that wildlife monitoring, conducted during planning and prior to AUC application, is valid for only a limited time. A delay in wind farm construction after AUC approval will require additional wildlife monitoring and may require additional mitigation as a result. To help ensure compliance with the *Wildlife Act*, the representative emphasized that wind farms that are approved based on out-of-date wildlife surveys need to update those surveys and consult again with Fish and Wildlife, prior to commencing construction.

242. Some participants were unclear about how a queue procedure for noise would be administered. The concept of a queue was in relation to some form of prioritization, or first right of access, to use up to the maximum permissible sound level at dwellings. For example, if multiple wind farm developers submit applications, there was some question as to whether the allowable noise level at dwellings would be administered on the basis of the time of the initial application, or the time that the application was deemed complete by the Commission, or the time of approval of the application, or some other approach.

243. Participants also questioned how the approval term would be administered, if the developer does not construct and operate facilities that are not otherwise constrained by transmission infrastructure, after a certain elapsed time. A related issue could occur if the actual noise level exceeds the predicted level in a noise impact assessment, causing a potential cascading effect on other applicants. Attendees of the consultation meetings also described the rapid evolution of turbine generation capacity and size and associated changes in noise

emissions. It is clear that there is potential for the issues to be intertwined and complex, particularly where multiple developers are competing in a geographic region.

Observations

244. It may be impractical to administer a noise queue on any other basis than the date of approval of an application. While this may provide a competitive advantage for noise emission levels for the applicants that obtain earlier approval, it may be equitable since some advantage could reside with an applicant who is able to assemble a complete proposal and thorough application that may result in an expeditious approval process. If a developer does not immediately construct the approved facilities, there may be a market opportunity to transfer ownership of an approved project.

245. In the circumstance that multiple developers are simultaneously pursuing wind farm approvals, and are competing for the allowable noise levels at dwellings in a certain area, it may be reasonable to expect the developers to work collaboratively to coordinate their turbine locations in their applications and to otherwise address any concerns in a specific application.

246. In the event that the predicted noise levels of an approved wind power project are subject to updates arising from a change in equipment or other factors, the developer would update the noise impact assessment accordingly. If the noise impact should exceed the original predicted noise levels in the approvals, but remain in compliance with AUC Rule 012, updates to the predicted noise level information that may have been utilized by others would be appropriate, and may result in some form of collaborative mitigation, or regulatory review if necessary. This type of increase in predicted sound levels that affect the plans of others may require adjudication by the Commission.

247. One wind developer recommended that if a queue is established as a result of a noise impact assessment in an area where there are competing developers, the queue should be limited to the level predicted in the original noise impact assessment. This developer also recommended that if all wind generators are operating in accordance with their approval conditions, control of an outstanding noise exceedance should be a shared responsibility. AUC Rule 012 is not explicit in this regard and may require future review.

248. Should the noise levels exceed the permissible sound levels at noise sensitive receptors, wind developers that are contributing to the exceedance will need to establish plans for noise mitigation. It is clear that noise issues in congested development areas are complex. Wind developers should carefully assess their development plans and proximity to other wind and energy related projects.

<p>Is the current process where the Commission establishes an end date for completion of construction and commencement of operations adequate and allow flexibility for review and potential extension at the expiry date of the initially specified term? Should adjacent proponents be provided with an opportunity to comment on an extension request?</p>

G. Public health and safety

Health and safety considerations

249. Perspectives on the risks of wind turbine generation to human health, public safety and quality of life are varied. Some organizations such as CanWEA consider that there are no direct health impacts, but acknowledge that there are indirect effects or annoyance factors such as noise, sub-audible vibration and shadow flicker.

Shadow flicker

250. Shadow flicker occurs when the rotating turbine blades cast intermittent shadows. Some participants identified that shadow flicker is not considered to create issues for people with photosensitive epilepsy triggered by rapidly rotating blades, since wind turbine blades rotate at a speed slower than the threshold level. Any impact on residences is likely to occur seasonally, for a few days per year when the angle of the sun is appropriate and then for only a few minutes per day when the sun is low in the sky. Modelling can assess locations and time when shadow flicker may be problematic and mitigation is possible through setbacks or programming of turbine operation.

251. Shadow flicker was not identified during the wind consultation as being a significant concern, particularly because setback distances to ensure compliance to noise levels at dwellings should alleviate most concerns. The Municipality of Pincher Creek also indicated that issues with shadow flicker in that municipal district are addressed through their bylaw.

Ice throw

252. Ice throw was discussed during the wind consultation process. While ice throw from turbine blades is a potential risk, participants suggested that it occurs in humidity and temperature conditions generally uncommon in Alberta. Also, modern turbine monitoring equipment is understood to detect blade imbalances associated with ice, and to shut down turbines when it occurs.

Observations

253. Setbacks from roads and residences that are established by county bylaws and Alberta Transportation requirements may provide adequate protection against potential ice throw concerns. However, access under or near turbines should be controlled to ensure the safety of the public and operational personnel.

Acts, regulations and codes for health and safety, and engineering of wind farms in Alberta

254. Comments were received from the County of Kneehill during the consultation session regarding safety codes for building wind farms, specifically for the construction of foundations. Aspects of safety, including responsibilities and codes are addressed below.

255. Alberta Municipal Affairs administers a system that ensures appropriate safety standards for the construction and maintenance of buildings and equipment. The department's Safety Services Branch develops safety codes, advises on code issues and assists municipalities and agencies that use the codes. Safety codes are available for buildings, electrical, gas and plumbing

(including sewage). The *Safety Codes Act* requires all contractors in Alberta to obtain permits before commencing work on buildings covered by the *Alberta Building Code Regulation*, the *Alberta Electrical Code Regulation* (with reference to the *Canadian Electrical Code*), the *Alberta Gas Code Regulation* or the *Alberta Plumbing Code Regulation*.

256. Building permits are available through municipalities that are accredited to administer the *Safety Codes Act*, or through agencies that provide inspection services on behalf of the province in non-accredited municipalities. Accredited municipalities or agencies of municipalities can provide a permit, examine plans by a certified safety codes officer, provide inspection reports, identify follow-up of deficiencies and unsafe conditions, and provide technical advice and a status report at the completion of the project. Some municipalities, when providing a development permit for a wind farm, may ensure the developer is aware of the requirement that the applicant, owner or developer assumes all responsibilities pertaining to construction plan submissions, approvals and inspections that may be required by other provincial and federal agencies.

Electrical

257. The electrical engineering required for a wind farm is subject to a number of codes, standards and mandates for compliance, and is subject to a review process. The electric system components include the electrical collection and communications system, pad-mount transformers, substations, switchyards and transmission lines. The system must be in compliance with the *Alberta Electric Utility Code*; the *Canadian Electrical Code*, published by the Canadian Standards Association; the electrical system design requirements set out in the functional specification issued by the AESO; and the interconnection technical standards specified in Section 502.1 of AESO rule *Wind Aggregated Generating Facilities Technical Requirements*, which became effective on December 1, 2011.

258. The electrical systems inside the turbine are considered integral to the wind turbine, and are designed by wind turbine manufacturers to one of several codes specific to wind turbine design. These codes include the International Electrotechnical Commission, Germanischer Lloyd, Underwriters Laboratories, Det Norske Veritas, and the Canadian Standards Association, among others.

Foundation and turbine tower engineering

259. In Alberta, wind turbines and their associated foundation systems have been classified since 2010 as utility towers, and are therefore exempt from the requirements of the *Alberta Building Code*.³² In the case of wind turbine foundations, the developer is responsible for the design of the wind turbine foundations. The standard practice is to hire registered professional engineers to design and stamp foundation designs.

260. The County of Kneehill suggested that municipalities should require building permits for the concrete foundations used to support wind turbines.

³² www.municipalaffairs.alberta.ca/documents/ss/standata/building/bci/06bci030.pdf

261. The turbine manufacturer is responsible for the tower design. Wind turbine manufacturers therefore, use their preferred professional engineers, who are experienced in these types of dynamic structures. The wind turbine manufacturer may also utilize a local professional engineer to review and stamp drawings, if the local jurisdiction requires the drawings to be reviewed by a professional engineer licensed in the jurisdiction. This approach is conducted on a case-by-case basis. There is, however, no regulatory requirement from the AUC or the *Alberta Building Code* for an engineer's stamp on turbine foundation design. The AUC recommends that an independent third party, with competent qualifications and skill, should review the foundation design as part of the municipal development permit.

262. The Canadian Standards Association has published the *CSA Guide to Wind Turbine Codes and Standards*,³³ which provides an overview of current Canadian processes. Apart from Ontario, there are no regulations or codes in Canada that pertain specifically to wind turbine foundations or towers. However, in most jurisdictions outside of Alberta, the foundations for all but the smallest wind turbines are subject to approval and permitting by the local municipality. These jurisdictions typically require professional engineers to provide stamped design drawings for review.

263. There are no specific Canadian Standards Association codes or standards that apply to wind turbine foundations. The review is conducted according to applicable local building codes. In addition to the potential range of applicable building codes, the association reports that professional engineers are understood to use a number of references to evaluate wind turbine foundations. These include studies conducted by the Canadian Standards Association, the International Electrotechnical Commission, Germanischer Lloyd, and Det Norske Veritas as well as other studies from recognized professional engineers. Furthermore, geotechnical assessments are typically conducted by the developer to ensure the foundations are appropriate for the soil type, however, this activity is not a requirement of the AUC or the *Alberta Building Code*.

264. When a project is financed by a bank, the bank normally hires a third-party engineer to check the engineered designs of the entire wind farm, including the foundations, towers, civil and electrical systems. Not all developers, however, utilize project financing.

265. In the United States, a registered professional engineer designs and stamps the foundation drawings and calculations. In the vast majority of United States' jurisdictions, the stamped drawings and calculations are submitted to the local municipal building department, which confirms conformance with codes and standards and issues a building permit for the individual turbine foundations. In the case of the wind turbine towers, the wind turbine manufacturer normally hires a professional engineer to design and seal the design of the steel towers. The local municipal building department often requires these drawings and calculations to be submitted along with the foundation design and calculations, although this is less common than the requirement to submit the foundation drawings and calculations.

³³ www.csa.ca/standards/energy/CSAGuidetoCanadianWindTurbineCodes.pdf

Safety codes

266. Safety codes are not specific to wind farms; they apply to all industries including wind farms. Following is a list of acts, regulations and codes applicable for wind farms. It outlines, at a high level, the health, safety and engineering requirements for developing, constructing and operating a wind farm in Alberta. Each requirement should be reviewed for applicability to a specific project.

267. *Alberta Occupational Health and Safety Act* authorizes the following regulations and codes:

- *Occupational Health and Safety Regulation*
- *Occupational Health and Safety Code*

268. *Occupational Health and Safety Code* contains a number of specific hazard control requirements, for example: confined spaces; chemical hazards; cranes, hoisting and lifting devices; emergency preparedness and response; fall protection; working alone; scaffolding; violence; etc. It includes nothing specific to electrical hazards.

269. Other acts and regulations:

- *Apprenticeship and Industry Training Act*
- *Electrician Trade Regulation*
- *Electric Motor Systems Technician Trade Regulation*
- *Electronic Technician Transition Regulation*
- *Certification and Permit Regulation* (master electrician)
- *Construction Craft Labourer Occupation Regulation*
- *Boom Truck Operator Exception Regulation*
- *Gasfitter Trade Regulation*
- *Industrial Construction Crew Supervisor Occupation Regulation*
- *Instrument Technician Trade Regulation*
- *Welder Trade Regulation*
- *Traffic Safety Act* and regulations
- *Dangerous Goods Transportation and Handling Regulation*
- *Fire Control Zone Regulation*
- *Forest and Prairie Protection Regulations*
- *Freedom of Information and Protection of Privacy (Ministerial) Regulation*
- *Engineering, Geological and Geophysical Professions Act* and regulations
- *Potable Water Regulation*
- *Pipeline Regulation* (the wind farm collection system may cross pipelines)
- *Workers' Compensation Act* and regulations
- *Radiation Protection Regulation*
- *Work Camps Regulation* (if applicable)
- *Historic Resources Act*
- *Surface Rights Act* (for crossing agreements and road access)

270. Codes – the *Alberta Safety Codes Act* authorizes the following codes, which must be followed in the development of wind farms and plant facilities. The act also authorizes accredited corporations to function as their own inspector and to issue their own permits if they meet specified criteria:

- *Alberta Building Code* (for substation and operations building)
- *Alberta Electrical Utility Code* and its references to the *Canadian Electrical Code*
- *Alberta Elevating Devices Code*
- *Alberta Fire Code*
- *Alberta Gas Code* (if applicable)
- *Alberta Plumbing Code* (if applicable)
- *Alberta Private Sewage Disposal System Regulation* (if applicable)

271. Many of the above regulations and codes reference other requirements such as those set out by the National Fire Protection Association, Canadian Standards Association for electrical and personal protective equipment, Underwriters Laboratories Inc., ISO, etc.

272. In addition to the codes included in the preceding list, all work undertaken by the transmission facility operators and customers must be designed, constructed and operated to meet the requirements of the functional specification issued by the AESO and all applicable standards, guidelines, codes and regulations governing the installations.³⁴

Observations

273. After assessing the above information, it is apparent that numerous codes and review processes are applicable to wind turbine installations to ensure safe construction and operation. There may be opportunities for additional clarity respecting turbine foundations in the *Alberta Building Code*.

H. Land use

Regional planning concept

274. Some consultation participants indicated that the Commission's approval process on a facility-by-facility basis does not consider cumulative environmental effects of multiple developments. An example given was the development of wind turbines on native prairie, where consideration of the environmental effects of individual applications may not adequately reflect the cumulative effect on the habitat of species at risk. Similarly, participants suggested that evaluating the effect of individual wind farms on the mortality of birds and bats may not be conducive to evaluating the significance of those effects to resident and migratory populations.

275. Some participants recommended that, because of the potential cumulative effect of wind turbines on birds and bats in particular, the AUC should require evaluation of cumulative environmental effects for wind turbine applications. Other workshop participants provided statistics that suggested the effect of wind turbines on bird mortality is extremely small in relation to the frequency of bird deaths due to collisions with buildings and telecommunication towers. However, others emphasized that the effect of wind turbines on bird and bat mortality is incremental to mortality rates from collisions with buildings and other features, and it is the

³⁴ www.aeso.ca/rulesprocedures/8778.html.

incremental increase in mortality that is not being adequately assessed in recent wind farm applications. These participants also noted that the prairie region of southeast Alberta, where wind turbines are currently being preferentially located, is habitat to a number of bird species protected as species at risk. In contrast, bird collisions in urban centres tend to involve more common and less threatened species.

276. For background reference, the AUC notes that an assessment of cumulative environmental effects is treated as an integral part of environmental impact assessment reports, and would be a requirement if those facilities were required to conduct an environmental assessment under Alberta Environment and Sustainable Resource Development guidelines. Where multiple developments adversely affect a common environmental aspect, the cumulative or net effect of those developments, considered simultaneously, may be greater than would be suggested by separately considering the effects of each single development.

Observations

277. Wind farm applications evaluate the potential effects of turbines and infrastructure in isolation of other wind farms or industrial developments. With the exception of ambient air quality and cumulative effects of noise, the environmental requirements of AUC Rule 007 pertain to facility-specific environmental effects.

278. The *Alberta Land Stewardship Act* regional plans are expected to address many of the cumulative effects perspectives, and by legislation, the AUC must implement the associated requirements.

I. Environment

Wildlife considerations respecting wind cut-in speed and monitoring

279. The Alberta Wilderness Association expressed specific concern with the prevalence of wind farm development on native prairie, which it noted was important in southeast Alberta as habitat for protected wildlife species. The Prairie Conservation Forum and Foothills Restoration Forum similarly expressed concern that development of wind farms was fragmenting wildlife habitat and further endangering wildlife already classified as “species at risk.”

280. The Alberta Association of Grassland Naturalists recommended that greater consideration be given to turbine-related bat deaths, and suggested mitigation by modifying the wind cut-in speed.

281. The Alberta Wind Energy Corporation expressed concerns about the environmentally-related questions posed by the AUC. It requested clarification of the AUC’s jurisdiction regarding birds, bats and related environmental aspects of wind turbine applications, given that Alberta Environment and Sustainable Resource Development had already reviewed and provided sign-off on these aspects.

282. In considering the proposal put forth to have the AUC approve an envelope or buildable area within which turbines can be constructed, the Alberta Wilderness Association asked how the government would monitor or audit what was developed after the approval of the envelope was issued. The association also recommended that, if an envelope approach was adopted, the AUC should consider distinguishing areas required for temporary construction activities from areas where long term or permanent features would be constructed.

283. One workshop participant asked which government agency monitors implementation of mitigation measures, for example the modification of wind turbine cut-in speed intended to reduce adverse effects to wildlife. An Alberta Environment and Sustainable Resource Development Fish and Wildlife representative responded that the ministry lacked the regulatory authority, and resources, to check wind cut-in speed and therefore, does not monitor compliance in regard to the mitigation measures specified in the Fish and Wildlife Division's Wind Energy Referral Report (sign-off). It was suggested therefore that the commitments made to reduce wind turbine cut-in speed, are, in effect, voluntary and that greater regulatory oversight of mitigation measures may be recommended. It was further suggested by environmental groups and stakeholders that if a commitment is made as part of an application to the AUC, and Alberta Environment and Sustainable Resource Development cannot monitor compliance with that commitment, then the AUC should step in and assume the monitoring role. Stakeholders also recommended that if a commitment is made as part of an application to the AUC, and Alberta Environment and Sustainable Resource Development cannot monitor compliance with that commitment, the AUC should step in for that circumstance as well and assume that role.

284. When participants were asked if there are any specific environmental considerations for wind farm development, a Fish and Wildlife representative noted that wildlife is a public resource and restrictions for wildlife protection apply on both private and public lands.

Crown policy for development on public lands

285. Alberta government philosophy does not facilitate wind turbine installations on public lands. Sixty per cent of Alberta is considered Crown land, or public land. Crown land policies are available for forestry, mining and oil and gas activities as well as hydro power generation. Oil and gas activities routinely occur on crown lands that have native prairie.

286. The Fish and Wildlife Division participant noted that on Crown lands there may be issues resulting from overlapping leases. For example, when provisions of an existing grazing lease conflict with a proposed wind turbine lease. However, these potential conflicts have been administered for oil and gas activities and grazing leases. The government is reviewing its public lands wind development policy.

Native prairie

287. The Alberta Wilderness Association expressed concern about the prevalence of wind farm development on native prairie, noting its importance in southeast Alberta as habitat for protected wildlife species. The Alberta Wilderness Association emphasized that in its view, the rapid rate of decline in the amount of remaining native prairie warrants additional regard for wind turbine siting, maintenance and operations to ensure that applicable government standards and policies are maintained. To better address this issue, Alberta Wilderness Association

recommended more direct involvement of Alberta Environment and Sustainable Resource Development in AUC proceedings.

288. The Environmental Law Centre similarly expressed concerns about the siting of wind farms, particularly in environmentally sensitive areas.

289. The Prairie Conservation Forum and Foothills Restoration Forum recommended that the recently released document *Recommended Principles and Guidelines for Minimizing Disturbance of Native Prairie from Wind Energy Development in Alberta*, developed in consultation with the Fish and Wildlife Division of Alberta Environment and Sustainable Resource Development, be formally adopted. Both forums noted that the environmental footprint of the wind turbine industry is comparable to that of the oil and gas industry and fragmentation of wildlife habitat, and native prairie in particular, is a concern.

290. It was the view of the Prairie Conservation Forum and Foothills Restoration Forum that the current regulatory process in regard to wind turbines is inadequate to minimize the disturbance of native prairie, which is a specified Fish and Wildlife Division policy objective. The forums recommended that the following regulatory gaps should be addressed:

- a) There are no guidelines for avoiding native prairie that apply to the wind industry.
- b) Environmental assessment of wind farms is not a requirement under the *Environmental Protection and Enhancement Act*, meaning that Alberta Environment and Sustainable Resource Development assessment standards, protocol and guidelines, etc. do not apply.
- c) There is no assessment of the need for wind turbine development.
- d) AUC Rule 007 does not specify the level of authority required by Fish and Wildlife Division staff to provide sign-off.
- e) There is a lack of Fish and Wildlife Division oversight of the conditions specified in the division's sign-off.
- f) There is a lack of oversight provided by the AUC in regard to the approval conditions issued for wind turbines.
- g) Wind turbines are not considered specified lands in *Environmental Protection and Enhancement Act*, and therefore, there is no obligation to obtain a reclamation certificate or meet Alberta Environment and Sustainable Resource Development reclamation standards, and related requirements do not apply to wind turbine sites.

291. The Prairie and Foothills Conservation Forums indicated that the environmental footprint of wind turbines may be similar to that of oil and gas development, and that the government should rely upon existing Energy Resources Conservation Board and other guidelines for managing those effects. The forum emphasized this position in relation to effects on native prairie, noting that the best wind resources that are attracting development of wind turbines are located in areas where native prairie is prevalent.

292. The Fish and Wildlife Division representative of Alberta Environment and Sustainable Resource Development indicated that while the division's guidelines recommend avoiding native prairie, Alberta Environment and Sustainable Resource Development does not review portions of wind turbine applications to address native prairie issues, other than those pertaining to wildlife habitat.

Observations

293. A review of the project locations of wind power applications filed at the AESO for wind farm interconnection indicates that applications are not exclusively in the southeast of the province, however are dispersed throughout central, eastern and northern Alberta.

294. When development is proposed on native prairie, all power plant applicants must describe the efforts undertaken to avoid native prairie and provide specific reasons why development on native prairie is, in the applicant's view, in the public interest. The AUC will continue to consider the direction provided by Fish and Wildlife regarding the avoidance, mitigation, compensation and restoration of native prairie, as described in the sign-off report, *Wind Turbine Referral Report*, provided by Fish and Wildlife.

295. Environmental groups indicated concerns over development of wind farms on native prairie. Their concerns were that native prairie should be avoided or if avoidance is not possible, then the disturbance should be minimized, with remediation of the site disturbance. These suggestions are consistent with Alberta Environment and Sustainable Resource Development's *Wildlife Guidelines for Alberta Wind Energy Projects*.³⁵

Reclamation and abandonment

296. Under the provisions of Section 22 of the *Hydro and Electric Energy Act*, a generator must provide written notice to the Commission and the independent system operator (currently, the AESO) before permanently discontinuing the operation of, or permanently dismantling or removing any works or installations forming part of, the power plant. This is to ensure that the cessation of operations of a power plant does not have an adverse effect on the operation of the Alberta electric system. The Commission does not have responsibilities for remediation or reclamation of the site.

297. Industry participants noted that reclamation issues are addressed through a contract between the landowner and the wind turbine operator. It was suggested that the AUC, or another government agency, need not intervene in reclamation-related matters. However, since wind energy developments may be constructed in native grasslands and other habitats important to sustaining wildlife populations, and wildlife is a public-owned resource in Alberta, then such a view may be incomplete.

298. The municipal district representatives stated that some municipalities have bylaws in place regarding the need to reclaim wind turbines. The Municipal District of Pincher Creek, for example, requires the developer to provide a post-construction reclamation plan and a decommissioning plan. Those bylaws typically obligate landowners to address outstanding decommissioning or restoration issues in the event of a default of a wind-turbine approval holder. The municipal district representatives also stated that linear developments are taxed by the municipalities, and it may be possible to address outstanding wind-turbine reclamation issues through municipal taxation.

³⁵ www.srd.alberta.ca/FishWildlife/WildlifeLandUseGuidelines/documents/WildlifeGuidelines-AlbertaWindEnergyProjects-Sep19-2011.pdf

299. The Environmental Law Centre commented that the reliance on landowners to ensure that wind-turbine decommissioning and reclamation is completed provides no regulatory means to settle disputes, and pits the landowner against the wind farm operator. However, the AUC is advised that landowner-developer contracts for lease agreements typically have dispute resolution clauses that specify how disputes will be resolved. These clauses often require arbitration or application to the courts for resolution.

300. It was suggested by the Foothills Restoration Forum that landowners, even those leasing to wind turbine developers, would appreciate more regulatory support including information about the specific requirements for decommissioning wind turbines and reclaiming wind turbine sites.

301. In some circumstances existing wind generation installations that have reached their useful life may be repowered rather than abandoned.

Repowering wind turbines

302. Wind farms in North America historically have not been abandoned but, typically are “repowered.” Repowering is a wind industry term that involves the removal of the turbine and part of the foundation, and building additional turbines on the same lands but not necessarily at the same specific turbine location. The existing substation and transmission facilities are typically used for the repowering. This is very different from thermal power generators that are now in use. These have a very long design life but were typically built with environmental criteria that are now outdated. Wind farms have a design life of 20 to 25 years, as estimated by certification bodies such as TUV Nord, Germanischer Lloyd and others. Power purchase agreements can be relatively short, or can extend as long as 40 years in some jurisdictions. After that period of time, given that the wind turbines are at the end of their design life, the wind resource is proven, and a power purchase agreement may be still available for continued production, the developer has some decisions to make. Towards the end of the design life, the developer must determine when the project will be re-powered, or reclaimed and abandoned.

303. Since wind power is a non-depleting resource, areas with strong winds tend to have older turbines removed and newer-technology turbines installed on the same lands. Palm Springs, California is currently undergoing this kind of transition, where several turbines may be removed and be replaced with one turbine on the same lands. The lands continue to be used as an operating wind farm. Larger and more efficient turbines are readily available by the end of the life of previous wind turbine technology. The layout of the new wind farm that is replacing the old wind farm will vary from the original footprint. The turbine foundation design will also be different and will be customized to the specific loads of the new turbine.

304. Typically, wind developers are obligated under their wind-power lease agreement with the landowner to reclaim the land used by the initial turbines. The specifics of the reclamation may be identified in the legal agreement between the developer and landowner, and typically specify removal of all foundations and collection systems to below-plough depth in cultivated fields. Any failure to comply with reclamation would be considered a breach of contract with the landowner and the wind farm developer would not be able to continue developing wind power on the lands. Other wind farm developers might be interested in these lands as they have a proven wind resource. If the wind farm is not repowered, there is a risk that the wind farm could be abandoned.

305. In the United States, municipalities that act as regulators require developers to provide a decommissioning bond for a portion of the potential decommissioning costs. While this requirement is a cost to the developer, it ensures that abandoned wind farms can be decommissioned. There is a robust aftermarket for both refurbished turbines and spare parts for older technology, and often this value exceeds the cost of decommissioning. In the United States, decommissioning typically includes removing the turbine, removing the foundation to a depth of about one metre and removing any surface equipment such as overhead lines and substations. Collection systems are not typically removed.

No regulated duty to reclaim wind turbines

306. The *Environmental Protection and Enhancement Act* requires some power generating facilities, approved by the AUC, to be decommissioned and reclaimed at the end of their facility life.³⁶

307. Alberta Environment and Sustainable Resource Development is responsible for establishing the decommissioning and reclamation standards of these activities, and administers processes to ensure that the work is done and the applicable standards are met. *Environmental Protection and Enhancement Act's* reclamation requirements for hydroelectric, coal and thermal power plants provide administrative processes and legal means to motivate approval holders to decommission and reclaim at the end of the facility life. The requirements also enable Alberta Environment and Sustainable Resource Development to evaluate the quality of the decommissioning and reclamation work conducted, as well as to deliver enforcement should the decommissioning or reclamation work not be done to a sufficient standard.

308. As wind farms are not governed by the reclamation requirements specified in *Environmental Protection and Enhancement Act*, there appears to be no legislative authority to ensure that wind turbine decommissioning and reclamation occurs when wind turbines reach the end of the facility life. There is no administrative process to oversee, evaluate and enforce the standard to which decommissioning and reclamation of wind turbines occurs.

309. While the AUC does not have the mandate to address reclamation for wind farms, it would encourage landowners and developers to ensure that reclamation, repowering and abandonment are covered in any bilateral lease agreement.

³⁶ Section 137 of the *Environmental Protection and Enhancement Act* requires operators to reclaim specified lands where reclamation is defined as:

- (i) the removal of equipment or buildings or other structures or appurtenances;
- (ii) the decontamination of buildings or other structures or other appurtenances, or land or water;
- (iii) the stabilization, contouring, maintenance, conditioning or reconstruction of the surface of land;
- (iv) any other procedure, operation or requirement specified in the regulations;

Environmental Protection and Enhancement Act, Section 134(b)(i) defines an operator as “the holder of a licence, approval or permit issued by the Energy Resources Conservation Board or the Alberta Utilities Commission for purposes related to the carrying on of an activity on or in respect of specified land”

Environmental Protection and Enhancement Act, Section 1(a) defines activity as “an activity or part of an activity listed in the Schedule of Activities.” The Schedule of Activities in the *Environmental Protection and Enhancement Act* governs the “construction, operation or reclamation of a plant, structure or thing,” “the generating of thermal electric power or steam,” and “the generating of hydro-electric power,” as set out in sections 2(n) and 2(o). The schedule establishes reclamation obligations but does not include wind turbines.

Role of AUC regarding orphaned wind turbine liabilities

310. Municipal stakeholders indicated that in the event of a business failure of a wind turbine operator, the municipalities expect the landowner to address any outstanding decommissioning and reclamation obligations, or orphaned liabilities of the wind farm.

311. The Environmental Law Centre indicated that having landowners address orphaned liabilities would result in requiring landowners to make legal claims against defaulting companies. The law centre's opinion was that government should play a more active role in addressing the liability concerns of wind farms, as public interests do exist concerning privately owned land. The Environmental Law Center requested the AUC to consider a broader interpretation of stewardship in its proceedings for examining the public interest, which would extend beyond the interests of only those parties that are directly and adversely affected by a project.

Observations

312. The apparent legislative gap regarding reclamation of wind turbine sites may create unresolved liability issues for landowners that the AUC may be requested to assist with. The AUC would be legislatively constrained in this regard.

313. If a wind farm approval holder goes bankrupt, receivers may be assigned to help manage the affairs of the company in order to discharge debts. In doing so, receivers have a responsibility to secure and realize the assets of the troubled approval holder. To fulfill this obligation, receivers may avoid the associated liabilities. In the event of the financial failure of an approval holder, unprofitable, damaged or otherwise unwanted wind turbine facilities and associated infrastructure may not be addressed during the receivership proceedings. Old wind turbines have inherent value in parts, metals and particularly in the copper grounding wires and fixtures. The associated decommissioning and reclamation obligations for the remaining facilities could be left unfilled. With the legal dissolution of an approval holder, no financially viable party remains to address the outstanding legal obligations to decommission and reclaim the unwanted wind turbine facilities. In the event that a wind farm owner is bankrupt, the facility has not been sold to debt holders, the wind resource is no longer considered valuable, and the existing turbines or turbine parts have no inherent value, or the existing turbines cannot be sold for salvage value, then the outstanding legal obligations to decommission and reclaim may be said to become orphaned liabilities.

314. In the event that an approval holder is legally dissolved and orphaned liabilities remain, it has been the experience of other Alberta regulatory agencies, such as the Energy Resources Conservation Board, that there is an expectation that the approving authority will address the outstanding decommissioning and reclamation obligations left behind. In response to this expectation, the Energy Resources Conservation Board has developed a delegated administrative organization, the Orphan Fund, to complete the decommissioning and reclamation of orphaned sites on behalf of the Energy Resources Conservation Board and Alberta Environment and Sustainable Resource Development. In addition, the Energy Resources Conservation Board has developed liability management programs to ensure that licensees and not the public remain financially responsible for addressing orphaned liabilities.

315. The differences between wind development, being a non-depleting resource with increased potential for long term location utilization, and the oil and gas industry facilities, being a depleting resource, may be sufficient to preclude a need to explore the development of an orphan fund approach for wind development at this time.

4 Next steps

316. To reflect that this is a discussion paper, the AUC would like comments on its content and answers to follow up questions.

317. Following the posting of this discussion paper, we will consider whether to hold a meeting with stakeholders to talk about the discussion paper. Please give consideration to whether sufficient explanation has been provided in the discussion paper and whether there is need for an additional stakeholder meeting.

318. Whether an additional meeting is held or not, stakeholder comments are welcome on the discussion paper and all submissions will be reviewed and revisions made to the discussion paper. The AUC will then prepare a report and recommendations to the Commission.

319. The Commission will review the discussion paper and consider what changes may be required to AUC Rule 007 and other processes. Any draft changes to AUC Rule 007 will be issued to stakeholders for written comment.

5 Summary of questions to participants identified in the observations

1. Please comment on the merits of the approaches identified above. Are there additional approaches that should be considered?
2. Do the preceding and subsequent figures reflect your experiences with permitting timelines?
3. Comment on the opportunities for landowners who object to the buildable area and second stage application to trigger an AUC hearing.
4. Can stakeholders identify any other buildable-area requirements?
5. Should a viewscape representation of visual impacts be included in the application?
6. Are 36-month and 48-month time periods for buildable-area approvals to remain in effect reasonable?
7. If the buildable-area concept is implemented, are further changes to the AESO processes necessary?
8. Are there other agency overlap and coordination issues that have not been identified?
9. How might the AUC and other government agencies effectively address overlap and streamlining opportunities?

10. Should wind farm developers advise the municipality of the status of approvals or should the AUC develop a specific process to advise the municipality of receipt of an application?
11. Should the municipalities have enhanced regulatory authority for small-scale wind generation projects?
12. Is the current cost regime effective given the experience of participants to date?
13. Should the public policy or statute be amended regarding cost recovery?
14. Should the AUC look at more fully developing procedures for measuring low-frequency noise?
15. Should the AUC rely on the frequency and severity of noise complaints before taking measures to otherwise curtail wind generation?
16. Does the current process where the Commission establishes an end date for completion of construction and commencement of operations adequate and allow flexibility for review and potential extension at the expiry date of the initially specified term? Should adjacent proponents be provided with an opportunity to comment on an extension request?

Appendix A – Consultation meeting and discussion notes

On November 10, 2011, the Alberta Utilities Commission (AUC or the Commission) issued Bulletin 2011-25³⁷ announcing a two-day consultation meeting on the regulatory permitting process for wind-power generation projects. The stakeholder consultation meetings were held in Calgary on December 12 and 13, 2011.

Sixty-four interested participants responded to the bulletin by sending their intent to attend the two-day consultation. These participants included representatives from all areas related to the wind industry, including wind developers, environmental groups, municipalities and counties, wind consulting organizations, government agencies, landowner groups and the Alberta Electric System Operator (AESO).

The topics for the discussion were identified in advance by the AUC and focused on the regulatory process for wind generation facility applications, not on government policies. A summary of the topics and concerns raised by participants are outlined below.

Concerns raised by wind developers and consultants:

- Flexibility – Developers proposed an envelope approval for a buildable area that would meet all conditions for setbacks, noise levels, turbine height, etc., but would allow flexibility for the locations, specifications and procurement, etc. of the turbines.
- Clarity on the approval timelines – As long as there is a timeline, a developer can schedule for that. This will add certainty to the process and decrease the risk, as the developer will be able to secure financing and procure the turbines.
- Clarity on the AUC’s information request process – Developers are not sure what is expected from them for an application. They still receive many information requests even if they include in their application the information required in AUC Rule 007: *Applications for Power Plants, Substations, Transmission Lines, and Industrial System Designations* (AUC Rule 007). An additional concern was that the second round of information requests is used for additional information requests rather than for follow-up to the initial information requests. This increases the uncertainty for developers regarding timelines. They suggested that a pre-application meeting between the developer and the AUC could take place before an application is submitted. This would give the regulator a chance to clarify the questions, limit the IRs and reduce the process timelines. It would also help the developer understand what is being asked and what the Commission looks for. They suggested that minutes for the meetings could be published for public review.
- Financial capacity test – The requirements for demonstrating the financial capability of the applicant would drive small entrepreneurs out of the business, leaving all the industry to the big companies.
- Noise levels – A concern was raised that AUC Rule 007 and AUC Rule 012: *Noise Control* (AUC Rule 012) duplicate some of the noise control requirements. The duplication could be removed or different standards could be allowed.

³⁷ Bulletin 2011-25: Consultation on wind-power generation regulatory permitting, November 10, 2011.

- Bats, birds and wildlife – The developers acknowledged that there is an effective mechanism in place to review and scrutinize the impact on bats, birds and wildlife, and that mitigation issues should be specific to each project. Participants also discussed how many bats deaths should trigger a mitigation process; the developers cited Ontario and the United States as examples.
- Duplication of information asked by different regulators – Developers and consultants provided examples of duplication. For example, the AUC asks lots of information requests on environmental studies that have already been signed off by Alberta Environment and Sustainable Resource Development.

Concerns raised by environmental groups:

- Bats, native land and prairies – The environmental groups argued that the protection of bats, native land and prairies is in the public interest and should be addressed by regulation.
- Reclamation and decommissioning – There are no requirements for reclamation under the *Environmental Protection and Enhancement Act*, and no criteria or audits, for construction and decommissioning.
- Regional planning – Participants discussed the use of land-use frameworks, which are done individually for each project, but all projects have a cumulative effect on the environment. They suggested that a coordinating map depicting where it will be unadvisable to put wind power plants, due to high environmental costs, could be part of the regional planning process.
- Financial capacity test – Requiring developers to demonstrate their financial capacity would add certainty to their reclamation capabilities as well.
- Gaps in regulation – There is no standard for the review of grassland and native prairie mitigation process. Concerns were raised about how issues would be dealt with if the company cannot comply.

Concerns raised by municipalities and landowners groups:

- Envelope approval – These groups were concerned that allowing increased flexibility for developers might impact other aspects that were not considered before.
- Visual effect – Municipalities and landowners were concerned about the visual effects created by both turbines and power lines.
- Noise – One municipality identified the necessity of communicating planned or existing wind turbine noise potential beyond the titled parcels participating in the wind farm, and is registering caveats for potential noise on the titles of adjacent, potentially affected properties that are outside the wind farm boundaries. According to the municipality, this registration is intended to simply notify parties that a wind farm has been approved in the region, since historically, many wind farms in the region have been approved, but not built.
- Municipalities' role – Municipalities felt that they should be responsible for establishing setbacks, and that the AUC's role should be to review the setbacks established by the municipality to ensure a safe and reliable system.

- Health issues – These groups cited indirect effects on health caused by shadow flicker. They acknowledged that mitigations do exist, and that shadow flicker usually occurs over a short period of time and are predictable. As there is not a specific threshold set by the AUC, the municipalities currently address this issue under their bylaws.

Other topics discussed at the consultation meetings:

- Role of the agencies – It was suggested that defining the role for all agencies and how they interact would be helpful for all parties. Increased coordination between different regulatory agencies would help reduce the duplication of work.
- Wind project queues and noise levels – Concerns were raised regarding projects that are approved but never constructed, how this situation influences the cumulative noise levels that are allowable for the next project, and how this should be addressed.
- Distributors' involvement – Distributors would like to be involved in planning the wind plant from the beginning, especially the gathering systems. As the underground wind farm electrical collectors go into road allowances, safety issues should be considered, because if there are any issues the distributor is responsible for addressing them.
- Coordination of facility applications and wind farm applications – Reasons to have both applications addressed in the same proceeding are that, in general, landowners would be the same for interconnections as for the turbine placements. Addressing both applications in the same proceeding would streamline the communication process. On the other hand, concerns were also raised that this could confuse interveners, as they would not be sure which project they have standing for. It could also be difficult for applicants to identify which specific concerns relate to which project (wind or transmission).
- Reclamation and abandonment – Participants discussed the concern that when a company is bankrupt, who is responsible for the decommission work is unclear. Developers mentioned that decommissioning is addressed in the contractual obligation with the landowner and can be enforceable in court. To deal with this, some municipalities require a process put in place for decommissioning before approving the wind farm.

Participants who attended the consultation meetings

Acciona Wind Energy Canada Inc.	Golder Associates Ltd.
Alberta Electric Systems Operator	Grasslands Naturalists
Alberta Tourism, Parks and Recreation	Greengate Power Corporation
Alberta Prairie Conservation Forum	HFP Acoustical Consultants
Alberta Environment and Sustainable Resource Development, Fish and Wildlife Division, and Lands Division	Historic Resources Management Branch, Alberta Culture
Alberta Wilderness Association	Jones Group Engineering Ltd.
Alberta Wind Energy Corporation	Kneehill County
AltaGas Ltd.	Livingstone Landowners Group
AltaLink Management Ltd.	Mainstream Renewable Power
ATCO Power Ltd.	Municipal District of Pincher Creek
ATCO Structures & Logistics	Municipal District of Willow Creek
Bat Conservation Society of Calgary	Meaghan Conroy Consulting
Benign Energy Canada Inc.	Miistakis Institute
BluEarth Renewables Inc.	NaturEner Energy Canada Inc.
Boreas Consulting	Palliser Regional Municipal Services
Canadian Society of Environmental Biologists	Patching Associates Acoustical Engineering
Canadian Wind Energy Association	RWDI Air Inc.
Capital Power Corporation	Shell Canada Limited
City of Calgary, Development & Building Approvals	SNC-Lavalin Environnement
Cypress County; dBA Noise Consultants	Solas Energy Consulting Inc.
E.ON Climate & Renewables North America Inc.	Stantec Consulting Ltd.
EBA - A Tetra Tech Company	Suncor Energy
Enel Green Power Canada Inc.	Suzlon Wind Energy Corporation
ENMAX Corporation	Town of Pincher Creek
Environmental Law Centre	TransAlta
Foothills Restoration Forum and Prairie Conservation Forum	TransCanada
FortisAlberta Inc.	University of Calgary students

Appendix B - Case studies

Purpose

Much of the feedback received from developers in the stakeholder consultation process for the Wind Power Regulatory Process Review centered on time to obtain regulatory approval. Additional criteria deemed important were the transparency of the process, the clarity of the requirements and the responsiveness of the Alberta Utilities Commission (AUC or the Commission) in its interactions with the applicants. In order to provide a better understanding of the time periods for regulatory approval, it was determined that it would be helpful to analyze the wind generation regulatory process from the perspective of actual projects. Three actual projects that received regulatory approval within different timeframes were selected for this analysis: the Ardenville Wind Farm, the Wintering Hills Wind Farm, and the Castle Rock Ridge Wind Farm. The projects were submitted to the AUC for consideration between February 2002 and April 2009. The projects had overall AUC approval times of 277 days, 413 days, and 2,090 days, respectively. Project sizes were all more than 50 megawatts, at 69, 88 and 109 megawatts, respectively.

Methodology

Each project's application to the AUC was reviewed, as well as information requests and responses, developers' response time to information requests, and amendments and timeframes. Other information reviewed in relation to each project was: the workload of the AUC, including internal staffing levels, in the context of the timeframes for each project; project complexity; project size; and number of interveners, if any.

Highlights

The analysis of the case studies showed that specific actions by both the AUC and the applicant affected the approval time for the projects. The majority of all information requests addressed environmental and noise impact aspects of the projects. Information requests are usually batched and are extensively reviewed within the AUC before they are sent to the developer.

Factors that contributed significantly to longer approval times included: amendments to the project configuration during the application process; lack of clarity of the AUC application requirements; number and nature of interveners; and the developer's approach to the application, for example the inclusion of contingent turbine sites, changes to turbine specifications, completeness of initial application, and adequacy of information request responses, and their experience in the AUC application process. All three projects had amendments to the initial applications. Furthermore, at the time that two of the applications were submitted, the AUC had a considerable workload within the facilities group. Many applications for wind power, conventional generation and transmission lines had been received at the same time. Due to these factors, reviewing the applications and issuing the first information requests took considerably more time than the average of one month.

Project 1: Ardenville Wind Farm

Name	TransAlta Ardenville wind plant and substation
Duration of permitting	277 days
Time to first information request from AUC	58 days
Time started	April 13, 2009
Time approved	January 15, 2010
Time commissioned	December 2010*
Turbine type	3.0-megawatt Vestas V90
Number of turbines	23
Total plant capacity	69 megawatts
Number of turbines on native prairie	Maximum 13 turbines, minimum 9 turbines
Needs identification document timeline	April 9, 2010 to July 23, 2010 ~ 3 months
Facility approval timeline	April 14, 2010 to July 23, 2010 ~ 3 months
Substation application timeline	April 13, 2009 to January 15, 2010 ~ 9 months
County	Willow Creek

*Completed in a one-year build.

Project summary

The proposed project was for 23 turbines, at three megawatts (MW) each for a total of 69 MW. The developer, TransAlta, demonstrated contingency planning by identifying a total of 27 turbine sites, with the objective of choosing the 23 best sites of the 27 identified. The project distinguishes itself in the speed with which it was approved, 277 days. The interconnection process was also quickly approved.

Project details

On April 13, 2009, TransAlta requested AUC approval to construct and operate a 69-MW wind farm and substation at Ardenville, Alberta, located southwest of Fort McLeod.

The proposed project consisted of 23 turbines at three-MW each, for a total project output capacity of 69 MW. The substation was proposed to have two 138/34.5-kilovolt (kV) main power transformers, circuit breakers and voltage control equipment located within the project footprint. Additionally, the project included a 34.5-kV gathering system, and underground and overhead power lines, for collecting and transmitting electric power from each wind turbine to the Ardenville substation.

AUC request for information

The AUC requested information on the environmental and noise impacts, the gathering system and the proposed design that showed 27 potential turbine sites. The information requests were made June 10, 2009 and June 18, 2009. TransAlta provided the requested information on June 23, July 15, and September 21, 2009. The initial responses by TransAlta were provided within 14 days of the request.

At the time that this application was submitted, the Commission had received a significant number of other applications, and therefore, the backlog of work for the environmental and noise groups was quite large. The two groups at the time were staffed by two full-time personnel and one full-time personnel, respectively. The facilities group was processing nine wind farm applications at the time, as well as handling 16 scheduled hearings. During this time all transmission applications also required noise impact assessments, which further increased workload. Toward the end of 2009, new policies supporting the *Freedom of Information and Protection of Privacy Act* were implemented, requiring an additional layer of review.

The internal target for sending information requests to the applicant is 30 days after receiving an application. For this application the process took 58 days.

The operational procedure for the AUC is to put together all information requests from each department into a single document and issue them as a batch to the developer, rather than issue information requests as questions arise during the processing of the application. The Ardenville project had multiple information request documents issued during the application period.

The analysis of the information requests for this project indicates that many of the questions focused on why the developer was seeking approval for 27 potential turbine sites, when it intended to utilize only 23 of the sites.

Project modifications

On September 28, 2009, more than five months after the initial application, TransAlta amended the project by removing four of the potential turbine locations that were in proximity to Highway 810, narrowing the turbine sites to the final 23.

The developer's contingency planning allowed the contentious turbines with uncertain setbacks to be removed from the application without needing to go through an amendment.

Hearings and interveners

The Commission issued a notice to all interested parties and landholders within two kilometres of the proposed wind farm.³⁸ The Commission received a letter from two individuals in response, raising issues around fossil fuels, alternative fuels, ecological impacts, the aesthetic impacts of wind farms and land values.

The Commission ruled that several matters raised by the parties (government assistance programs; dependence on fossil fuels, etc.) were general matters of government policy, and were unrelated to specific characteristics of the application. The Commission also ruled that environmental concerns related to bats and migrating animals were of a general nature and not specific to the project before the Commission, and that a sign-off from Alberta Environment and Sustainable Resource Development was sufficient indication that the project's impacts on wildlife and landscape features could be adequately mitigated.³⁹

Finally, no one within two kilometres of the proposed wind farm objected to the project. The Commission ruled that the proposed wind farm would not adversely affect the interveners, since their place of residence was about 25 kilometres away, and therefore, no hearing was held.

Consultation, noise and environmental impacts, and other approvals

The Commission found that TransAlta's public consultation complied with the AUC's participant involvement program and notification requirements outlined in AUC Rule 007: *Applications for Power Plants, Substations, Transmission Lines, and Industrial System Designations* (AUC Rule 007). The Commission found that TransAlta's consultation steps were adequate given the nature and scope of the TransAlta project.

³⁸ Decision 2010-021: TransAlta Wind – Ardenville Wind Plant and Substation, Application No. 1604970, Proceeding ID No. 260, January 15, 2010.

³⁹ Decision 2010-021, January 15, 2010.

A TransAlta noise impact assessment indicated that the maximum predicted sound levels at the nearest or most-affected residence would be 40 decibels (dBA), equal to the nighttime permissible sound level of 40 decibels set out in AUC Rule 012: *Noise Control* (AUC Rule 012). Other less affected receptors had predicted sound levels of 37 to 39 dBA.

A March 19, 2009 letter from Alberta Sustainable Resource Development, in response to a report submitted by TransAlta in February 2009, advised there were no concerns with the proposed project.⁴⁰

TransAlta received approvals from the Municipal District of Willow Creek No. 26 as well as from Transport Canada. Alberta Transportation's approval was not required as there were no proposed turbines within 300 metres of a numbered highway.

Interconnection

A needs identification document was filed on April 9, 2010, by the AESO to interconnect the Ardenville wind power facility.

AltaLink Management Ltd. (AltaLink) was directed by the AESO to submit a facility application to construct a new 11-kilometre, 138-kV transmission line and related facilities. A single line of supply at 138-kV was required for the generator interconnection.

The AESO studies confirmed that the Ardenville project could be interconnected with a 138-kV transmission line.⁴¹ However, an intermediate remedial action scheme was still required to mitigate transmission overloads in the area until southern Alberta transmission reinforcement upgrades were put in place.

To meet the specified needs of the needs identification document, AltaLink proposed:

- construction of 11 kilometres of new 138-kV transmission line to connect with the project substation
- re-designation of a portion of existing transmission line 608L, east of the new connection point, to TransAlta Blue Trail Substation as 608AL
- addition of a new structure in transmission line 725BL, near the location where the 725BL crosses the proposed transmission line

AltaLink proposed five different routes for the transmission line, and chose the one that was preferred by most landowners. AltaLink conducted an environmental evaluation and confirmed that potential environmental impacts could be mitigated by complying with standard environmental operating procedures.

The AESO indicated no comments or concerns were received regarding the need for this project. The Commission issued a notice of application on June 10, 2010 and Greengate Power Corp. (Greengate) filed an objection on July 2, 2010, on the basis that a remedial action scheme or special protection schemes had not been revealed or identified in the needs application.

⁴⁰ Decision 2010-021, January 15, 2010.

⁴¹ Decision [2010-351](#): Alberta Electric System Operator – Needs Identification Document and AltaLink Management Ltd. Ardenville Wind Power Facility – Facility Applications and Interconnection, Applications No. 1606076 and No. 1606090, Proceeding ID No. 595, July, 23, 2010.

Greengate also argued that the AESO failed to properly consider the potential impacts of the Ardenville project on Greengate's Blackspring Ridge Wind Project. The Commission dismissed this objection.

The Commission issued approval and permits and licences for the Ardenville Wind Power Facility interconnection on July 23, 2010.

Positive aspects of the application process

The developer's contingency planning allowed for very minor modifications to be made to the project configuration after the application was submitted, even though four specific turbines were eventually removed from the application. The methodology used by the developer to identify alternative turbine locations, although initially confusing for the AUC reviewers, prevented a re-application by the developer to the AUC and ultimately helped to streamline the project approval. On the other hand, this approach required slightly more time on the part of the AUC to review four turbine locations that would not be part of the final approval.

The interconnection approval process was straightforward, simple and as a result the application was approved in less than four months. When compared to the two case studies that follow, this process went smoothly. Delays in the other case studies can be attributed to complications with the interconnection application, and miscommunication between agencies.

The transmission facilities application was approved within six months of the power plant approval.

Learning opportunities

The applications to build the wind farm and to interconnect went smoothly, likely because the developer was experienced with the AUC application process and because of the developer's decision to plan for contingent turbine locations.

The information requests took longer than the average length of time for the Commission, but less time than the other case studies required. The AUC may consider revising its anticipated service level so that more realistic expectations are set for applicants. The delay from 30 days to 58 days was attributed to the workload of the environmental and noise groups within the AUC at the time the application was submitted. As a result, the first information request was issued close to two months after the application for this project was received, approximately one month longer than the AUC's internal target for issuing information requests.

Project 2: Wintering Hills

Name	Suncor Wintering Hills
Duration of AUC approval	413 days
Time to first information request from AUC	150 days
Date application was submitted	April 17, 2009
Time application was approved	June 4, 2010
Time commissioned	December 2011*
Final turbine type	1.6-megawatt General Electric turbines
Final number of turbines	55 turbines
Total plant capacity	88 megawatts
Number of turbines on native prairie	9 turbines
Needs identification document timeline	September 8, 2010 to May 31, 2011 ~ 9 months
Facility approval timeline	October 6, 2010 to May 31, 2011 ~ 8 months
Substation timeline	April 17, 2009 to June 4, 2010 ~ 14 months
County	Wheatland

* Completed with a two-year build

Project summary

The applicant originally proposed a 99-MW project, with 66 turbines, each at 1.5 MW. The project was later amended to 55 turbines, each at 1.6-MW, for a total of 88 MW. The substation application was also amended. This case study provides an example of a more recent application process that encountered some difficulties and delays in its application process. Of the three case studies looked at, this project represents the middle of the road, it was not the fastest project approved, nor was it the project with the longest approval process. This project is not located in an area where wind farm developments have traditionally been developed.

Project details

Suncor filed an application on April 17, 2009, for approval to construct and operate the Wintering Hills Wind Power Project, initially comprising a 99-MW wind power plant with a project substation.

A 34.5-kV collector system, mostly of underground power lines, was proposed as part of the application for collecting and transmitting electric power from each wind turbine to the amended substation. Suncor provided a map showing the location of the collector lines, and cross-sectional drawings of locations where the collector lines would cross existing road allowances.

The substation would be located roughly 28 kilometres south-southeast of Drumheller. It was to be built, owned and operated by Suncor on privately owned lands.

A new transmission line was needed to connect the proposed substation to the Alberta Interconnected Electricity System at the existing Wintering Hills substation.

At the time, there were approximately 27 stakeholders within two kilometres of the Wintering Hills Wind Power Project site. There were no residents within 800 metres of the amended substation boundary.

The amendment for the substation was submitted on December 16, 2009 (see below).

AUC requests for information

The AUC found that certain aspects of the application were incomplete and discussed these concerns with Suncor on June 1, 2009. On June 23, 2009, Suncor provided information including a list of affected landowners, landowner concerns and maps.

Approximately one and a half months after submission of the initial application, the AUC requested a meeting with the developer in order to issue a verbal information request, and to clarify expectations for a submission. The meeting was held because the response to the initial information request was deficient, especially with respect to the stakeholder consultation information.

Following the meeting with Suncor, the Commission issued a written information request on Sept. 14, 2009, requesting clarification of 38 points from the initial application. This was the first written information request, and was issued almost five months after the original application. Although the written information requests were ready within the AUC approximately two weeks before they were issued, internal approval workload delayed their issuance by two weeks. The information requested primarily addressed Suncor's consultation with landowners and local jurisdictions, its economic assessment and its environmental overview, technical specifications including the collector system lines and substation location, and noise issues including cumulative effects, aerodynamic noise and construction noise. The environmental issues raised included visual impacts, land use and siting, and provision of environmental reports. Suncor responded on December 11, 2009, with information on the substation, routing of the gathering system, potential environmental and noise impacts, and landowner consultation.

Modifications

On December 16, 2009, Suncor filed an amendment to the substation application. The substation design was changed to a two-transformer configuration, each sized to 60 per cent of the power plant capacity to provide redundancy should one of the transformers need to be taken out of service.

On December 17, 2009, Suncor filed an amendment to the power plant application. The design was changed from 66 turbines to 55 turbines, each at 1.6-MW instead of the 1.5-MW model. Minor adjustments were made to the location of the wind turbines. Four turbines were moved more than 50 metres from their original locations in the filings. Many turbines were moved less than 50 metres from their original locations.

Hearings and interveners

Hearings – On February 5, 2010, the Commission issued a notice of application to interested persons, residents and landowners within two kilometres of the amended proposed locations for the power plant and substation. The notice was published in four local newspapers.

Interveners – The Commission received one letter from Fox Coulee Aviation Ltd. on February 26, 2010, in response to the notice of application. Fox Coulee Aviation Ltd. had concerns with aviation safety and potential economic impact on its business. The Commission requested additional details from Suncor, and after receiving the information on April 6, 2010, the Commission issued a notice of hearing on April 20, 2010. The hearing was scheduled for May 27, 2010. Fox Coulee Ltd. withdrew its objection and did not intend to participate in the scheduled hearing. The hearing was cancelled as no other parties expressed their intent to participate.

Participant involvement, noise, environmental impacts and other approvals

Suncor stated that its participant involvement program included all parties within two kilometres of the proposed project site, landowners, nearby and other residents, all levels of government, non-governmental organizations and other special interest groups. Suncor's stakeholder consultation plan provided details on the consultation process: two open houses were held, and additional consultations were conducted with the municipality, participating landowners, the general public, Wheatland County council members, planners and the road department, as well as the volunteer fire department. Communications took the form of letters, presentation materials, phone and face-to-face meetings.

The noise assessment predicted that all receptors would comply with the AUC nighttime criteria of 40 dBA. Nine of the 69 receptor locations were predicted to be within 0.5 dBA of the permissible sound level. The contractor who undertook the noise impact assessment recommended that Suncor conduct a post-construction comprehensive sound level survey at these nine receptors once the power plant was in service.

Suncor conducted a comprehensive environmental assessment that included surveys of plant and animal species. The proposed turbine layout was developed to avoid sensitive environmental features identified in the survey, in accordance with Alberta Environment and Sustainable Resource Development recommended setbacks. Initially, the application stated that all but nine turbines would be located on previously disturbed land, with these located on native prairie.

Suncor submitted initial approvals and letters to the AUC: the Wheatland County development permit, for the substation and general site locations of each of the wind turbines; Transport Canada approval; NAV Canada non-objection letter; Environment Canada Meteorological Service of Canada non-objection letter; Alberta Transportation approval, for gathering system lines or turbines within 300 metres of numbered Highway 564; and Alberta Environment and Sustainable Resource Development – Fish and Wildlife Division approval. Subsequent approvals from NAV Canada and Alberta Transportation were submitted for the 55-turbine layout, although no amended Wheatland County development permit was submitted.

Suncor consulted Alberta Culture on the preparation of its historic resources impact assessment. No new historic or archaeological sites were identified.

Interconnection

The AESO submitted a needs identification document on September 23, 2010, requesting approval to construct a 55-kilometre, single-circuit 144-kV transmission line, between Wheatland 609S substation (Alberta Interconnected Transmission Systems) and the existing Wintering Hills substation, and to make modifications to the Wintering Hills 804S substation to accommodate the connection. This was submitted about five months after the power plant application was approved.

The AESO directed ATCO Electric Ltd. (ATCO) to submit a facility application to the AUC to satisfy the needs identified in the needs identification document application.

ATCO filed a facility application with the AUC on October 21, 2010, requesting approval to build and operate a new 144-kV transmission line and to upgrade the existing Wintering Hills 804S substation within Wheatland County in southeast Alberta. The AESO and ATCO requested the Commission combine and consider the needs identification document application and facility application jointly. The Commission considered the combined applications as Proceeding ID No. 835.

On January 26, 2011, TransCanada Energy Ltd., the power purchase agreement owner of the Sheerness power plant, filed a submission regarding the applications in response to the notice.⁴² TransCanada Energy stated that they were not objecting to the applications and were not requesting a public hearing; they were seeking information from the applicants regarding potential impacts during and after construction of the proposed transmission facilities on the power output of Sheerness. TransCanada Energy asked the AUC to establish a written information request process.⁴³

Subsequently, on January 28, 2011, TransCanada Energy advised the AUC that they would contact representatives from the AESO and ATCO to discuss their concerns about Sheerness instead of using a written process. On April 20, 2011, the company informed the AUC that its concerns had been adequately addressed, and withdrew its statement of intent to participate.⁴⁴ The transmission line was planned for an area where there were no 240-kV transmission facilities. The only available option was to connect to the 144-kV transmission facilities in the area.

An engineering study report concluded that even before connecting the wind facility, the existing system had already overloaded the transmission facilities under steady-state and contingency conditions, and thus contravened the current transmission reliability criteria.⁴⁵ Connection of the project would aggravate the loading of transmission elements that were already overloaded. The AESO received approval from the Commission for transmission developments to upgrade the existing system in both the Hanna and the central-east regions. The AESO also forecast the transmission system reinforcements needed for service in 2012. The needs identification document application indicated that until the planned reinforcements were in place, the AESO would develop remedial action schemes to curtail the wind facility generation from the system, as system constraints require. In response to an information request from the Commission, the AESO stated that it had not performed the detailed operational studies to develop the specific remedial action schemes required in the Hanna and central-east regions. However, they would be developed in time to facilitate the interconnection. During the period from April to June 2010, the AESO coordinated with ATCO to carry out a participant involvement program to notify stakeholders of the need for the connection. The AESO stated that there were no outstanding concerns related to its assessment of the need.⁴⁶

⁴² Decision 2011-027: Alberta Electric System Operator and ATCO Electric Ltd. – 144-kV Transmission Line 7L153 for Wintering Hills Wind Power Plant Interconnection, Needs Identification Document Application and Facility Application, Applications No. 1606544 and No. 1606641, Proceeding ID No. 835, May 31, 2011.

⁴³ www.auc.ab.ca/eub/dds/EPS_Query/TransferAttachmentWS.aspx?DOCNUM=212949&SIZE=264346

⁴⁴ www.auc.ab.ca/eub/dds/EPS_Query/TransferAttachmentWS.aspx?DOCNUM=212949&SIZE=264346

⁴⁵ www.auc.ab.ca/eub/dds/EPS_Query/TransferAttachmentWS.aspx?DOCNUM=212949&SIZE=264346

⁴⁶ www.auc.ab.ca/eub/dds/EPS_Query/TransferAttachmentWS.aspx?DOCNUM=212949&SIZE=264346

ATCO had already consulted with all of the 58 landowners, occupants, agencies and other interested parties within the preliminary study area for the proposed transmission line. ATCO then re-consulted with the 39 landowners, occupants, agencies and other interested parties that were along or directly adjacent to the proposed transmission line route. The participant involvement program for the project consisted of mailed information packages, follow-up phone calls, direct correspondence, in-person meetings, and a mailed project update package. ATCO identified two route options, an easterly and a westerly route. The easterly route was ATCO's preferred route option. It had the fewest number of outstanding concerns and objections, followed an existing distribution line which minimized cumulative effects of electric facilities in the area, and would have good road accessibility. ATCO argued that the westerly route had a greater number of outstanding concerns and followed a less-developed roadway, which would result in higher maintenance costs.

ATCO's final design specification for the Wintering Hills project contemplated that the Wintering Hills 804S substation would be upgraded to accommodate connection of the new 144-kV transmission line 7L153, the installation of three 144-kV circuit breakers, and related support and communications equipment and infrastructure.

The AUC approved the new transmission line and interconnection on May 31, 2010.

Positive project attributes

While Suncor's initial application was incomplete, the Commission organized an in-person meeting to issue a verbal information request to clarify submission requirements and mitigate some of the delays caused by the incomplete application.

The responses from Suncor to the information request by the Commission took approximately two months. Given that information was requested on multiple aspects of the application, this can be considered an adequate timeline. Subsequently, Suncor also submitted agency approvals for the amended application (NAV Canada and Alberta Transportation).

A change in wind turbine technology did not have a significant effect on the application time frame. Although the number of turbines was reduced from 69 to 55, only four turbines were moved more than 50 metres from their original proposed location. More importantly, the developer selected an upgrade to the turbine that was initially proposed, rather than selecting a different manufacturer and model. The change of turbine technology therefore had only a minor effect on the application, as grid characteristic differences between the GE 1.5-MW and 1.6-MW machines are minimal. The use of the same manufacturer ensured fewer complications than a full change in technology.

Consultation with local stakeholders adhered to guidelines stipulated by Alberta Environment and Sustainable Resource Development. Two open houses were conducted and consultations were held with the municipality, landowners, the general public, Wheatland County planners, county council and the road department, optioned land owners and the volunteer fire department. Communications took the form of letters, presentation materials, phone calls and face-to-face meetings.

It would appear that proper planning was conducted in the original siting of the turbines, which anticipated setback requirements and a limited new disturbance area, and took into account the outcome of the consultations.

The only intervener for the hearing subsequently withdrew its objection, which resulted in a cancellation of the hearing.

Learning opportunities

Suncor's initial application was incomplete and deficiencies were identified by the AUC. This caused more delays in the application process than if the developer had submitted a complete application, which would have reduced the clarifying information requests from the Commission. As mentioned in the earlier case study, the AUC had received a number of applications at this time, and the number of staff in the environmental and noise groups was insufficient for a timely processing of all the applications. Nonetheless, five months from receipt of the application until submission of information requests identifies an opportunity for improvement for the AUC.

The apparently unforeseen complications regarding interconnection, and request for information from a third party, TransCanada Energy Ltd., may also have contributed to the time required for processing the application. However the company's request appears to have been resolved by cooperation between the parties.

Project 3: Castle Rock Ridge Wind Farm

Name	Castle Rock Ridge Wind Farm (Castle Rock Ridge Project)
Duration of permitting	2,920 days (from time of first application to fourth approval)
Time to first information requests	Unknown
Time started	February 14, 2002
Number of interveners	Two landowners 2005, Fortis 2005
Time approved	February 10, 2010 (fourth approval). Initial approval in 2002, second approval in 2005, third approval in 2007, transfer ownership in 2009
Time commissioned	June 30, 2012 (Phase 1 estimated date)
Turbine type	Enercon 2.3 megawatts
Number of turbines	47
Total plant capacity	108 megawatts
Number of turbines on native prairies	Unknown
Needs identification document timeline	August 13, 2010 to November 1, 2011 ~ 15 months
Facility approval timeline	October 15, 2010 (amended August 5, 2011) to November 1, 2011 ~ 13 months
Substation	August 13, 2010 to November 1, 2011 ~ 15 months
Interconnection duration	June 6, 2010 – ongoing
County	Pincher Creek

*Two-year build

Project summary

The initial project proposed the construction of a 100-MW wind farm, consisting of 56 wind turbines with a rated capacity of 1.8 MW. The developer requested multiple changes to the wind farm during the course of the application, including changes to the number of turbines, the turbine layout and the turbine technology. This project took almost 10 years to be constructed from the date of the initial application to the fourth and final approval. During this 10-year timeframe, the project changed ownership and several major amendments were made to the project configuration. On January 1, 2008, the AUC and the Energy Resources Conservation Board (ERCB) replaced the Energy and Utilities Board (EUB or the Board). The interconnection process for this project was also complicated, requiring an unusual length of time for final approval.

Project details

2002 – Initial application

On February 14, 2002, the developer of Castle Rock Ridge Project, Wind Power Inc., received Approval No. U2002-087⁴⁷ from the EUB to construct the 100-MW Castle Rock Ridge Project, consisting of 56 wind turbines, each rated 1.8 MW. The EUB issued approval for the wind farm to be completed by December 31, 2003.

2004 to 2005 – Turbine change

On July 2, 2004, Wind Power Inc. submitted an application to change the turbine technology to a 2.0-MW-rated machine, at the same 56 locations, with a 25-kV gathering system. This also effectively increased the capacity of the plant from 100 to 112 MW. On July 21, 2004, the Board had completed its review of the application and identified many deficiencies. While the applicant had considered the change of turbine technology to be relatively minor, the board interpreted it as a major modification. The first information request on the revised application was issued July 28, 2004. Wind Power Inc. took

⁴⁷ Approval No. U2002-087, Application No. 2001024, February 14, 2002.

significant time to respond to the request. The information was submitted to the Board in small batches in September, October and December of 2004, and in January, April, and May of 2005.

While it took only 26 days for the Board to issue an initial information request, the time lag between issuing the information request and receiving the responses was significant. Additional information requests to clarify noise issues were issued by the EUB on November 22, 2004.

The applicant provided the last responses to the July 28, 2004, information requests on May 16, 2005 – almost 10 months after receiving the request.

On November 08, 2005, the EUB issued its second approval for the project in its new configuration, as Approval No. [U2005-398](#).⁴⁸ The Board stipulated that the wind farm construction should be completed by December 31, 2008.

2006 – Noise modelling errors and subsequent turbine change

On February 7, 2006, the consultants who prepared the noise impact assessment indicated that there were errors in the location of the turbines, which resulted in significant discrepancies in the estimation of sound levels at residences. The consultants requested time to recalculate the data. The Board requested the developer file a new noise impact assessment for the application.

Approximately nine months later, on November 1, 2006, the developer submitted its application to modify the project including the deletion of six wind turbines with 50 remaining. The modifications using newer turbine technology increased the power output from each turbine and correspondingly increased the noise levels. This proposed modification changed the turbine technology from 2.0 to 2.3-MW, increasing the capacity for the project to 115 MW. The EUB issued information requests with respect to noise issues on February 16, 2007 and received responses on March 12, 2007. On March 22, 2007, the EUB issued Approval No. [U2007-74](#),⁴⁹ and stated construction should be completed no later than December 31, 2009.

2008 – Transfer of ownership

The Commission was notified on December 31, 2008, by Enel Alberta Wind Inc. that as of December 18, 2008, Enel had acquired the ownership of the power plant and requested approval to build and operate the plant. As a result of the notification, the AUC issued Approval No. [U2009-21](#)⁵⁰ on January 27, 2009, valid until December 31, 2009.

2009 – Application amendment

On August 5, 2009, Enel requested an amendment to Approval No. U2009-21, with respect to the voltage of the collector system and the construction deadline.

On December 16, 2009, Enel requested further amendments which included a further extension of the construction deadline to December 31, 2013, an increase in voltage for

⁴⁸ Power Plant Approval No. U2005-398, Application No. 1351934, November 8, 2005.

⁴⁹ Power Plant Approval No. U2007-74, Application No. 1485132, March 22, 2007.

⁵⁰ Power Plant Approval No. U2009-21, Application No. 1600883, January 27, 2009.

the collector system from 25-kV to 34.5-kV, and the removal of three wind turbines from the layout as per NAV Canada recommendations. During its review of this request, the Commission discovered that the turbine coordinates approved for use in Approval No. U2009-21 and those approved by the Municipal District of Pincher Creek No. 9 were not identical. The municipality does not permit variations from its approved site locations, but the AUC approvals provide for deviations within 50 metres of the approved locations. The wind turbine coordinates approved by the AUC decision supersede the municipal approvals. However, the developer decided to amend the layout to an older layout that incorporated wind turbine locations previously approved by the municipality. These changes respected the 50-metre tolerance of the AUC and did not cause violations of the AUC Rule 012: *Noise Control* for all receptors.

2010 – Facility approval

The AUC issued Decision [2010-058](#)⁵¹ and Approval No. [U2010-72](#)⁵² on February 10, 2010, approving the construction and operation of 47 wind turbines. No interconnection facilities were approved in that decision. The Castle Rock Ridge Project was proposed to be built in two phases. The first phase would install the 33 wind turbines at the locations identified in the amendment submitted to the AUC on December 16, 2009. The remaining 14 would be installed subsequently. Enel reported in May 2012 that the first phase was expected to be commissioned in June 2012.

Interconnection

Interconnection of a power plant requires AUC approval of both an application from the AESO with respect to need as well as approval of specific facilities from a transmission operator. Interconnection of the Castle Rock Ridge Project was delayed because of a lack of transmission facilities in the area. The lack of transmission capacity was aggravated by delays caused by differing interpretations of what projects were included in the Southern Alberta Transmission Reinforcement needs identification document approved in Decision [2009-126](#).⁵³ Initially the Castle Rock Ridge Project was expected to connect to transmission facilities proposed between Goose Lake 103S substation and a proposed Fidler 312S substation.

The facilities most directly related to the Castle Rock Ridge Project were subsequently identified as an Enel substation, an adjacent AltaLink Castle Rock Ridge 205S substation and nine kilometres of double-circuit 240-kV transmission line connecting to the Goose Lake 103S substation.

⁵¹ Decision 2010-058 (Errata): Enel Alberta Wind Inc. Errata to Decision 2010-058 – Time Extension and Gathering System Voltage Change for the Construction of Castle Rock Ridge Wind Power Plant, Application No. 1605345, Proceeding ID No. 316, February 10, 2010.

⁵² Power Plant Approval No. U2010-72 (Errata), Application No. 1605345, February 10, 2010.

⁵³ Decision 2009-126: Alberta Electric System Operator – Needs Identification Document Application – Southern Alberta Transmission System Reinforcement, Application No. 1600862, Proceeding ID No. 171, September 8, 2009.

The AESO applied to the AUC for approval of the interconnecting transmission line and Castle Rock Ridge substation 205S in a needs identification document on August 13, 2010, and amended on August 4, 2011. The AUC approved the substation needs identification document and transmission line in Decision 2011-439.⁵⁴ AltaLink also submitted the related transmission facility application which was also approved in Decision 2011-439.

Enel began construction of the Enel substation without AUC approval when it began ground clearing activities in July, 2010. Commissioning of the Enel substation equipment was completed in May, 2012. Enel submitted an application for the substation on July 20, 2012. A temporary substation permit and licence was granted to Enel in Approval No. U2012-362⁵⁵ and a temporary connection order to connect to the AltaLink Castle Rock Ridge 205S substation was granted to Enel in Approval No. U2012-361.⁵⁶ Both temporary approvals were issued on July 27, 2012. The substation was approved by Decision 2012-247⁵⁷ on September 17, 2012 and Permit and Licence No. U2012-465⁵⁸ was issued, as well as a temporary connection Order No. U2012-464.⁵⁹

Project modifications

Changed the turbine technology on July 4, 2004, from 1.8 to two-MW, and on November 1, 2006, from two to 2.3-MW. Unlike the Suncor amendment, the turbine type and turbine vendor were changed significantly and the capacity was increased in each amendment. These changes required additional studies.

- Changed the number of turbines from 56 to 50 on November 1, 2006 and to 47 on December 16, 2009.
- Changed the voltage of the collection/gathering system from 25-kV to 34.5-kV on August 5, 2009.
- Changed the turbine layout on December 16, 2009.
- Changed the timing of project construction on December 16, 2009.
- Divided project into two construction phases on December 16, 2009.

Positive aspects of the application process

In total, seven approvals were issued for the project by the AUC and its predecessor, the EUB. The first information request was issued in a reasonable period of time, 26 days after the modified application was submitted in 2004.

⁵⁴ Decision 2011-439: Alberta Electric System Operator and AltaLink Management Ltd. – Castle Rock Ridge 205S and Transmission Line Development Needs Identification Document Application and Facility Application, Applications No. 1606460 and No. 1606668, Proceeding ID No. 778, November 1, 2011.

⁵⁵ Temporary Substation Permit and Licence No. U2012-362, Application No. 1608666, Proceeding ID No. 2026, July 27, 2012.

⁵⁶ Temporary Connection Order No. U2012-361, Application No. 1608666, Proceeding ID No. 2026, July 27, 2012.

⁵⁷ Decision 2012-247: Enel Alberta Wind Inc. and AltaLink Management Ltd. – Castle Rock Ridge Power Plant Substation and Interconnection, Applications No. 1608666 and No. 1608663, Proceeding ID No. 2026, September 17, 2012.

⁵⁸ Substation Permit and Licence No. U2012-465, Application No. 1608666, Proceeding ID No. 2026, September 17, 2012.

⁵⁹ Temporary Connection Order No. U2012-464, Application No. 1608666, Proceeding ID No. 2026, September 17, 2012.

Learning opportunities

This case study identifies learning opportunities for both developers and the AUC, as actions undertaken led to multiple delays in approval and construction of the project.

Delays initiated by the developer

The developer requested numerous significant project modifications that delayed the project. The developer misunderstood the importance of an amendment to its application. The 2004 amendment was considered minor by the developer but was considered major by the board. As a result, the developer submitted an application that was deemed to be deficient and incomplete. As a result, relatively extensive information requests followed. Further delays were caused by the significant time the developer required to respond to the information requests. Multiple modifications by the developer, including changes in technology and layout of the turbines, caused confusion and resulted in the approval of different turbine coordinates by the AUC and the municipality, causing further delays. The change in technology from 1.8 to 2.3-MW turbines involved significantly different grid characteristics and rotor diameters, a more complicated change than occurred in the previous case studies that resulted in further delays.

Noise impact assessments were conducted for the wrong turbine locations.

Other delays

Transmission capacity in the area was constrained, initially because of a 900-MW cap on wind power in Alberta that was eliminated in October 2007.

A difference in interpretation by the AESO respecting the scope of detail intended to be approved by the AUC in the Southern Alberta Transmission Reinforcement needs identification document created confusion and delays for interconnection.

The developer misunderstood the level of information needed for application amendments, causing further delays when the application was considered incomplete or deficient.

Case study analysis and conclusions

The AUC application process has six key areas that can impact the duration to receive approval. The figure below identifies factors that can influence the duration from the time the initial application is received, to final approval.

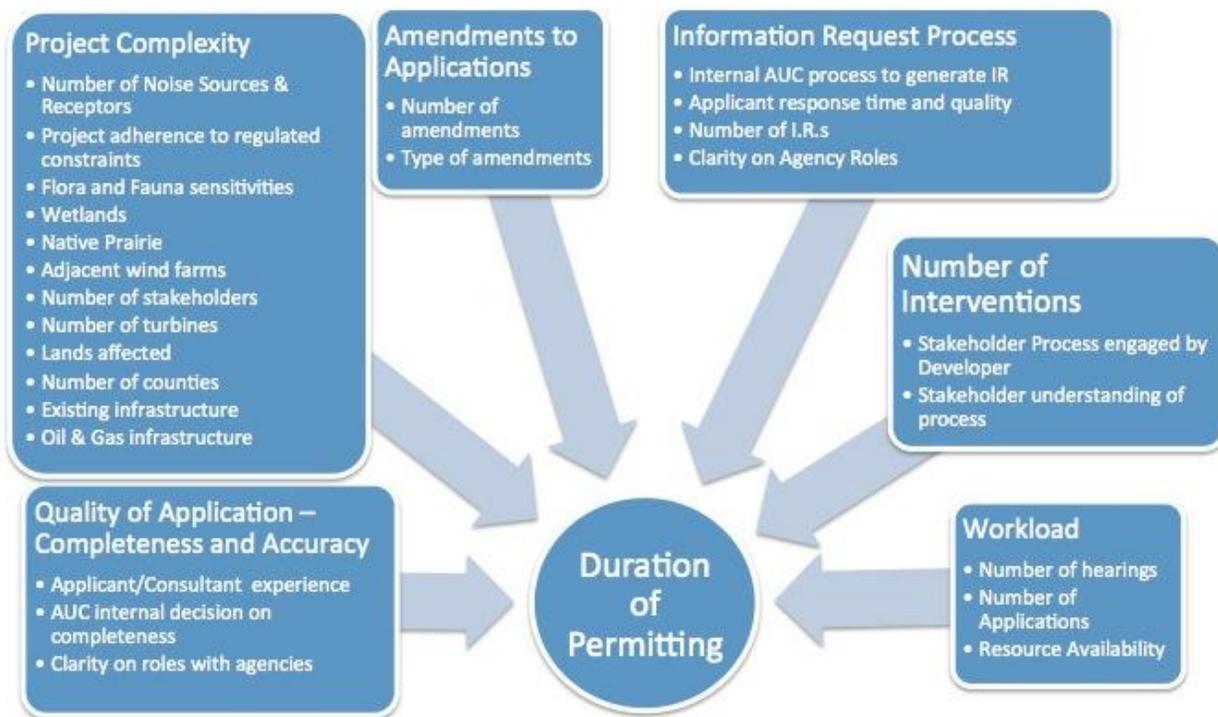


Figure 7: Factors affecting wind farm approval duration

Six factors are important considerations in determining the potential impact on permitting duration.

1. Project complexity

Wind power projects that are more complex can expect to have a longer timeframe for duration of permitting. Complexity can result from the number of noise sources and receptors, flora and fauna sensitivities and constraints, proximity to wetlands, usage or proximity to native prairie, proximity to adjacent wind farms, number of stakeholders involved, number of turbines, span of the wind farm, number of counties involved, and existing infrastructure, including oil and gas infrastructure. The time required to review the project and understand the potential issues takes longer. Recent applications have tended to be more complex compared to initial wind farm developments. The proposed wind farm developments are now larger, regulatory setbacks have been articulated, there is a greater likelihood of interaction with existing infrastructure, more stakeholders, and more land areas that are affected as well as potential conflict with existing wind farms.

2. Quality of applications – completeness and accuracy

Developer inexperience, lack of awareness of AUC Rule 007 requirements and amendments to integrate technology advancements may create potential for problems and delays. A review of the three case studies shows a great variation in the quality of the applications. This may partially be explained by the experience of the applicant and consultants being used to develop the application. As the wind industry matures in Alberta, applicants and consultants are likely to have more direct experience in preparing applications. The Ardenville is a good example of how contingency planning by the developer can result in a smoother approval process. The developer oversized the project, allowing later changes within the build area and utilizing fewer turbines to be more easily processed; the developer also did a more thorough job of the development details before submitting the application.

Part of the process is the AUC's review of the application to deem it complete. To varying degrees all the cases revealed that applicants submitted applications without all the required documentation for AUC Rule 007. The addition of an administrative check-in process as part of the AUC's initial review of the application might help streamline the process to ensure that applications are accepted only if they have all required documentation.

The case studies indicate that AUC Rule 007 application requirements are unclear. While new applications appear to be improving, it is also clear that AUC reviewers are now looking for additional information. Consequently, determining when an application is complete continues to be a challenge. AUC Rule 007 has not been updated since it was created in 2009 and does not reflect the AUC's evolving expectations for content that should be included. To address this gap, some developers review the information requests responded to by other applicants, to track new information requirements for submissions. This gap could be closed by refreshing and amending AUC Rule 007, as well as by creating a guide to the rule and workshops for applicants.

Currently, the AUC reviews all environmental aspects of the project that Alberta Environment and Sustainable Resource Development has already reviewed and signed off on. The AUC sees a considerable range in signoff from Alberta Environment and Sustainable Resource Development officers and can determine if the Alberta Environment and Sustainable Resource Development guidelines have been consistently applied to applications. Any gaps are addressed by the AUC. Alberta Environment and Sustainable Resource Development has recently added a standard form for sign-off to improve the consistency of how the guidelines are applied. This procedure has not been in place long enough to determine its effectiveness.

3. Amendments to applications

A consistent factor for each of the three case studies is that the developer made changes to the project after submitting their application to the AUC. Developers frequently amend applications for collection system voltage, turbine layout, turbine model, turbine capacity, turbine rotor diameter and turbine height. Amendments are sometimes made during an application process or after the approval has been granted. Amendments add confusion to the process, generate additional information requests and at times create additional work, including more stakeholder consultation as well as changes to municipal permits. The

type of amendment will effect the duration of the delay. Changes to a collection system voltage may have very little impact compared to turbine model, size or rotor diameter, which typically require a new layout and a new noise impact assessment.

In the first case study, the developer built contingent turbine locations into the application. As a result the application went through the approval cycle only once. In the last case study, the developer made modifications to the project after the approval was received from the AUC, requiring multiple new amendments. Errors in the submissions for amendments also slowed the approval of the amendments.

A more transparent application process may also help developers understand whether the Commission will consider amendments to be minor or major, and allow developers to act accordingly. A formal process to correct errors in the application would also be helpful. The Castle Rock Ridge Project was delayed partially because the developer considered an amendment to the project to be minor, however the Board considered it to be major. Additional information was then required that had not been provided by the developer. The reapplication was also deemed incomplete.

Since the AUC requires specific project details very early in the process, the developer's ability to make changes is limited. A more flexible process that allows for changes or flexibility in the layout may reduce the overall time for permitting. Additionally, contingency planning by developers would prevent the need to submit a new application if changes occur after the approval has been issued. A two-stage process with a buildable area would allow changes as long as the setbacks are adhered to. This would reduce the number of amendments made to the application.

4. Information request process

After the AUC receives an application, the application is reviewed for completeness by the assigned application coordinator. Information requests are prepared by the application coordinator with assistance by environmental and noise specialists. The information requests are then reviewed by legal counsel and the assigned commission panel before they are sent to the applicant. Information requests are generally prepared and reviewed as a single package. This process has an administrative advantage for both the AUC and the applicant. The disadvantage is the extra time involved in preparing a batch of information requests.

The response to the information requests can also take significant amount of time for the applicant. The quality of these responses also varies. Some developers take several months to respond to information requests, while others will respond within days or weeks. Some topics also require more time to respond to. The response time can have a considerable impact on the duration of a permit.

The time to first information request, as well as the time until the application is deemed complete and notice is issued, have important impacts on duration of the application process. For example, case study Project 2: Wintering Hills, required twice as long as case study Project 1: Ardenville Wind Farm. It would appear that in some cases such as case study Project 2: Wintering Hills, the developer was not aware that submitting an incomplete application early, rather than a complete application later, would actually cause greater delays in the overall approval of the application. A more transparent AUC

approval process may help synchronize developer and AUC priorities, leading to fewer delays caused by incomplete applications or the need for information requests. Another potential solution could be to impose a time limit on responses to information requests so that the application review process can proceed with scheduling expectations. In extreme cases, an application that fails to provide information responses in a timely fashion may be closed. Both a more transparent process and a deadline for responses to information requests may reduce the overall permit approval duration for participants.

5. Number of interventions

A hearing is a costly and lengthy process for all parties involved. An effective stakeholder consultation process can reduce the number and type of interventions. Stakeholders who are aware of the process can determine if and when they wish to intervene, and assess whether or not they might have standing during the process. Currently, the AUC provides information on its website that describes how stakeholders can get involved in the process, *Involving Albertans/Getting Involved*. Developers are now asked to provide the AUC handout *Public Involvement in Needs or Facility Applications to the AUC* to participants in their consultation package.

6. Workload

Time to permit approval is also based on the current workload of the AUC. The AUC potentially could add casual or contracted staff, additional permanent staff or redeploy existing staff to ensure that permitting times are not excessive. AUC noise and environmental specialists are part of the application review team. Currently, most information requests address noise and environmental issues. When AUC staff are involved in a significant number of hearings, or not available through the normal staff scheduling, application reviews can be delayed. An increase in the number of concurrent applications also increases workload and delays the permit application process.

A check-in system for applications might be of some value to flag incomplete and deficient applications quickly so that the developer could address deficiencies and resubmit the application without absorbing significant and limited resources within the AUC. In particular, the staff of the noise and environment group within the Facilities Division of the AUC at times can be overloaded for managing significant generator and transmission applications. A process for outsourcing studies could be examined when the Commission is faced with large volumes of applications.

The AUC has recently hired short-term contract staff to assist where the workload is greatest. Conflict of interest checks are carried out to ensure that contractors are not otherwise working on active applications during the time of their work with the AUC.

Alberta is expected to have the highest growth rate in electricity consumption over the next 10 years compared to any other province in Canada, with a corresponding increase in the number of energy-related applications to the AUC. The increase in applications will be driven by the growing demand for power, federal coal regulations that require a change-over of the coal-fired plant fleet before 2020, and a significant interest in wind power projects. AESO's project list indicates that more than half of the applications are for wind power facilities. The AESO project list provides an idea of the number and size of projects that will be submitting applications to the AUC in Stage 3 of the AESO

process. This information can provide the AUC with an idea of the timing of applications that will be submitted to the AUC, and can provide a tool to facilitate planning for staffing needs to support the growth of Alberta's electricity sector.

Appendix C – Existing approval and permitting process



Wind Flowchart.pdf

(consists of 2 pages)

Appendix D – Buildable area layered file illustration



Appendix D -
Buildable area layered
(consists of 7 pages)

Appendix E – Alberta Culture archaeological survey information bulletin



Archaeological
Survey Information B
(consists of 2 pages)

Appendix F – Alberta Utilities Commission staff and consultants

Victor Choy

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Appendix G: Generic constraints list



Appendix G - Generic
constraints list.pdf

(consists of 6 pages)

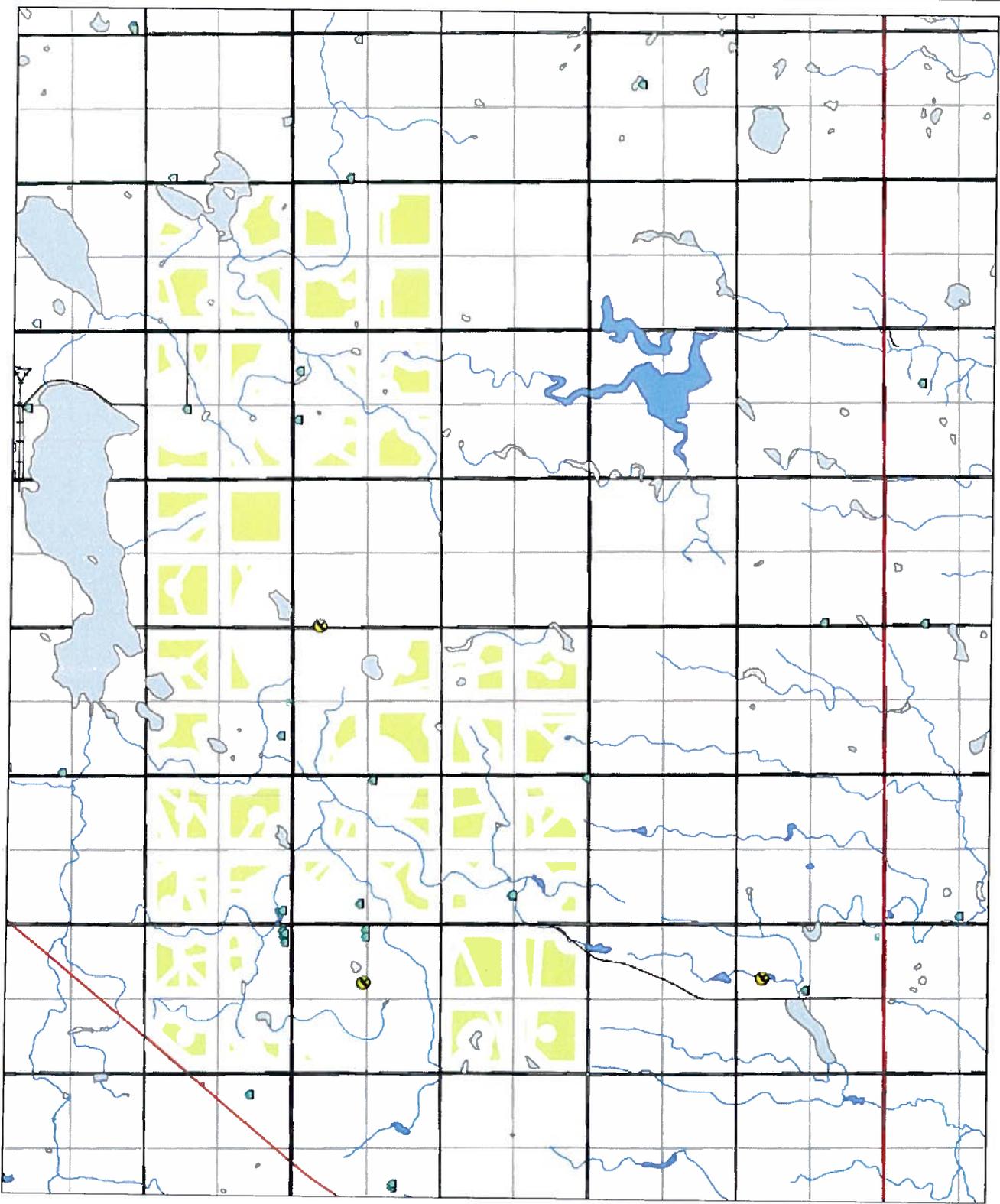
Preliminary Project Development	Pre-Application Early Planning	Public Consultation
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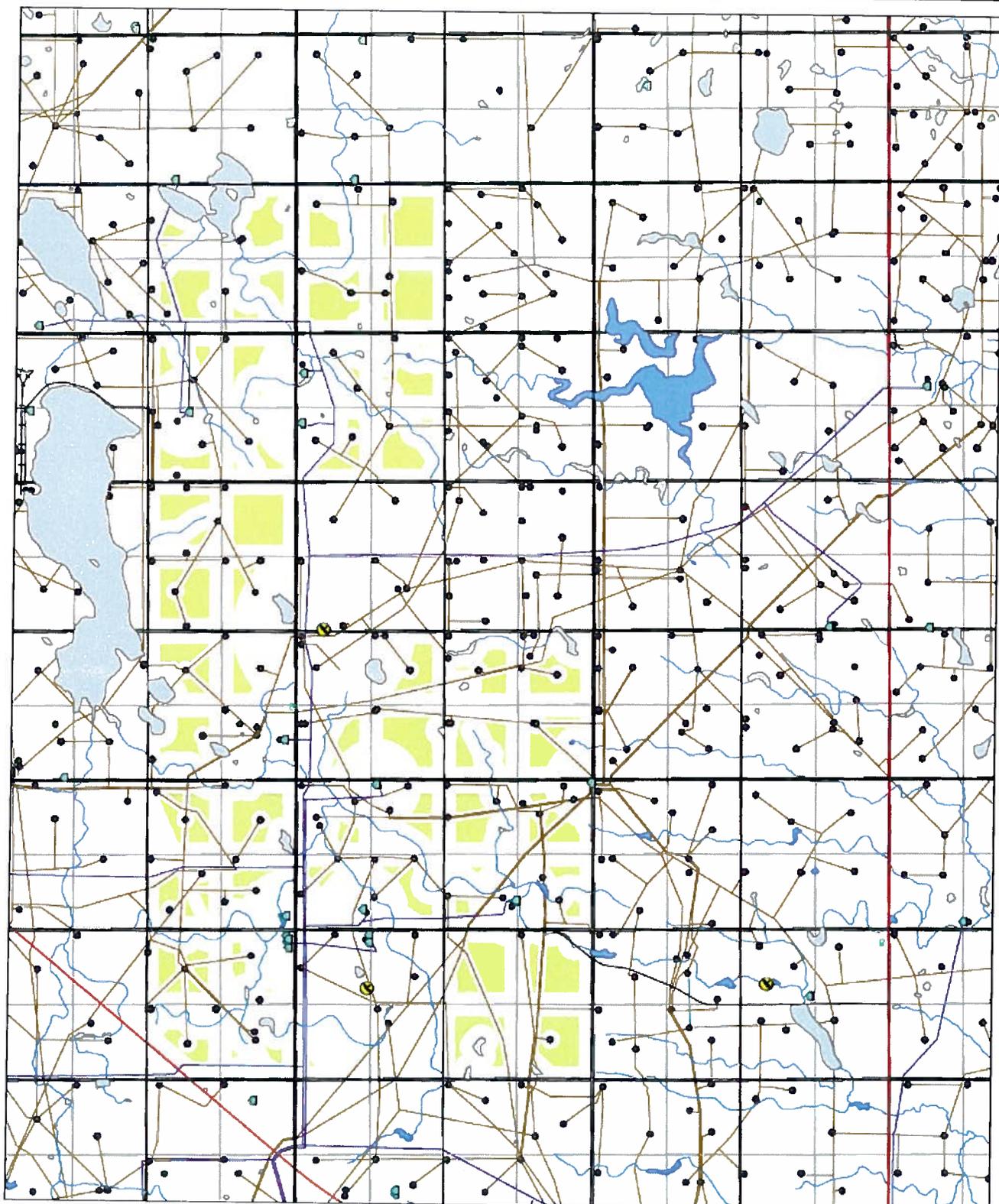
Proponent	<p>Prospect potential areas for wind development, transmission access, environmental issues, constructability issues, municipal planning issues</p>	<p>Determine land ownership, Negotiate Option/Lease Agreement with Landowner</p> <p>Permit Met Tower(s)</p> <p>Install Met Tower(s)</p>	<p>Complete preliminary wind resource assessment (after 1 year)</p> <p>Determine wind resource - site viability</p> <p>Complete a System Access Service Request with the AESO</p>	<p>Complete desktop study for environmental, historical resources, noise sources, noise sensitive receptors and other constraints, Sign Confidentiality agreement with AESO, choose consultant to perform connection proposal, agree on connection study scope, provide data package to AESO</p> <p>Install Additional Met Towers(s)</p> <p>Initiate discussions with County on Bylaws</p>	<p>Initiate Environmental Studies - Avian, Bat, Wildlife, Completed Communications study, discussion with ASRD on First Nations Consultation</p> <p>Provide security payment for stage 2 to complete connection studies and proposal.</p>	<p>Prepare and complete initial open house</p>	<p>Determine potential Turbine Choices, Develop Preliminary Layout including turbine locations, project substation, roads, crane pads, collection system, permanent met tower</p> <p>Receive interconnection studies and interconnection proposal from consultant</p> <p>Provide security payment for stage 3 and 4 to the TFO</p>	<p>Complete Environmental Studies, Receive turbine quotes and balance of plant quotes, Determine Optimal Turbine, receive O&M quotes, Run Project Economics</p> <p>Negotiate with Turbine Vendor on Turbine Supply Agreement and Service/Maintenance and/or Warranty Agreement</p>	<p>Meetings with SRD-FWD on results of studies and layout.</p> <p>Finalize layout with specific turbine, negotiate crossing agreements, and ROW access as required</p> <p>Negotiate with EPC contractor for Balance of Plant EPC Contract</p>	<p>Prepare PIP</p> <p>Complete AUC Rule 007 Application</p>	<p>Receive PPS and Functional Specification document from AESO</p>
					Identify Impacted Parties	Preliminary disclosure with Impacted parties		Consultation with all agency stakeholders on impacts	Open House, complete one-on-one consultation,	Complete Stakeholder Consultation on Final Layout	
Municipality				Discussions with Developer on setbacks and municipal development process, Approve additional met towers				Notification to parties on Development Permit Application Receipt and rezoning	Reading of Council for rezoning (multiple readings) and open house	Review development permit application	Issue development permit, or letter of endorsement
Alberta Sustainable Resource Development - Fish and Wildlife				Discussion with Applicant, determine appropriate studies	Provide developer listing of First Nations that need to be consulted (if any)						Receive completed studies and finalized layout and provide standardized sign-off letter, determine post monitoring conditions
Alberta Electric System Operator			AESO Stage 0 - Receive System Access Service Agreement from developer	AESO Stage 1 - Complete Connection Study Scope	AESO determines whether there is a need for new or upgraded transmission lines or substations in order to avoid violations of accepted reliability criteria	AESO Stage 2 - Review of the provided Connection Proposal and receive Security Payment				Stage 3 - completion and filing of AUC NID application; direction to TFO to file Facility Application	The AESO must notify all occupants, residents and landowners in the areas or corridors where facilities could be installed by the TFO
Alberta Utilities Commission											
Transmission Facility Owner				Construction Commitment Agreement							
Distribution Facility Owner					Section 101 signoff			Discussion with Developer on system service as well as any potential impacts on ROW			
Nav Canada								Review application and provide Land Use Submission Approval			
Transport Canada								Review application and provide Aeronautical Obstruction Clearance Permit, Review application and provide Aeronautical Lighting Permit			
Alberta Culture and Community Spirit					Provide opinion on requirement to complete a site-specific Historical Resource Impact Assessment			Provide Conditional Historical Resources Act clearance.			Provide final HRA Clearance
Alberta Transport								Review application for clearance of turbine development within 300 meters. Provide clearance (if appropriate)			
DND								Review letter from Developer to determine any potential interference			
RCMP								Review letter from Developer to determine any potential interference			
Environment Canada Meteorological Service of Canada								Review letter from Developer to determine any potential interference			
Other Stakeholders Comm tower owners, communication towers								Engage in discussions with developer on any potential impacts			
Landowners and First Nations		Negotiate Option/Lease Agreement with Proponent						Participate in open houses for information and input			Participate in AESO consultation

	Public Consultation		Application submission				Approval		Construction		Post Construction		
Proponent	Prepare PIP	Complete AUC Rule 007 Application	Preparation of Application	Submission of Power Plant Application under Rule 007	Answer Information Requests	Application Deemed Complete	Receive AUC Decision	Receive development approval from Municipality (if not done prior to AUC application)	Payment of Generator System Payment to AESO within 90 days of approval of Facilities Application	Complete civil work	Complete turbine erection and energize	Operate facility under the regulations of Alberta	Complete post monitoring studies for noise and environmental studies
	Receive PPS and Functional Specification document from AESO						Potentially additional discussions with Stakeholders	Agreement with Municipality on Road use and upgrades	Issue Notice to Proceed with Turbine Vendor and EPC contractor				
	Open House, complete one-on-one consultation	Complete Stakeholder Consultation on Final Layout							Order Long Lead Items	Notify agencies and AUC of start of construction			
Municipality	Review development permit application	Issue development permit, or letter of endorsement						Issue development approval, if not done prior to AUC Application, Agreement with Developer on road use and upgrades					
Alberta Sustainable Resource Development - Fish and Wildlife		Receive completed studies and finalized layout and provide standardized sign-off letter, determine post monitoring conditions			Support Information Requests if needed								
Alberta Electric System Operator	Stage 3 - completion and filing of AUC NID application; direction to TFO to file Facility Application	The AESO must notify all occupants, residents and landowners in the areas or corridors where facilities could be installed by the TFO	AESO to prepare NID Application.	Stage 4 - Submission of the NID document	Answer Information Requests		AUC Decision		Stage 5 - Receive Customer Contribution and Generator System Contribution in cash within 90 days after the P+L was issued				Review post-monitoring studies as required
Alberta Utilities Commission				Receive Application, Review Application, determine any information requests, collate, review internally with legal and issue to applicant	Review responses to information requests and potentially issue additional information requests.	Provide Notice of Application and issue letters to all those within 2,000 meters	Issue Decision on Power Plant Application to applicant, decision on NID to AESO, decision on Facilities Application to TFO			Issue Connection Order			
Transmission Facility Owner	TFO carefully evaluates and identifies potential alternative transmission line routes and/or substation locations		TFO completes PIP and consultation, TFO to obtain option agreements to facilitate access to land, survey land, title etc.	Facilities Application Submission. File Completed environmental assessments and other required studies with application	Answer Information Requests	Application deemed complete	AUC Decision	Interconnection Agreement			Energize the facilities		
Distribution Facility Owner											Provide service level power		
Nav Canada										Inform of construction			
Transport Canada										Inform of construction			
Alberta Culture and Community Spirit		Provide final HRA Clearance											
Alberta Transport								Special Move Permit Overweight					
DND													
RCMP													
Environment Canada Meteorological Service of Canada													
Other Stakeholders Comm tower owners, communication towers													
Landowners and First Nations	Participate in AESO consultation		Participate in AESO consultation				Receive and review Notice of AUC application and participate as desired						

Legend

- Receptors
- Primary Road
- Secondary Road
- Railway
- Hawk's Nest
- Cemetery
- Watercourse
- Waterbody 1
- Waterbody 2
- Wetland
- Transmission
- Section Lines
- Quarter Section Lines
- Markers
- Pipes
- Facilities
- Fences
- Well1
- Well2
- Well3
- Contacts - Merged
- Primary Roads - 165 m
- Secondary Road - 79 m
- Sound Receptors - 450 m
- Sound Receptors - 500 m
- Sound Receptors - 600 m
- Sound Receptors - 800 m
- Section Lines - 50 m
- Section Lines - 79 m
- Property Lines - 130 m
- Property Lines - 160 m
- Substation - 130 m
- Watercourse - 140 m
- Waterbody - 140 m
- Mudis - 1000 m
- Well Surface Hole - 130 m
- Well Bottom Hole - 100 m
- High Pressure Pipe - 43 m
- Low Pressure Pipe - 43 m
- Low Pressure Meters - 120 m
- Facilities - 120 m
- Excision/Lands

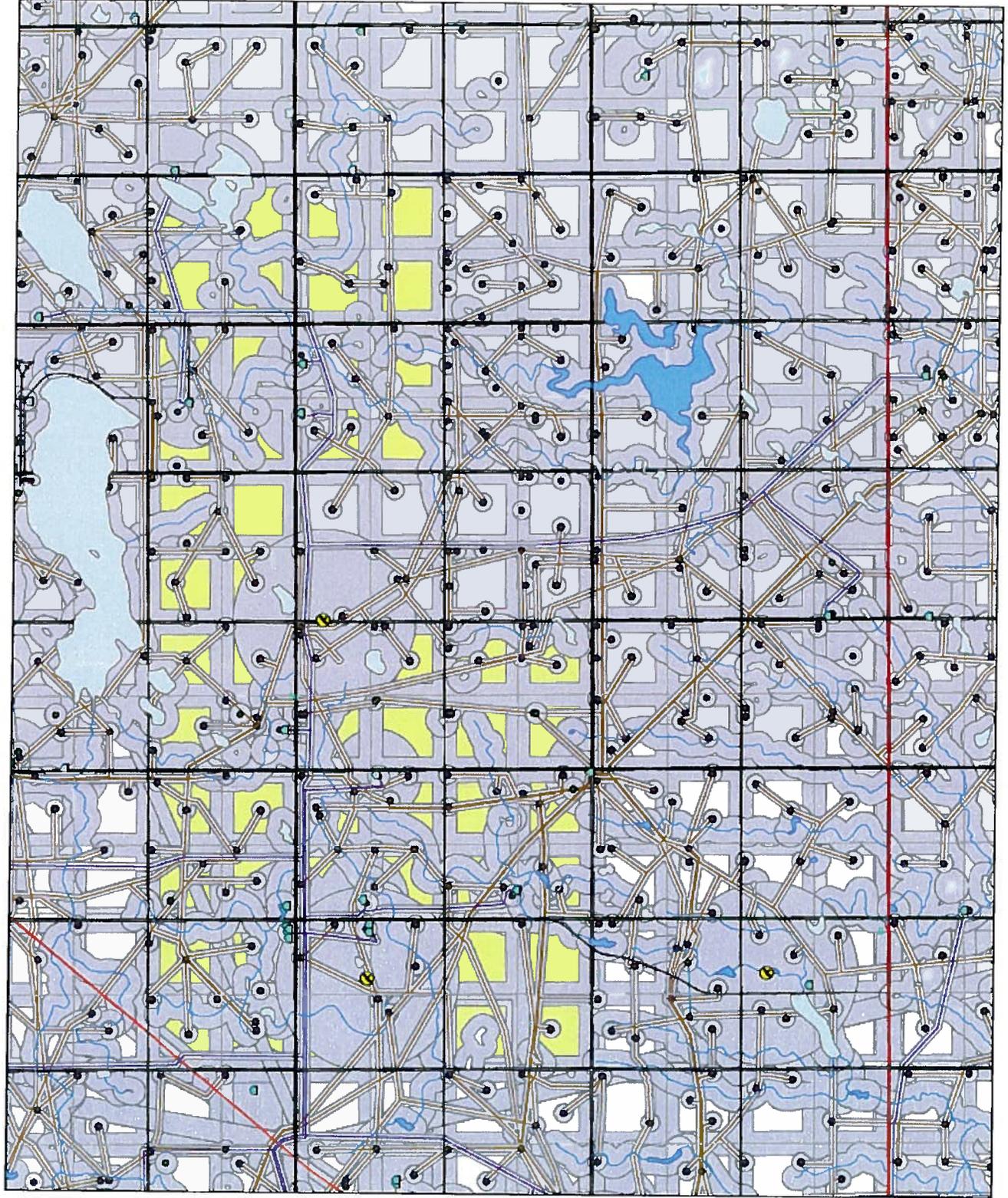




Legend

- Receptors
- Primary Road
- Secondary Road
- Railway
- Hall's Nest
- Cemetery
- Watercourse
- Waterbody 1
- Waterbody 2
- Wetland
- Transmission
- Section Lines
- Quarter Section Lines
- Meters
- Pipes
- Facilities
- Pipes
- Well 1
- Well 2
- Well 3
- Setbacks - Merged
- Primary Roads - 185 m
- Secondary Road - 75 m
- Sound Receptors - 450 m
- Sound Receptors - 500 m
- Section Lines - 50 m
- Section Lines - 75 m
- Property Lines - 130 m
- Property Lines - 160 m
- Quadrant - 130 m
- Watercourse - 140 m
- Waterbody - 140 m
- Nests - 1300 m
- Well Surface Hole - 130 m
- Well Bottom Hole - 130 m
- High Pressure Pipe - 43 m
- Low Pressure Pipe - 43 m
- Low Pressure Meters - 130 m
- Facilities - 130 m
- Inclusion Lands

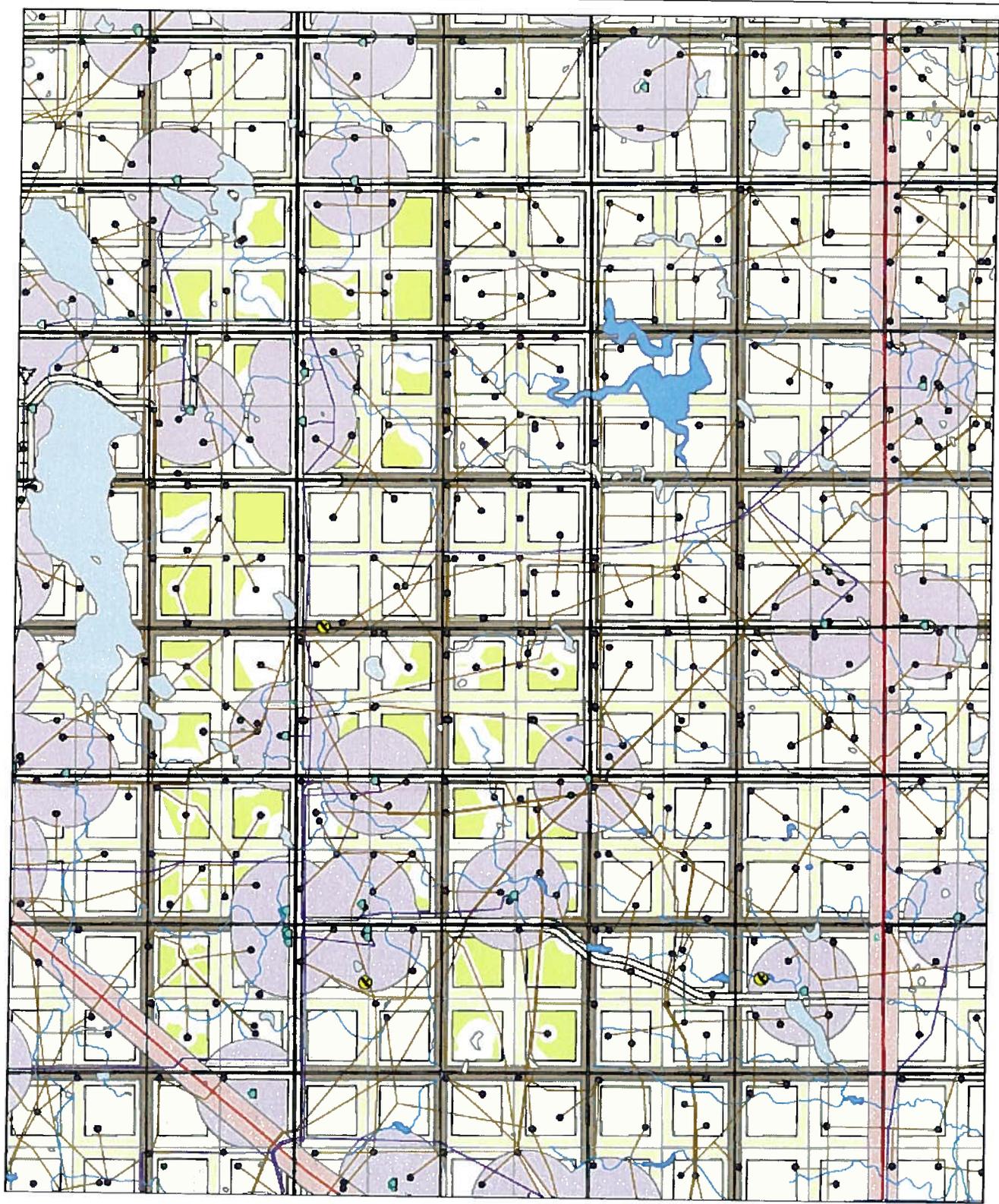




Legend

- Receptors
- Primary Road
- Secondary Road
- Railway
- Hawk's Nest
- Cemetery
- Watercourse
- Waterbody 1
- Waterbody 2
- Wetland
- Transmission
- Section Lines
- Quarter Section Lines
- Meters
- Pipes
- Facilities
- Pipes
- Well 1
- Well 2
- Well 3
- Subaerial - Merged
- Primary Roads - 165 m
- Secondary Road - 70 m
- Sound Receptors - 450 m
- Sound Receptors - 800 m
- Sound Receptors - 900 m
- Sound Receptors - 900 m
- Section Lines - 50 m
- Section Lines - 70 m
- Property Lines - 130 m
- Property Lines - 160 m
- Quarantine - 130 m
- Watercourse - 140 m
- Waterbody - 140 m
- Nests - 1300 m
- Well Surface Hole - 130 m
- Well Bottom Hole - 130 m
- High Pressure Pipe - 43 m
- Low Pressure Pipe - 43 m
- Low Pressure Meters - 130 m
- Pipelines - 130 m
- Industrial Lands





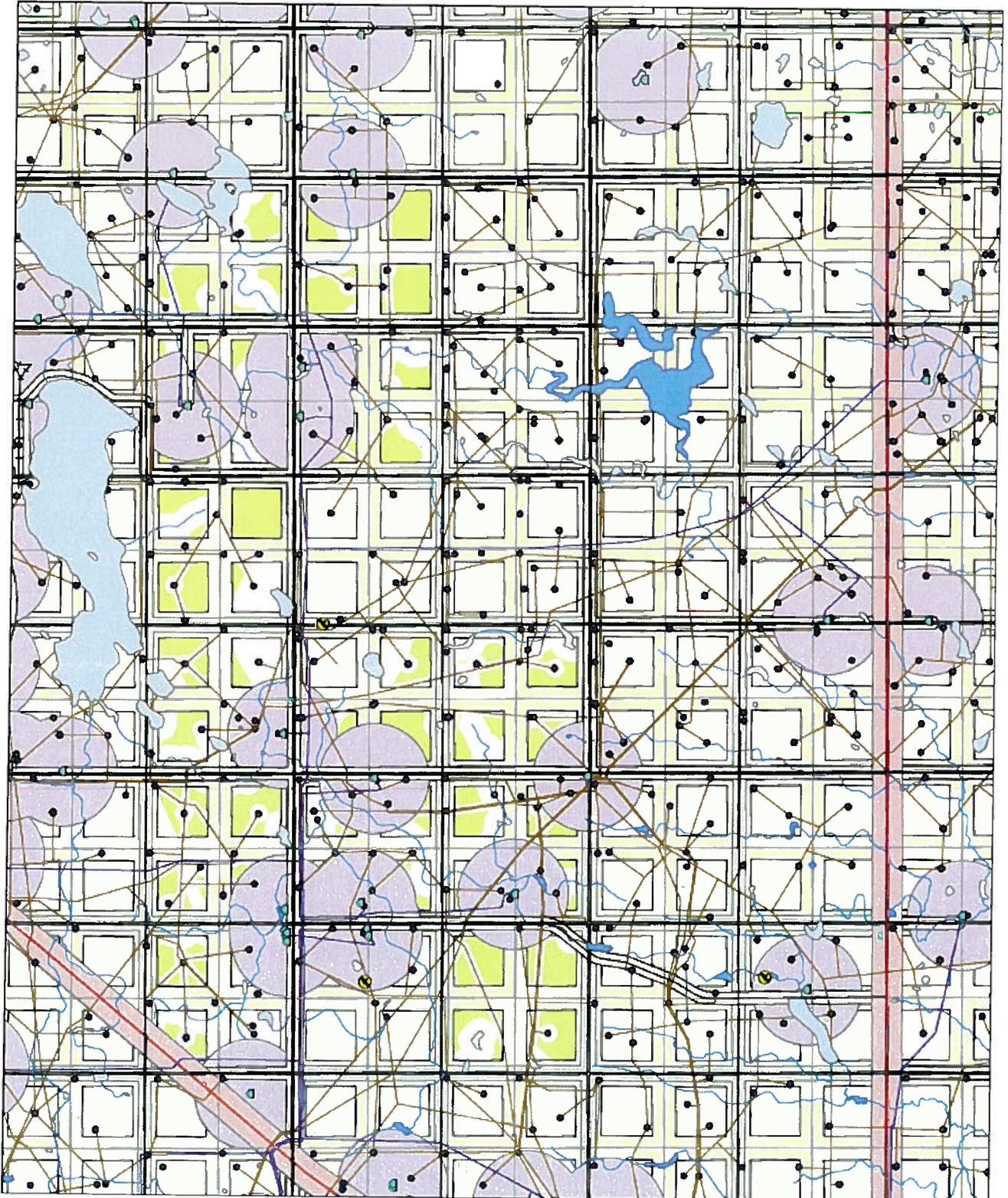
Legend

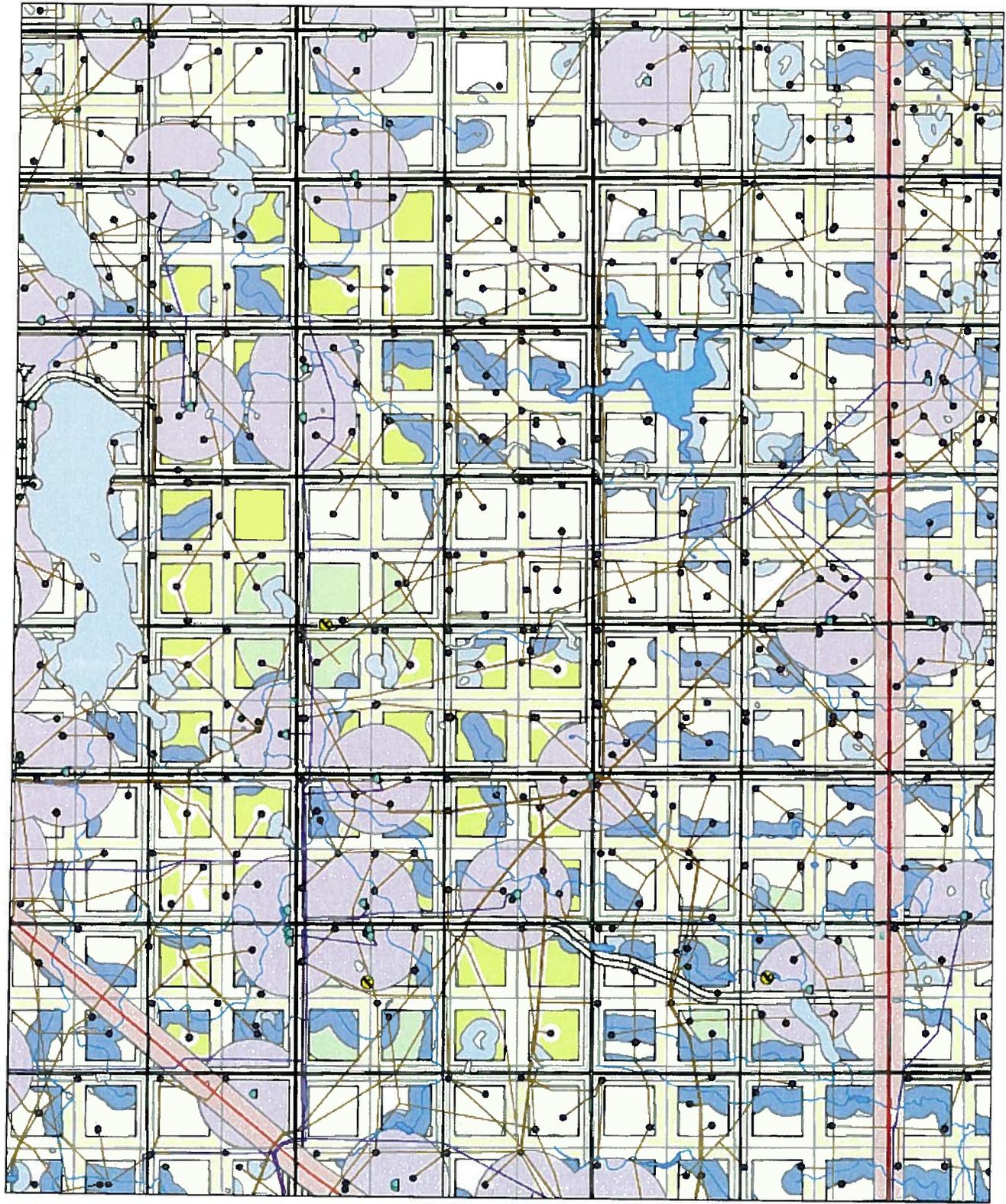
- Receptors
- Primary Road
- Secondary Road
- Railway
- Habitat Nest
- Cemetery
- Watercourse
- Waterbody 1
- Waterbody 2
- Wetland
- Transmission
- Section Lines
- Quarter Section Lines
- Meters
- Pipes
- Facilities
- Poles
- Well 1
- Well 2
- Well 3
- Setbacks - Mapped
- Primary Road - 165 m
- Secondary Road - 73 m
- Sound Receptors - 450 m
- Sound Receptors - 500 m
- Sound Receptors - 500 m
- Sound Receptors - 500 m
- Section Lines - 50 m
- Section Lines - 70 m
- Property Lines - 130 m
- Property Lines - 160 m
- Succession - 130 m
- Watercourse - 140 m
- Waterbody - 140 m
- Meads - 1300 m
- Well Surface Hole - 130 m
- Well Bottom Hole - 130 m
- High Pressure Pipe - 43 m
- Low Pressure Pipe - 43 m
- Low Pressure Meters - 120 m
- Facilities - 120 m
- Acquisition Lands



Legend

- Receptors
- Primary Road
- Secondary Road
- Railway
- Hawk's Nest
- Cemetery
- Watercourse
- Waterbody 1
- Waterbody 2
- Wetland
- Transmission
- Section Lines
- Quarter Section Lines
- Meters
- Pipes
- Facilities
- Pipes
- Well
- WellC
- WellS
- Setbacks - Merged
- Primary Roads - 165 m
- Secondary Road - 70 m
- Sound Receptors - 450 m
- Sound Receptors - 500 m
- Sound Receptors - 600 m
- Sound Receptors - 650 m
- Section Lines - 50 m
- Section Lines - 70 m
- Property Lines - 30 m
- Property Lines - 60 m
- Substation - 133 m
- Watercourse - 140 m
- Waterbody - 140 m
- Nests - 1300 m
- Well Surface Hole - 100 m
- Well Bottom Hole - 100 m
- High Pressure Pipe - 40 m
- Low Pressure Pipe - 40 m
- Low Pressure Meters - 130 m
- Facilities - 120 m
- Inclusion Lands

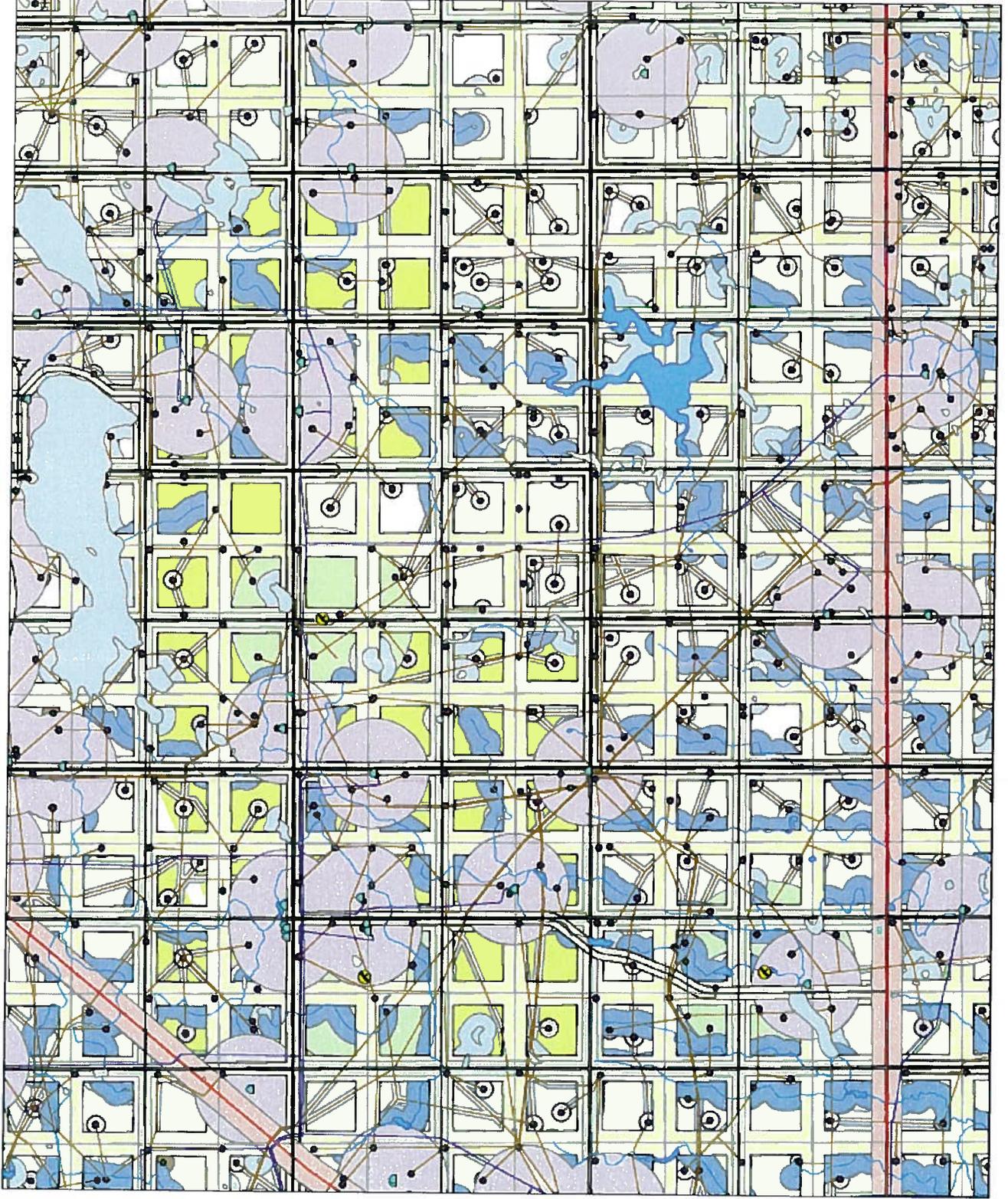




Legend

- Receivers
- Primary Road
- Secondary Road
- Railway
- Hawk's Nest
- Cemetery
- Watercourse
- Waterbody 1
- Waterbody 2
- Wetland
- Transmission
- Section Lines
- Quarter Section Lines
- Meters
- Pipes
- Facilities
- Pipes
- Well I
- Well C
- Well S
- Barbaco's - Merged
- Primary Roads - 165 m
- Secondary Roads - 70 m
- Sound Receptions - 450 m
- Sound Receptions - 500 m
- Sound Receptions - 620 m
- Sound Receptions - 620 m
- Section Lines - 50 m
- Section Lines - 70 m
- Property Lines - 130 m
- Property Lines - 160 m
- Substation - 130 m
- Watercourse - 140 m
- Waterbody - 140 m
- Wells - 1000 m
- Well (Drain Hole) - 100 m
- Well (Drain Hole) - 100 m
- High Pressure Pipe - 40 m
- Low Pressure Pipe - 40 m
- Low Pressure Meters - 130 m
- Facilities - 130 m
- Included Lands





Legend

- Receptors
- Primary Road
- Secondary Road
- Railway
- Hawk's Nest
- Cemetery
- Watercourse
- Waterbody 1
- Waterbody 2
- Wetland
- Transmission
- Section Lines
- Quarter Section Lines
- Meters
- Pipes
- Facilities
- Pipes
- Well
- Well
- Wells
- Setbacks - Merged
- Primary Roads - 165 m
- Secondary Road - 70 m
- Sound Receptors - 450 m
- Sound Receptors - 520 m
- Sound Receptors - 600 m
- Sound Receptors - 630 m
- Sound Receptors - 630 m
- Section Lines - 50 m
- Section Lines - 70 m
- Property Lines - 150 m
- Property Lines - 160 m
- Substation - 130 m
- Watercourse - 140 m
- Waterbody - 140 m
- Nests - 1000 m
- Well Surface Hole - 100 m
- Well Surface Hole - 100 m
- High Pressure Pipes - 40 m
- Low Pressure Pipes - 40 m
- Low Pressure Meters - 130 m
- Facilities - 130 m
- Inclusion Lands



Archaeological Survey Information Bulletin: Wind Power Projects

Of late, Historic Resources Management Branch has been receiving a considerable number of referrals for wind power projects. These are the result of rules for application for such projects issued by the Alberta Utilities Commission (Rule 007; PP10 and TS37), which require consultation with this Department. Consequently, HRIA requirement letters have been issued when necessary, and consultants have applied for permits to fulfill these requirements. Because these projects have presented management problems in the past, this note is intended to clarify the some of the review procedures this office will use for wind power projects, so you can advise clients accordingly.

Commonly, project proposals consist only of potential tower locations, many of which might never be constructed. Often no transmission lines or access roads are identified or planned. Our experience has been that as-built facilities do not often bear a direct relationship to those originally proposed and are more numerous. Consequently, archaeological assessments have not often covered all high potential impact areas, recorded sites do not always get avoided as required, and unrecorded sites are occasionally affected. Once approvals are provided, we remain uncertain of actual disturbance areas and whether or not modifications or additions will be referred to this office, especially if project ownership changes, as is likely in many cases.

Given these concerns, the high potential of many of these development areas and the assessment methods proposed in recent permit applications, it is unlikely that unconditional clearance can be provided for projects that have received requirement orders. Consequently the following principals will be applied to review of permit sanctioned studies:

- While widely based, thorough assessments are encouraged to accommodate finalized or future development, at minimum, requirement letter conditions must be fulfilled. Development areas of high archaeological potential must be assessed; low potential areas such as cultivated fields do not require assessment. Irrespective of archaeological potential, buildings encountered within or directly adjacent to proposed development areas must be recorded, while those outside proposed development areas need not be recorded.
- Low potential areas recommended for clearance and high potential areas examined in the field must be clearly mapped in final reports; GIS shape files would be helpful.
- Conditional clearance will be issued only for those areas considered of low potential or that were examined in the field. These areas will be clearly indicated in a response letter to the developer with a copy provided to the AUC.

- Final development plans for all project elements will be required to remove conditions from the clearance. It is expected that requirement letter conditions will be applied to revised and/or additional development locations beyond those presented in the initial proposal.
- To ensure this latter principal is being applied, project audits may be conducted by this office.

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Example of Comprehensive Setback List for Wind Farm Developments

Updated: 18 August 2012

Type of Constraint	Specific Constraint	Regulating agencies for setback.	Reference Document Guideline	Reference Document for Constraints and Setbacks	Period	Setback
Environmental - Water Hydrology Features	Wetlands Class I	ASRD	100 meters or more	A	Construction/ Operations	Setback to Rotor Arc
	Wetlands Class II	ASRD	100 meters or more	A	Construction/ Operations	Setback to Rotor Arc
	Wetlands Class III	ASRD	100 meters or more	A	Construction/ Operations	Setback to Rotor Arc
	Wetlands Class IV	ASRD	100 meters or more	A	Construction/ Operations	Setback to Rotor Arc
	Wetlands Class V	ASRD	100 meters or more	A	Construction/ Operations	Setback to Rotor Arc
	Watercourses	ASRD	100 meters or more	A	Construction/ Operations	Setback to Rotor Arc
	Fish and Fish Habitat	ASRD	100 meters or more	A	Construction/ Operations	Setback to ground disturbance
Environmental – Species	Greater Sage Grouse	ASRD	3,200 meters for leks, 1,000 meters for habitat	A	Construction/ Operations	Setback to Rotor Arc
	Sharp-tailed Grouse Leks	ASRD	500 meters or greater	A	Construction/ Operations	Setback to Rotor Arc
	Burrowing Owl	ASRD	500 meters	B	Construction/ Operations	Setback to rotor arc from active nest and surrounding habitat, setback to ground disturbance
	Perrigrine Falcon, Bald Eagle, Golden Eagle, Prairie Falcon, Ferruginous Hawk	ASRD	1000 meters	B	Construction/ Operations	Setback to rotor arc from active nest and surrounding habitat, setback to ground disturbance
	Colonial Nesting Birds: American White Pelican, Great Blue Heron	ASRD	1000 meters from nesting sites	B	Construction/ Operations	Setback to rotor arc from active nest and surrounding habitat, setback to ground disturbance
	Loggerhead Shrike	ASRD	Consultation based	B	Construction/ Operations	Setback to rotor arc from active nest and surrounding habitat, setback to ground disturbance
	Piping Plover waterbodies	ASRD	200 meters from nesting sites	B	Construction/ Operations	Setback to rotor arc from active nest and surrounding habitat, setback to ground disturbance
	Long-billed curlew, Upland Sandpiper, Mountain Plover, Short-eared Owl, Sprague's Pipit	ASRD	100 meters	B	Construction/ Operations	Setback to rotor arc from active nest and surrounding habitat, setback to ground disturbance

Red-tailed hawk	ASRD	500 meters	B	Construction/ Operations	Setback to rotor arc from active nest and surrounding habitat, setback to ground disturbance
Swainson's hawk	ASRD	500 meters	B	Construction/ Operations	Setback to rotor arc from active nest and surrounding habitat, setback to ground disturbance
Swift Fox	ASRD	500 meters	B	Construction/ Operations	Ground disturbance, including access roads
Ord's Kangaroo Rat	ASRD	250 meters from Nesting Sites	B	Construction/ Operations	Ground disturbance, including access roads
Ord's Kangaroo Rat	ASRD	1000 meters - no artificial illumination	B	Construction/ Operations	setback for artificial illumination
Great Plains Toad, Plains Spadefoot	ASRD	100 meters	B	Construction/ Operations	Ground disturbance, including access roads
Northern Leopard Frog	ASRD	100 meters	B	Construction/ Operations	Ground disturbance, including access roads
Eastern Short Horned Lizard	ASRD	200 meters	B	Construction/ Operations	Ground disturbance, including access roads
Bull snake, Western Hognose Snake, Prairie Rattlesnake	ASRD	500 meters from hibernacula, 200 meters from Rookery	B	Construction/ Operations	Ground disturbance, including access roads
Threatened or Endangered Plants	ASRD	300 meters from Habitat	B	Construction/ Operations	Ground disturbance, including access roads
Native Prairie	ASRD	Avoid, restore if not avoidable	A	Construction/ Operations	Ground disturbance, including access roads, rotor arc
Environmentally Sensitive Areas	ASRD	Avoid, restore if not avoidable	A	Construction/ Operations	Ground disturbance, including access roads, rotor arc
Bat hibernacula, breeding and nurse colonies, or migration corridors	ASRD	Avoid	A	Construction/ Operations	Rotor arc
Infrastructure - proposed	ASRD	minimize to avoid habitat destruction and wildlife disturbance	A	Construction/ Operations	Ground disturbance, including access roads
Terrain - Landscape features	ASRD	Avoid landscape features that attract or funnel birds or bats	A	Construction/ Operations	Rotor arc

	Wilderness Areas, Ecological Reserves, Wildland Parks, Willmore Wilderness , Park Provincial Parks, Provincial Recreation Areas, Heritage Rangelands, Natural Areas	Alberta Parks	Consultation based	Alberta Parks	Operations	Ground disturbance, including access roads, rotor arc
	Flood Plain Development	Municipality	Varies by County	See county specific Bylaws	Construction/ Operations	Tower, or access roads
	Rare Plants	ASRD	Typically 5 meters, but could be larger			
Property Line	Participating Property Line	Municipality	Distance from quarter section line, or any property line	See county specific Bylaws	Operations	Setback to tower base location, or rotor arc. Varies by county. Note this is on property lines that have both landowners included in the project.
	Non-participating Property line	Municipality	Distance from quarter section line, or any property line	See county specific Bylaws	Operations	Setback to tower base location, or rotor arc. Varies by county. Note this is on property lines where one landowner is not included in the project.
Sound Level	Setback distance from dwellings	AUC	Varies by layout, turbine type and noise sensitive receptors	C	Operatons	Setback for Sound
Residences	Setback	Some Municipalities	Distance from existing residences	See county specific Bylaws	Operations	Setback to tower. Varies by county.
Historical Resource	Historical Resource, archaeology, paleontology, traditional land use	Alberta Culture and Community Service	Varies based on significance. Distance from known, or potential historical resource.	ACCS guidance	Construction/ Operations	Setback to tower location, and access roads
Radar/Communications	Broadcast systems, Navigational aids systems, Mobile systems, Point to Point radio systems, Point to multi-point systems, navigational and meteorological radar systems	Environment Canada or DND, Information from Industry Canada Database	Setbacks determined through consultation with seven potential parties. See reference guide for consultation zone guidelines	D	Operations	Setback to rotor arc or tower location

Transportation	Numbered Highway Road allowances and highways	Alberta Transport	300 meters, but can apply for a variance	Alberta Transport 300 meter requirement	Operations	Setback to tower location
	Existing county roads	Municipality	Varies by county. Can ask for variance	See county specific Bylaws	Construction/ Operations	setback to tower location
	County Road allowances	Municipality	Varies by county. Can ask for variance	See county specific Bylaws	Construction/ Operations	setback to tower location
Transmission line and related equipment	Existing or new Transmission Line	Transmission Facility Owner	Consultation based	Varies by TFO	Construction/ Operations	Setback to tower location
Distribution line	Existing or new collection system	Distribution Facility Owner	Consultation based	Varies by DFO	Construction/ Operations	Setback to tower location
Oil and Gas Infrastructure	Wells, Sweet, active	ERCB	Consultation Based	E	Construction/ Operations	Setback to tower location, access roads, substation
	Wells, Sour, Active	ERCB	Consultation Based	E	Construction/ Operations	Setback to tower location, access roads, substation
	Wells, abandoned	ERCB	Consultation Based	E	Construction/ Operations	Setback to tower location, access roads, substation
	Pipelines, high pressure	ERCB	Consultation Based	E	Construction/ Operations	Setback to tower location, access roads, substation
	Pipeline lines low pressure (e.g. natural distribution)	ERCB	Consultation Based	E	Construction/ Operations	Setback to tower location, access roads, substation
	Pipeline ROW (with or without a pipeline)	ERCB	Consultation Based	E	Construction/ Operations	Setback to tower location, access roads, substation
	Facilities	ERCB	Consultation Based	E	Construction/ Operations	Setback to tower location, access roads, substation
Other	slope, coulee, irrigation and other physical constraints	Municipality	Varies by County	see county specific bylaws	Construction/operations	Setback to tower or access road. County specific
	Cemeteries	Municipality	Varies by County	see county specific bylaws	Construction/operations	Setback to tower or access road. County specific
	Built up areas	Municipality	Varies by County	see county specific bylaws	Construction/operations	Setback to tower or access road. County specific
	Parks and recreational areas	Municipality or ACCS	Consultation based	see county specific bylaws or consult with ACCS	Construction/operations	Setback to Tower

Important Viewsheds	Municipality or ACCS	Consultation based	see county specific bylaws or consult with ACCS	Construction/operations	Setback to Tower
Airports	Airport	Consultation Based	see specific airport	Construction/operations	Setback to Tower
Registered air strips	Owner	Consultation Based	see specific airport	Construction/operations	Setback to Tower
Unregistered air strips	Owner	Consultation Based	see specific airport	Construction/operations	Setback to Tower
Railway	Owner	Consultation Based	see specific railway owner	Construction/operations	Setback to Tower
Water wells	Owner	Consultation Based	Varies by owner	Construction/operations	Setback to ground disturbance
Turbine colour and Finish	Municipality or ACCS	Varies by County	see county specific bylaws or consult with ACCS	Operations	Turbine
Turbine lettering or Advertising	Municipality or ACCS	Varies by County	see county specific bylaws or consult with ACCS	Operations	Turbine
Wind Farm Collection system, underground or overhead	Municipality or ACCS	Varies by County	see county specific bylaws or consult with ACCS	Operations	Collection system
Hazardous Materials - Large scale Anhydrous Ammonia or LPG Storage	None	Guidelines from Canadian Fertilizer Industry	F	Operations	Setback to Tower
Turbine Spacing	ASRD	minimum spacing 200 meters between blade tips	A	Operations	Setback to Rotor Arc

	References:	Latest Known	Link
A	See most recent Wildlife Land Use Guidelines for Alberta Wind Energy Projects, issued by ASRD. Latest issued September 19, 2011	Sep-11	http://www.srd.alberta.ca/FishWildlife/WildlifeLandUseGuidelines/documents/WildlifeGuidelines-AlbertaWindEnergyProjects-Sep19-2011.pdf
B	See "Recommended Land Use Guidelines for Protection of Selected Wildlife Species and Habitat within Grassland and Parkland Natural Regions of Alberta" and "Recommended Land Use Guidelines for Protection of Selected Wildlife Species and Habitat Within Grassland and Parkland Natural Regions of Alberta" issued by SRD Fish and Wildlife Division.		www.srd.alberta.ca http://www.assembly.ab.ca/lao/library/egovdocs/alsrd/2001/148614.pdf
C	AUC Rule 012 Technical Information and Coordination Process between Wind Turbines and Radio	2012	www.auc.ab.ca/acts-regulations-and-auc-rules/rules/Documents/Rule012.pdf
D	Communcation and Radar Systems	Apr-10	http://www.rabc-cccr.ca/Files/RABC%20CANWEA%20Guidelines.pdf
E	ERCB Directive 056 Canadian Fertilizer	Sep-11	http://www.ercb.ca/directives/Directive056.pdf
F	Industry Storage and Handling Guidelines	2001	http://www.cfi.ca/_documents/Storage%20Handling.PDF